TITLE: ENVIRONMENTAL MANAGEMENT STRATEGY

Badgerys Creek Quarry and Brick Making Project

235 Martin Road, Badgerys Creek, NSW, 2171

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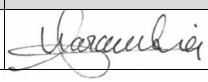
Nelma Arancibia	

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03	09/02/2021	Updated	Updated to incorporate peer review comments
04	23/03/2021	Updated	Updated to reflect approved Phase 1a

1 Introduction

1.1 *Purpose*

CSR Building Products Limited (CSR) will implement all practicable measures to prevent or minimise harm to the environment that may result from the Badgerys Creek Quarry and Brick Making Project.

This EMS has been prepared in accordance with Schedule 5, Condition 1 of the Project Approval. Table 1 EMS requirements outlines the section of the EMS where each sub-condition in Schedule 5, Condition 1 has been addressed.

Table 1 EMS requirements

Requirement	EMS section
1. The Proponent must prepare an Environmental Management Strategy for the project to the satisfaction of the Secretary. This strategy must:	
(a) be submitted to the Secretary for approval within 6 months of the determination of Modification 3 and 4, unless otherwise agreed by the Secretary;	Noted
(b) provide the strategic framework for environmental management of the project;	2
(c) identify the statutory approvals that apply to the project;	3, 4
(d) set out the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;	5.1
(e) set out the procedures that would be implemented to:	
• keep the local community and relevant agencies informed about the operation and environmental performance of the project;	9, 10
• receive, record, handle and respond to complaints;	9.5
• resolve any disputes that may arise during the course of the project;	9.5
• respond to any non-compliance and any incident; and	9.2
• respond to emergencies; and	Appendix K
(f) include:	
• references to any strategies, plans and programs approved under the conditions of this approval; and	1.3
• a clear plan depicting all the monitoring to be carried out under the conditions of this approval.	7

1.2 *Scope and Application*

The Badgerys Creek Brickworks (Site) is located at 235 Martin Road, Badgerys Creek, 41 kilometres to the south west of Sydney, within the Liverpool City Council Local Government Area (LGA) (see Figure 1). Primary access to the site is provided through Martin Road at the north eastern corner of the site. Features of the existing site are shown on Figure 2.

As outlined in Section 2.2, this Environmental Management Strategy (EMS) applies to Phase 1a of the Project including:

- Dewatering of pits 1, 2 and 3; and
- Importation of VENM to backfill pits 1, 2 and 3 as part of quarry rehabilitation works.

Hereafter, Phase 1a is referred to as 'the Project'. The Project layout including the location of pits to be dewatered and backfilled is shown on Figure 2.

1.3 *Environmental Management Plans, Strategies, Programs and Protocols*

The main body of this document outlines the environmental management system and processes relevant to the delivery of the Project in accordance with the regulatory, contractual and other requirements. The main body of this document also provides the overall objectives, roles and responsibilities, legal and other requirements, training, monitoring, auditing and reporting requirements for the Project.

The EMS consists of this main document plus a series of 17 environmental management plans as outlined below:

F: Noise Management Plan (NMP)

G: Air Quality Management Plan (AQMP)

H: Soil and Water Management Plan (SWMP)

I: Groundwater Management Plan (GWMP)

J: Traffic Management Plan (TMP)

K: Aboriginal Heritage Management Plan (AHMP)

L: Rehabilitation Management Plan (RMP)

M: Waste Management Plan (WMP)

N: Community and Stakeholder Consultation Plan (CCP)

O: Mining Operations Plan (MOP)

P: Emergency Management Response Plan (EMRP)

Q: Visual Impact Management Plan (VIMP)

R: VENM Management Plan (VMP)

S: De-watering Infrastructure Plan (DWIP)

T: De-watering Management Plan (DWMP)

U: Fauna Relocation Management Plan (FRMP)

V: Evacuation plan (EP)

The sub plans form appendices to the EMS and these documents provide detailed strategies for the planning, implementation, operation, inspection and monitoring requirements for a range of specific environmental issues. The management plans and their relationship to the EMS are shown in Diagram 1.

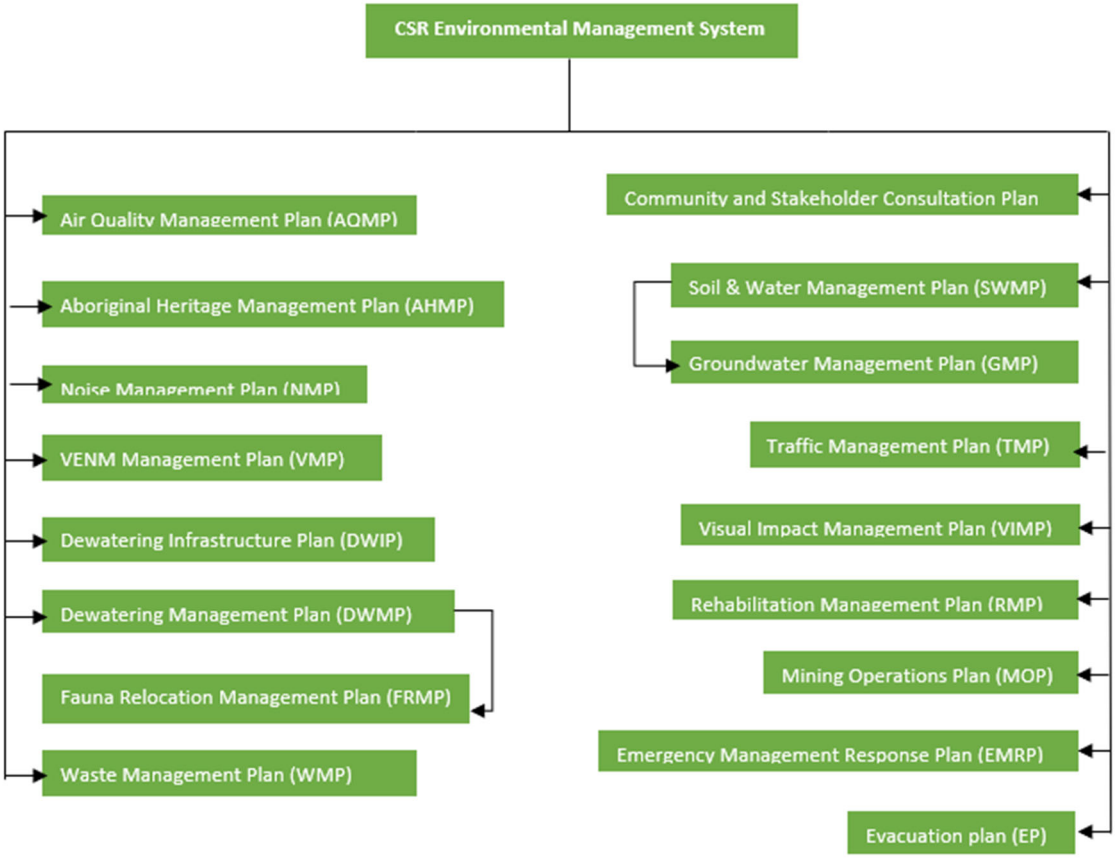


Diagram 1: Environmental Management Plans, Strategies, Programs and Protocols

1.4 *Definitions and Abbreviations*

Bgl:	Below Ground Level
Conditions of Approval (CoA):	Conditions contained in Schedules 2 to 5 of the Project Approval under Section 75J of the EP&A Act for the Badgerys Creek Quarry and Brick Making Project
Secretary:	Secretary of the Department of Planning, Industry and Environment, or delegate
DPI&E Water:	DPI&E (Water) Department of Planning, Industry and Environment (Water)
DRG:	Division of Resources and Geoscience, within DPI&E
DPI&E:	NSW Department of Planning, Industry and Environment
EPL:	Environment Protection Licence
Incident:	An occurrence or set of circumstances that causes or threatens to cause material harm to the environment, and/or breaches or exceeds the limits or performance measures/criteria in the conditions of approval.

Non-compliance:	An occurrence or set of circumstances that is a breach of conditions of approval 10_0014, EPL 684, or ML 1771
NRAR:	Natural Resources Access Regulator
Material harm to the environment:	Is unauthorised harm that: • involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or • results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment).
ML:	Mining Lease
BCD:	NSW Biodiversity and Conservation Division of Department of Planning, Industry and Environment
Rehabilitation:	The treatment or management of land disturbed by the project for the purpose of establishing a safe, stable and non-polluting environment, and includes remediation.
Water NSW:	State-owned Corporation established under the Water NSW Act 2014
CSR:	Notes the Parent company CSR Limited but also includes its subsidiary PGH Bricks and Pavers.

2 Strategic Framework for Environmental Management

In addition to meeting the specific performance measures and criteria established under the development approval, CSR will implement all reasonable and feasible measures to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from the Project, and any rehabilitation required under the approval.

2.1 *Work health, safety and environmental polity*

CSR Work Health, Safety and Environmental Policy provides the following commitments and objectives:

- complying with the laws, regulations and our operational policies and standards; establishing measurable WHSE objectives and targets, recognising and celebrating their achievement;
- identifying, assessing and controlling hazards and impacts, and adopting an approach that will strive to eliminate or reduce the risk to an acceptable level;
- informing employees, contractors (and their sub-contractors), visitors and the public of these hazards and impacts, that may cause potential harm to them, our business and/or our environment;
- identifying, implementing, monitoring and reinforcing the safe behaviours we expect in our business to eliminate unsafe acts and practices;
- providing appropriate workplace health, safety and environmental training to employees and contractors;
- investigating incidents and sharing the learning's with all applicable stakeholders to prevent re- occurrences; and
- consulting and communicating with employees and contractors to continually improve the work health, safety and environmental performance in our workplaces.

All employees, contractors, sub-contractors and visitors are expected to comply with this policy and the conditions of approval relevant to activities they carry out in respect of the Project, and Management will provide the necessary resources and training to ensure this compliance.

2.2 *Environmental Context*

Quarrying and brick making activities have been undertaken on the site for over 30 years. In August 2020, a modification (Mod 3&4) to the development consent was granted by the Minister for Planning and Public Spaces to continue operations on the site including dewatering of the quarry pits, extraction of clay (quarrying), brick manufacturing, and importation of VENM to backfill and rehabilitate the quarry pits.

The Department of Planning, Industry and Environment (DPIE) has since approved the delivery of the Project and associated strategies, plans and programs in stages as follows:

Phase 1a:

- Dewatering of pits 1, 2 and 3; and

- Importation of VENM to backfill pits 1, 2 and 3 as part of quarry rehabilitation works.

Phase 1b:

- Construction activities;
- Brickmaking activities; and
- Quarrying activities in Pit 3.

This EMS applies to Phase 1a of the Project.

2.3 *Environmental Management Strategy*

The environmental management strategy for Badgerys Creek can be summed up as follows:

Site Rehabilitation works:

- Commence the Dewatering activities for Pit 1, 2 and 3.
- Commence the site rehabilitation works and importing VENM material to back fill pits 1,2 and 3.
- Treat and discharge surface water as required.
- ensure water as far as practical does not get diverted into pit 1, 2 and 3.

2.4 *Aspects and Impacts*

Dewatering and Rehabilitation (VENM import) works will comprise:

- VENM fill import.
- discharge of pit water off site.
- bulk earthworks movement.
- bulk earthworks compaction.
- water diversion.
- water pumping.

The environmental aspects from these activities include:

- ground disturbance;
- noise;
- dust generation;
- air emissions;
- waste generation;
- surface runoff;
- groundwater movement; and
- rehabilitation.

The Environmental Assessment of the Project identified potential impacts from the above aspects of the Project and outlined a suite of mitigation measures. These mitigation measures are being adopted in this EMS and framed within the CSR environmental policies and procedures for its facilities of similar nature.

2.5 *Risk Assessment*

CSR will assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures described in each management plan and summarised in Section 7.0. Any exceedance of these criteria and/or performance measures constitutes a breach of the Approval and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.

CSR maintains an Environmental Risk Register for the Badgerys Creek project (Appendix W). The register assesses the environmental impacts of the pit dewatering and VENM importation activities of the Badgerys Creek facility and ranks the associated environmental risks from low to high and flags where appropriate risk mitigation measures need to be put in place. The Environmental Risk Register is reviewed every 12 months (or more frequently in times of high project activity) to assess residual risks and provide for enhanced risk mitigation measures.

3 Project Approval Conditions

Any exceedance of criteria and/or performance measures required by the conditions of approval constitutes a breach of the approval and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Table 2 outlines the section of the EMS or the relevant management plan where each condition has been addressed.

Table 2 Conditions of approval

Sched	Condition	Condition Text	Where covered
2	ADMINISTRATIVE CONDITIONS		
2	1	OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT In addition to meeting the specific performance measures and criteria established under this approval, the Proponent must implement all reasonable and feasible measures to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from the construction and operation of the project, and any rehabilitation required under this approval.	6.0 and the management plans
2	TERMS OF APPROVAL		
2	2	The Proponent, in acting on this approval, must carry out the project: (a) in compliance with the conditions of this approval; (b) in accordance with all written directions of the Secretary; and (c) in accordance with the project layout.	Implementation of the EMS
2	3	The Proponent, in acting on this approval, must carry out the project: (a) generally in accordance with the EA; (b) generally in accordance with EA (Mod 1); (c) generally in accordance with EA (Mod 2); and (d) in accordance with the Statement of Commitments.	Implementation of the EMS
2	4	The conditions of this approval and directions of the Secretary prevail to the extent of any inconsistency, ambiguity or conflict between them and a document referenced in condition 3 of this Schedule. In the event of an inconsistency, ambiguity or conflict between any of the documents referenced in condition 3 of this Schedule, the most recent document prevails.	Noted
2	5	Consistent with the requirements of this approval, the Secretary may make written directions to the Proponent in relation to: (a) the content of any strategy, study, system, plan, program, review, audit, notification, report or correspondence submitted under or otherwise made in relation to this approval, including those that are required to be, and have been, approved by the Secretary; and (b) the implementation of any actions or measures contained in any such document referred to in (a) above.	Noted

<table>
<tr><th>Sched</th><th>Condition</th><th>Condition Text</th><th>Where covered</th></tr>
<tr><td>2</td><td>6</td><td>COMPLIANCE
The Proponent must ensure that all of its employees, contractors (and their sub-contractors) are made aware of, and are instructed to comply with, the conditions of this approval relevant to activities they carry out in respect of the project.</td><td>5.2</td></tr>
<tr><td>2</td><td>7</td><td>APPLICABILITY OF GUIDELINES
References in the conditions of this approval to any guideline, protocol, Australian Standard or policy are to such guidelines, protocols, standards or policies in the form they are in as at the date of this approval.
However, consistent with the conditions of this approval and without altering any limits or criteria in this approval, the Secretary may, when issuing directions under this approval in respect of ongoing monitoring and management obligations, require compliance with an updated or revised version of such a guideline, protocol, standard or policy, or a replacement of them.</td><td>Implementation of the EMS</td></tr>
<tr><td>2</td><td colspan="2">LIMITS OF APPROVAL</td><td></td></tr>
<tr><td>2</td><td>8</td><td>The Proponent may carry out quarrying operations and brick making on the site until 27 September 2031.
Note: Under this approval, the Proponent is required to decommission and rehabilitate the site and carry out additional requirements. Consequently, this approval will continue to apply in all respects other than to permit the carrying out of quarrying operations, until the rehabilitation of the site and those requirements and undertakings have been carried out to the required standard.</td><td>3.1</td></tr>
<tr><td>2</td><td>10</td><td>The Proponent must not exceed the limits in Table 1 during any calendar year.
Table 1: Limits on extraction, production, receival and dispatch volumes per calendar year
<table>
<tr><th>Activity</th><th>Project Phase</th><th>Total Volume (tonnes per calendar year)</th></tr>
<tr><td>Extraction from Pit 3</td><td>Phase 1 and 2</td><td>420,000</td></tr>
<tr><td rowspan="2">Receive raw materials for brickmaking</td><td>Phase 1 and 2</td><td>215,000</td></tr>
<tr><td>Phase 3 onwards</td><td>360,000</td></tr>
<tr><td>Dispatch raw materials</td><td>Phase 1,2 and 3</td><td>275,000</td></tr>
<tr><td>Brick production</td><td>All Phases</td><td>300,000</td></tr>
<tr><td>Dispatch finished building products</td><td>All Phases</td><td>330,000</td></tr>
</table>
Note: The Total Volume limits in Table 1 do not apply to the import of VENM for the purpose of backfilling voids. The import of VENM is separately managed under the restrictions on truck movements contained in Condition 12 of this Schedule.</td><td>3.1</td></tr>
</table>

<table>
<tr><th>Sched</th><th>Condition</th><th>Condition Text</th><th>Where covered</th></tr>
<tr><td>2</td><td>12</td><td>The Proponent must not exceed the total truck movements detailed in Table 2.

Table 2: Total Truck Movements
<table>
<tr><th>Transport Route Stage</th><th>Project Phases</th><th>Day</th><th>Total truck movements[a]</th></tr>
<tr><td rowspan="3">Prior to the upgrade of the Martin Road-Elizabeth Drive Intersection</td><td rowspan="3">1,2 and 3</td><td>Monday to Friday</td><td>120</td></tr>
<tr><td>Saturday</td><td>40</td></tr>
<tr><td>Sundays</td><td>40</td></tr>
<tr><td rowspan="6">Following completion of the Martin Road-Elizabeth Drive Intersection upgrade</td><td rowspan="3">1,2 and 3</td><td>Monday to Friday</td><td>800</td></tr>
<tr><td>Saturday</td><td>358</td></tr>
<tr><td>Sundays</td><td>200</td></tr>
<tr><td rowspan="3">4</td><td>Monday to Friday</td><td>366</td></tr>
<tr><td>Saturday</td><td>98</td></tr>
<tr><td>Sunday</td><td>0</td></tr>
</table>
[a] Note: each truck entering or exiting the site is counted as a separate movement.</td><td>TMP</td></tr>
<tr><td>2</td><td>12A</td><td>Truck movements entering or exiting the site on Sundays are restricted to the importation of VENM for the purpose of backfilling quarry pits and rehabilitation activities.

Note: Truck movements are also controlled further by the limits in condition 10 of this Schedule and operating hours in condition 1 of Schedule 3.</td><td>TMP</td></tr>
<tr><td>2</td><td colspan="2">STRUCTURAL ADEQUACY</td><td></td></tr>
<tr><td>2</td><td>13</td><td>All new buildings and structures, and any alterations or additions to existing buildings and structures, that are part of the project, must be constructed in accordance with the BCA.
Notes:
Under Part 6 of the EP&A Act, the Proponent is required to obtain construction and occupation certificates for any proposed building works;
Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.</td><td>6.2</td></tr>
</table>

Sched	Condition	Condition Text	Where covered
2	DEMOLITION		
2	14	All demolition work must be carried out in accordance with the Australian Standard AS 2601-2001: The Demolition of Structures (Standards Australia, 2001).	6.2
2	PROTECTION OF PUBLIC INFRASTRUCTURE		
2	15	Unless the Proponent and the applicable authority agree otherwise the Proponent must: (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the project; and (b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the project. *Note: This condition does not apply to damage to roads caused as a result of general road usage or otherwise addressed by contributions required by condition 25 of Schedule 3.*	TMP
2	OPERATION OF PLANT AND EQUIPMENT		
2	16	All plant and equipment used on the site, or to monitor the performance of the project, must be: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	6.3
2	16A	The external walls of all buildings including additions to existing buildings must comply with the relevant requirements of the BCA. Before the issue of a Construction Certificate and an Occupation Certificate, the Proponent must provide the Certifying Authority with documented evidence that the products and systems proposed for use or used in the construction of external walls, including finishes and claddings such as synthetic or aluminium composite panels, comply with the requirements of the BCA. The Proponent must provide a copy of the documentation given to the Certifying Authority to the Secretary within seven days after the Certifying Authority accepts it.	Noted
2	LIMITS OF EXTRACTION		
2		Identification of Approved Extraction Limits	

2	18	Within 3 months of the determination of Modification 3 and 4, the Proponent must: (a) engage a registered surveyor to mark out the boundary of the approved area of extraction within Pit 3; and (b) provide the Secretary with a survey plan of the boundary. The boundary of the approved area of extraction within Pit 3 must be clearly marked in a manner that allows them to be easily identified at all times during the carrying out of quarrying operations.	6.3.1
Sched	**Condition**	**Condition Text**	**Where covered**
2		Maximum Extraction Depth	
2	19	The Proponent must not extract any extractive materials or carry out any work in the extraction area below 35 m below the pre-existing natural surface of the ground, other than construction of bores approved by DPIE Water or in-pit sumps approved by the Secretary.	6.3.1
3	SPECIFIC ENVIRONMENTAL CONDITIONS		
3	NOISE		
3	Hours of Operation		
3	1	The Proponent must comply with the operating hours set out in Table 1.	NMP
3	1A	With the written agreement of the Secretary, the Proponent may undertake limited campaign trucking (within the limits imposed under conditions 10 and 12 of Schedule 2) for the import of VENM outside of the operating hours prescribed in condition 1 of this Schedule.	NMP
3	2	The following activities may be carried out outside the hours specified in condition 1 of this Schedule: (a) activities that are inaudible at residences on privately-owned land; (b) the delivery or dispatch of materials as requested by the NSW Police Force or other public authorities for safety reasons; or (c) emergency work to avoid the loss of life, property or to prevent material harm to the environment. In such circumstances, the Proponent must notify the Department and affected residents prior to undertaking the activities, or as soon as is practical thereafter.	9.6.1
3	Construction Noise		
3	3	Approved construction works must only be undertaken during standard construction hours (7 am to 6 pm, Monday to Friday and 8 am to 1 pm on Saturdays), unless the Secretary agrees otherwise.	NMP

3	5	Operational Noise Criteria The Proponent must ensure that operational noise generated by the project (including construction activities) does not exceed the criteria in Table 2 at any residence on privately-owned land. Noise generated by the project must be monitored and measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Noise Policy for Industry (NSW EPA 2017). However, the noise criteria in Table 2 do not apply if the Proponent has an agreement with the relevant landowner to exceed the noise criteria, and the Proponent has advised the Department in writing of the terms of this agreement. *Note: should an agreement with a landowner be terminated for any reason, the Proponent must comply with the noise criteria in Table 2.*	7.2.2, NMP

Sched	Condition	Condition Text	Where covered
3		Road Traffic Noise Criteria	
3	6	The Proponent must ensure that the road traffic noise generated by the project does not exceed the criteria in Table 3 at any privately-owned residence. Traffic noise generated by the project is to be measured in accordance with the relevant procedures in the NSW Road Noise Policy (Department of Environment, Climate Change and Water NSW). However, the noise criteria in Table 3, do not apply if the Proponent has an agreement with the relevant landowner to exceed the noise criteria, and the proponent has advised the Department in writing of the terms of this agreement.	7.2.2, NMP
3	6A	Upon receiving a written request from the owner of residences RN5, RN9, RN14, RN16, RN21 or RN22, the Proponent must implement noise mitigation treatment packages as described in the EA (Mod 3 and 4) and as set out in the RMS Draft At-Receiver Treatment Packages. If within 3 months of receiving this request from the owner, the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.	NMP
3		Noise Operating Conditions	
3	7	The Proponent must: (a) take all reasonable steps to minimise the construction, operational, low frequency and road transportation noise of the project; (b) take all reasonable steps to minimise the noise impacts of the project during noise enhancing meteorological conditions; (c) operate a noise management system to guide the day to day planning of quarrying operations and the implementation of noise mitigation measures to ensure compliance with the relevant conditions of this approval; (d) carry out regular noise monitoring to determine whether the project is complying with the relevant conditions of this approval; and (e) modify or stop operations on the site to comply with the relevant conditions of this approval. Note: Monitoring under this approval is not required at all residences and the use of representative monitoring locations can be used to demonstrate compliance with criteria, if agreed to by the Secretary.	NMP

Sched	Condition	Condition Text	Where covered
3		Noise Management Plan	
3	8	The Proponent must prepare a Noise Management Plan for the project to the satisfaction of the Secretary. This plan must: (a) be submitted to the Secretary for approval prior to commencing Modification 3 and 4, unless otherwise agreed by the Secretary; (b) describe the measures to be implemented to ensure: • compliance with the noise criteria and operating conditions of this approval; • best practice management is being employed; • residences listed in condition 6A of this Schedule are notified of their rights to request road noise mitigation measures; • vibration impacts are minimised; and • the construction and operational noise impacts of the project are minimised during noise enhancing meteorological conditions; (c) describe measures to ensure that all the commitments in the EA (Mod 3 and 4) in relation to noise are implemented; (d) include a consultation plan detailing: • procedures for notifying and consulting nearby residents prior to the recommencement of quarrying and brick making activities; • procedures for notifying and consulting nearby residents prior to the commencement of construction activities; • details of a telephone complaints line (operated at all hours) and relevant site persons responsible for following up complaints; • procedures for handling and monitoring all complaints received; and • contingency measures that would be implemented where complaints are received; (e) describe the proposed noise management system; and (f) include a noise monitoring program that: • is capable of evaluating the performance of the project; • includes a protocol for determining any exceedances of the relevant conditions of this approval; and • effectively supports the noise management system. The Proponent must implement the Noise Management Plan as approved by the Secretary.	NMP
3	AIR QUALITY		
3		Air Quality Impact Assessment Criteria	
3	9	The Proponent must ensure that particulate matter emissions generated by the project do not cause exceedances of the criteria in Table 4 at any residence on privately-owned land.	7.2.2, AQMP

Sched	Condition	Condition Text	Where covered
3		Operating Conditions	
3	10	The Proponent must: (a) implement best practice management to minimise the dust emissions of the project; (b) implement all air quality management and mitigation measures that were committed to in the EA (Mod 3 and 4); (c) implement real-time monitoring of 24-hour average PM10 and meteorological conditions; (d) regularly assess meteorological and air quality monitoring data and relocate, modify and/or stop operations on site to ensure compliance with the air quality criteria in this approval; (e) minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events (see note d under Table 4); (f) monitor and report on compliance with the relevant air quality conditions in this approval; and (g) minimise the area of surface disturbance and undertake progressive rehabilitation of the site, to the satisfaction of the Secretary.	AQMP
3		Air Quality Management Plan	
3	13	The Proponent must prepare an Air Quality Management Plan for the project to the satisfaction of the Secretary. This plan must: (a) be prepared in consultation with relevant WSA authorities; (b) be submitted to the Secretary for approval prior to commencing Phase 1, unless otherwise agreed by the Secretary; (c) describe the proposed air quality management system; (d) describe the measures to be implemented to ensure: • compliance with the air quality criteria and operating conditions of this approval; • best practice management is being employed; and • the air quality impacts of the project are minimised during adverse meteorological conditions and extraordinary events; (e) describe measures to ensure that all the commitments in the EA (Mod 3 and 4) in relation to air quality are implemented; (f) include a program to ensure surface disturbance associated with quarrying operations is minimised; (g) include an air quality monitoring program that: • is capable of evaluating the performance of the project and informing day to day operational decisions; • includes a protocol for determining any exceedances of the relevant conditions of this approval; and • effectively supports the air quality management system; and (h) include a program to: • notify affected landowners of the potential health-related impacts associated with dust; • respond effectively to enquiries or complaints. The Proponent must implement the Air Quality Management Plan as approved by the Secretary.	AQMP

Sched	Condition	Condition Text	Where covered
3		Meteorological Monitoring	
3	14	For the life of the project, the Proponent must ensure that there is a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the Approved Methods for Sampling and Analysis of Air Pollutants in New South Wales guideline and is capable of measuring meteorological conditions in accordance with the NSW Noise Policy for Industry (EPA, 2017).	AQMP
3		Odour	
3	15	The Proponent must ensure that no offensive odours, as defined by the POEO Act, are emitted from the site.	AQMP
3		Greenhouse Gas Emissions	
3	16	The Proponent must implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site.	AQMP
3		SOIL AND WATER	
3		Water Supply	
3	17	The Proponent must ensure that it has sufficient water for all stages of the project, and if necessary, adjust the scale of operations under the approval to match its available water supply, to the satisfaction of the Secretary.	SWMP
3	17A	The Proponent must report on water extracted from the site each year (direct and indirect) in the Annual Review, including water taken under each water licence.	8.1
3		Water Discharges	
3	18	The Proponent must ensure that all quarry water from the site is contained wholly within the site except where otherwise authorised by condition 19 and 19A of this Schedule.	SWMP
3	19	The Proponent must ensure that all surface water discharges from the site comply with the limits (both volume and quality) set in any EPL applicable to the site	SWMP
3	19A	Dewatering of Pits 1, 2 and 3 All water that is dewatered from Pit 1 (including any water transferred into Pit 1 from Pit 2 and Pit 3) must be transferred from the site in accordance with the Dewatering Management Plan required under Condition 23A of this Schedule.	DWMP

3	19B	All dewatering activities from Pit 1 must be completed within Phase 1 unless otherwise agreed by the Secretary.	DWMP
3		Riparian Buffer Distance	
Sched	**Condition**	**Condition Text**	**Where covered**
3	20	The Proponent must maintain a minimum setback width of 60 metres (measured from the top of bank) between extraction areas and both Badgerys Creek and Badgerys Creek tributary. *Note: This condition does not prohibit overburden emplacement or rehabilitation works in accordance with the Project Layout Plan.*	SWMP
3		Alluvial Aquifers	
3	21	The Proponent must ensure that the project has no impact on alluvial aquifers associated with South Creek, Badgerys Creek or their tributaries.	SWMP
3		Soil and Water Management Plan	
3	23	The Proponent must prepare a Soil and Water Management Plan for the project to the satisfaction of the Secretary. This plan must: (a) be prepared by a suitably qualified and experienced person/s approved by the Secretary; (b) be prepared in consultation with Council and DPIE-Water; (c) be submitted to the Secretary for approval prior to commencing Phase 1, unless otherwise agreed by the Secretary; and	SWMP
3	23	(d) include a: (i) Site Water Balance that includes: • details of: – sources and security of water supply; – water use and management on site; – adequacy of water storage facilities to contain all surface water runoff; – all existing Water Access Licences and potential Water Access Licences, including information on the relevant Water Sharing Plan and Water Sources; – any off-site water transfers, including those described in condition 23A of this Schedule; and – reporting procedures; and – measures to be implemented to minimise clean water use on site;	SWMP
3	23	(ii) Surface Water Management Plan, that includes: • a program for obtaining detailed baseline data on surface water flows and quality in water bodies that could potentially be affected by the project;	SWMP

3	23	• a detailed description of the surface water management system on site including the: – clean water diversion system; o erosion and sediment controls; o dirty water management system; and – water storages, including the area, depth and capacity of any in-pit sumps;

Sched	Condition	Condition Text	Where covered
3	23	• detailed plans, including design objectives and performance criteria, for: o reinstatement of drainage lines on the rehabilitated areas of the site; and o control of any potential water pollution from rehabilitated areas of the site;	SWMP
3	23	• performance criteria for the following, including trigger levels for investigating any potentially adverse impacts on: – the water management system; – surface water quality in creeks and other water bodies that could potentially affected by the project (including Badgerys Creek and Badgerys Creek tributary); and – the stream health, vegetation health and channel stability of water bodies that could potentially affected by the project;	SWMP
3	23	• a program to monitor and report on: – any surface water discharges; – the effectiveness of the water management system; – the quality of water discharged from the site to the environment; – surface water flows and quality in local watercourses; and – the stream health, riparian vegetation health and channel stability of creeks and other water bodies that could potentially be affected by the project; and	SWMP
3	23	• a plan to respond to any exceedances of the performance criteria, and mitigate and/or offset any adverse surface water impacts of the project; and	SWMP
3	23	(iii) Groundwater Management Plan that includes: • measures to ensure that the maximum extraction depth is not exceeded (see condition 19 of Schedule 2); • a protocol to obtain appropriate water licence(s) to cover the volume of any unforeseen groundwater inflows into the quarry from the quarry face or floor; • groundwater assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts; 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:	SWMP

		– monitoring of boreholes within the alluvial sediments adjacent to Badgerys and South Creeks and their tributaries, and in the Bringelly Shale bedrock aquifer; – monitoring of groundwater inflows into the quarry from the quarry face or floor, or into any in-pit sumps; – monitoring the impacts of the project on baseflows to Badgerys and South Creeks and their tributaries; – identification of a methodology for determining exceedances of the assessment criteria; – a plan to respond to any exceedances of the performance criteria; and – a program to regularly report on monitoring. The Proponent must implement the Soil and Water Management Plan as approved by the Secretary.	
3	23A	Dewatering Infrastructure Plan	
3	23A	Prior to carrying out any construction activities associated with the dewatering activities on the site, the Proponent must prepare a Dewatering Infrastructure Plan for the project to the satisfaction of the Secretary. This plan must include: (a) detailed designs for: • any pipeline infrastructure used for dewatering activities; and • the method to be used to cross Badgerys Creek; (b) a flooding assessment which: • considers the impacts of any structures (including overland pipelines) to flood flow within the floodplain up to the PMF; and • describes the measures that will be implemented to minimise those impacts; and (c) a description of the measures to be implemented for: • managing construction and operation of minor surface infrastructure; • avoiding significant impacts and minimisation of impacts generally; • controlling any potential water pollution from construction; • minimising and managing erosion and sedimentation; • decommissioning of pipeline infrastructure; and • rehabilitating disturbed areas. The Proponent must implement the Dewatering Infrastructure Plan as approved by the Secretary.	DWIP
3	23B	Dewatering Management Plan	
		The Proponent must prepare a Dewatering Management Plan for the project to the satisfaction of the Secretary. This plan must: (a) be prepared in consultation with DPIE-Water and NRAR; (b) be submitted to the Secretary for approval prior to dewatering activities from Pit 1, unless otherwise agreed by the Secretary; and (c) include: • details of:	DWMP

		– off-site water transfer or discharge arrangements; and – procedures for monitoring on volumes transferred off-site and reporting on this as part of AEMR; • a Fauna Relocation Plan regarding the transfer of aquatic fauna from Pits 1, 2 and 3 prepared by a suitably qualified ecologist which includes details on: – native fauna species known to inhabit and/or use the pits which require transfer from the pits; – methodology proposed to transfer the fauna; – location and suitability of the proposed relocation sites; – any potential impacts of relocating the fauna to the relocation sites and proposed mitigation measures; and – details of ecologists to monitor dewatering activities; • a Geotechnical Monitoring Program, prepared by a suitably qualified and experience geotechnical engineer, to examine and monitor the faces and high walls of the quarry pits to determine potential geotechnical hazards and evaluate risks of potential failures; • a program to monitor and report on dewatering that involves any discharge from the site, including: – the quality of any water discharged from the site; – surface water flows and quality in local watercourses; and – the stream health, riparian vegetation health and channel stability of creeks and other water bodies that could potentially be affected by the discharges; and • a plan to respond to any exceedances of the performance criteria and mitigate and/or offset any adverse surface water impacts of the discharges. The Proponent must implement the Dewatering Management Plan as approved by the Secretary.	
3		Flooding	
3	23C	The Proponent must prepare and implement an Evacuation Plan for the site. This Evacuation Plan must be prepared in consultation with the State Emergency Services and include details of the site evacuation and sheltering procedures during flood events.	EP
3	TRANSPORT		
3		Road Haulage	
3	24	Prior to commencing Phase 1, the Proponent must: (a) erect signage on Elizabeth Drive advising of “trucks turning”; (b) install a wheel wash on the quarry access road and VENM haul road to prevent material being deposited on Martin Road; and (c) ensure the access driveway from Martin Road is capable of catering for all heavy vehicles associated with the project in accordance with AS2890.2, to the satisfaction of Council.	TMP

Sched	**Condition**	**Condition Text**	**Where covered**
3		Road Upgrade and Maintenance Contribution	
3	25	Prior to the recommencement of quarrying operations, the Proponent must enter into a formal agreement with Council for: (a) the repair of historical impacts of trucking from the project on Martin Road; and (b) annual road maintenance contributions to be paid to Council, based on the weight of all laden truck movements to and from the site, for the duration that Martin Road is vested in the Council as the roads authority. The Proponent must provide evidence to the Secretary that the agreement has been executed and implemented to the satisfaction of Council. If there is any dispute between the Proponent and Council, then either of the parties may refer the matter to the Secretary for resolution	TMP
3	25A	Prior to increasing truck movement limits as specified in condition 12 of Schedule 2, the Proponent must complete an interim upgrade of the Martin Road and Elizabeth Drive Intersection. The final design of intersection must be to the satisfaction of the relevant roads authority/s and must: (a) be designed and constructed in accordance with Austroads Guidelines, Australian Standards and any requirements of the relevant road authority/s; (b) include, at a minimum, a three phase signal operation including a right turn green light and pedestrian crossings on one Martin Road and one Elizabeth Drive approach; (c) be subject to a Works Authorisation Deed (WAD) with TfNSW; and (d) be funded by the Proponent, unless otherwise agreed with TfNSW.	TMP
3	25B	With the written agreement of the Secretary, the requirements of condition 25A of this Schedule may be waived if the Proponent can demonstrate that the Martin Road-Elizabeth Drive Intersection has been upgraded to achieve service, capacity and safety standards equivalent to or greater than those required under condition 25A of this Schedule.	Noted
3	25C	The Proponent must provide an area for a potential transport corridor associated with an extension of Martin Road through the site (as conceptually shown in Appendix 3). The final design and location of the transport corridor and any associated commercial arrangements must be determined in consultation with TfNSW. The Proponent must advise the Secretary in writing of the final design and location of the transport corridor as agreed with TfNSW, and update relevant management plans, strategies or programs for the project to reflect the transport corridor.	Noted

Sched	Condition	Condition Text	Where covered
3		Monitoring of Product Transport	
3	26	The Proponent must keep accurate records of: (a) all truck movements to and from the site (including time of arrival and dispatch and nature of material transported); (b) the weight of all bricks, VENM and quarry products transported to and from the site; and (c) publish a summary of these records on its website every 6 months.	TMP
3		Operating Conditions	
3	27	The Proponent must: (a) ensure that all laden trucks carrying quarry products, raw materials or VENM have their loads covered when arriving at or leaving the site; (b) ensure that all trucks are cleaned of material that may fall from vehicles, before leaving the site; (c) use its best endeavours to ensure that appropriate signage is displayed on trucks used to transport finished building materials, quarry products or raw materials to or from the project so they can be easily identified by road users; and (d) continue to engage with TfNSW regarding the detailed planning and design for the Eastern Airport Ring Road.	TMP
3		Traffic Management Plan	
3	28	The Proponent must prepare a Traffic Management Plan for the project to the satisfaction of the Secretary. This plan must: (a) be prepared in consultation with TfNSW, WSA and Council; (b) be submitted to the Secretary for approval prior to commencing Phase 1 operations, unless otherwise agreed by the Secretary; (c) describe the processes in place to control the arrival and dispatch of trucks; (d) include a Drivers' Code of Conduct that details the safe and quiet driving practices that must be used by drivers travelling to and from the site; (e) describe the measures to be put in place to ensure compliance with the Drivers' Code of Conduct; (f) propose measures to minimise the transmission of dust and tracking of material onto the surface of the public road from vehicles leaving the quarry; (g) describe the measures to manage construction and cumulative traffic impacts on the surrounding road network; and (h) be updated as necessary to reflect the operational phases and truck movement limits specified in condition 12 of Schedule 2 and prior to the commencement of any construction works for the upgrade of the Martin Road – Elizabeth Drive Intersection or the Eastern Airport Ring Road. The Proponent must implement the Traffic Management Plan as approved by the Secretary.	TMP
Sched	**Condition**	**Condition Text**	**Where covered**
3		ABORIGINAL HERITAGE	

3	29	The Proponent must ensure that: (a) archaeological salvage of site BC-01-09 is undertaken in accordance with Recommendation 1, Section 6.0 of the Aboriginal Heritage Assessment – Addendum in the EA; (b) regeneration works, dewatering activities and water discharges in the area of the archaeological deposit identified adjacent to Badgerys Creek (see Appendix 5) are either avoided, or else undertaken in a manner that will minimise harm to Aboriginal objects, to the satisfaction of the Secretary; and (c) measures are implemented prior to the commencement of Phase 1, to conserve and protect the hearth feature within site BCBW18 AS 02 02 (AHIMS ID 45-5-5164).	AHMP
3	30	The Proponent must prepare an Aboriginal Heritage Management Plan for the project to the satisfaction of the Secretary. The plan must: (a) be prepared by suitably qualified and experienced persons; (b) be prepared in consultation with Registered Aboriginal Parties and Heritage NSW; (c) be submitted to the Secretary for approval within 6 months of the determination of Modification 3 and 4, unless otherwise agreed by the Secretary; (d) include a description of the measures that would be implemented to: i protect, monitor and manage identified Aboriginal objects and Aboriginal places on the site (including any proposed archaeological investigations and salvage measures), including specific measures to ensure that the archaeological deposit adjacent to Badgerys Creek (see Appendix 5) is not impacted during regeneration operations; ii conserve the entire extent of the hearth feature within site BCBW18 AS 02 (AHIMS ID 45-5-5164); iii manage the discovery of previously unidentified Aboriginal objects or Aboriginal places on the site; and iv facilitate ongoing consultation and involvement of Registered Aboriginal Parties in the conservation and management of Aboriginal cultural heritage on the site; and (e) include a protocol to be implemented in the event that skeletal remains are discovered during the project. The Proponent must implement the Aboriginal Heritage Management Plan as approved by the Secretary.	AHMP
3	31	If human remains are discovered on the site, then all work in the area surrounding the discovery must cease, and the area must be secured. The Proponent must immediately notify NSW Police Force and Heritage NSW, and work must not recommence in the area until authorised by NSW Police Force and Heritage NSW.	AHMP
3	32	If any potential Aboriginal object or Aboriginal place is identified on the site, or suspected to be on the site: (a) all work in the immediate vicinity of the object or place must cease immediately; (b) a 10 m buffer area around the object or place must be cordoned off; and (c) Heritage NSW must be contacted immediately.	AHMP
Sched	**Condition**	**Condition Text**	**Where covered**

3	33	Work in the immediate vicinity of a site identified in condition 32 of this Schedule may only recommence if: (a) the object or place is confirmed by Heritage NSW upon consultation with the Registered Aboriginal Parties not to be an Aboriginal object or Aboriginal Place; (b) the Aboriginal Cultural Heritage Management Plan is revised to include the object or place and appropriate measures in respect of it; or (c) the Secretary is satisfied with the measures to be implemented in respect of the object or place and makes a written direction in that regard.	AHMP
3	REHABILITATION		
3		Rehabilitation Objectives	
3	34	The Proponent must rehabilitate the site in accordance with the conditions imposed on the mining lease(s) associated with the project under the Mining Act 1992. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EA (Mod 3 and 4) and shown in Appendix 4, and must comply with the objectives in Table 5.	6.3.2, RMP
3		Progressive Rehabilitation	
3	35	The Proponent must rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable measures must be taken to minimise the total area exposed for dust generation at any time. Interim stabilisation measures must be implemented where reasonable and feasible to control dust emissions in disturbed areas that are not active and which are not ready for final rehabilitation. Note: It is accepted that parts of the site that are progressively rehabilitated may be subject to future re-disturbance	RMP
3	35A	The Proponent must complete the backfilling of Pits 1 and 2 within 6 years of commencement of Phase 1, or as otherwise agreed by the Secretary.	RMP
3	35B	The Proponent must complete the backfilling of Pit 3 within 2 years of the date of completion of extraction activities in Pit 3, or as otherwise agreed by the Secretary.	RMP
3		Rehabilitation Management Plan	
3	36	The Proponent must prepare a Rehabilitation Management Plan for the project, in accordance with the conditions imposed on the mining lease(s) associated with the project under the Mining Act 1992. This plan must: (a) be prepared in consultation with the Department, DPIE Water, BCD, TfNSW, relevant WSA authorities and Council; (b) build upon the Rehabilitation Objectives in Table 5 and the proposed rehabilitation strategy described in the EA (Mod 3 and 4) and shown in Appendix 4; (c) investigate options for the future use of disturbed areas following the completion of backfilling operations, having regards to the strategic planning associated with the draft Western Sydney Aerotropolis Plan (or subsequently adopted NSW Government strategic plans); (d) describe and justify the proposed rehabilitation strategy for the site, including the landform and use of the site following the completion of quarry operations; (e) include details of the planting of replacement trees in riparian areas consistent with the Statement of Commitments and with vegetation requirements for WSA to minimise wildlife impacts;	RMP

3	36	(f) describe how the rehabilitation of the site would achieve the objectives identified in Table 5 and the requirements of conditions 35A and 35B of this Schedule; (g) include detailed Rehabilitation Objectives, Rehabilitation Completion Criteria and the Final Landform and Rehabilitation Plan for evaluating the performance of the rehabilitation of the site; (h) include procedures for the use of interim stabilisation and temporary vegetation strategies, where reasonable to minimise the area exposed for dust generation; (i) to the maximum extent practicable, build on and integrate with the other management plans required under this consent; (j) include a life of mine rehabilitation and mining schedule and a protocol for progressive reviews of key progressive rehabilitation milestones from the commencement of operations through to decommissioning and mine closure; (k) include an overview of the identified risks to achieving successful rehabilitation and strategies to be implemented to address these risks; (l) include a program to monitor, audit and report on the progress against the Rehabilitation Objectives and Rehabilitation Completion Criteria and the Final Landform and Rehabilitation Plan; and (m) describe the measures to be implemented to ensure compliance with the relevant conditions of this approval, including intervention and adaptive management techniques that may be required to ensure rehabilitation remains on a trajectory of achieving the Rehabilitation Objectives, Rehabilitation Completion Criteria and the Final Landform and Rehabilitation Plan as soon as reasonably practical. Note: The Rehabilitation Management Plan may be combined with a Mining Operations Plan, or similar plan, required under the mining lease granted for the development.	RMP
3	VISUAL		
3	37	The Proponent must implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the project to the satisfaction of the Secretary.	6.3.11
3	37A	Within 3 months of commencing quarrying operations in Pit 3, the Proponent must construct landscaped earthen bunds and plant vegetation screens (as shown conceptually in Appendix 3), to minimise the visual impacts of the project. The landscaped earthen bunds and plant vegetation screens must be maintained until the Pit 3 area has been fully rehabilitated.	VIMP
3	37B	Within 6 months of the Secretary being advised of the confirmed Eastern Airport Ring Road alignment, as required under condition 25C of this Schedule, the Proponent must construct landscaped earthen bunds and plant vegetation screens around the brickmaking facility and raw material stockpile (as shown conceptually in Appendix 3), to minimise the visual impacts of the project. The landscaped earthen bunds and plant vegetation screens must be maintained for the life of the project.	VIMP
Sched	**Condition**	**Condition Text**	**Where covered**
3	37C	The Proponent must ensure that all outdoor and external lighting at the site: (a) complies with AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting; and	VIMP

		(b) is designed in accordance with any Civil Aviation Safety Authority requirements for the WSA and is mounted, screened and directed in such a manner that it does not cause distraction or confusion to pilots due to light spill above the horizontal plane.	
3		Visual Impact Management Plan	
3	37D	Visual Impact Management Plan Within 6 months of approval of Modification 3 and 4, the Proponent must prepare a Visual Impact Management Plan for the project to the satisfaction of the Secretary. This plan must: (a) be prepared by a suitably qualified and experienced person/s; (b) be prepared in consultation with Council, TfNSW and relevant WSA authorities; (c) describe the measures to be implemented to minimise the visual, landscaping and off-site lighting impacts of the project to the WSA and surrounding community; (d) include a landscaping strategy to shield public views of the project (including views from the Eastern Airport Ring Road) that includes: • the measures identified in the EA (Mod 3 and 4); • a vegetation strategy utilising a diversity of local provenance tree species from the native vegetation community (or communities) that occur or once occurred on the site, and would minimise wildlife attraction; • a bund vegetation and maintenance schedule; and • procedures to notify, consult with and implement site-specific mitigation measures at affected privately-owned residences; (e) include a program to monitor and report on the implementation and effectiveness of the mitigation measures; and (f) include a protocol to update the plan to include the requirements of condition 37A and 37B of this Schedule, once the Secretary has been advised of the confirmed Eastern Airport Ring Road alignment, as required under condition 25C of this Schedule. The Proponent must implement the Visual Impact Management Plan as approved by the Secretary.	VIMP
3	WASTE		
3	38	The Proponent must: (a) manage on-site sewage treatment and disposal in accordance with the requirements of its EPL, and to the satisfaction of the EPA and Council; (b) minimise the waste generated by the project; (c) ensure that the waste generated by the project is appropriately stored, handled, and disposed of; and (d) report on waste management and minimisation in the Annual Review, to the satisfaction of the Secretary. *Note: Approval pursuant to Section 68 of the Local Government Act 1993 is required from Council for onsite sewage management systems.*	WMP

3	39	Except as expressly permitted in an EPL and/or the conditions of this approval, the Proponent must not receive waste on the site for storage, treatment, processing, reprocessing or disposal.	WMP
3	39A	VENM Management Plan	
		Prior to the import of VENM to the site, the Proponent must prepare a VENM Management Plan for the project to the satisfaction of the Secretary. This plan must: (a) identify the quantities of VENM to be imported to site; (b) describe: • the procedures for monitoring VENM imported to the site to ensure that it meets relevant quality specifications for VENM; • management measures for the emplacement and temporary stockpiling of VENM; • the process for handling VENM for use in rehabilitation; • measures for the on-site use of water captured in sediment basins to ensure that the water does not present a contamination risk; and • processes for assessing, recording, handling and managing any contamination found on the site; and (c) provide an indicative schedule of VENM material to be imported to the site for each Phase of the project, in order to achieve the conceptual final landform. The Proponent must implement the VENM Management Plan as approved by the Secretary.	VMP
3	LIQUID STORAGE		
3	40	The Proponent must ensure that all tanks and similar storage facilities (other than for water) are protected by appropriate bunding or other containment, in accordance with the relevant Australian Standards.	Section 6.2
3	DANGEROUS GOODS		
3	41	The Proponent must ensure that the storage, handling, and transport of dangerous goods is done in accordance with the relevant Australian Standards, particularly AS1940 and AS1596, and the Dangerous Goods Code.	Section 6.2
3	FIRE SAFETY		
3	42	The Proponent must: (a) ensure that the project is suitably equipped to respond to any fires on site; and (b) assist the emergency services to the extent practicable if there is a fire in the vicinity of the site. (c) ensure that the project provides for asset protection in accordance with the relevant requirements in Planning for Bushfire Protection 2019 (NSW RFS 2019).	EMRP
Sched	**Condition**	**Condition Text**	**Where covered**
4	ADDITIONAL PROCEDURES		

4		NOTIFICATION OF LANDOWNERS	
4	1	As soon as practicable, and no longer than 7 days, after obtaining monitoring results showing: (a) an exceedance of any criteria in Schedule 3, the Proponent must notify the affected landowners in writing of the exceedance, and provide regular monitoring results, at least every 3 months, to each affected landowner until the project is again complying with the relevant criteria; and	9.2
4		(b) an exceedance of any air quality criteria in Schedule 3, the Proponent must send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and current tenants of the land (including the tenants of land which is not privately-owned).	9.2
4		INDEPENDENT REVIEW	
4	2	If a landowner considers the project to be exceeding the relevant criteria in Schedule 3, they may ask the Secretary in writing for an independent review of the impacts of the project on their land. If the Secretary is not satisfied that an independent review is warranted, the Secretary will notify the landowner in writing of that decision, and the reasons for that decision, within 21 days of the request for a review. If the Secretary is satisfied that an independent review is warranted, within 3 months, or as otherwise agreed by the Secretary and the landowner, of the Secretary's decision, the Proponent must: (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to: • consult with the landowner to determine his/her concerns; • conduct monitoring to determine whether the project is complying with the relevant criteria in Schedule 3; and • if the project is not complying with these criteria, then identify measures that could be implemented to ensure compliance with the relevant criteria; (b) give the Secretary and landowner a copy of the independent review; and (c) comply with any written requests made by the Secretary to implement any findings of the review.	9.3
5	ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING		
5	1	The Proponent must prepare an Environmental Management Strategy for the project to the satisfaction of the Secretary. This strategy must: (a) be submitted to the Secretary for approval within 6 months of the determination of Modification 3 and 4, unless otherwise agreed by the Secretary; (b) provide the strategic framework for environmental management of the project; (c) identify the statutory approvals that apply to the project; (d) set out the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project; (e) set out the procedures to be implemented to:	Refer to table in Section 1.1

		• keep the local community and relevant agencies informed about the operation and environmental performance of the project; • receive, record, handle and respond to complaints; • resolve any disputes that may arise during the course of the project; • respond to any non-compliance and any incident; and • respond to emergencies; and (f) include: • references to any strategies, plans and programs approved under the conditions of this approval; and • a clear plan depicting all the monitoring to be carried out under the conditions of this approval. The Proponent must implement any Environmental Management Strategy as approved by the Secretary.	
5		Evidence of Consultation	
5	2	Where the conditions of this approval require consultation with an identified party, the Proponent must: (a) consult with the relevant party prior to submitting the subject document to the Secretary for approval; and (b) provide details of the consultation undertaken, including: • the outcome of that consultation, matters resolved and unresolved; and • details of any disagreement remaining between the party consulted and the Proponent and how the Proponent has addressed any unresolved matters. However, if the Secretary agrees, a strategy, plan or program may be prepared without consultation being undertaken with an identified party required under a condition of this approval.	6.0 and within each management plan
Sched	**Condition**	**Condition Text**	**Where covered**
5	3	**Management Plan Requirements** The Proponent must ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include: (a) a summary of relevant background or baseline data; (b) a description of: • the relevant statutory requirements (including any relevant approval, licence or lease conditions); • any relevant limits or performance measures/criteria; and • the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;	6.0 and within each management plan

5		(c) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; (d) a program to monitor and report on the: • impacts and environmental performance of the project ; and • effectiveness of any management measures (see (c) above);	Within each management plan
5		(e) a 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; (f) a program to investigate and implement ways to improve the environmental performance of the project over time;	Within each management plan
		(g) a protocol for managing and reporting any: • incidents; • complaints; and • non-compliances with statutory requirements;	Within each management plan
5		(h) a protocol for periodic review of the plan; and (i) a document control table that includes version numbers, dates when the management plan was prepared and reviewed, names and positions of the person/s who prepared and reviewed the management plan, a description of any revisions made and the date of the Secretary's approval.	Within each management plan
5		Application of Existing Strategies, Plans and Programs	
5	4	The Proponent must continue to apply existing management plans, strategies or monitoring programs approved prior to the approval of Modification 3 and 4, until the approval of a similar plan, strategy or program following the approval of Modification 3 and 4.	Noted
5		Revision of Strategies, Plans & Programs	

Sched	Condition	Condition Text	Where covered
5	5	Within 3 months of: (a) the submission of an incident report under condition 10 below; (b) the submission of an Annual Review under condition 12 below; (c) the submission of an Independent Environmental Audit report under condition 14 below; and (d) the approval any modifications to this approval, the Proponent must review the suitability of all strategies, plans and programs required under this approval, to the satisfaction of the Secretary. 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. *Notes:* *• 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 project.* *• In the event of an inconsistency between condition 5(d) above and any condition in Schedule 3 of this approval, the latter prevails.*	8.2

5		Updating and Staging of Strategies, Plans or Programs	
5	6	With the approval of the Secretary, the Proponent may: (a) prepare and submit any strategy, plan or program required by this approval on a staged basis (if a clear description is provided as to the specific stage and scope of the project to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy, plan or program); (b) combine any strategy, plan or program required by this approval (if a clear relationship is demonstrated between the strategies, plans or programs that are proposed to be combined); and (c) update any strategy, plan or program required by this approval (to ensure the strategies, plans and programs required under this approval are updated on a regular basis and incorporate additional measures or amendments to improve the environmental performance of the project).	Noted Section 2.2
5		Adaptive Management	
5	7	The Proponent must assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedule 3. Any exceedance of these criteria and/or performance measures constitutes a breach of this approval and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.	2.5
5		Where any exceedance of these criteria and/or performance measures has occurred, the Proponent must as soon as becoming aware of any exceedance: (a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not reoccur; (b) consider all reasonable and feasible options for remediation (where relevant); (c) within 14 days of the exceedance occurring, submit a report to the Secretary describing these remediation options and any preferred remediation measures or other course of action; and (d) implement remediation measures as directed by the Secretary; to the satisfaction of the Secretary.	9.0
5		COMMUNITY CONSULTATIVE COMMITTEE	

Sched	Condition	Condition Text	Where covered

5	8	The Proponent must establish and operate a Community Consultative Committee (CCC) for the project to the satisfaction of the Secretary. The CCC must be established prior to recommencing quarrying operations and be operated in general accordance with the Department's Community Consultative Committee Guidelines, November 2016 (or later version).	CCP
5		*Notes* • The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Proponent complies with this approval. • In accordance with the guidelines, the Committee should comprise an independent chair and appropriate representation from the Proponent, Council and the local community. • The Proponent may, with the approval of the Secretary, combine the function of this CCC with the functions of other CCCs in the area.	
5	REPORTING		
5		Incident Reporting	
5	9	The Proponent must immediately notify the Department and any other relevant agencies immediately after it becomes aware of an incident. The notification must be made in writing through the Department's Major Projects Website and identify the project (including the development application number and name) and set out the location and nature of the incident.	9.2
5	10	Non-Compliance Notification Within seven days of becoming aware of a non-compliance, the Proponent must notify the Department of the non-compliance. The notification must be made in writing through the Department's Major Projects website and identify the project (including the development application number and name), set out the condition of this approval that the project is non-compliant with, why it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non- compliance. *Note: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.*	9.2
5		Regular Reporting	
5	11	The Proponent must provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.	9.1.4
5		Annual Review	
Sched	**Condition**	**Condition Text**	**Where covered**

5	12	Prior to recommencing quarrying operations or VENM import, and annually thereafter, the Proponent must submit a review to the Department reviewing the environmental performance of the project to the satisfaction of the Secretary. This review must: (a) describe the project (including any progressive rehabilitation) that was carried out in the previous calendar year, and the project that is proposed to be carried out over the current calendar year; (b) include a comprehensive review of the monitoring results and complaints records of the project over the previous calendar year, which includes a comparison of these results against the: • relevant statutory requirements, limits or performance measures/criteria; • requirements of any plan or program required under this approval; • monitoring results of previous years; and • relevant predictions in the documents listed in condition 3 of Schedule 2;	8.1
5		(c) evaluate and report on: • the effectiveness of the air quality and noise management systems; and • compliance with the performance measures, criteria and operating conditions in this approval. (d) identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence: (e) identify any trends in the monitoring data over the life of the project; (f) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and (g) describe what measures will be implemented over the current calendar year to improve the environmental performance of the project.	8.1
5		The Proponent must ensure that copies of the Annual Review are submitted to Council and are available to the Community Consultative Committee (see condition 8 of Schedule 5) and any interested person upon request.	8.1
5	INDEPENDENT ENVIRONMENTAL AUDIT		
5	13	Within 12 months of the commencement of Phase 1, and every 3 years thereafter, unless the Secretary directs otherwise, the Proponent must commission, commence and pay the full cost of an Independent Environmental Audit of the project. This audit must: (a) be led and conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary; (b) include consultation with the relevant agencies and the CCC; (c) assess the environmental performance of the project and whether it is complying with the relevant requirements in this approval and any relevant EPL or necessary water licences for the project (including any assessment, strategy, plan or program required under these approvals); (d) review the adequacy of strategies, plans or programs required under the abovementioned approvals;	9.4.1
5		(e) recommend appropriate measures or actions to improve the environmental performance of the project, and/or any assessment, strategy, plan or program required under the abovementioned approvals; and	9.4.1

5		(f) be conducted and reported to the satisfaction of the Secretary.	9.4.1
5	14	Within 12 weeks of commencing this audit, or as otherwise agreed by the Secretary, the Proponent must submit a copy of the audit report to the Secretary and any other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of these recommendations as required. The Proponent must implement these recommendations, to the satisfaction of the Secretary.	9.4.1
5	14A	Any condition of this approval that requires the carrying out of monitoring or an environmental audit, whether directly or by way of a plan, strategy or program, is taken to be a condition requiring monitoring or an environmental audit under Division 9.4 of Part 9 of the EP&A Act. This includes conditions in respect of incident notification, reporting and response, non-compliance notification, compliance report and independent audit. Note: For the purposes of this condition, as set out in the EP&A Act, "monitoring" is monitoring of the development to provide data on compliance with the approval or on the environmental impact of the project, and an "environmental audit" is a periodic or particular documented evaluation of the project to provide information on compliance with the approval or the environmental management or impact of the project.	Noted
5	ACCESS TO INFORMATION		
5	15	Within 3 months of the determination of Modification 3 and 4, until the completion of all works, including rehabilitation and remediation the Proponent must: (a) make the following information publicly available on its website: • the documents listed in condition 3 of Schedule 2; • current statutory approvals for the project; • all approved strategies, plans and programs required under the conditions of this approval; • regular reporting on the environmental performance of the project in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval; • a comprehensive summary of the monitoring results of the project, reported in accordance with the specifications in any conditions of this approval, or any approved plans and programs; • summary of the current stage and progress of the project; • contact details to enquire about the project or to make a complaint; • a complaints register, updated at least monthly; • the Annual Reviews of the project; • any Independent Environmental Audit as described in condition 13 above, and the Proponent's response to the recommendations in any audit; and • any other matter required by the Secretary; and (b) keep this information up-to-date, to the satisfaction of the Secretary.	pghbricks.com.au

3.1 *Limits of Approval*

The CoA provides the limits in **Error! Reference source not found.** relevant to Phase 1a.

Table 3 Limits of approval

Consent Condition	Limitations
S2 C12	• Prior to Martin Rd – Elizabeth Dr intersection upgrade total truck movements to or from the site (phase 1,2 &3) must not exceed: – 120 per day Monday to Friday between 6:00 am and 10:00 pm – 40 per day on Saturday between 6:00 am and 6:00 pm; – 40 per day on Sunday – between 9:00am and 6:00pm (VENM only) – Public Holidays - NIL • Following completion of the Martin Rd – Elizabeth Dr intersection upgrade total truck movements to or from the site (phase 1,2 &3) must not exceed: – 800 per day Monday to Friday between 6:00 am and 10:00 pm – 358 per day on Saturday between 6:00 am and 6:00 pm; – 200 per day on Sunday between 9am and 6pm (VENM only) – Public Holidays - NIL
S2 C 19	Extraction or any works in the extraction area may not proceed beyond 35m below the pre-existing natural surface of the ground, other than approved construction of bores or in-pit sumps and within the approved extraction areas.

3.2 *Hours of Operation*

The operating hours relevant to Phase 1a prescribed in Schedule 3, Condition 1 of the project approval are reproduced in **Error! Reference source not found.**.

Table 4 Operating hours

Activity	Permissible Hours
Truck arrival and dispatch (VENM import only)	7:00 am to 6:00 pm Monday to Saturday
	9:00 am to 6:00pm Sunday
	At no time on or public holidays
Maintenance	At any time, provided that these activities are not audible at any privately-owned residence outside of permissible hours for quarrying operations

4 Regulatory Framework

4.1 *Environmental Legislation*

The following legislation is relevant to the project:

- Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act);
- NSW Environmental Planning and Assessment Act 1979 (EP&A Act);
- NSW Water Management Act 2000;
- NSW Protection of the Environment Operations Act 1997 (PoEOA);
- NSW Protection of the Environment Operations (Clean Air) Regulation 2010;
- NSW Biosecurity Act 2015;
- NSW National Parks and Wildlife Act 1974 (NPW Act);
- NSW Biodiversity Conservation Act 2016;
- NSW Fisheries Management Act 1994;
- NSW Contaminated Land Management Act 1997 (CLM Act);
- NSW Roads Act 1993;
- Road Rules 2014;
- NSW Mining Act 1992; and
- NSW Local Government Act 1993.

4.2 *Planning Instruments*

The following planning instruments are relevant to the project:

- State Environmental Planning Policy (SEPP) (Major Development) 2005;
- SEPP (Mining, Petroleum Production and Extractive Industries) 2007;
- SEPP (Sydney Region Growth Centres) 2006;
- SEPP 33 Hazardous and Offensive Industries;
- SEPP 44 Koala Habitat Protection;
- SEPP 55 Remediation of Land; and
- Liverpool Local Environmental Plan.

4.3 *Codes, Standards and Guidelines*

- The Building Code of Australia;
- Australian Standards relating to construction, demolition, storage and transport of liquid and solid dangerous goods;
- Dangerous Goods Code;
- Applying SEPP 33 - Hazardous and Offensive Development Application Guidelines, developed by the NSW Department of Infrastructure, Planning and Natural Resources (DIPNR, 1994); and
- Compliance Reporting Post Approval Requirements, (DPI&E as updated from time to time).

Other aspect-specific Standards and Guidelines are listed under the various environmental management plans.

4.4 *Permits and Licences.*

4.4.1 Environment Protection Licence 684

The site is subject to Environment Protection Licence (EPL) 684, issued under the NSW PoEO Act. The EPL includes the following requirements in relation to air quality and noise management and monitoring measures:

- Noise from the premises (excluding mobile plant) must not exceed:
    - An LA10 (15 minute) noise emission criterion of 55dB(A) (0700 to 2200) Monday to Saturday and 0800 to 2200 Sundays and Public Holidays; and
    - An LA10 (15 minute) noise emission criterion of 40dB(A) at all other times, except as expressly provided by this licence.
- Noise from the operation of mobile plant must not exceed:
    - An LA10 (15 minute noise emission criterion of 50dB(A) > (0700 to 2200) Monday to Saturday and 0800 to 2200 Sundays and Public Holidays; and
    - An LA10 (15 minute noise emission criterion of 40dB(A) at all other times, except as expressly provided by this licence.
- An emergency response plan (including PRIMP) must be prepared and implemented for the premises.
- The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.

Reporting protocols are included in section 9.0.

4.4.2 Mining Lease 1771

The site is subject to Mining Lease (ML) 1771, issued under the NSW *Mining Act 1992*. The ML requires the preparation of a Mining Operations Plan (MOP) that details how mining operations will be undertaken in such a way as to prevent or minimise harm to the environment. Reporting requirements of the ML are described in section 9.0.

4.4.3 Water Licence

Approval number 10WA109463 for supply works was issued under the Water Management Act 2000 from 1/7/2011 until 8/11/2025 for the Sydney Basin Central Groundwater source under the Greater Metropolitan Region Groundwater Sources water sharing plan. The works licenced is excavations on Lot 1 DP 373863 and Lot 1 DP 1035249. A water access licence number 24346 is issued under that approval for 25 ML per year. The status is current and continuing.

A logbook is required to record the following regarding any water taken:

- Confirmation that a “Cease to take condition” does not apply, including date, time and flow rate or level at reference point;
- Purpose for water taken; and
- Date, volume, start and end time of pump, pump capacity.

4.4.4 Enforceable Undertaking

On 3 June 2020 PGH Bricks and Pavers entered into an Enforceable Undertaking (EU) with the Natural Resources Access Regulator (NRAR).

The EU requires PGH to:

- Supply the pit stored water from the site to Western Sydney Airport Corporations (WSA)
- Undertake works to prevent further surface water to enter the open pits, these works need to be completed by 30 March 2021.

The EU will be in place for a further 3 years after the completion of the works to prevent surface water entering the pits.

5 Organisation, Training and Resource Requirements

5.1 *Organisation, Roles and Responsibilities*

Environmental management for the Badgerys Creek facility is overseen by the Workplace Health Safety and Environment (WHSE) Personnel, and the environmental management measures throughout the site are implemented through the facility site management structure at the time. The activities on the site may vary and are not defined at this time, they will be identified per work package and staging of the overall project.

The Site Manager (subject to the phasing/work package for the project that can be the production, mining or site rehabilitation) will be ultimately responsible for the general project at Badgerys Creek including the environmental management.

Roles and responsibilities will be developed further with input from site management as this structure is put in place. In the absence of any site management structure the Senior Project Manager at CSR will be responsible for the site.

5.2 *Training*

Employees, Contractors, including sub-contractors and visitors are required to complete an induction and/or training prior to the commencement of the works at the Project Site so that they are made aware of, and are instructed to comply with, the conditions of this approval relevant to activities they carry out in respect of the project. The induction will inform personnel of their WHSE responsibilities and gain the necessary knowledge and skills to fulfil their roles on the site.

Induction will be a CSR induction that comprises:

- introduction to CSR and overview of scope of operations;
- overview of Company Policies, including WHSE and explanation of company safety culture and standards;
- key CSR WHSE procedures
- And a site induction that covers:
  overview of scope of the Badgerys Creek project;
- specific requirements of the Badgery's Creek site;
- emergency contacts and incident reporting procedures;
- emergency response and notification including site evacuation / fire spill response etc;
- Works undertaken will involve development of a safe work method statement or job safety and environmental analysis that covers the specific aspects of WHSE risk for the task and outlines the control measures. Through this process, specific procedures and training pertinent to the task will be covered to minimise the opportunity for risk.
  This process will cover (as appropriate to activity):
  description of proposed works/project to be conducted;
- location of, and respect for neighbours and adjoining properties;
- permitted hours of (different aspect of the project) operations/specific noise limitations;
- site WHS requirements including:
  - heavy and light plant and equipment operations/restrictions;

- site Traffic control and Traffic Management Plan/hours of operation/access;
- Job Safety Analyses / Safe Work Method Statements / Risk Assessment / WHS legislative requirements / Hazards/ Controls / Systems and Procedures;
- authority to work permits;
- chemical handling and storage; manual Handling; and spill response and procedures.

- supervisors and key personnel;
- site environmental monitoring and requirements;
- waste controls and recycling;
- site water controls and systems including erosion control;
- restricted areas and special operations/sensitive areas;
- location and description of site facilities/amenities;
- discharges to air and water;
- cultural issues and notification processes should work be carried out in a sensitive area;
- weed and pest control and flora and fauna preservation;
- fire controls;
- Unexpected finds procedure (esp as applicable to Aboriginal heritage).

5.3 *Resource Requirements*

Specific resource requirements are outlined in the various environmental management plans for the Badgerys Creek Project. These include environmental monitoring equipment.

For specialist environmental monitoring CSR will engage the following:

- air quality specialists for air quality monitoring;
- acoustic specialists, for noise monitoring;
- water quality specialists, for surface water and groundwater monitoring; and
- NATA-accredited analytical laboratories for water and dust analysis.

6 Environmental Management Measures

In addition to meeting the specific performance measures and criteria established under the approval, CSR will implement all reasonable and feasible measures to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from the construction and operation of the Project, and any rehabilitation required under the approval.

6.1 *Management Plan Requirements*

The appended management plans have been prepared in accordance with Schedule 5, Condition 3 of the Project Approval.

Where the conditions of the approval require consultation with an identified party, CSR will:

- consult with the relevant party prior to submitting the subject document to the Secretary for approval; and
- provide details of the consultation undertaken within the relevant document, including:
    - the outcome of that consultation, matters resolved and unresolved; and
    - details of any disagreement remaining between the party consulted and the operator and how any unresolved matters have been addressed.

6.2 *Construction Environmental Management*

All new buildings and structures, and any alterations or additions to existing buildings and structures, that are part of the Project, will be constructed in accordance with the Building Code of Australia. All demolition work will be carried out in accordance with the relevant Australian Standard, as may be updated from time to time.

All tanks and similar storage facilities except those used for water will be constructed and appropriately bunded in accordance with the relevant Australian Standards.

Storage handling and transportation of dangerous goods will be undertaken in accordance with Australian Standards and the Dangerous Goods Code, as may be updated from time to time.

6.3 *Operational Environmental Management*

Potential impacts associated with operation of the Project will be managed in accordance with the commitments in the modifications 3 and 4 environmental assessments and the revised commitments in the corresponding response to submission reports. These commitments are in Appendix 6 of the Project Approval and those relevant to Phase 1a are replicated in Table 5.

These management measures are also provided in the corresponding management plans described in Section 1.3 where required.

Table 5 Environmental management measures

Measure	Timing/ frequency
General	
1. The Proponent shall implement all practicable measures to prevent or minimise harm to the environment that may result from the construction, operation or rehabilitation of the project.	Duration of the Project
2. CSR will apply to amend EPL 684 to reflect the project.	As required
3. The environmental management strategy and sub plans will be amended to reflect the project.	As required
Air quality	
4. The Proponent will prepare an Air Quality and Green House Gas Management Plan (AQGHGMP) for the project to the satisfaction of the Director-General. The AQGHGMP will outline the purpose, methodology and expected outcomes of the dust monitoring, and will include the following content:	Prior to VENM importation
▪ Dust fraction to be measured, i.e. TSP, PM10, PM2.5 etc.;	
▪ Equipment to be used to measure selected dust fraction;	
▪ Frequency of the monitoring, i.e. sample collection schedule;	
▪ Duration of the monitoring program;	
▪ Location of the monitoring station/s;	
▪ Standards/guidelines that are to be followed for location/construction of the monitoring station, equipment calibration, collection of samples and analysis of samples;	
▪ Calibration methodology and schedule;	
▪ Reporting procedure;	
▪ Regulatory guidelines and compliance criteria;	
▪ Action levels and contingency measures in the event that pollutant concentrations approach or are likely to exceed the relevant compliance criteria; and	
▪ A consultation program that involves nearby agricultural producers and residents, in order to determine if the dust mitigation measures are being affective.	
5. The AQGHGMP will detail measures to control dust and emissions from the Project Site including the following measures:	

▪ Haul roads should be watered using water carts such that the road surface has sufficient moisture to minimise visible on-road dust generation but not so much as to cause pooling and mud/dirt track out to occur	
▪ Unloading of trucks containing raw or unusable extracted material to be controlled using water sprays/dust suppression when generating excessive visible dust.	
▪ Dust from existing stockpiles of unusable material and open pits to be controlled using water sprays with chemical additives (surfactants);	
▪ Completed pits to be revegetated as soon as practicable after completion of quarrying activities.	
▪ Disturbed soil surfaces to be revegetated in accordance with the RMP for the Project Site.	
▪ Operational practices to be reviewed to ensure 'best practice' techniques are being employed and that operational equipment is working efficiently	
(6) The existing HVAS will be moved to as close to the northern boundary of the property and the closest sensitive receiver as possible.	Prior to VENM importation
(7) The existing deposited dust gauges will be relocated to appropriate positions as close to the property boundaries and nearest sensitive receivers as possible.	Prior to VENM importation
(8) If HVAS and deposited dust air quality monitoring identifies ongoing exceedances of the relevant air quality criteria then the reactive dust management program may need to be reinstated at the site.	As required
Noise	
9. The Proponent will implement all practicable measures to undertake the development in a way that minimises the noise generated. The Proponent has made the following commitments in relation to operation noise management:	Duration of the Project
17.Construction works shall be limited to 7am to 6pm Monday to Friday and 8am to 1pm on Saturdays.	During construction
18. A CNVMP will be prepared and implemented during project construction.	Prior to works
18. The construction noise mitigation measures described in Chapter 5.5 of the preferred project noise impact assessment report (appended to the RTS) shall be implemented.	During construction
19. Vibration during construction will be managed through the CNVMP to ensure that vibration impacts comply with the limits prescribed in British Standard BS 7385 for structural damage and in Assessing Vibration: a technical guide (DECCW, 2006) for human response.	During construction
20. The Proponent and/or its appointed contractors will select and maintain bulk earthwork machinery as specified in the preferred project noise impact assessment report (appended to the RTS).	Duration of the Project
21. Broadband reversing alarms or other non-tonal vehicle movement and warning alarms shall be fitted to all machinery on site. The potential noise impact associated with reversing alarms shall be managed and minimised via a combination of proactive driver/operator training and operational procedures.	Duration of the Project

22. The Proponent shall implement a noise monitoring programme which would involve quarterly attended noise monitoring at a number of nearby identified receiver locations for 12 months after all Modification 3 and 4 activities are in full operation. If there are no exceedances of the project noise trigger levels during quarterly noise monitoring during the first year of monitoring then noise monitoring will cease. Additional noise monitoring would be undertaken in response to any noise complaints.	For the first 12 months of the Project
23. The Proponent shall undertake consultation with identified Martin Road residential receivers predicted to exceed the RNP criteria and conduct further investigation of their residences (as detailed in Section 2.3.3 and 4.1 of the RTS) to determine whether they qualify for and require the 'Type 1' treatment package from RMS's (2015) At-receiver Treatment Guideline.	Prior to increase of heavy vehicle movements above the original Project Approval heavy vehicle movement limits
23. Further investigations of the six residences potentially affected by road noise will be undertaken prior to increasing heavy vehicle movements along Martin Road above the approved heavy vehicle numbers and no greater than 180 truck movements in the daytime period. The investigation will determine whether the residences require the 'Type 1' treatment package from RMS's (2015) At-receiver Treatment Guideline.	Prior to increase of heavy vehicle movements above the original Project Approval heavy vehicle movement limits
24. Prior to construction of the Martin Road-Elizabeth Drive intersection, existing road noise levels would be qualified to determine if architectural treatment should be offered to receivers along Elizabeth Drive raising complaints about increased road noise levels.	Prior to construction of intersection
24. The Proponent will maintain a noise complaint register.	Duration of the Project
Surface water – stormwater management	
25. The Proponent shall manage surface water on the Project Site in accordance with the WMP prepared for the Project Site and revised for the project, including surface water management measures include in the Modification 3 and 4 EA and the RTS.	Duration of the Project
26. If during the operational phase of the quarry or on completion of the quarry operations, the proponent wishes to make use of the water from the pits/dams in the brick making process or for reuse at other premises offsite etc, a licence will be obtained from DPIE.	Prior to dewatering of pits
27. Sediment basins 4, 5 and 6 and the new basins at the raw material stockpile area and Pit 3 will be sized and operated in accordance with Landcom's (2004) Managing Urban Stormwater: Soils & Construction. If any of these basins are to be modified to perform additional stormwater treatment functions in future (other than sediment capture), then appropriate modelling and design of the basins will be required at that time. In this case monitoring of discharges from the basin at Pit 3 to South Creek will be required.	Prior to works
28. The site WMP will be revised prior to commencement of the modification to include the revised surface water management approach, and monitoring of any water discharged from the site.	Prior to works
Surface water – monitoring	
29. Electrical conductivity, pH, total nitrogen, total suspended solids, turbidity, total alkalinity, arsenic and copper will be monitored at the discharge points to Badgerys Creek and South Creek. Discharges will be monitored daily during the first month of continuous discharge, then weekly if the first month of data does not exceed concentration limits. Monitoring will revert to daily if any limits are exceeded and/or concentrations are reduced below limits.	Duration of the Project

30. Total dissolved solids, total phosphorus, arsenic, cadmium, chromium, lead, nickel, zinc and mercury will be sampled weekly during the first two months, which will reduce to monthly if there are no exceedances.	Duration of the Project
31. The analytes previously sampled in Pit 1 will be monitored at three depth levels from the surface to 6 m at two locations near the discharge point to Badgerys Creek. Water will be monitored weekly for three weeks prior to discharge, then monthly. This monitoring will continue for the life of the project, and in the perched treatment basin described above.	Duration of the Project
32. Similar sampling is also required for the new basin at Pit 3 if the basin is being used to treat Pit 3 water (other than sediment capture). The list of analytes may be able to be reduced according to the future quality of stormwater collected in Pit 3.	Duration of the Project
Surface water – licensing and approvals	
33.CSR will apply to the EPA to amend the EPL to incorporate the discharge rates and concentration limits for relevant physical and chemical stressors, and toxicants, at the discharge point to Badgerys Creek.	Prior to works
34.CSR will apply to the EPA to amend the EPL, if and when required, to incorporate appropriate discharge rates and concentration limits for discharges from the basin at Pit 3, for which time the basin provides additional water treatment other than sediment capture.	As required
35.CSR will consult DPIE Water on the need for water licenses associated with the modification.	Prior to works
36. The EPA will be engaged, post approval, to determine whether the pit water must be classified in terms of the Protection of the Environment Operations Act 1997 (POEO Act) and to include the discharge point in the EPL.	Prior to works
Surface water – erosion and sediment control	
37. Erosion and sediment controls will be implemented at the pit areas once they are filled with VENM and rehabilitation has commenced. These measures will remain in place until surfaces are fully stabilised.	During rehabilitation
38. Erosion and sediment controls will be implemented along the unsealed VENM haul road, which will direct runoff to the pits or local sediment traps.	Duration of the Project
Groundwater	
39. The Proponent shall prepare and implement a Groundwater Monitoring Program for the Project Site generally in accordance with the methodology provided in Chapter 11 of the 2011 EA, subject to consultation with the DPIE (water, lands and primary industry) and the satisfaction of the Director-General of the DP&I.	Prior to and for the duration of the project
40. The WMP will be updated to include the groundwater monitoring network and a TARP for exceedances of groundwater criteria, which will be developed based on the baseline groundwater data.	Prior to works
41. The Proponent shall report the results of the Groundwater Monitoring Program to the Secretary of the DPIE on an annual basis.	Duration of the Project
42. The Proponent shall implement appropriate management measures in relation to groundwater as indicated by the Monitoring Program and agreed with the Secretary.	Duration of the Project
43. A licence to authorise any groundwater monitoring installation, required as part of this project, shall be obtained from the DPIE Water prior to any drilling commencing.	Prior to works
Rehabilitation	
45. The site will be progressively rehabilitated in accordance with the approved rehabilitation strategy and rehabilitation management plan.	During rehabilitation
46. The rehabilitation strategy and rehabilitation management plan will be revised to incorporate the project, and any additional management strategies to ensure temporary stabilisation of exposed surfaces, permanent stabilisation strategies and progressive rehabilitation with groundcover vegetation.	Prior to works
47. The rehabilitation management plan will be revised to exclude plant species that are known to attract wildlife and grow to a size which will penetrate the OLS.	Prior to works
48. The Proponent shall carry out rehabilitation works at the Project Site in accordance with the RMP prepared for the Project Site.	During rehabilitation

49. The Proponent will prepare a Final Landform Rehabilitation Plan in consultation with the DPIE two years prior to the completion of all approved quarrying activities.	Two years prior to the completion of quarrying
Traffic and transport	
50. The Proponent shall manage traffic movements to and from the Project Site generally in accordance with the following:	
▪ Personnel operating trucks and vehicles to and from the Project Site would be required to undertake a site-specific health and safety induction, specifying operating hours and vehicle speed limits on Martin Road.	Duration of the Project
▪ A heavy vehicle protocol would be developed for the Project Site and distributed to relevant staff and contractors during induction procedures. The protocol would deal with such issues as timing of vehicle movements, idling of vehicles, speed limits and parking.	Prior to works
▪ Unnecessary vehicle movements would be minimised where possible.	Duration of the Project
▪ Deliveries would be scheduled on larger capacity 'Truck and Trailer' vehicles rather than 'Truck Only' vehicles where possible to minimise truck movements.	Duration of the Project
▪ A construction traffic management plan will be prepared and implemented to manage impacts on the road network, including the intersection, from construction vehicles.	Prior to and for the duration of the project
▪ Traffic signals and road upgrades will be constructed at the Martin Road-Elizabeth Drive intersection prior to increasing heavy vehicle movements from the project above the approved heavy vehicle numbers.	Prior to increase of heavy vehicle movements above the original Project Approval heavy vehicle movement limits
▪ CSR will contribute to the upgrade and ongoing maintenance of Martin Road in accordance with the deed of agreement with LCC.	Duration of the Project
Cultural heritage	
51. The Proponent shall adopt the following measures in relation to the management of cultural heritage on the Project Site:	
▪ The heat retainer hearth will continue to be protected by a fenced 10m exclusion zone.	Duration of the Project
▪ All Aboriginal heritage items collected during survey and test excavations will be reburied with the hearth in consultation with the RAPs.	During surveys and excavations
▪ Should Aboriginal objects be uncovered during the course of the approved works, works shall cease. In cases where historical items have been uncovered, Heritage NSW is to be advised or should indigenous items be uncovered the National Parks and Wildlife Service shall be advised.	Duration of the Project

▪ Workers/contractors shall be informed of their obligations under the NPW Act 1974, namely that it is illegal to disturb, damage or destroy an Aboriginal object without the prior approval of the Secretary of DPC.	Prior to and for the duration of the project
▪ Should human remains be found in, on, or under the land during construction, the responsible party shall: ○ Contact the local police. ○ Not disturb or excavate the remains. ○ Immediately cease all work at the particular location. ○ Notify the Heritage NSW (DPC) office as soon as practicable and provide any available details of the remains and their location. ○ Not recommence any work at the particular location until authorised in writing by the Heritage NSW.	Duration of the Project
52. The AHMP will be updated with the findings of the Modification 4 ACHA.	Prior to works
Ecology	
53. The Proponent shall adopt the following measures in relation to the removal of any trees on the Project Site:	
▪ The canopy of the trees to be visually inspected prior to clearing to assess for the presence of fauna. Where bird species are detected the tree is to be nudged prior to felling to encourage the fauna to vacate the tree prior to felling. Trees to be left in situ until the birds leave the canopy.	Prior to the removal of any trees
▪ Felled trees are to be left in-situ for at least 24 hours to allow fauna species to relocate. Qualified personnel are to be on hand to check for wildlife and relocate them.	During the removal of any trees
▪ Felled wood is to be relocated to the remnant woodland (and not placed in piles) or chipped and used in rehabilitation areas.	After the removal of any trees
▪ Should any wildlife be inadvertently injured during the proposed works, WIRES or an accredited veterinarian shall be contacted.	Duration of the Project
▪ A 60 m buffer area shall be provided along Badgerys Creek and the Badgerys Creek tributary, except where Pit 2 extends into these buffers. Rehabilitation works are to be undertaken in this area in accordance with the RMP.	Duration of the Project
▪ Five local native trees shall be planted for each mature native tree that is removed. The replacement trees shall consist of a diversity of local provenance tree species from the native vegetation community (or communities) that occur, or once occurred on the site. The plantings shall be located adjacent to the riparian vegetation along South Creek, Badgerys Creek and its tributary.	
Aquatic biodiversity	
54. A 40 m vegetated riparian zone will be maintained around the wetland adjacent to South Creek and 20 m zone will be maintained around the tributary to Badgerys Creek (except over Pit 2).	Duration of the Project
55. As the hydraulic modelling for the surface water assessment was indicative, geomorphology will be assessed in greater detail to validate the bed and bank materials of	Prior to finalisation of

Badgerys Creek prior to finalisation of the pit dewatering strategy. This will include quantification of bed and bank material and particle size and calculation of critical shear stress for the bed and bank to determine its sensitivity to erosion.	the dewatering strategy
56. If the bed and bank materials are demonstrated to be sensitive to erosion, the optimum flow rate that can be achieved without impacting the creek bed and banks will be determined in a sediment transport model.	Prior to finalisation of the dewatering strategy
57. It will be necessary to gain further water quality and flow data to determine the impact of discharges on Badgerys Creek. Water quality will be monitored every month at the four Badgerys Creek and South Creek monitoring locations as described in Section 6.3.2 of the EA. This will include nitrogen speciation to determine which portion of nitrogen is bioavailable and could impact aquatic ecosystems.	Prior to and for the duration of the Project
58. A biological monitoring program will be developed to detect if the macroinvertebrate community is changed by exposure to discharge water. An in-stream vegetation monitoring program will be prepared and implemented to detect if the discharge is impacting vegetation community composition and mortality.	Prior to and for the duration of the project
59.Monitoring for changes to instream vegetation and macroinvertebrates will be incorporated into a pit dewatering plan as a sub-plan to the existing water management plan.	Prior to finalisation of the dewatering strategy
60.CSR will compile a fauna relocation plan. This plan will develop strategies for aspects such as transferring aquatic fauna, acclimatising aquatic fauna to different water conditions and managing pest species. DPIE will be consulted during the development of this strategy.	Prior to finalisation of the dewatering strategy
Contamination	
61. The potential presence of asbestos in the eastern edge of Pit 1 will be added to the site Asbestos Register.	Prior to works
62. A materials management plan will be prepared to ensure that surface water, backfilled material and imported soils are handled appropriately, do not pose a risk to human health or the environment and will be suitable for the proposed land use. The plan will provide procedures to appropriately quantify, classify, dispose of and report on potential contaminants.	Prior to works
63. A UFP will be prepared, providing guidance in the event that future below ground excavations identify contaminated materials (e.g. asbestos, staining, odours). The UFP will outline procedures for handling, assessing and managing any contamination that may be identified as part of Modification 4 works. If previously unidentified contaminated materials are encountered during construction and operation of the proposed modification, relevant statutory requirements, including potential soil testing and waste classification, will need to be complied with, and the material managed and disposed of appropriately.	Prior to works
64. Stored/stockpiled materials within the proposed disturbance footprints will be inspected and they will be recycled or disposed at facilities which can legally receive such materials.	Duration of the Project
65. Soil materials within the vicinity of the Modification 3 works will be assessed in accordance with NSW EPA (2014) Waste Classification Guidelines and either re-use them on site where suitable or dispose of them offsite to a landfill which can legally receive such materials.	Duration of the Project
66.Conduct a hazardous material survey on existing site structures prior to demolition/alteration activities.	Prior to demolition/ alteration
Waste	
67. The Proponent shall manage waste in relation to the project in accordance with the existing WMP for the Project Site.	Duration of the Project
68. The existing WMP will be updated to include the importation and handling of VENM.	Prior to works

69. All waste generated on site will be managed in accordance with the site's waste management plan that will follow the waste hierarchy of avoid, reduce, re-use, recycle and will be updated to include project works.	Duration of the Project
Visual amenity	
70. Proposed lighting at the site will still comply with Australian Standard AS4282 (INT) 1995 - Control of Obtrusive Effects of Outdoor Lighting.	Duration of the Project
Environmental management	
72. The Proponent shall prepare an EMS for the Project Site to provide environmental management practices and procedures to be followed during the operation of the project. The EMS shall include, but not necessarily be limited to:	Prior to works
▪ identification of statutory and other obligations that the Proponent is required to fulfil in relation to operation of the project;	
▪ a description of the roles and responsibilities for all key personnel involved in environmental management of the project;	
▪ the environmental policies and principles to be applied to the operation of the project; and	
▪ describe in general terms how the environmental performance of the project would be monitored and managed.	

6.3.1 Extraction Limitations

In accordance with Schedule 2 Condition 18 a registered surveyor has marked out the boundary of the approved area of extraction within Pit 3 – Refer to Figure 4. These boundaries are marked on site by large pegs with high visibility markings and a written explanation as to what they represent (eg NE cnr Pit 3).

Within these extraction areas, PGH will not extract any extractive materials or carry out any work in the extraction area below 35 m below the pre-existing natural surface of the ground, other than construction of approved bores or in-pit sumps.

6.3.2 Additional rehabilitation matters

The site will be rehabilitated to the satisfaction of the Secretary. This rehabilitation will be generally consistent with the proposed rehabilitation strategy described in the EA and the Rehabilitation Management Plan (RMP), and will comply with the objectives in Table 6.

Table 6 Rehabilitation objectives

Feature	Objective
All areas of the site affected by the project	▪ Safe ▪ Hydraulically and geotechnically stable ▪ Non-polluting ▪ Fit for the intended final land use(s)

	▪ Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and minimising visual impacts when viewed from surrounding land
Surface infrastructure	▪ Decommissioned and removed, unless otherwise agreed by the Secretary
Landscaping bunds	▪ Hydraulically and geotechnically stable ▪ Vegetated
Pit 1, 2 and 3	▪ Backfilled to a landform that is consistent with natural ground level and is geotechnically stable ▪ Free draining

The Rehabilitation Management Plan (RMP) will be implemented progressively and as soon as reasonably practicable following disturbance to minimise the total area exposed for dust generation at any time.

CSR will complete the backfilling of Pits 1 and 2 within 6 years of commencement of Phase 1 or otherwise agreed by the Secretary, and pit 3 within 2 years of date of completion of extraction activities in Pit 3.

A Final Landform Rehabilitation Plan will be prepared in consultation with the BCD, DPI&E and DRG and any other relevant authorities or agencies two years prior to the completion of all approved quarrying activities.

6.3.3 Dewatering

CSR will undertake the Dewatering works in accordance with the Dewatering Management Plan and the Dewatering Infrastructure Plan.

CSR has entered into an agreement with WSA for them to take the Pit water from Pit 1 to their site for their dust suppression during their Civil works. The dewatering infrastructure is in place concurrently and will be managed in accordance with the approved management plans.

7 Monitoring and Performance Criteria

7.1 *General*

Inspection, monitoring and auditing will be undertaken to assess and record whether activities are in compliance with regulatory requirements and the objectives outlined in the Health, Safety and Environment Management System, which guides Project Site operations.

7.2 *Environmental Monitoring*

A summary of parameters to be monitored and their performance criteria are given in the tables below. Monitoring locations are given on Figure 3. Details are given in each Management Plan.

7.3 *Construction Monitoring*

Table 7 summarises specific performance criteria relating to construction activities, responsibilities, and where more detailed information may be found. Monitoring locations are given on Figure 3.

Table 7 Construction environmental management commitments

Condition	Action	Details	Responsible Staff	When
S3 C3	Approved construction works must be undertaken during standard construction hours	Noise Management Plan	Site Manager	During construction

7.3.1 Operational Monitoring and Inspections

Table 8 Operational environmental monitoring requirements to 17 summarise specific performance criteria relating to operational activities within the site, responsibilities, and where more detailed information may be found. Monitoring locations are given on Figure 3.

Table 8 Operational environmental monitoring requirements

Condition	Action	Details	Responsible Staff	Accountability	When
S2 C18	Extraction areas to be surveyed and plan supplied to DPI&E	Section 6.3.1	Registered Surveyor	Raw Materials Manager	Completed
S2 C18	Extraction boundaries clearly marked on site	Section 6.3.1	Raw Materials Manager	Raw Materials Manager	Completed

S2 C19	No unapproved works below 35m below pre-existing natural ground level	Section 6.3.1	Raw Materials Manager	Raw Materials Manager	Prior to commencement of the Project, then every 3 months
Condition	**Action**	**Details**	**Responsible Staff**	**Accountability**	**When**
S3 C5	Noise generated from the project will not exceed criteria (Table 8)	Noise Management Plan (NMP)	Noise consultant	Site Manager	During operations – measured within 14 days of commencement of the Project
S3 C6	Traffic noise generated by the project will not exceed criteria (Table 10)	Noise Management Plan (NMP)	Noise consultant	Site Manager	Prior to commencement of the Project
S3 C9	Particulate matter emissions generated by the project will not exceed criteria (Table 13) at any residence on privately owned land	Air Quality Management Plan (AQMP)	Laboratory	Site Manager	During operations Excluding extraordinary events
S3 C14	Operate a meteorological station in the vicinity of the site	Air Quality Management Plan (AQMP)	Laboratory	Site Manager	During all operations
S3 C19	All surface water discharges will comply with volume and quality limits (Table 14)	Soil and Water Management Plan (SWMP)	Laboratory	Site Manager	During surface water discharge events
S3 C23 ii	Surface water quality in the vicinity of the site will be monitored for potential impacts (Table 15, Table 16)	Soil and Water Management Plan (SWMP)	Laboratory	Site Manager	Table 14, Table 15, and Table 16

S3 C23 iii	Groundwater quality in the vicinity of the site will be monitored for potential impacts (Table 18)	Groundwater Management Plan (GWMP)	Laboratory	Site Manager	Table 18
S3 C26	Laden truck time, date, weights, and load type to be recorded and reported	Traffic Management Plan (TMP)	Weighbridge operator	Site Manager	All laden VENM import trucks Published 6 monthly
S3 C30	Monitor identified places or objects of Aboriginal Heritage	Aboriginal Heritage Management Plan (AHMP)	Nat Env manager	Site Manager	Prior to clearing activities
S3 C36	Monitor Rehabilitation	Rehabilitation Management Plan (RMP)	Rehabilitation Manager	Site Manager	As per Rehabilitation Management Plan (RMP)

Table 9 Operational noise criteria

Receiver ID	Morning Shoulder	Day	Evening	Night	
	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	L_{AFmax}
R9, R25, R35	43	45	40	38	52
R5, R26, R27, R28, R29, R30, R31, R32, R34, R42, R43, R44, R45, R46	42	42	41	38	52
R11, R12, R13, R14, R15	43	43	43	38	52
All other residences	-	40	35	35	52

Reference: Table 2 of Project Approval.

Table 10 Road traffic noise criteria

Road Noise Receiver ID	Day / Evening $L_{Aeq\ (1\ hour)}$	Night $L_{Aeq\ (1\ hour)}$
Prior to Martin Road – Elizabeth Road Intersection Upgrade		
Residents on Martin Road	60	55
Following Martin Road – Elizabeth Road Intersection Upgrade		
RN5	61	55
RN9, RN21	62	55
RN14, RN22	63	55
RN16	64	55
All other residences on Martin Road	60	55

Reference: Table 3 of Project Approval.

Table 11Ambient air quality criteria

Pollutant	Averaging Period	Criterion	
Particulate Matter < 2.5 µm (PM_{10})	Annual	[a,d]8 µg/m^3	
Particulate Matter < 2.5 µm (PM_{10})	24 hour	[b]25 µg/m^3	
Particulate Matter < 10 µm (PM_{10})	Annual	[a,d]25 µg/m^3	
Particulate Matter < 10 µm (PM_{10})	24 hour	[b]50 µg/m^3	
Total Suspended Particulates (TSP)	Annual	[a,d] 90 µg/m^3	
[c] Deposited Dust (Insoluble Solids)	Annual	[b] 2 g/m^2/month	[a,d] 4 g/m^2/month

Notes for Table 10:

[a] *Total impact (ie increase in concentrations due to the project plus background concentrations due to all other sources).*

[b] *Incremental impact (ie increase in concentrations due to the project alone, with zero allowable exceedances of the criteria over the life of the project.*

[c] *Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method.*

[d] *Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.*

[e] *Reference: Table 4 of consent.*

Table 12 Point source air quality criteria

Pollutant	Units	100 percentile Concentration Limit	Method
Total Solid Particles	mg/m^3	100	TM-15
Hydrogen fluoride	mg/m^3	50	TM-9
Nitrogen Oxides	mg/m^3	2000	TM-11
Chlorine	mg/m^3	NL	TM-7
Dry gas density	kg/m^3	NL	TM-23
Moisture content	%	NL	TM-22
Molecular Weight of stack gases	g/g mole	NL	TM-23
Odour	Odour	NL	OM-8
Temperature	°C	NL	TM-2
Type I substances	mg/m^3	NL	TM-12
Pollutant	**Units**	**100 percentile Concentration Limit**	**Method**
Type II substances	mg/m^3	NL	TM-13
Velocity	m/s	NL	TM-2
Volatile organic compounds	mg/m^3	NL	TM-34
Volumetric Flowrate	m^3/s	NL	TM-2

NL To be monitored but no criteria specified.

Table 13 Surface water monitoring program

Aspect	Parameters	Frequency	Compliance Criteria
Monitor water quality at three locations: a) Confluence of Badgerys Creek tributary and Badgerys Creek– b) 100m upstream from of confluence point c) 100m, downstream from confluence point	Total Phosphorus	Annually and following rainfall events exceeding 15mm in a 24-hour period	<1.0mg/L
	Filterable Reactive Phosphate		<0.35mg/L
	Oxides of Nitrogen		<0.18mg/L
	Ammonium		<0.48mg/L
	Dissolved Oxygen		85-110% saturation
	Total Nitrogen		8.7mg/L
	pH		6.5-8.0
	Conductivity		<3,200µS/cm

Table 14 Stream health monitoring program

Aspect	Parameters	Frequency	Compliance Criteria
Monitor geomorphology and riparian vegetation condition in Badgerys Creek	Visual baseline to be established	Quarterly	No deterioration from baseline for riparian vegetation condition and morphology due to site operations

Table 15 Discharge quality criteria

Aspect	Parameters	Frequency	Compliance Criteria
Monitor discharges prior to any event which requires discharge of dirty water from site	pH	Event based	6.5-8.0
	Conductivity		<3,200µS/cm
	Total Suspended Solids		<50mg/L

Table 16 Water usage criteria

Aspect	Parameters	Frequency	Compliance Criteria
Site Water Balance	Rainfall	Monthly (download from on-site weather station)	Not applicable
	Water usage on site	Event based	Not applicable
	Discharge volumes	Event based	Not applicable
	On-site transfers	Event based	Not applicable
	Pit water levels	Annually	Not applicable

Table 17 Groundwater assessment criteria

Parameter	Location	Frequency	Criterion
Depth below ground level, pH EC	8 bores as per Figure 3	Every 2 months	None provided

Depth below ground level, pH EC, TDS, Na, K, Ca Mg, Cl, HCO3, NO2, SO4 and hardness		Annually	None provided

7.4 *Inspections*

Monitoring of the implementation of the various management plans will be undertaken as part of regular site inspections by CSR management and HSE Personnel. Inspection of activities will be undertaken quarterly by supervisory staff. On-going monitoring of these activities is essential to ensure compliance with regulatory requirements and conditions of approval.

8 Evaluation and Review

8.1 *Annual Review*

Prior to commencing VENM import, and annually thereafter, CSR will submit a review to the Department reviewing the environmental performance of the project to the satisfaction of the Secretary. This review will:

a) describe the project (including any progressive rehabilitation) that was carried out in the previous calendar year, and the project that is proposed to be carried out over the current calendar year;
b) include a comprehensive review of the monitoring results and complaints records of the project over the previous calendar year, which includes a comparison of these results against the:

- relevant statutory requirements, limits or performance measures/criteria;
- requirements of any plan or program required under this approval;
- monitoring results of previous years; and
- relevant predictions in the documents listed in condition 3 of Schedule 2;

c) evaluate and report on:

- the effectiveness of the air quality and noise management systems; and
- compliance with the performance measures, criteria and operating conditions in this approval.

d) identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence;
e) identify any trends in the monitoring data over the life of the project;
f) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and
g) describe what measures will be implemented over the current calendar year to improve the environmental performance of the project.

The Proponent must ensure that copies of the Annual Review are submitted to Council and are available to the Community Consultative Committee (see condition 8 of Schedule 5) and any interested person upon request.

8.2 *Strategy, Plan and Program Revision*

All project documents are generated, numbered, approved, revised, transmitted, and stored in accordance with the project's Document Control Plan.

The EMS review ensures the suitability, effectiveness, and adequacy of the plan. The EMS is formally reviewed annually (as a minimum) and as described below.

The review is conducted by a review team comprising the Project Manager (or delegate) and the Environmental Advisor/ Project Environmental Manager (or Safety Manager) and considers performance against the EMS with respect to incident trends and findings from internal and external audits.

The Project Manager (or delegate) ensures any changes to the EMS as a result of review/ change is communicated to personnel.

This environmental strategy and the management plans and programs prepared for the project will be reviewed and revised within three (3) months of the following:

- the submission of an Incident Report (refer 9.2);
- the submission of an annual review (refer 8.1);
- the submission of an audit report (refer 9.4); and
- any modification to the conditions of approval (unless the condition requires otherwise).

This is in accordance with the intent of the conditions of approval to ensure that strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the project.

All approved management plans, strategies and programs will be implemented until any updated measures have been approved by the relevant authorities.

9 Reporting

CSR will provide regular reporting in accordance with the approval, ML and EPL conditions. Approved plans, strategies and programs, monitoring results and environmental performance will be published on the website.

Environmental reporting is carried out both through the CSR internal reporting system, on a daily basis, and directly to senior management through monthly reports. Reporting will cover the following:

- Incidents, including exceedances of impact assessment criteria and/or performance criteria;
- complaints; and
- non-compliances with statutory requirements;

The key features of the Environmental reporting system include:

- daily inspection and identification of issues by supervisory staff.
- entry into the CSR Safety/Environmental Register which provides:
    - unique identification of each issue including non-compliance;
    - description of the issue;
    - investigation;
    - actions;
    - action completion timeframe and responsibility;
    - monitoring of action due dates and close out;
    - management signoff; and
    - data base of records / incidents.

An Environmental Report is submitted to CSR Senior Management monthly detailing:

- any site non-compliance with statutory and licence requirements;
- inspections and audits by statutory authorities;
- any project or improvement work being conducted on site; and
- any complaints received during the month.

9.1 *Regular Reporting*

9.2 *Reporting under the Conditions of Approval*

In accordance with the conditions of approval, CSR will provide the reports in Table 18 to the Secretary within the nominated timeframe. Details of environmental management plans are given in section 6.0.

Table 18 Reporting requirements from CoA

Condition	Description	Frequency	Distribution
S 3 C 11	Air Quality Audit in accordance with this condition	Prior operations	EPA, DPI&E
S 3 C 26	Truck movement numbers on the website	Every 6 months	Website

S 4 C 1	Notification of Landowners (details in section 9.2) of monitoring results that exceed any criteria in Schedule 3	7 days after obtaining exceeding monitoring results	Affected landowners and tenants
S 4 C 2	Independent Review (details in section 9.3)	Within 3 months of request from DPI&E	DPI&E, relevant landowner
S 5 C 9	Incident reporting (details in section 9.2)	Immediately through the Department's Major Project Website	DPI&E and any other relevant agency
S 5 C 10	Non-Compliance Notification	Immediately through the Department's Major Project Website	DPI&E and any other relevant agency
S 5 C 11	Regular reporting on the website (details in section 9.1.4)	Following commencement of works – Phase 1	Website
S 5 C 12	Annual Review (details in section 8.1)	Prior to commencement of VENM import thence annually	DPI&E, Council, CCC
S 5 C 13	Independent Environmental Audit (details in section 9.4)	Prior to commencing VENM import and annually thereafter	DPI&E and other agencies upon request

9.3 *Reporting under the Mining Lease*

In accordance with ML1771, CSR will provide the reports in Table 1820 to the DRG within the nominated timeframe.

Table 19 Reporting requirements from ML

Condition	Description	Frequency	Distribution
S 2 C 3(f)	Prepare a Rehabilitation Report that includes a detailed review of the progress of rehabilitation against the performance measures and criteria established in the Mining Operations Plan (MOP) in accordance with any relevant annual reporting guidelines published on the Department's website at https://www.resourcesandgeoscience.nsw.gov.au/miners and-explorers/applications-and-approvals/environmentalassessment/mining	Submitted annually on the grant anniversary date (4th May) or at such other times as agreed by the Minister	DRG
S 2 C 4	Non-compliances to be reported on the form specified (details in section 9.2)	Within 7 days	DRG
S2 C 5	Environmental Incident notifications and reports are to be provided to the Secretary	Within 7 days	DRG
	Exploration reports will be prepared in accordance with "Exploration Reporting: A guide for reporting on exploration and prospecting in New South Wales"	Submitted annually on 4th June (one month after the grant anniversary date of 4th May)	DRG

9.4 *Reporting under the EPL*

In accordance with EPL 684, CSR will provide the reports in Table 20 to the EPA within the nominated timeframe.

Table 20 Reporting requirements from EPL

Condition	Description	Frequency	Distribution
R1.1	Complete an Annual Return in the approved form comprising: a) A Statement of Compliance b) A Monitoring and Complaints Summary	Annually, submitted before 17th January	EPA
R2.1	Notification of environmental harm (details in section 9.2)	Immediately to 131 555, written details within 7 days	EPA
R3	Written report requested by EPA (details to be specified by requesting officer)	As requested	EPA

9.4.1 Information Required on the Website

In accordance with the Conditions of Approval and the EPL, CSR will make the following information associated with the Badgerys Creek project available on its website.

- the documents listed in section 1.3;
- current statutory approvals for the project;
- all approved strategies, plans and programs required under the conditions of approval;
- regular reporting on the environmental performance of the project in accordance with the reporting arrangements in any plans or programs approved under the conditions of approval;
- a comprehensive summary of the monitoring results of the project, reported in accordance with the specifications in any conditions of approval, any approved plans and programs, and the EPL;
- summary of the current stage and progress of the project;
- contact details to enquire about the project or to make a complaint;
- a complaints register, updated at least monthly;
- the Annual Reviews of the project; and
- any Independent Environmental Audit as described in section 9.4, and the operators' response to the recommendations in any audit.

9.5 *Incident and Non-compliance Reporting*

For the purposes of this EMS, an 'incident' is an occurrence or set of circumstances that:

- causes or threatens to cause material harm to the environment; and/or
- breaches or exceeds the limits or performance measures/criteria in the Project Approval

A 'non-compliance' is an occurrence, set of circumstances or development that is a breach of the Project Approval.

Common types of environmental incidents include:

- sewage spills (to land or to water)
- hydrocarbon spills (to land or to water)
- sediment discharge (to land or to water)
- unexpected finds (cultural heritage); and
- damage to heritage items or protected flora and fauna.

Possible non-compliances include non-compliance with the management measures outlined in this EMS, and mitigation strategies/ management measures outlined in the management plans.

Where detected, any non-compliance or environmental impact exceeding specified limits are investigated by the Environmental Advisor to determine the extent of possible non-conformance. The non-compliance is corrected as soon as possible with necessary action taken to prevent recurrence.

All non-compliances are reported and clearly identify the corrective/ preventative actions to be taken and the close-out date.

9.5.1 Responsibility

The Site Manager is responsible for ensuring that the appropriate management response and handling procedures are instigated and carried through in the event of an incident and/or non-compliance. All employees, contractors and subcontractors are to:

- Notify the Site Manager of any hazard or potential hazard that may result in an incident and/or non-compliance, regardless of the nature or scale; and
- Take immediate action (where it is safe to do so) to prevent, stop, contain and/or minimise any adverse impact associated with an incident and/or non-compliance.

The induction and toolbox talks will be used to ensure all site employees, contractors and subcontractors are aware of and understand their obligations for incident and/or non-compliance response.

9.5.2 Notification Requirements

9.5.2.1 Incidents

Section 147 of the POEO Act defines material harm as:

(a) harm to the environment is material if:

(i) it involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or

(ii) 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), and

(b) loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment.

Notification responsibilities for incidents that have caused or threaten to cause material harm to the environment are detailed in Section 148 of the POEO Act. In summary, these are broadly categorised as:

Duty of an employee or any person undertaking an activity:

Any person engaged as an employee or undertaking an activity with regard to the project will, immediately after becoming aware of any potential incident (even if outside of normal business hours), notify the Site Manager of the incident and all relevant information about it. The Site Manager will be available 24 hours a day, seven days a week and have the authority to stop or direct works.

Duty of an employer or occupier of the premises to notify:

The employer or occupier of the premises (in this case, the Site Manager) on which the incident occurred, who is notified (or otherwise becomes aware of) of the incident, will immediately notify the relevant authorities about the incident and all relevant information.

Under the POEO Act, "relevant authority" means any of the following:

- The appropriate regulatory authority – DPI&E and/or the EPA;
- If DPI&E an/or the EPA is not the appropriate regulatory authority – the local authority for the area in which the pollution incident occurs (i.e. Council);
- NSW Public Health Unit;
- SafeWork NSW; and
- Fire and Rescue NSW.

Table 21 lists the contact details for these authorities. The person reporting the pollution incident will provide the following key details:

- Location of the pollution incident/emergency;
- Nature of the pollution incident/emergency;
- Their name and contact details; and
- Details of any required assistance.

Table 21 Relevant authorities

Authority	Contact	Details
DPI&E	Compliance Unit	1300 305 695 or 02 9228 6111 compliance@planning.nsw.gov.au
EPA	Environment Line	131 555 info@environment.nsw.gov.au
	Head office (Sydney)	02 9995 5000
Liverpool City Council	Main switchboard	1300 36 2170
NSW Public Health Unit	Western Sydney Local Health District	(02) 8890 5555

SafeWork NSW	Incident Notification Hotline	131 050 Select Option 3 to report a "Serious Incident or Fatality" – this will result in the incident being recorded and the appropriate person being contacted.
Emergency Services	NSW Police NSW Fire and Rescue NSW Ambulance Service	131 444 1300 729 579 Emergency: 000
Division of Resources and Geosciences, Mine Safety and/or Environment Sustainability Unit		1300 814 609 cau@planning.**nsw**.gov.au
Community Consultation Committee		TBC

Once becoming aware of an incident, CSR will immediately (within 24 hours) notify the DPI&E, via the Major Projects website, and other relevant agencies if an incident, or potential incident, causes (or may cause) harm to the environment. The notification must identify the development (including the development application number and the name of the development if it has one) and set out the location and nature of the incident.

9.5.2.2 Non-compliances

DPI&E will be notified via the Major Projects website within seven days of becoming aware of any non-compliance.

A non-compliance notification will identify the development and the application number for it, set out the condition of consent that the development is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.

A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.

9.5.3 Incidents and non-compliance procedure

Upon becoming aware of an incident and/or non-compliance, the procedure outlined below will be followed.

1. Preventative action

   Where possible and safe to do so, immediate action will be taken to prevent, stop, contain and/or minimise the environmental impact of the incident and/or non-compliance.

   In the unlikely event that an incident and/or non-compliance requires the evacuation of the site, actions will be completed in accordance with evacuation procedures. All employees and contractors are to be made aware of the location of emergency assembly areas through site inductions, signage and regular toolbox talks.

2. Assistance

If adequate internal resources are not available and the incident and/or non-compliance threatens public health, property or the environment, it is essential that Fire and Rescue NSW be contacted by telephoning "000" for emergency assistance.

Contacting Fire and Rescue NSW does not negate the notification requirements in the above table.

3. Notify

Under the provisions of the POEO Act, there is a duty to notify any incident that has caused or threatens to cause material harm to the environment and all relevant information about the incident. The specific duties to notify are outlined above.

If there is a serious incident or emergency, it is more than likely that Fire and Rescue NSW will take control and manage the required investigation and remedial activities. Any instructions issued will be strictly adhered to.

DPI&E and other relevant authorities be provided with a written incident notification via the Major Projects website within 24 hours after the incident.

A written notification will:

- Identify the development and application number;
- Provide details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident);
- Identify how the incident was detected;
- Identify when the Applicant became aware of the incident;
- Identify any actual or potential non-compliance with conditions of consent;
- Describe what immediate steps were taken in relation to the incident;
- Identify further action(s) that will be taken in relation to the incident; and
- Identify a project contact for further communication regarding the incident.
- Non-compliances will be notified in accordance with Section 9.2.2.2.

4. Investigate

Immediately investigate the cause of the incident and/or non-compliance.

5. Remedial action

Address the cause of the incident and/or non-compliance and mitigate any further environmental impact. In some instances, outside resources such as specialist contractors/consultants may be required.

6. Record

It is imperative that an honest assessment of the situation is carried out and documented in order to minimise the potential for similar events in the future. On this basis, every incident is to be recorded in an Incident Report. A copy of the completed report will be maintained for at least five years.

A detailed incident report be provided to the DPI&E within 30 days of the incident occurring.

The detailed 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.
- All non-compliances are recorded.

7. Preventative action

Once the incident and/or non-compliance has been suitably handled, appropriate measures will be identified and implemented to reduce the possibility of re-occurrence.

9.5.4 Incidents and non-compliance register

An Incidents and Non-Compliance Register will be maintained and will contain the following:

- A copy of the environmental incident and non-compliance notification requirements and handling procedure described above.
- Site evacuation procedures.
- A separate reference sheet containing the contact details for the site contacts and the contact details for the regulatory authorities listed in Section 9.2.2.
- Blank hard copies of the Incident Report.
- Copies of all completed Incident Reports which are to be maintained for at least five years after the event to which they relate.

9.5.5 Minor environmental incidents

There is the possibility of minor environmental incidents occurring as part of this project. A 'minor environmental incident' is where there has been no potential or actual material harm to the environment. Examples are excessive dust sighted by the project team or a small contained hydrocarbon spill that does not leave a site boundary and are cleaned up without residual on-site environmental harm.

Minor environmental incidents will still be handled under the process outlined in Section 9.2.3 except there will be no requirement for government notification. All minor or major incidents will be recorded in the Incidents and Non-Compliance Register. A minor incident does not constitute a non-compliance with the Project Approval.

9.5.6 Incident reporting

Within 7 days following the incident or non-compliance, an Incident Report will be submitted to the above stakeholders including the following information:

- Time and date of the incident;
- Details of the incident and/or non-compliance (including the condition and instrument breached);
- Measures implemented, or to be implemented to ensure the event ceases and to prevent a re-occurrence;

- Remediation options to be implemented and/or any other course of action taken or to be taken.

EPA and DRG require notification on specific forms that can be found on the relevant websites.

Where the incident relates to an exceedance of monitoring criteria, the results of the monitoring will be supplied to the affected landowners for the following three months as a minimum and until the results are again compliant. If the exceedance relates to an air quality criteria, the affected landowners and current tenants will be supplied with a copy of the NSW Health Fact Sheet "Mine Dust and You".

9.6 *Independent Review*

If a landowner considers the project to be exceeding the relevant criteria in the Conditions of Approval, they may ask the Secretary in writing for an independent review of the impacts of the project on their land.

If the Secretary is not satisfied that an independent review is warranted, the Secretary will notify the landowner in writing of that decision, and the reasons for that decision, within 21 days of the request for a review.

If the Secretary is satisfied that an independent review is warranted, within 3 months, or as otherwise agreed by the Secretary and the landowner, of the Secretary's decision, CSR will:

a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to:

   i. consult with the landowner to determine his/her concerns;

   ii. conduct monitoring to determine whether the project is complying with the relevant criteria; and

   iii. if the project is not complying with these criteria, then identify measures that could be implemented to ensure compliance with the relevant criteria;

b) give the Secretary and landowner a copy of the independent review; and

c) comply with any written requests made by the Secretary to implement any findings of the review.

9.7 *Environmental Auditing*

9.7.1 Independent Environmental Audits

Independent environmental audits will be undertaken in accordance with the Conditions of Approval to assess the compliance of the Project with regulatory requirements during construction and operation, and will be undertaken within 12 months of commencement of the project, thence every 3 years. This audit will:

- be 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;
- assess the environmental performance of the project and assess whether it is complying with the requirements in this approval, the EPL and the ML applicable to the site (including any assessment, plan or program required under these approvals);
- review the adequacy of strategies, plans or programs required under the abovementioned approvals; and

- recommend appropriate measures or actions to improve the environmental performance of the project, and/or any assessment, plan or program required under the abovementioned approvals.
- The audit team will be led by a suitably qualified auditor and include experts in any field specified by the Secretary.

CSR will submit a copy of the audit report within 12 weeks of commencing the audit, or as otherwise agreed by the Secretary, the Proponent shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.

CSR will ensure that records are kept of all auditing that is conducted. Based on results of the audits, CSR management and HSE Personnel will conduct reviews and where practicable implement any recommended corrective actions towards identified environmental impacts or concerns of the project.

9.7.2 Rehabilitation Progress Audit

The effectiveness of the measures implemented to address all aspects of rehabilitation as described in the RMP will be independently audited as described in the Plan.

9.8 *Environmental complaints*

9.8.1 Environmental Complaints

In the event of a third-party environmental complaint the following, the CSR policy will be followed which involves:

- assessing whether it threatens the environment or not,
- follows the implement pollution incident management plan and commences notification protocol
- as well as commence verbal notifications to relevant external authorities
- investigates and verifies complaints, and assesses if excessive off-site impacts have occurred.
- implements corrective measures including modification of execution methods and operational techniques to avoid recurrence or minimise ongoing adverse impacts.
- completes monitoring/ additional investigations to verify the adequacy of the recommendations, as required.
- notifies the complainant of actions taken; and
- continues to monitor activity, if required.

9.8.2 Responsibility

The Community Liaison Manager is responsible for ensuring that the appropriate management response and handling procedures are instigated and carried through in the event of an environmental complaint. The induction and toolbox talks will be used to ensure all site employees are aware of and understand their obligations for complaints response.

All employees who take receipt of a complaint, either verbal or written, are to immediately notify the Site Manager.

9.8.3 Procedure

1. Record and acknowledge

Any employee who receives a complaint, either verbal or written, is to immediately notify the Community Liaison Manager.

In the normal course of events, the first contact for complaints will usually be made in person or by telephone. The complainant's name, address and contact details, along with the nature of the complaint, will be requested. If the complainant refuses to supply the requested information, a note will be made on the form and the complainant advised of this.

2. Assess and prioritise

The Community Liaison Manager will prioritise all complaints by considering the seriousness of the complaint including risk to health and safety and will attempt to provide an immediate response via phone or email.

3. Investigate

A field investigation will be initiated to confirm details relevant to the complaint and the cause of the problem. Any monitoring information and/or records at and around the time of the complaint will be reviewed for any abnormality or incident that may have resulted in the complaint.

If the complaint is due to an incident, the notification requirements and handling procedures outlined in Section 9.2 will be followed.

4. Action or rectify

Once the cause of the complaint has been established, every possible effort will be made to undertake appropriate action to rectify the cause of the complaint and mitigate any further impact. The Community Liaison Manager will assess whether the complaint is founded or unfounded and delegate the remediation, as required.

5. Respond to complainant

The Community Liaison Manager will oversee the rectification of the issue and respond to the complainant once the issue has been resolved. The complainant will be provided with a follow up verbal response on what action is proposed. Where a complaint cannot be resolved by the initial or follow-up verbal response, a written response will be provided to the complainant.

6. Record

Every complaint received is to be recorded in the Complaints Register, which will be uploaded to the website within 3 months of the determination of Modification 3 and 4 and will be updated monthly.

7. Preventive action

Once the complaint has been suitably handled, appropriate measures will be identified and implemented to negate the possibility of re-occurrence. The complaint is not closed out and the Complaints Register is not finalised until the preventative actions are completed and recorded.

9.8.4 Dispute Resolution

The dispute resolution process meets the requirements of the Work Health and Safety Regulation 2011.

If there is a dispute that arises between CSR and Council or a public authority, in relation to an applicable requirement in the Project Approval or relevant matter relating to construction or operation of the project, either party may refer the matter to the Planning Secretary for resolution. The Planning Secretary's determination of any such dispute will be final and binding on the parties.

In the case of a dispute between CSR and a community member/complainant, either party may refer the matter to the DPI&E and/or relevant regulatory authority for consideration, advice and/or negotiation. If the matter escalates, a third party mediator may be required.

9.9 *Other Notification Requirements*

9.9.1 Out-of-hours Works

The following activities may be undertaken outside of permissible operating hours. When this occurs, CSR will notify the DPI&E and affected residents prior to undertaking the activities, or as soon as practical thereafter.

- Activities that are inaudible at residences on privately-owned land;
- The delivery or dispatch of materials as requested by the NSW Police Force or other public authorities for safety reasons; or
- Emergency work to avoid the loss of life, property or to prevent material harm to the environment.

9.9.2 Written report to EPA

Where an authorised officer of the EPA suspects on reasonable grounds that an event has occurred at the premises, and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises), the authorised officer may request a written report of the event.

CSR will make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.

The request may require a report which includes any or all of the following information:

a) the cause, time and duration of the event;
b) the type, volume and concentration of every pollutant discharged as a result of the event;
c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
g) any other relevant matters.

9.9.3 Discovery of Human Remains

If human remains are discovered on the site, then all work in the area surrounding the discovery will cease, and the area will be secured. CSR will immediately notify the NSW Police Force and BCD, and work will not recommence in the area until authorised by the NSW Police Force and BCD.

9.9.4 Unexpected Heritage Find

If any potential Aboriginal object or Aboriginal place is identified on the site, or suspected to be on the site:

a) all work in the immediate vicinity of the object or place will cease immediately;
b) a 10 m buffer area around the object or place must be cordoned off; and
c) BCD will be contacted immediately.

Work in the immediate vicinity of the find will only recommence if:

a) the object or place is confirmed by BCD upon consultation with the Registered Aboriginal Parties not to be an Aboriginal object or Aboriginal Place;
b) the Aboriginal Heritage Management Plan (AHMP) is revised to include the object or place and appropriate measures in respect of it; or
c) the Secretary is satisfied with the measures to be implemented in respect of the object or place and makes a written direction in that regard.

9.9.5 High Impact Noise Activities

Where high impact noise activities are proposed on the site, such as those likely to generate noise levels above LA_{eq} 75 dB(A) or activities likely to generate noise with intermittent, impulsive, tonal or low-frequency characteristics are required during the construction of the noise berm, adjacent sensitive receivers will be appropriately notified prior to works commencing and respite periods will be implemented.

9.9.6 Breach of Water Licence Conditions

Once the approval holder becomes aware of a breach of any condition on the water approval or licence, the approval holder must notify NRAR as soon as practicable by:

- email: nrar.enquiries@nrar.nsw.gov.au, and/or
- telephone: 1800 633 362.

Any notification by telephone must also be confirmed in writing within seven (7) business days of the telephone call.

10 Community Consultation Procedures

CSR will establish and operate a Community Consultative Committee (CCC) for the project prior to recommencing quarrying operations. It will be operated in general accordance with the DPI&E's Community Consultative Committee Guidelines, as updated from time to time.

The Community and Stakeholder Consultation Plan (CCP) describes procedures to:

- keep the local community and relevant agencies informed about the operation and environmental performance of the project;
- receive, record, handle and respond to complaints; and
- resolve any disputes that may arise during the course of the project.

11 References

Element Environmental. (February 2019). Environmental Assessment, CSR Advanced manufacturing hub – Modification 3 & 4.

Approval by Minister for Planning and Infrastructure (August 2020) Badgerys Creek Quarry and Brick *Making Project*

FIGURE 1 - SITE LOCATION

Plan of:	Environmental Management Strategy for Badgerys Creek Brick Manufacture & Quarry Operations 2019 - Site Location	***Location:***	235 Martin Road, Badgerys Creek, NSW	***Source:***	nearmap - Image Date 29/12/2018 & Google Maps 2018	***Our Ref:***	6790_BB_EMS2019_C001_V0_F1.cdr
Figure:	ONE	***Council:***	Liverpool City Council	***Survey:***	N/A	***Plan By:***	JD
Sheet:	1 of 1	***Tenures:***	ML1771 *(Act 1992)*	***Projection:***	N/A	***Project Manager:***	LT
Version/Date:	V0 14/01/2019	***Client:***	PGH Bricks & Pavers Pty Ltd	***Contour Interval:***	N/A	***Office:***	Thornton

This figure may be based on third party data which has not been verified by vgt and may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and vgt does not warrant its accuracy.

N

vgt Environmental Compliance Solutions Pty Ltd

Approx Scale: 0 2 4km

Approx Scale: 0 500m

Legend

Property Boundary

Mine Lease Boundary *(ML1771)*

Manager/Authorisation Holder PGH Bricks & Pavers Pty Ltd Richard Mason
Signed:
Date: 01/02/2019

Project Manager VGT: LisaThomson
Signed:
Date: 01/02/2019

CSR Limited

FIGURE Overview of Preferred Project

CSR ADVANCED MANUFACTURING HUB

Modification 3 and 4

FIGURE 3 - MONITORING LOCATIONS

Plan of:	Environmental Management Strategy for Badgerys Creek Brick Manufacture & Quarry Operations 2019 - Monitoring Locations	***Location:***	235 Martin Road, Badgerys Creek, NSW	***Source:***	nearmap - Image Date 29/12/2018, Client & Boral Badgerys Creek EIS AECOM Figure 7 November 2010	***Our Ref:***	6790_BB_EMS2019_C003_V2_F3.cdr
Figure:	THREE	***Council:***	Liverpool City Council	***Survey:***	Client Supplied	***Plan By:***	SK/JD
Sheet:	1 of 1	***Tenures:***	ML1771 *(Act 1992)*	***Projection:***	N/A	***Project Manager:***	LT
Version/Date:	V2 06/02/2019	***Client:***	PGH Bricks & Pavers Pty Ltd	***Contour Interval:***	N/A	***Office:***	Thornton

This figure may be based on third party data which has not been verified by vgt and may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and vgt does not warrant its accuracy.

vgt Environmental Compliance Solutions Pty Ltd

N

0 50 100 150 200 250m

Manager/Authorisation Holder PGH Bricks & Pavers Pty Ltd: Richard Mason
Signed:
Date: 1/2/2019

Project Manager VGT: Lisa Thomson
Signed:
Date: 1/2/2019

INSET

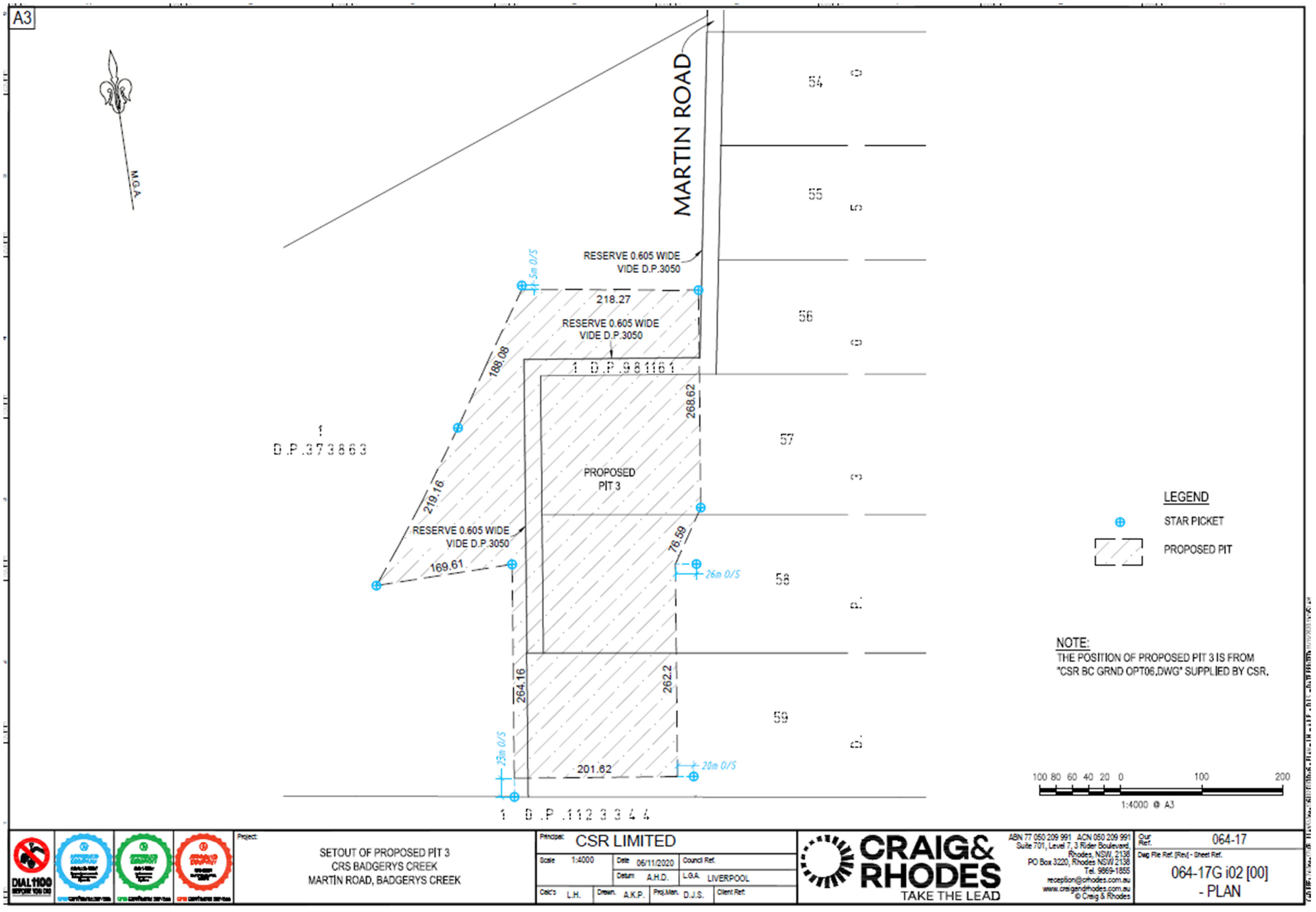
SEE INSET FOR ARCHAEOLOGICAL DETAILS

~100m Downstream
Tributary Confluence
~100m Upstream
BW2A
BW2B
BW1
MW2
D4
MW4
PIT 1 (Dam 1)
Badgerys Creek
PIT 2 (Dam 2)
WESTERN SP
SEDIMENTATION BASIN 1
SEDIMENTATION BASIN 2
PIT 5 (Dam 5)
N1
BW3
N2
D1
OFFICE
HVAS
WEIGHBRIDGE
GATE HOUSE
CARPARK
DAIRY
MW3A
MW3B
MW4
BRICK PRODUCT STORAGE AREA
BRICK MAKING FACILITY
MW1
RAW MATERIAL STOCKPILE
CENTRAL SP
SOUTH EASTERN (WEST) SP
SOUTH EASTERN (EAST) SP
SOUTHERN SP
EASTERN SP
PIT 4 (Dam 4)
PIT 3 (Dam 3)
D3
D2 (Hay Shed)
BW4A
BW4B
BW5A
BW5B
South Creek
N3

LEGEND

Feature/Domain		Monitoring	
	Property Boundary		Surface Water Monitoring Location
	Approved Project Boundary	MW1	Groundwater Monitoring Location
	Mine Lease Boundary *(ML1771)*	D1	Dust Monitoring Location
	60m Badgerys Creek Buffer		HVAS & Weather Station
	Active Pit	N1	Noise Monitoring Location
	Proposed Pit		
	Noise Attenuation Bund	Archaeology	
	Indicative Quarrying Direction		Archaeological Deposit Avoidance Zone
	Raw Material Stockpile		Test Pit With Artefacts
	Overburden		Test Pit With No Artefacts

FIGURE 4 –SURVEY AREA PIT 3



APPENDIX A CONDITIONS OF APPROVAL

Project Approval

Section 75J of the *Environmental Planning & Assessment Act 1979*

As delegate of the Minister for Planning and Infrastructure, I approve the project application referred to in Schedule 1, subject to the conditions in Schedules 2 to 5.

These conditions are required to:

- prevent, minimise, and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

Richard Pearson
Deputy Director-General, Development Assessment and Systems Performance

Sydney 2011

SCHEDULE 1

Application Number:	10_0014
Proponent:	CSR Building Products Limited
Approval Authority:	Minister for Planning and Infrastructure
Land:	See Appendix 1
Project:	Badgerys Creek Quarry and Brick Making Project

Navy text shows Modification 2 May 2018
Green Type shows Modification 3 and 4 August 2020

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DEFINITIONS

Aboriginal object or place	Have the same meaning as the definitions of the terms in section 5 of the NP&W Act
Annual Review	The review required by condition 12 of Schedule 5
BCA	Building Code of Australia
BCD	Biodiversity and Conservation Division within the Department
Brickmaking Activities	The manufacturing, storage and sale of brick products, and associated operation of the innovation centre and laboratory described in EA (Mod 3 and 4)
Calendar year	A period of 12 months from 1 January to 31 December
CCC	Community Consultative Committee
Conditions of this approval	Conditions contained in Schedules 2 to 5 (inclusive) of this document
Construction Activities	All physical works to enable mining operations to be carried out, including demolition and removal of buildings or works, and erection of buildings and other infrastructure permitted by this consent
Council	Liverpool City Council
Day	The period from 7 am to 6 pm on Monday to Saturday, and 8 am to 6 pm on Sundays and Public Holidays
Department	NSW Department of Planning, Industry and Environment
Demolition	The deconstruction and removal of buildings, sheds and other structures on the site
Dewatering	Removal of accumulated water from Pits 2 and 3 into Pit 1, and removal of water accumulated in Pit 1
DPIE Water	Water Group within the Department
EA	Environmental Assessment titled *Boral Badgerys Creek Continued Operation of Quarry and Brick Making Facility* (Volumes 1 – 3), prepared by AECOM and dated November 2010, and associated Response to Submissions titled *Boral Badgerys Creek Continued Operation of Quarry and Brick Making Facility – Submissions* Report, prepared by AECOM and dated June 2011
EA (Mod 1)	Environmental Assessment titled *Boral Badgerys Creek Quarry and Brick Making Project, Application Number: 10_0014*, prepared by Boral Property Group and dated 5 November 2012
EA (Mod 2)	Environmental Assessment titled *Badgerys Creek Brick Making Facility Modification 2 Environmental Assessment* prepared by Element Environment and dated November 2017, the associated the Response to Submissions prepared by Element Environment and dated February 2018, and additional information provided by Element Environment dated 8 March 2018
EA (Mod 3 and 4)	Environmental Assessment titled *CSR Advanced manufacturing hub – Modification 3 Environmental Assessment* prepared by Element Environment and dated March 2019, Environmental Assessment titled *CSR Advanced manufacturing hub – Modification 4 Environmental Assessment* prepared by Element Environment and dated March 2019, the associated Response to Submissions Reports prepared by Element Environment and dated October 2019, and additional information provided by CSR Limited and dated 5 May 2020
Eastern Airport Ring Road	Transport corridor associated with development of the WSA and depicted in the *Draft Western Sydney Aerotropolis Plan* (or later version)
EPA	NSW Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPL	Environment Protection Licence under the POEO Act
Evening	The period from 6 pm to 10 pm
Finished Building Products	Building products prepared or manufactured on site, as described in EA (Mod 3 and 4)
Heritage NSW	Heritage NSW within the Department of Premier and Cabinet
Incident	An occurrence or set of circumstances that: • causes or threatens to cause material harm to the environment; and/or • breaches or exceeds the limits or performance measures/criteria in this approval
Laden trucks	Trucks transporting bricks, quarry products or finished building products to or from the site
Land	Has the same meaning as the definition of the term in section 4 of the EP&A Act, except where the term is used in the noise and air quality conditions in Schedules 3 and 4 of this approval, where it is defined as the whole of a lot, or contiguous lots owned by the same landowner, in a current plan registered at the Land Titles Office at the date of this approval
Landscaped Screens	Landscaped vegetated screens or bunds to reduce both noise and visual impacts described in EA (MOD 3 and 4) and shown in Appendix 3
m	Metres
Martin Road – Elizabeth Road Intersection Upgrade	The upgrade of the Martin Road – Elizabeth Drive Intersection to a standard required by Condition 25A of Schedule 3
Material harm	Is unauthorised harm that: • involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or

	• results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment)
MEG	Regional NSW – Mining, Exploration and Geoscience
Minimise	Implement all reasonable and feasible mitigation measures to reduce the impacts of the project
Minister	Minister for Planning and Public Spaces, or delegate
Mitigation	Activities associated with reducing the impacts of the project prior to or during those impacts occurring
Modification 3 and 4	The modifications to the project, as described in EA (Mod 3 and 4)
Morning Shoulder Period	The period from 5 am to 7 am Monday to Saturday
Night	The period from 10 pm to 7 am on Monday to Saturday, and 10 pm to 8 am on Sundays and Public Holidays
NP&W Act	*National Parks and Wildlife Act 1974*
NRAR	NSW Natural Resources Access Regulator
Phase 1	The initial phase of development associated with Modification 3 and 4, that comprises: • construction activities; • brickmaking activities; • dewatering of Pits 1, 2 and 3; • quarrying activities in Pit 3. • VENM import for quarry rehabilitation activities and preferential backfilling of Pits 1, 2 and 3.
Phase 2	The phase of the development associated with Modification 3 and 4 that commences from the date of completion of backfilling of Pits 1 and 2 and comprises: • construction activities; • brickmaking activities; • quarrying activities in Pit 3; • VENM import for quarry rehabilitation activities and progressive backfilling of Pit 3.
Phase 3	The phase of the development associated with Modification 3 and 4 that commences from the date of completion of extraction activities in Pit 3 and comprises: • brickmaking activities; • VENM import for quarry rehabilitation activities and backfilling of Pit 3.
Phase 4	The phase of development associated with Modification 3 and 4 that commences from the date of completion of VENM import to site and the backfilling of Pit 3, and comprises: • brickmaking activities; and • residual rehabilitation activities (excluding VENM import).
PMF	Probable Maximum Flood event
POEO Act	*Protection of the Environment Operations Act 1997*
Privately-owned land	Land that is not owned by a public agency or a mining, petroleum or extractive industry company (or its subsidiary)
Project	The development includes Quarrying Operations, Brickmaking Activities and rehabilitation activities as described in the documents listed in condition 3 of Schedule 2
Project layout	The plans in Appendix 3 of this approval
Proponent	CSR Building Products Limited (or its successors) or any person carrying out any project to which this approval applies
Public infrastructure	Linear and other infrastructure that provides services to the general public, such as roads, railways, water supply, drainage, sewerage, gas supply, electricity, telephone, telecommunications, etc.
Quarrying operations	The extraction, processing, stockpiling and transportation of extractive materials carried out on the site and the associated removal and/or emplacement of vegetation, topsoil and overburden
Quarry products	Includes all saleable quarry products, including raw materials, but excludes bricks, tailings, other wastes and rehabilitation material for use on the site
Quarry water	Water that accumulates within active quarrying areas, overburden emplacement areas and infrastructure areas, synonymous with dirty water
Raw materials	Extractive materials used in making brick, tiles, clay pipes or similar
Registered Aboriginal Parties	As described in the *National Parks and Wildlife Regulation 2009*
Rehabilitation	The restoration of land disturbed by the project to a good condition, to ensure it is safe, stable and non-polluting
Reasonable	Means applying judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Resources Regulator	NSW Resources Regulator within the Department of Regional NSW
Secretary	Planning Secretary under the EP&A Act, or nominee
Site	The land defined in Appendix 1

Statement of Commitments	The Proponent's commitments in Appendix 6
TfNSW	Transport for New South Wales
VENM	Virgin Excavated Natural Material, as defined in the *Protection of the Environment Operations Act 1997*
Waste	Has the same meaning as defined in the Dictionary to the POEO Act
WSA	Western Sydney Airport

SCHEDULE 2
ADMINISTRATIVE CONDITIONS

OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT

1. In addition to meeting the specific performance measures and criteria established under this approval, the Proponent must implement all reasonable and feasible measures to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from the construction and operation of the project, and any rehabilitation required under this approval.

TERMS OF APPROVAL

2. The Proponent, in acting on this approval, must carry out the project:
   (a) in compliance with the conditions of this approval;
   (b) in accordance with all written directions of the Secretary; and
   (c) in accordance with the project layout.

3. The Proponent, in acting on this approval, must carry out the project:
   (a) generally in accordance with the EA;
   (b) generally in accordance with EA (Mod 1);
   (c) generally in accordance with EA (Mod 2);
   (d) generally in accordance with EA (Mod 3 and 4); and
   (e) in accordance with the Statement of Commitments.

4. The conditions of this approval and directions of the Secretary prevail to the extent of any inconsistency, ambiguity or conflict between them and a document referenced in condition 3 of this Schedule. In the event of an inconsistency, ambiguity or conflict between any of the documents referenced in condition 3 of this Schedule, the most recent document prevails.

   Note: For the purposes of this condition, there will be an inconsistency between documents if it is not possible to comply with both documents, or in the case of a condition of approval or direction of the Secretary, and a document, if it is not possible to comply with both the condition or direction, and the document.

5. Consistent with the requirements of this approval, the Secretary may make written directions to the Proponent in relation to:
   (a) the content of any strategy, study, system, plan, program, review, audit, notification, report or correspondence submitted under or otherwise made in relation to this approval, including those that are required to be, and have been, approved by the Secretary; and
   (b) the implementation of any actions or measures contained in any such document referred to in (a) above.

   Note: For the purposes of this condition, there will be an inconsistency between documents if it is not possible to comply with both documents, or in the case of a condition of consent or direction of the Secretary, and a document, if it is not possible to comply with both the condition or direction, and the document.

STAGED DEVELOPMENT

5A. The project as modified by EA Mod 3 and 4, must be undertaken sequentially in the following stages:
   (a) Phase 1;
   (b) Phase 2;
   (c) Phase 3; and
   (d) Phase 4.

   Note: Each of these phases is listed in the definitions and shown in Appendix 3.

5B. The Proponent must notify the Department in writing, at least two weeks before the date of:
   (a) the commencement of each Phase of the project;
   (b) the completion of extraction in Pit 3;
   (c) cessation of Brickmaking Activities; and
   (d) decommissioning.

COMPLIANCE

6. The Proponent must ensure that all of its employees, contractors (and their sub-contractors) are made aware of, and are instructed to comply with, the conditions of this approval relevant to activities they carry out in respect of the project.

APPLICABILITY OF GUIDELINES

7. References in the conditions of this approval to any guideline, protocol, Australian Standard or policy are to such guidelines, protocols, standards or policies in the form they are in as at the date of this approval.

However, consistent with the conditions of this approval and without altering any limits or criteria in this approval, the Secretary may, when issuing directions under this approval in respect of ongoing monitoring and management obligations, require compliance with an updated or revised version of such a guideline, protocol, standard or policy, or a replacement of them.

LIMITS OF APPROVAL

8. The Proponent may carry out quarrying operations on the site until 27 September 2031.

Note: Under this approval, the Proponent is required to decommission and rehabilitate the site and carry out additional requirements. Consequently, this approval will continue to apply in all respects other than to permit the carrying out of quarrying operations, until the rehabilitation of the site and those requirements and undertakings have been carried out to the required standard.

9. (Deleted).

10. The Proponent must not exceed the limits in Table 1 during any calendar year.

Table 1: Limits on extraction, production, receival and dispatch volumes per calendar year

Activity	***Project Phase***	***Total Volume (tonnes per calendar year)***
Extraction from Pit 3	Phase 1 and 2	420,000
Receive raw materials for brickmaking	Phase 1 and 2	215,000
	Phase 3 onwards	360,000
Dispatch raw materials	Phase 1,2 and 3	275,000
Brick production	All Phases	300,000
Dispatch finished building products	All Phases	330,000

Note: The Total Volume limits in Table 1 do not apply to the import of VENM for the purpose of backfilling voids. The import of VENM is separately managed under the restrictions on truck movements contained in Condition 12 of this Schedule.

11. The Proponent must not transport bricks or quarry products to or from the site, other than by road.

12. The Proponent must not exceed the total truck movements detailed in Table 2.

Table 2: Total Truck Movements

Transport Route Stage	***Project Phases***	***Day***	***Total truck movements[a]***
Prior to the upgrade of the Martin Road-Elizabeth Drive Intersection	1,2 and 3	Monday to Friday	120
		Saturday	40
		Sundays	40
Following completion of the Martin Road-Elizabeth Drive Intersection upgrade	1,2 and 3	Monday to Friday	800
		Saturday	358
		Sundays	200
	4	Monday to Friday	366
		Saturday	98
		Sunday	0

[a] *Note: each truck entering or exiting the site is counted as a separate movement.*

12A. Truck movements entering or exiting the site on Sundays are restricted to the importation of VENM for the purpose of backfilling quarry pits and rehabilitation activities.

Note: Truck movements are also controlled further by the limits in condition 10 of this Schedule and operating hours in condition 1 of Schedule 3.

STRUCTURAL ADEQUACY

13. All new buildings and structures, and any alterations or additions to existing buildings and structures, that are part of the project, must be constructed in accordance with the BCA.

Notes:

- *Under Part 6 of the EP&A Act, the Proponent is required to obtain construction and occupation certificates for any proposed building works;*
- *Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.*
- *A detailed stormwater drainage design, prepared by a qualified practicing civil engineer, is to be submitted to Council prior to the issue of a construction certificate.*

BRICK KILN STACKS

13A. The brick kiln stacks must not exceed 41 m above natural ground level.

DEMOLITION

14. All demolition work must be carried out in accordance with the *Australian Standard AS 2601-2001: The Demolition of Structures* (Standards Australia, 2001).

PROTECTION OF PUBLIC INFRASTRUCTURE

15. Unless the Proponent and the applicable authority agree otherwise the Proponent must:
    (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the project; and
    (b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the project.

Note: This condition does not apply to damage to roads caused as a result of general road usage or otherwise addressed by contributions required by condition 25 of Schedule 3.

OPERATION OF PLANT AND EQUIPMENT

16. All plant and equipment used on the site, or to monitor the performance of the project, must be:
    (a) maintained in a proper and efficient condition; and
    (b) operated in a proper and efficient manner.

16A. The external walls of all buildings including additions to existing buildings must comply with the relevant requirements of the BCA. Before the issue of a Construction Certificate and an Occupation Certificate, the Proponent must provide the Certifying Authority with documented evidence that the products and systems proposed for use or used in the construction of external walls, including finishes and claddings such as synthetic or aluminium composite panels, comply with the requirements of the BCA. The Proponent must provide a copy of the documentation given to the Certifying Authority to the Secretary within seven days after the Certifying Authority accepts it.

PRODUCTION DATA

17. The Proponent must:
    (a) provide calendar year annual quarry production data to MEG using the standard form for that purpose; and
    (b) include a copy of this data in the Annual Review.

LIMITS OF EXTRACTION

Identification of Approved Extraction Limits

18. Within 3 months of the determination of Modification 3 and 4, the Proponent must:
    (a) engage a registered surveyor to mark out the boundary of the approved area of extraction within Pit 3; and
    (b) provide the Secretary with a survey plan of the boundary.

The boundary of the approved area of extraction within Pit 3 must be clearly marked in a manner that allows them to be easily identified at all times during the carrying out of quarrying operations.

Maximum Extraction Depth

19. The Proponent must not extract any extractive materials or carry out any work in the extraction area below 35 m below the pre-existing natural surface of the ground, other than construction of bores approved by DPIE Water or in-pit sumps approved by the Secretary.

SCHEDULE 3
ENVIRONMENTAL PERFORMANCE CONDITIONS

NOISE

Hours of Operation

1. The Proponent must comply with the operating hours set out in Table 1.

Table 1: Operating hours

Activity	***Permissible Hours***
Quarrying operations (excluding truck arrival, loading and dispatch)	7.00 am to 6.00 pm Monday to Saturday
	At no time on Sundays or public holidays
Brickmaking Activities	24 hours per day, 7 days per week
Truck arrival and dispatch (raw materials only)	6.00 am to 10.00 pm Monday to Friday
	6.00 am to 6.00 pm Saturday
	At no time on Sundays or public holidays
Truck arrival and dispatch (finished building products only)	5.00 am to 10.00 pm Monday to Friday
	6.00 am to 6.00 pm Saturday
	At no time on Sundays or public holidays
Truck arrival and dispatch (VENM import only)	7.00 am to 6.00 pm Monday to Saturday
	9.00 am to 6.00 pm Sunday
	At no time on public holidays
Cash sales	6.00 am to 6.00 pm Monday to Saturday
	At no time on Sundays or public holidays
Sales selection/Customer Display Centre	8.00 am to 5.00 pm Monday to Sunday
Maintenance	At any time, provided that these activities are not audible at any privately-owned residence outside of permissible hours for quarrying operations

1A. With the written agreement of the Secretary, the Proponent may undertake limited campaign trucking (within the limits imposed under conditions 10 and 12 of Schedule 2) for the import of VENM outside of the operating hours prescribed in condition 1 of this Schedule.

2. The following activities may be carried out outside the hours specified in condition 1 of this Schedule:
   (a) activities that are inaudible at residences on privately-owned land;
   (b) the delivery or dispatch of materials as requested by the NSW Police Force or other public authorities for safety reasons; or
   (c) emergency work to avoid the loss of life, property or to prevent material harm to the environment.

   In such circumstances, the Proponent must notify the Department and affected residents prior to undertaking the activities, or as soon as is practical thereafter.

Construction Noise

3. Approved construction works must only be undertaken during standard construction hours (7 am to 6 pm, Monday to Friday and 8 am to 1 pm on Saturdays), unless the Secretary agrees otherwise.

4. (*Deleted*).

Operational Noise Criteria

5. The Proponent must ensure that operational noise generated by the project (including construction activities) does not exceed the criteria in Table 2 at any residence on privately-owned land.

Table 2: Operational noise criteria dB(A)

Receiver ID	Morning Shoulder	Day	Evening	Night	
	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	L_{AFmax}
R9, R25, R35	43	45	40	38	52
R5, R26, R27, R28, R29, R30, R31, R32, R34, R42, R43, R44, R45, R46	42	42	41	38	52
R11, R12, R13, R14, R15	43	43	43	38	52
All other residences	-	40	35	35	52

Noise generated by the project must be monitored and measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the *NSW Noise Policy for Industry (NSW EPA 2017)*.

However, the noise criteria in Table 2 do not apply if the Proponent has an agreement with the relevant landowner to exceed the noise criteria, and the Proponent has advised the Department in writing of the terms of this agreement.

Note: Should an agreement with a landowner be terminated for any reason, the Proponent must comply with the noise criteria in Table 2.

Road Traffic Noise Criteria

6. The Proponent must ensure that the road traffic noise generated by the project does not exceed the criteria in Table 3 at any privately-owned residence.

Table 3: Road traffic noise criteria dB(A)

Road Noise Receiver ID	Day / Evening $L_{Aeq\ (1\ hour)}$	Night $L_{Aeq\ (1\ hour)}$
Prior to Martin Road – Elizabeth Road Intersection Upgrade		
Residents on Martin Road	60	55
Following Martin Road – Elizabeth Road Intersection Upgrade		
RN5	61	55
RN9, RN21	62	55
RN14, RN22	63	55
RN16	64	55
All other residences on Martin Road	60	55

Traffic noise generated by the project is to be measured in accordance with the relevant procedures in the *NSW Road Noise Policy* (Department of Environment, Climate Change and Water NSW).

However, the noise criteria in Table 3 do not apply if the Proponent has an agreement with the relevant landowner to exceed the noise criteria, and the Proponent has advised the Department in writing of the terms of this agreement.

6A. Upon receiving a written request from the owner of residences RN5, RN9, RN14, RN16, RN21 or RN22, the Proponent must implement noise mitigation treatment packages as described in the EA (Mod 3 and 4) and as set out in the *RMS Draft At-Receiver Treatment Packages*.

If within 3 months of receiving this request from the owner, the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Noise Operating Conditions

7. The Proponent must:
   (a) take all reasonable steps to minimise the construction, operational, low frequency and road transportation noise of the project;
   (b) take all reasonable steps to minimise the noise impacts of the project during noise enhancing meteorological conditions;
   (c) operate a noise management system to guide the day to day planning of quarrying operations and the implementation of noise mitigation measures to ensure compliance with the relevant conditions of this approval;
   (d) carry out regular noise monitoring to determine whether the project is complying with the relevant conditions of this approval; and
   (e) modify or stop operations on the site to comply with the relevant conditions of this approval.

Note: Monitoring under this approval is not required at all residences and the use of representative monitoring locations can be used to demonstrate compliance with criteria, if agreed to by the Secretary.

Noise Management Plan

8. The Proponent must prepare a Noise Management Plan for the project to the satisfaction of the Secretary. This plan must:
   (a) be submitted to the Secretary for approval prior to commencing Modification 3 and 4, unless otherwise agreed by the Secretary;
   (b) describe the measures to be implemented to ensure:
      - compliance with the noise criteria and operating conditions of this approval;
      - best practice management is being employed;
      - residences listed in condition 6A of this Schedule are notified of their rights to request road noise mitigation measures;
      - vibration impacts are minimised; and
      - the construction and operational noise impacts of the project are minimised during noise enhancing meteorological conditions;
   (c) describe measures to ensure that all the commitments in the EA (Mod 3 and 4) in relation to noise are implemented;
   (d) include a consultation plan detailing:
      - procedures for notifying and consulting nearby residents prior to the recommencement of quarrying and brick making activities;
      - procedures for notifying and consulting nearby residents prior to the commencement of construction activities;
      - details of a telephone complaints line (operated at all hours) and relevant site persons responsible for following up complaints;
      - procedures for handling and monitoring all complaints received; and
      - contingency measures that would be implemented where complaints are received;
   (e) describe the proposed noise management system; and
   (f) include a noise monitoring program that:
      - is capable of evaluating the performance of the project;
      - includes a protocol for determining any exceedances of the relevant conditions of this approval; and
      - effectively supports the noise management system.

The Proponent must implement the Noise Management Plan as approved by the Secretary.

AIR QUALITY

Air Quality Impact Assessment Criteria

9. The Proponent must ensure that particulate matter emissions generated by the project do not cause exceedances of the criteria in Table 4 at any residence on privately-owned land.

Table 4: Air quality criteria

Pollutant	*Averaging Period*	*Criterion*
Particulate matter < 2.5 µm (PM_{10})	Annual	[a,d] 8 µg/m^3
Particulate matter < 2.5 µm (PM_{10})	24 hour	[b] 25 µg/m^3
Particulate matter < 10 µm (PM_{10})	Annual	[a,d] 25 µg/m^3

Particulate matter < 10 µm (PM_{10})	24 hour	[b] 50 µg/m^3	
Total suspended particulates (TSP)	Annual	[a,d] 90 µg/m^3	
[c] Deposited dust	Annual	[b] 2 g/m^2/month	[a,d] 4 g/m^2/month

Notes to Table 4:
a Total impact (ie increase in concentrations due to the project plus background concentrations due to all other sources).
b Incremental impact (ie increase in concentrations due to the project alone, with zero allowable exceedances of the criteria over the life of the project.
c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method.
d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.

Operating Conditions

10. The Proponent must:
    (a) implement best practice management to minimise the dust emissions of the project;
    (b) implement all air quality management and mitigation measures that were committed to in the EA (Mod 3 and 4);
    (c) implement real-time monitoring of 24-hour average PM_{10} and meteorological conditions;
    (d) regularly assess meteorological and air quality monitoring data and relocate, modify and/or stop operations on site to ensure compliance with the air quality criteria in this approval;
    (e) minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events (see note d under Table 4);
    (f) monitor and report on compliance with the relevant air quality conditions in this approval; and
    (g) minimise the area of surface disturbance and undertake progressive rehabilitation of the site,
    to the satisfaction of the Secretary.

10A. During Phase 4, the Proponent may request the Secretary's agreement to reduce or waive certain air quality monitoring requirements if the Proponent can demonstrate that they are no longer necessary.

11. The Proponent must ensure compliance with stack emission limits and gaseous pollutant load limits included in any EPL applicable to the site.

12. Within 14 months of commencement of increased production of bricks to 300,000 tonnes per year, or as otherwise required by the EPA, the Proponent must submit an Air Quality Verification Assessment to the EPA, and must provide a copy of this assessment to the Secretary. The Air Quality Verification Assessment must be completed in accordance with the requirements of the EPL for the premises.

Air Quality Management Plan

13. The Proponent must prepare an Air Quality Management Plan for the project to the satisfaction of the Secretary. This plan must:
    (a) be prepared in consultation with relevant WSA authorities;
    (b) be submitted to the Secretary for approval prior to commencing Phase 1, unless otherwise agreed by the Secretary;
    (c) describe the proposed air quality management system;
    (d) describe the measures to be implemented to ensure:
        - compliance with the air quality criteria and operating conditions of this approval;
        - best practice management is being employed; and
        - the air quality impacts of the project are minimised during adverse meteorological conditions and extraordinary events;
    (e) describe measures to ensure that all the commitments in the EA (Mod 3 and 4) in relation to air quality are implemented;
    (f) include a program to ensure surface disturbance associated with quarrying operations is minimised;
    (g) include an air quality monitoring program that:
        - is capable of evaluating the performance of the project and informing day to day operational decisions;
        - includes a protocol for determining any exceedances of the relevant conditions of this approval; and
        - effectively supports the air quality management system; and
    (h) include a program to:
        - notify affected landowners of the potential health-related impacts associated with dust;
        - respond effectively to enquiries or complaints.

The Proponent must implement the Air Quality Management Plan as approved by the Secretary.

Meteorological Monitoring

14. For the life of the project, the Proponent must ensure that there is a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the *Approved Methods for Sampling and Analysis of Air Pollutants in New South Wales* guideline and is capable of measuring meteorological conditions in accordance with the *NSW Noise Policy for Industry* (EPA, 2017).

Odour

15. The Proponent must ensure that no offensive odours, as defined by the POEO Act, are emitted from the site.

Greenhouse Gas Emissions

16. The Proponent must implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site.

SOIL AND WATER

Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Proponent is required to obtain all necessary approvals and/or water licences for the project.

Water Supply

17. The Proponent must ensure that it has sufficient water for all stages of the project, and if necessary, adjust the scale of operations under the approval to match its available water supply, to the satisfaction of the Secretary.

17A. The Proponent must report on water extracted from the site each year (direct and indirect) in the Annual Review, including water taken under each water licence.

Water Discharges

18. The Proponent must ensure that all quarry water from the site is contained wholly within the site except where discharges are otherwise authorised by condition 19 and 19A of this Schedule.

19. The Proponent must ensure that all surface water discharges from the site comply with the limits (both volume and quality) set in any EPL applicable to the site.

Dewatering of Pits 1, 2 and 3

19A. All water that is dewatered from Pit 1 (including any water transferred into Pit 1 from Pit 2 and Pit 3) must be transferred from the site in accordance with the Dewatering Management Plan required under Condition 23A of this Schedule.

19B. All dewatering activities from Pit 1 must be completed within Phase 1 unless otherwise agreed by the Secretary.

Riparian Buffer Distance

20. The Proponent must maintain a minimum setback width of 60 metres (measured from the top of bank) between extraction areas and both Badgerys Creek and Badgerys Creek tributary.

Note: This condition does not prohibit overburden emplacement or rehabilitation works in accordance with the Project Layout Plan.

Alluvial Aquifers

21. The Proponent must ensure that the project has no impact on alluvial aquifers associated with South Creek, Badgerys Creek or their tributaries.

22. *(Deleted)*

Soil and Water Management Plan

23. The Proponent must prepare a Soil and Water Management Plan for the project to the satisfaction of the Secretary. This plan must:
    (a) be prepared by a suitably qualified and experienced person/s approved by the Secretary;
    (b) be prepared in consultation with Council and DPIE-Water;

(c) be submitted to the Secretary for approval prior to commencing Phase 1, unless otherwise agreed by the Secretary; and

(d) include a:

(i) Site Water Balance that includes:

- details of:
  - sources and security of water supply;
  - water use and management on site;
  - adequacy of water storage facilities to contain all surface water runoff;
  - all existing Water Access Licences and potential Water Access Licences, including information on the relevant Water Sharing Plan and Water Sources;
  - any off-site water transfers, including those described in condition 23A of this Schedule; and
  - reporting procedures; and
- measures to be implemented to minimise clean water use on site;

(ii) Surface Water Management Plan, that includes:

- a program for obtaining detailed baseline data on surface water flows and quality in water bodies that could potentially be affected by the project;
- a detailed description of the surface water management system on site including the:
  - clean water diversion system;
  - erosion and sediment controls;
  - dirty water management system; and
  - water storages, including the area, depth and capacity of any in-pit sumps;
- detailed plans, including design objectives and performance criteria, for:
  - reinstatement of drainage lines on the rehabilitated areas of the site; and
  - control of any potential water pollution from rehabilitated areas of the site;
- performance criteria for the following, including trigger levels for investigating any potentially adverse impacts on:
  - the water management system;
  - surface water quality in creeks and other water bodies that could potentially affected by the project (including Badgerys Creek and Badgerys Creek tributary); and
  - the stream health, vegetation health and channel stability of water bodies that could potentially affected by the project;
- a program to monitor and report on:
  - any surface water discharges;
  - the effectiveness of the water management system;
  - the quality of water discharged from the site to the environment;
  - surface water flows and quality in local watercourses; and
  - the stream health, riparian vegetation health and channel stability of creeks and other water bodies that could potentially be affected by the project; and
- a plan to respond to any exceedances of the performance criteria, and mitigate and/or offset any adverse surface water impacts of the project; and

(iii) Groundwater Management Plan that includes:

- measures to ensure that the maximum extraction depth is not exceeded (see condition 19 of Schedule 2);
- a protocol to obtain appropriate water licence(s) to cover the volume of any unforeseen groundwater inflows into the quarry from the quarry face or floor;
- groundwater assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts; 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:
  - monitoring of boreholes within the alluvial sediments adjacent to Badgerys and South Creeks and their tributaries, and in the Bringelly Shale bedrock aquifer;
  - monitoring of groundwater inflows into the quarry from the quarry face or floor, or into any in-pit sumps;
  - monitoring the impacts of the project on baseflows to Badgerys and South Creeks and their tributaries;
  - identification of a methodology for determining exceedances of the assessment criteria;
  - a plan to respond to any exceedances of the performance criteria; and
  - a program to regularly report on monitoring.

The Proponent must implement the Soil and Water Management Plan as approved by the Secretary.

Dewatering Infrastructure Plan

23A. Prior to carrying out any construction activities associated with the dewatering activities on the site, the Proponent must prepare a Dewatering Infrastructure Plan for the project to the satisfaction of the Secretary. This plan must include:

(a) detailed designs for:
- any pipeline infrastructure used for dewatering activities; and
- the method to be used to cross Badgerys Creek;

(b) a flooding assessment which:
- considers the impacts of any structures (including overland pipelines) to flood flow within the floodplain up to the PMF; and
- describes the measures that will be implemented to minimise those impacts; and

(c) a description of the measures to be implemented for:
- managing construction and operation of minor surface infrastructure;
- avoiding significant impacts and minimisation of impacts generally;
- controlling any potential water pollution from construction;
- minimising and managing erosion and sedimentation;
- decommissioning of pipeline infrastructure; and
- rehabilitating disturbed areas.

The Proponent must implement the Dewatering Infrastructure Plan as approved by the Secretary.

Dewatering Management Plan

23B. The Proponent must prepare a Dewatering Management Plan for the project to the satisfaction of the Secretary. This plan must:

(a) be prepared in consultation with DPIE-Water and NRAR;

(b) be submitted to the Secretary for approval prior to dewatering activities from Pit 1, unless otherwise agreed by the Secretary; and

(c) include:
- details of:
  - off-site water transfer or discharge arrangements; and
  - procedures for monitoring on volumes transferred off-site and reporting on this as part of AEMR;
- a Fauna Relocation Plan regarding the transfer of aquatic fauna from Pits 1, 2 and 3 prepared by a suitably qualified ecologist which includes details on:
  - native fauna species known to inhabit and/or use the pits which require transfer from the pits;
  - methodology proposed to transfer the fauna;
  - location and suitability of the proposed relocation sites;
  - any potential impacts of relocating the fauna to the relocation sites and proposed mitigation measures; and
  - details of ecologists to monitor dewatering activities;
- a Geotechnical Monitoring Program, prepared by a suitably qualified and experience geotechnical engineer, to examine and monitor the faces and high walls of the quarry pits to determine potential geotechnical hazards and evaluate risks of potential failures;
- a program to monitor and report on dewatering that involves any discharge from the site, including:
  - the quality of any water discharged from the site;
  - surface water flows and quality in local watercourses; and
  - the stream health, riparian vegetation health and channel stability of creeks and other water bodies that could potentially be affected by the discharges; and
- a plan to respond to any exceedances of the performance criteria and mitigate and/or offset any adverse surface water impacts of the discharges.

The Proponent must implement the Dewatering Management Plan as approved by the Secretary.

Flooding

23C. The Proponent must prepare and implement an Evacuation Plan for the site. This Evacuation Plan must be prepared in consultation with the State Emergency Services and include details of the site evacuation and sheltering procedures during flood events.

TRANSPORT

Road Haulage

24. Prior to commencing Phase 1, the Proponent must:
    (a) erect signage on Elizabeth Drive advising of "trucks turning";
    (b) install a wheel wash on the quarry access road and VENM haul road to prevent material being deposited on Martin Road; and
    (c) ensure the access driveway from Martin Road is capable of catering for all heavy vehicles associated with the project in accordance with AS2890.2,
    to the satisfaction of Council.

Road Upgrade and Maintenance Contribution

25. Prior to the recommencement of quarrying operations, the Proponent must enter into a formal agreement with Council for:
    (a) the repair of historical impacts of trucking from the project on Martin Road; and
    (b) annual road maintenance contributions to be paid to Council, based on the weight of all laden truck movements to and from the site, for the duration that Martin Road is vested in the Council as the roads authority.

    The Proponent must provide evidence to the Secretary that the agreement has been executed and implemented to the satisfaction of Council.

    If there is any dispute between the Proponent and Council, then either of the parties may refer the matter to the Secretary for resolution.

25A. Prior to increasing truck movement limits as specified in condition 12 of Schedule 2, the Proponent must complete an interim upgrade of the Martin Road and Elizabeth Drive Intersection. The final design of intersection must be to the satisfaction of the relevant roads authority/s and must:
    (a) be designed and constructed in accordance with Austroads Guidelines, Australian Standards and any requirements of the relevant road authority/s;
    (b) include, at a minimum, a three phase signal operation including a right turn green light and pedestrian crossings on one Martin Road and one Elizabeth Drive approach;
    (c) be subject to a Works Authorisation Deed (WAD) with TfNSW; and
    (d) be funded by the Proponent, unless otherwise agreed with TfNSW.

25B. With the written agreement of the Secretary, the requirements of condition 25A of this Schedule may be waived if the Proponent can demonstrate that the Martin Road-Elizabeth Drive Intersection has been upgraded to achieve service, capacity and safety standards equivalent to or greater than those required under condition 25A of this Schedule.

25C. The Proponent must provide an area for a potential transport corridor associated with an extension of Martin Road through the site (as conceptually shown in Appendix 3). The final design and location of the transport corridor and any associated commercial arrangements must be determined in consultation with TfNSW.

    The Proponent must advise the Secretary in writing of the final design and location of the transport corridor as agreed with TfNSW, and update relevant management plans, strategies or programs for the project to reflect the transport corridor.

Monitoring of Product Transport

26. The Proponent must keep accurate records of:
    (a) all truck movements to and from the site (including time of arrival and dispatch and nature of material transported);
    (b) the weight of all bricks, VENM and quarry products transported to and from the site; and
    (c) publish a summary of these records on its website every 6 months.

Operating Conditions

27. The Proponent must:
    (a) ensure that all laden trucks carrying quarry products, raw materials or VENM have their loads covered when arriving at or leaving the site;
    (b) ensure that all trucks are cleaned of material that may fall from vehicles, before leaving the site;
    (c) use its best endeavours to ensure that appropriate signage is displayed on trucks used to transport finished building materials, quarry products or raw materials to or from the project so they can be easily identified by road users; and

(d) continue to engage with TfNSW regarding the detailed planning and design for the Eastern Airport Ring Road.

Traffic Management Plan

28. The Proponent must prepare a Traffic Management Plan for the project to the satisfaction of the Secretary. This plan must:
    (a) be prepared in consultation with TfNSW, WSA and Council;
    (b) be submitted to the Secretary for approval prior to commencing Phase 1 operations, unless otherwise agreed by the Secretary;
    (c) describe the processes in place to control the arrival and dispatch of trucks;
    (d) include a Drivers' Code of Conduct that details the safe and quiet driving practices that must be used by drivers travelling to and from the site;
    (e) describe the measures to be put in place to ensure compliance with the Drivers' Code of Conduct;
    (f) propose measures to minimise the transmission of dust and tracking of material onto the surface of the public road from vehicles leaving the quarry;
    (g) describe the measures to manage construction and cumulative traffic impacts on the surrounding road network; and
    (h) be updated as necessary to reflect the operational phases and truck movement limits specified in condition 12 of Schedule 2 and prior to the commencement of any construction works for the upgrade of the Martin Road – Elizabeth Drive Intersection or the Eastern Airport Ring Road.

    The Proponent must implement the Traffic Management Plan as approved by the Secretary.

ABORIGINAL HERITAGE

29. The Proponent must ensure that:
    (a) archaeological salvage of site BC-01-09 is undertaken in accordance with Recommendation 1, Section 6.0 of the *Aboriginal Heritage Assessment – Addendum* in the EA;
    (b) regeneration works, dewatering activities and water discharges in the area of the archaeological deposit identified adjacent to Badgerys Creek (see Appendix 5) are either avoided, or else undertaken in a manner that will minimise harm to Aboriginal objects, to the satisfaction of the Secretary; and
    (c) measures are implemented prior to the commencement of Phase 1, to conserve and protect the hearth feature within site BCBW18 AS 02 02 (AHIMS ID 45-5-5164).

30. The Proponent must prepare an Aboriginal Heritage Management Plan for the project to the satisfaction of the Secretary. The plan must:
    (a) be prepared by suitably qualified and experienced persons;
    (b) be prepared in consultation with Registered Aboriginal Parties and Heritage NSW;
    (c) be submitted to the Secretary for approval within 6 months of the determination of Modification 3 and 4, unless otherwise agreed by the Secretary;
    (d) include a description of the measures that would be implemented to:
        (i) protect, monitor and manage identified Aboriginal objects and Aboriginal places on the site (including any proposed archaeological investigations and salvage measures), including specific measures to ensure that the archaeological deposit adjacent to Badgerys Creek (see Appendix 5) is not impacted during regeneration operations;
        (ii) conserve the entire extent of the hearth feature within site BCBW18 AS 02 (AHIMS ID 45-5-5164);
        (iii) manage the discovery of previously unidentified Aboriginal objects or Aboriginal places on the site; and
        (iv) facilitate ongoing consultation and involvement of Registered Aboriginal Parties in the conservation and management of Aboriginal cultural heritage on the site; and
    (e) include a protocol to be implemented in the event that skeletal remains are discovered during the project.

    The Proponent must implement the Aboriginal Heritage Management Plan as approved by the Secretary.

31. If human remains are discovered on the site, then all work in the area surrounding the discovery must cease, and the area must be secured. The Proponent must immediately notify NSW Police Force and Heritage NSW, and work must not recommence in the area until authorised by NSW Police Force and Heritage NSW.

32. If any potential Aboriginal object or Aboriginal place is identified on the site, or suspected to be on the site:
    (a) all work in the immediate vicinity of the object or place must cease immediately;
    (b) a 10 m buffer area around the object or place must be cordoned off; and

(c) Heritage NSW must be contacted immediately.

33. Work in the immediate vicinity of a site identified in condition 32 of this Schedule may only recommence if:
(a) the object or place is confirmed by Heritage NSW upon consultation with the Registered Aboriginal Parties not to be an Aboriginal object or Aboriginal Place;
(b) the Aboriginal Cultural Heritage Management Plan is revised to include the object or place and appropriate measures in respect of it; or
(c) the Secretary is satisfied with the measures to be implemented in respect of the object or place and makes a written direction in that regard.

REHABILITATION

Rehabilitation Objectives

34. The Proponent must rehabilitate the site in accordance with the conditions imposed on the mining lease(s) associated with the project under the *Mining Act 1992*. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EA (Mod 3 and 4) and shown in Appendix 4, and must comply with the objectives in Table 5.

Table 5: Rehabilitation Objectives

Feature	***Objective***
All areas of the site affected by the project	• Safe • Hydraulically and geotechnically stable • Non-polluting • Fit for the intended final land use(s) • Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and minimising visual impacts when viewed from surrounding land
Surface infrastructure	• Decommissioned and removed, unless otherwise agreed by the Secretary
Landscaping bunds	• Hydraulically and geotechnically stable • Vegetated
Pits 1, 2 and 3	• Backfilled to a landform that is consistent with natural ground level and is geotechnically stable • Free draining

Progressive Rehabilitation

35. The Proponent must rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable measures must be taken to minimise the total area exposed for dust generation at any time. Interim stabilisation measures must be implemented where reasonable and feasible to control dust emissions in disturbed areas that are not active and which are not ready for final rehabilitation.

Note: It is accepted that parts of the site that are progressively rehabilitated may be subject to future re-disturbance.

35A. The Proponent must complete the backfilling of Pits 1 and 2 within 6 years of commencement of Phase 1, or as otherwise agreed by the Secretary.

35B. The Proponent must complete the backfilling of Pit 3 within 2 years of the date of completion of extraction activities in Pit 3, or as otherwise agreed by the Secretary.

Rehabilitation Management Plan

36. The Proponent must prepare a Rehabilitation Management Plan for the project, in accordance with the conditions imposed on the mining lease(s) associated with the project under the *Mining Act 1992*. This plan must:
(a) be prepared in consultation with the Department, DPIE Water, BCD, TfNSW, relevant WSA authorities and Council;
(b) build upon the Rehabilitation Objectives in Table 5 and the proposed rehabilitation strategy described in the EA (Mod 3 and 4) and shown in Appendix 4;
(c) investigate options for the future use of disturbed areas following the completion of backfilling operations, having regards to the strategic planning associated with the draft Western Sydney Aerotropolis Plan (or subsequently adopted NSW Government strategic plans);

(d) describe and justify the proposed rehabilitation strategy for the site, including the landform and use of the site following the completion of quarry operations;
(e) include details of the planting of replacement trees in riparian areas consistent with the Statement of Commitments and with vegetation requirements for WSA to minimise wildlife impacts;
(f) describe how the rehabilitation of the site would achieve the objectives identified in Table 5 and the requirements of conditions 35A and 35B of this Schedule;
(g) include detailed Rehabilitation Objectives, Rehabilitation Completion Criteria and the Final Landform and Rehabilitation Plan for evaluating the performance of the rehabilitation of the site;
(h) include procedures for the use of interim stabilisation and temporary vegetation strategies, where reasonable to minimise the area exposed for dust generation;
(i) to the maximum extent practicable, build on and integrate with the other management plans required under this consent;
(j) include a life of mine rehabilitation and mining schedule and a protocol for progressive reviews of key progressive rehabilitation milestones from the commencement of operations through to decommissioning and mine closure;
(k) include an overview of the identified risks to achieving successful rehabilitation and strategies to be implemented to address these risks;
(l) include a program to monitor, audit and report on the progress against the Rehabilitation Objectives and Rehabilitation Completion Criteria and the Final Landform and Rehabilitation Plan; and
(m) describe the measures to be implemented to ensure compliance with the relevant conditions of this approval, including intervention and adaptive management techniques that may be required to ensure rehabilitation remains on a trajectory of achieving the Rehabilitation Objectives, Rehabilitation Completion Criteria and the Final Landform and Rehabilitation Plan as soon as reasonably practical.

***Note**: The Rehabilitation Management Plan may be combined with a Mining Operations Plan, or similar plan, required under the mining lease granted for the development.*

VISUAL

37. The Proponent must implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the project to the satisfaction of the Secretary.

37A. Within 3 months of commencing quarrying operations in Pit 3, the Proponent must construct landscaped earthen bunds and plant vegetation screens (as shown conceptually in Appendix 3), to minimise the visual impacts of the project. The landscaped earthen bunds and plant vegetation screens must be maintained until the Pit 3 area has been fully rehabilitated.

37B. Within 6 months of the Secretary being advised of the confirmed Eastern Airport Ring Road alignment, as required under condition 25C of this Schedule, the Proponent must construct landscaped earthen bunds and plant vegetation screens around the brickmaking facility and raw material stockpile (as shown conceptually in Appendix 3), to minimise the visual impacts of the project. The landscaped earthen bunds and plant vegetation screens must be maintained for the life of the project.

37C. The Proponent must ensure that all outdoor and external lighting at the site:
(a) complies with *AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting*; and
(b) is designed in accordance with any Civil Aviation Safety Authority requirements for the WSA and is mounted, screened and directed in such a manner that it does not cause distraction or confusion to pilots due to light spill above the horizontal plane.

Visual Impact Management Plan

37D. Within 6 months of approval of Modification 3 and 4, the Proponent must prepare a Visual Impact Management Plan for the project to the satisfaction of the Secretary. This plan must:
(a) be prepared by a suitably qualified and experienced person/s;
(b) be prepared in consultation with Council, TfNSW and relevant WSA authorities;
(c) describe the measures to be implemented to minimise the visual, landscaping and off-site lighting impacts of the project to the WSA and surrounding community;
(d) include a landscaping strategy to shield public views of the project (including views from the Eastern Airport Ring Road) that includes:
- the measures identified in the EA (Mod 3 and 4);
- a vegetation strategy utilising a diversity of local provenance tree species from the native vegetation community (or communities) that occur or once occurred on the site, and would minimise wildlife attraction;
- a bund vegetation and maintenance schedule; and

- procedures to notify, consult with and implement site-specific mitigation measures at affected privately-owned residences;

(e) include a program to monitor and report on the implementation and effectiveness of the mitigation measures; and

(f) include a protocol to update the plan to include the requirements of condition 37A and 37B of this Schedule, once the Secretary has been advised of the confirmed Eastern Airport Ring Road alignment, as required under condition 25C of this Schedule.

The Proponent must implement the Visual Impact Management Plan as approved by the Secretary.

WASTE

38. The Proponent must:
(a) manage on-site sewage treatment and disposal to the satisfaction of Council;
(b) minimise the waste generated by the project;
(c) ensure that the waste generated by the project is appropriately stored, handled, and disposed of; and
(d) report on waste management and minimisation, including management of non-recyclable materials in the Annual Review,
to the satisfaction of the Secretary.

Note: Approval pursuant to Section 68 of the Local Government Act 1993 is required from Council for onsite sewage management systems.

39. Except as expressly permitted in an EPL and/or the conditions of this approval, the Proponent must not receive waste on the site for storage, treatment, processing, reprocessing or disposal.

VENM Management Plan

39A. Prior to the import of VENM to the site, the Proponent must prepare a VENM Management Plan for the project to the satisfaction of the Secretary. This plan must:
(a) identify the quantities of VENM to be imported to site;
(b) describe:
- the procedures for monitoring VENM imported to the site to ensure that it meets relevant quality specifications for VENM;
- management measures for the emplacement and temporary stockpiling of VENM;
- the process for handling VENM for use in rehabilitation;
- measures for the on-site use of water captured in sediment basins to ensure that the water does not present a contamination risk; and
- processes for assessing, recording, handling and managing any contamination found on the site; and

(c) provide an indicative schedule of VENM material to be imported to the site for each Phase of the project, in order to achieve the conceptual final landform.

The Proponent must implement the VENM Management Plan as approved by the Secretary.

LIQUID STORAGE

40. The Proponent must ensure that all tanks and similar storage facilities (other than for water) are protected by appropriate bunding or other containment, in accordance with the relevant Australian Standards.

DANGEROUS GOODS

41. The Proponent must ensure that the storage, handling, and transport of dangerous goods is done in accordance with the relevant Australian Standards, particularly AS1940 and AS1596, and the *Dangerous Goods Code*.

FIRE SAFETY

42. The Proponent must:
(a) ensure that the project is suitably equipped to respond to any fires on site;
(b) assist the emergency services to the extent practicable if there is a fire in the vicinity of the site; and
(c) ensure that the project provides for asset protection in accordance with the relevant requirements in *Planning for Bushfire Protection 2019* (NSW RFS 2019).

SCHEDULE 4
ADDITIONAL PROCEDURES

NOTIFICATION OF LANDOWNERS

1. As soon as practicable, and no longer than 7 days, after obtaining monitoring results showing:
   (a) an exceedance of any criteria in Schedule 3, the Proponent must notify the affected landowners in writing of the exceedance, and provide regular monitoring results, at least every 3 months, to each affected landowner until the project is again complying with the relevant criteria; and
   (b) an exceedance of any air quality criteria in Schedule 3, the Proponent must send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and current tenants of the land (including the tenants of land which is not privately-owned).

INDEPENDENT REVIEW

2. If a landowner considers the project to be exceeding the relevant criteria in Schedule 3, they may ask the Secretary in writing for an independent review of the impacts of the project on their land.

   If the Secretary is not satisfied that an independent review is warranted, the Secretary will notify the landowner in writing of that decision, and the reasons for that decision, within 21 days of the request for a review.

   If the Secretary is satisfied that an independent review is warranted, within 3 months, or as otherwise agreed by the Secretary and the landowner, of the Secretary's decision, the Proponent must:
   (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to:
      - consult with the landowner to determine his/her concerns;
      - conduct monitoring to determine whether the project is complying with the relevant criteria in Schedule 3; and
      - if the project is not complying with these criteria, then identify measures that could be implemented to ensure compliance with the relevant criteria;
   (b) give the Secretary and landowner a copy of the independent review; and
   (c) comply with any written requests made by the Secretary to implement any findings of the review.

SCHEDULE 5
ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. The Proponent must prepare an Environmental Management Strategy for the project to the satisfaction of the Secretary. This strategy must:
   (a) be submitted to the Secretary for approval within 6 months of the determination of Modification 3 and 4, unless otherwise agreed by the Secretary;
   (b) provide the strategic framework for environmental management of the project;
   (c) identify the statutory approvals that apply to the project;
   (d) set out the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;
   (e) set out the procedures to be implemented to:
      - keep the local community and relevant agencies informed about the operation and environmental performance of the project;
      - receive, record, handle and respond to complaints;
      - resolve any disputes that may arise during the course of the project;
      - respond to any non-compliance and any incident; and
      - respond to emergencies; and
   (f) include:
      - references to any strategies, plans and programs approved under the conditions of this approval; and
      - a clear plan depicting all the monitoring to be carried out under the conditions of this approval.

   The Proponent must implement any Environmental Management Strategy as approved by the Secretary.

Evidence of Consultation

2. Where the conditions of this approval require consultation with an identified party, the Proponent must:
   (a) consult with the relevant party prior to submitting the subject document to the Secretary for approval; and
   (b) provide details of the consultation undertaken, including:
      - the outcome of that consultation, matters resolved and unresolved; and
      - details of any disagreement remaining between the party consulted and the Proponent and how the Proponent has addressed any unresolved matters.

   However, if the Secretary agrees, a strategy, plan or program may be prepared without consultation being undertaken with an identified party required under a condition of this approval.

Management Plan Requirements

3. The Proponent must ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:
   (a) a summary of relevant background or baseline data;
   (b) a description of:
      - the relevant statutory requirements (including any relevant approval, licence or lease conditions);
      - any relevant limits or performance measures/criteria; and
      - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;
   (c) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
   (d) a program to monitor and report on the:
      - impacts and environmental performance of the project; and
      - effectiveness of any management measures (see (c) above);
   (e) a 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;
   (f) a program to investigate and implement ways to improve the environmental performance of the project over time;
   (g) a protocol for managing and reporting any:
      - incidents;

- complaints; and
- non-compliances with statutory requirements;

(h) a protocol for periodic review of the plan; and

(i) a document control table that includes version numbers, dates when the management plan was prepared and reviewed, names and positions of the person/s who prepared and reviewed the management plan, a description of any revisions made and the date of the Secretary's approval.

Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.

Application of Existing Strategies, Plans and Programs

4. The Proponent must continue to apply existing management plans, strategies or monitoring programs approved prior to the approval of Modification 3 and 4, until the approval of a similar plan, strategy or program following the approval of Modification 3 and 4.

Revision of Strategies, Plans & Programs

5. Within 3 months of:

(a) the submission of an incident report under condition 10 below;

(b) the submission of an Annual Review under condition 12 below;

(c) the submission of an Independent Environmental Audit report under condition 14 below; and

(d) the approval any modifications to this approval,

the Proponent must review the suitability of all strategies, plans and programs required under this approval, to the satisfaction of the Secretary. 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.

Notes:

- *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 project.*
- *In the event of an inconsistency between condition 5(d) above and any condition in Schedule 3 of this approval, the latter prevails.*

Updating and Staging of Strategies, Plans or Programs

6. With the approval of the Secretary, the Proponent may:

(a) prepare and submit any strategy, plan or program required by this approval on a staged basis (if a clear description is provided as to the specific stage and scope of the project to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy, plan or program);

(b) combine any strategy, plan or program required by this approval (if a clear relationship is demonstrated between the strategies, plans or programs that are proposed to be combined); and

(c) update any strategy, plan or program required by this approval (to ensure the strategies, plans and programs required under this approval are updated on a regular basis and incorporate additional measures or amendments to improve the environmental performance of the project).

Adaptive Management

7. The Proponent must assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedule 3. Any exceedance of these criteria and/or performance measures constitutes a breach of this approval and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.

Where any exceedance of these criteria and/or performance measures has occurred, the Proponent must as soon as becoming aware of any exceedance:

(a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not reoccur;

(b) consider all reasonable and feasible options for remediation (where relevant);

(c) within 14 days of the exceedance occurring, submit a report to the Secretary describing these remediation options and any preferred remediation measures or other course of action; and

(d) implement remediation measures as directed by the Secretary;

to the satisfaction of the Secretary.

COMMUNITY CONSULTATIVE COMMITTEE

8. The Proponent must establish and operate a Community Consultative Committee (CCC) for the project to the satisfaction of the Secretary. The CCC must be established prior to recommencing quarrying operations

and be operated in general accordance with the Department's *Community Consultative Committee Guidelines, November 2016* (or later version).

Notes:

- *The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Proponent complies with this approval.*
- *In accordance with the guidelines, the Committee should comprise an independent chair and appropriate representation from the Proponent, Council and the local community.*
- *The Proponent may, with the approval of the Secretary, combine the function of this CCC with the functions of other CCCs in the area.*

REPORTING AND AUDITING

Incident Notification

9. The Proponent must immediately notify the Department and any other relevant agencies immediately after it becomes aware of an incident. The notification must be made in writing through the Department's Major Projects Website and identify the project (including the development application number and name) and set out the location and nature of the incident.

Non-Compliance Notification

10. Within seven days of becoming aware of a non-compliance, the Proponent must notify the Department of the non-compliance. The notification must be made in writing through the Department's Major Projects website and identify the project (including the development application number and name), set out the condition of this approval that the project is non-compliant with, why it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.

***Note**: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.*

Regular Reporting

11. The Proponent must provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.

Annual Review

12. Prior to recommencing quarrying operations or VENM import, and annually thereafter, the Proponent must submit a review to the Department reviewing the environmental performance of the project to the satisfaction of the Secretary. This review must:
    (a) describe the project (including any progressive rehabilitation) that was carried out in the previous calendar year, and the project that is proposed to be carried out over the current calendar year;
    (b) include a comprehensive review of the monitoring results and complaints records of the project over the previous calendar year, which includes a comparison of these results against the:
        - relevant statutory requirements, limits or performance measures/criteria;
        - requirements of any plan or program required under this approval;
        - monitoring results of previous years; and
        - relevant predictions in the documents listed in condition 3 of Schedule 2;
    (c) evaluate and report on:
        - the effectiveness of the air quality and noise management systems; and
        - compliance with the performance measures, criteria and operating conditions in this approval.
    (d) identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence;
    (e) identify any trends in the monitoring data over the life of the project;
    (f) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and
    (g) describe what measures will be implemented over the current calendar year to improve the environmental performance of the project.

    The Proponent must ensure that copies of the Annual Review are submitted to Council and are available to the Community Consultative Committee (see condition 8 of Schedule 5) and any interested person upon request.

INDEPENDENT ENVIRONMENTAL AUDIT

13. Within 12 months of the commencement of Phase 1, and every 3 years thereafter, unless the Secretary directs otherwise, the Proponent must commission, commence and pay the full cost of an Independent Environmental Audit of the project. This audit must:
    (a) be led and conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;
    (b) include consultation with the relevant agencies and the CCC;
    (c) assess the environmental performance of the project and whether it is complying with the relevant requirements in this approval and any relevant EPL or necessary water licences for the project (including any assessment, strategy, plan or program required under these approvals);
    (d) review the adequacy of strategies, plans or programs required under the abovementioned approvals;
    (e) recommend appropriate measures or actions to improve the environmental performance of the project, and/or any assessment, strategy, plan or program required under the abovementioned approvals; and
    (f) be conducted and reported to the satisfaction of the Secretary.

14. Within 12 weeks of commencing this audit, or as otherwise agreed by the Secretary, the Proponent must submit a copy of the audit report to the Secretary and any other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of these recommendations as required. The Proponent must implement these recommendations, to the satisfaction of the Secretary.

14A. Any condition of this approval that requires the carrying out of monitoring or an environmental audit, whether directly or by way of a plan, strategy or program, is taken to be a condition requiring monitoring or an environmental audit under Division 9.4 of Part 9 of the EP&A Act. This includes conditions in respect of incident notification, reporting and response, non-compliance notification, compliance report and independent audit.

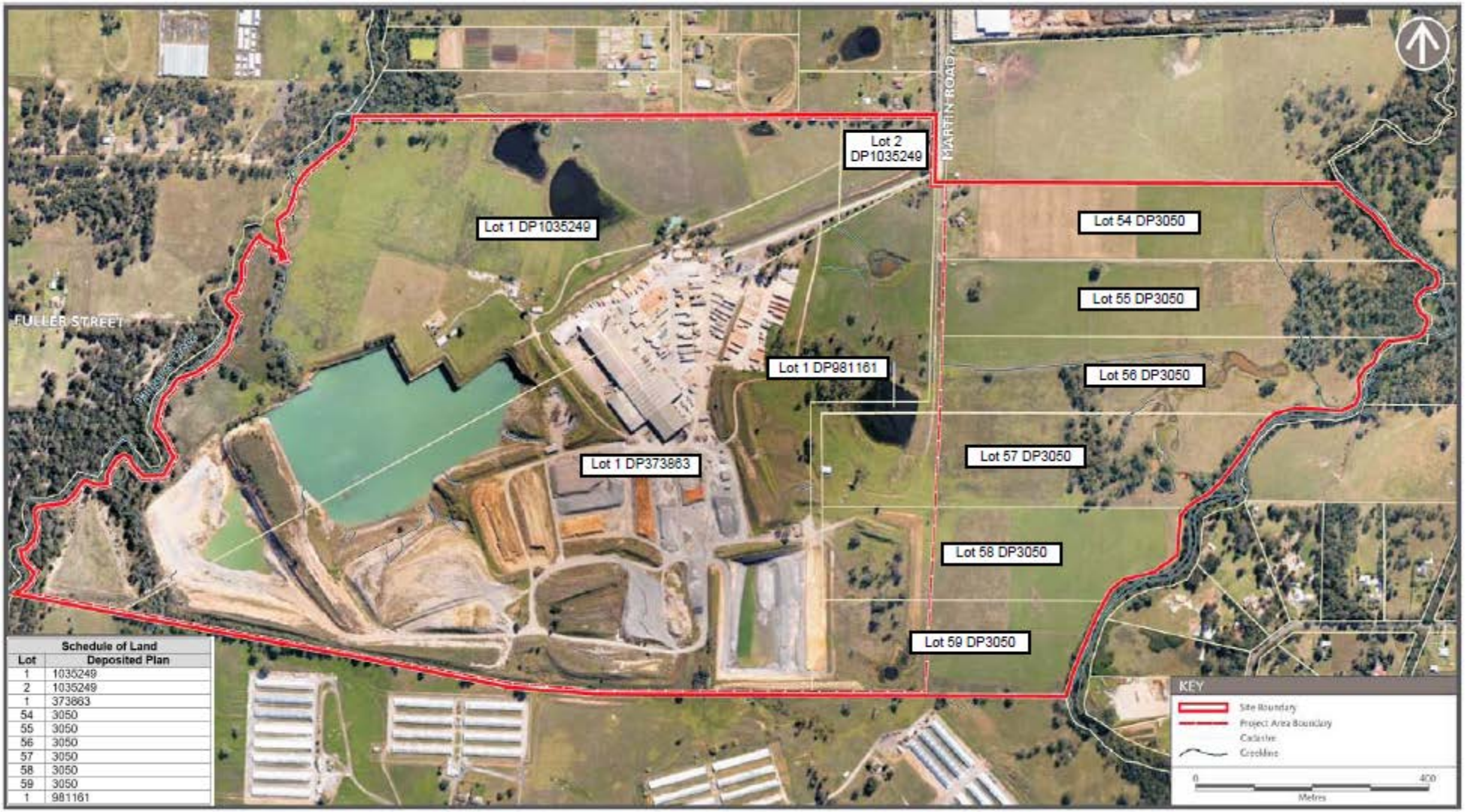
Note: *For the purposes of this condition, as set out in the EP&A Act, "monitoring" is monitoring of the development to provide data on compliance with the approval or on the environmental impact of the project, and an "environmental audit" is a periodic or particular documented evaluation of the project to provide information on compliance with the approval or the environmental management or impact of the project.*

ACCESS TO INFORMATION

15. Within 3 months of the determination of Modification 3 and 4, until the completion of all works, including rehabilitation and remediation the Proponent must:
    (a) make the following information publicly available on its website:
        - the documents listed in condition 3 of Schedule 2;
        - current statutory approvals for the project;
        - all approved strategies, plans and programs required under the conditions of this approval;
        - regular reporting on the environmental performance of the project in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval;
        - a comprehensive summary of the monitoring results of the project, reported in accordance with the specifications in any conditions of this approval, or any approved plans and programs;
        - summary of the current stage and progress of the project;
        - contact details to enquire about the project or to make a complaint;
        - a complaints register, updated at least monthly;
        - the Annual Reviews of the project;
        - any Independent Environmental Audit as described in condition 13 above, and the Proponent's response to the recommendations in any audit; and
        - any other matter required by the Secretary; and
    (b) keep this information up-to-date,

    to the satisfaction of the Secretary.

APPENDIX 1
SCHEDULE OF LAND



Schedule of Land	
Lot	Deposited Plan
1	1035249
2	1035249
1	373863
54	3050
55	3050
56	3050
57	3050
58	3050
59	3050
1	981161

APPENDIX 2
LAND OWNERSHIP SURROUNDING THE PROJECT

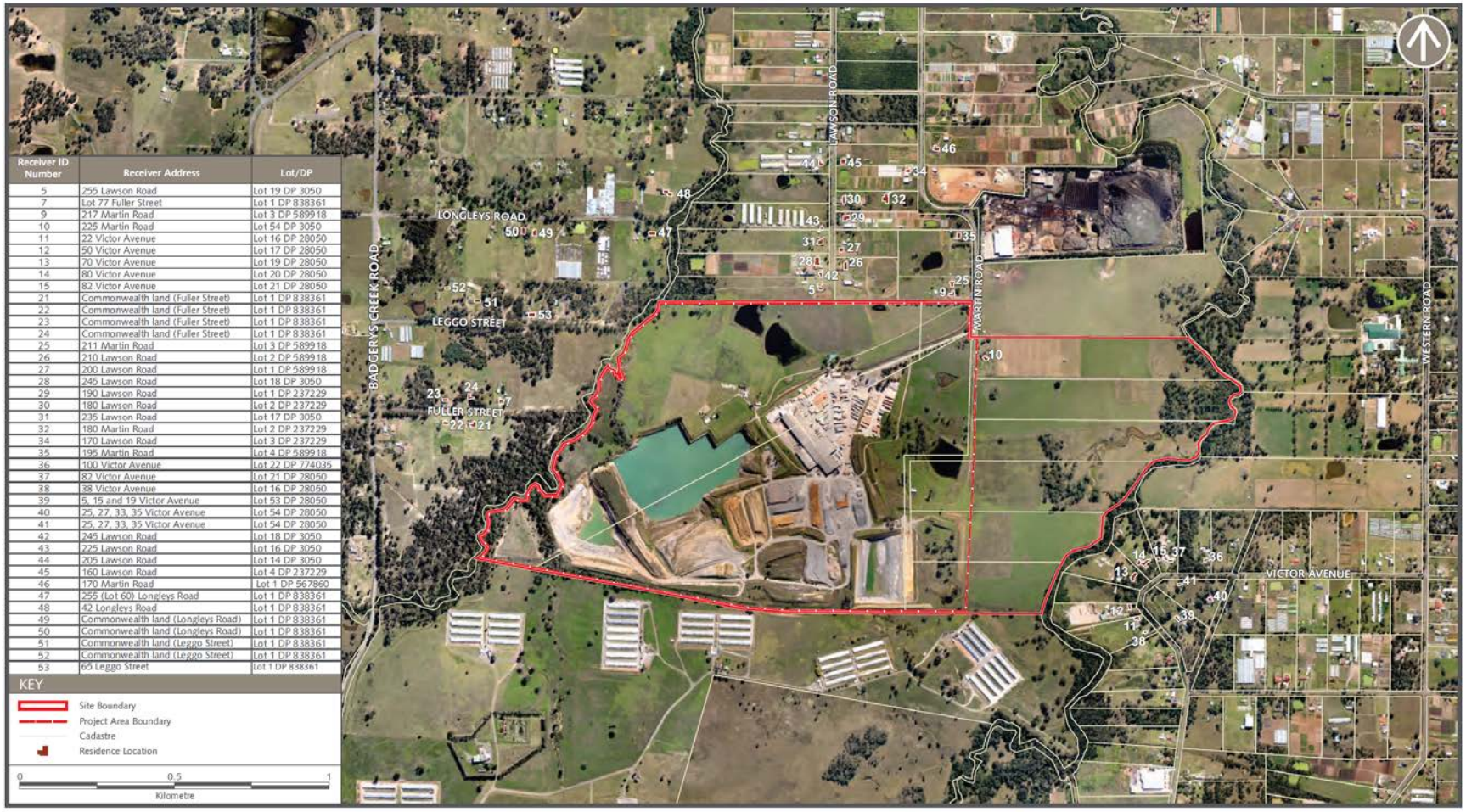


Figure 1: Receiver ID

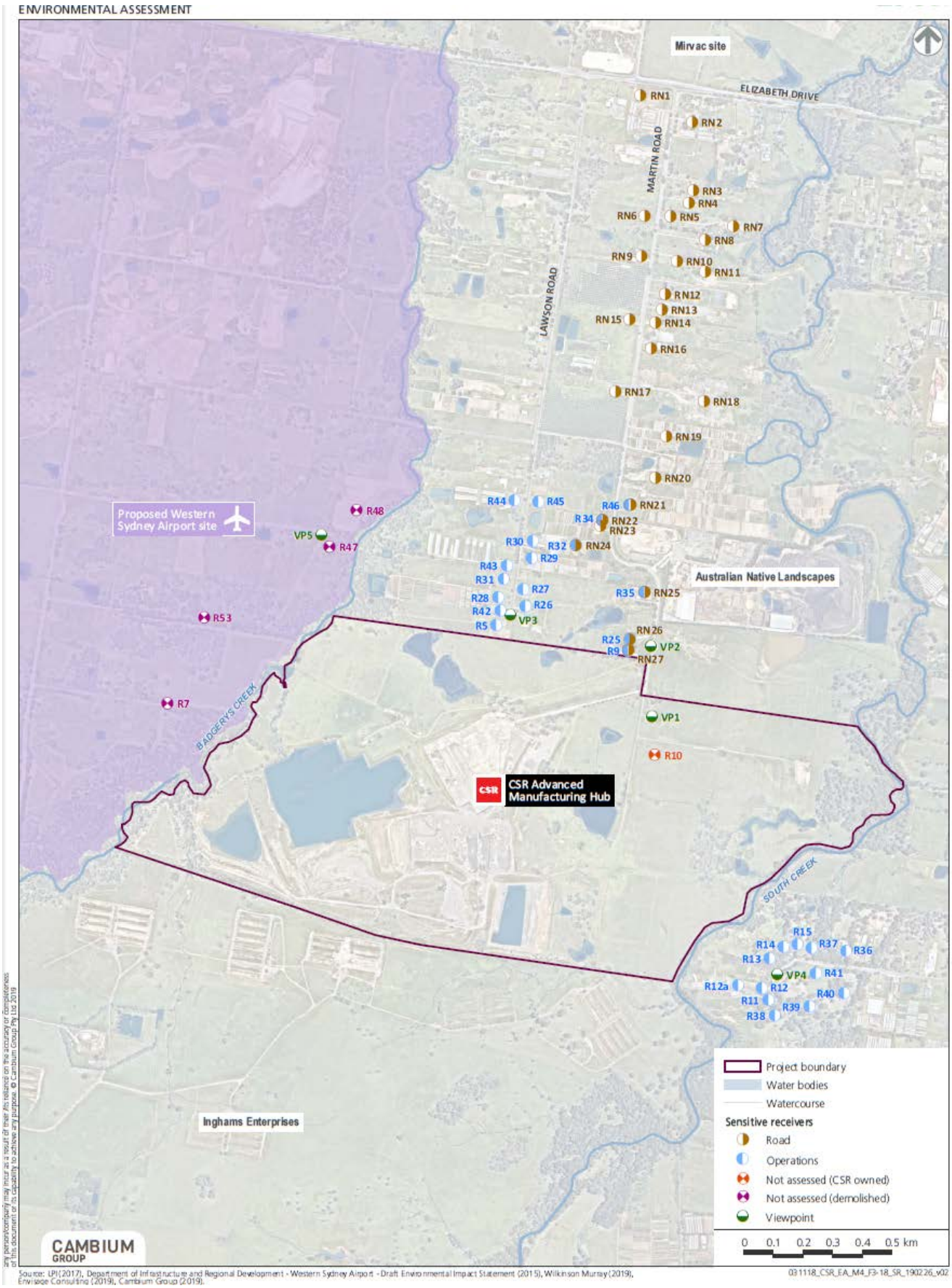


Figure 2: Road Noise Receiver ID

APPENDIX 3
PROJECT LAYOUT PLANS

Figure 1:Project Layout Overview

Figure 2: Phase 1 Project Layout

Figure 3: Phase 2 Project Layout

Figure 4: Phase 3 Project Layout

Figure 5: Phase 4 Project Layout

APPENDIX 4
REHABILITATION PLAN

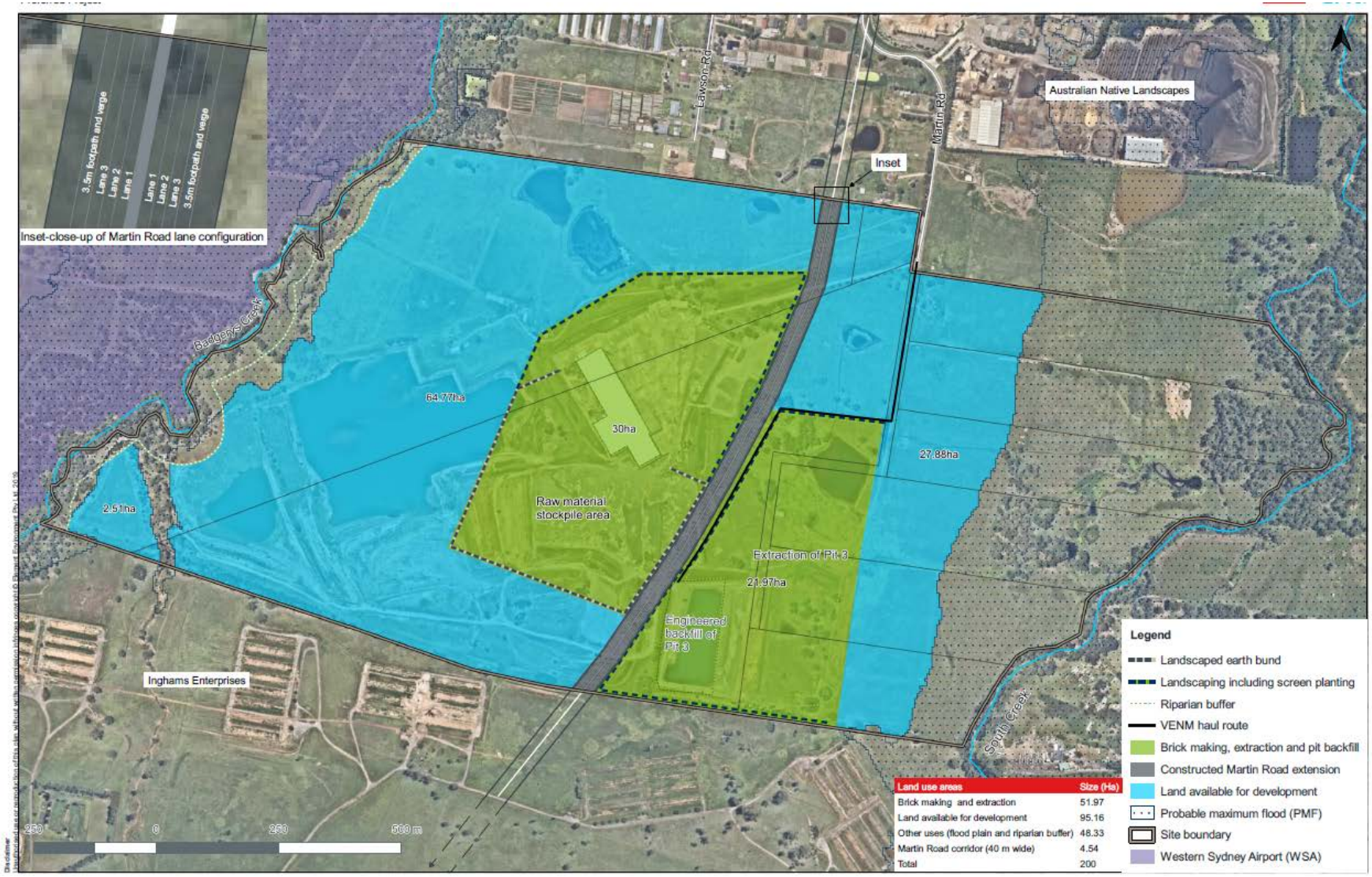


Figure 1: Phase 2 Rehabilitation

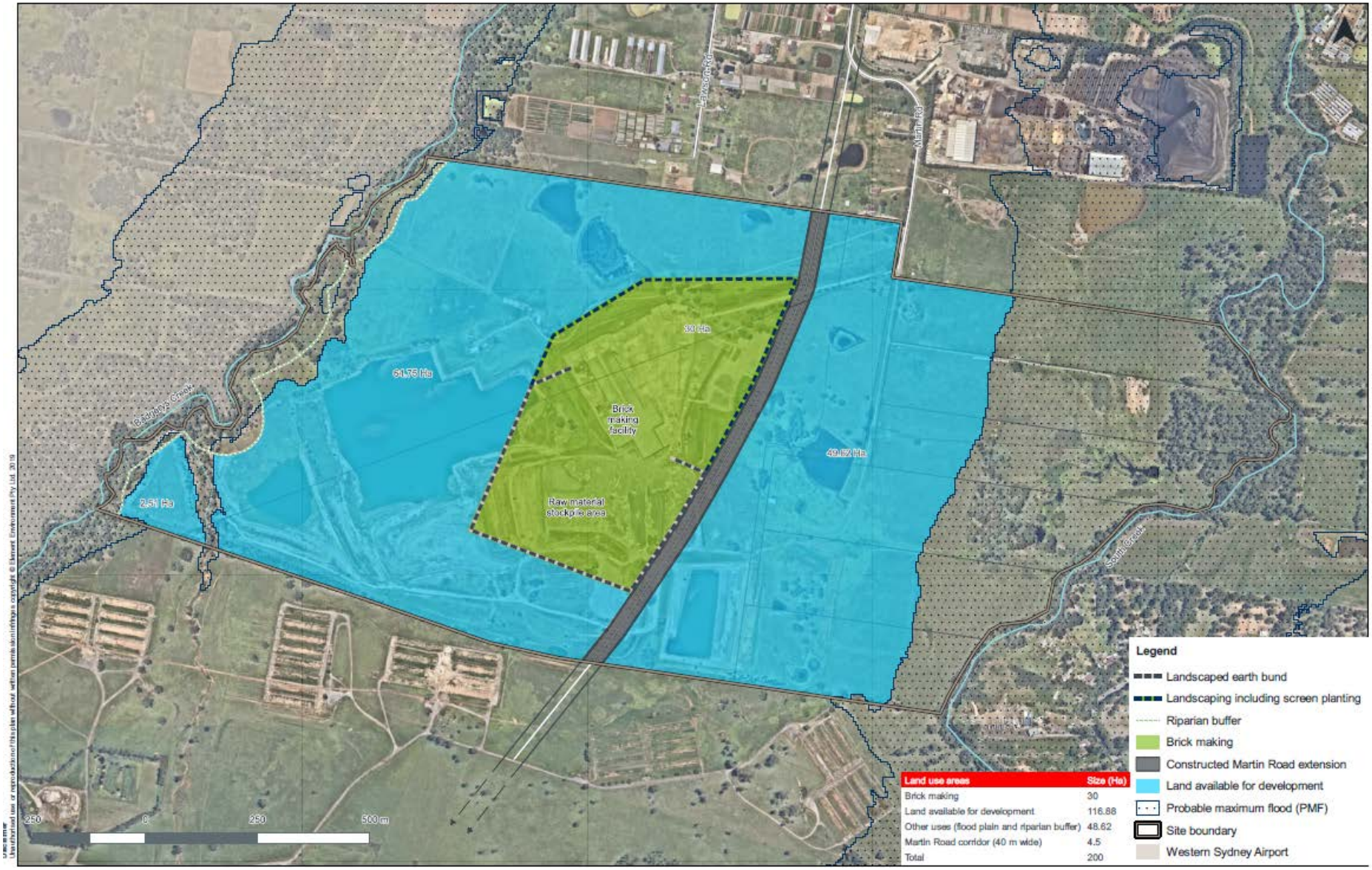
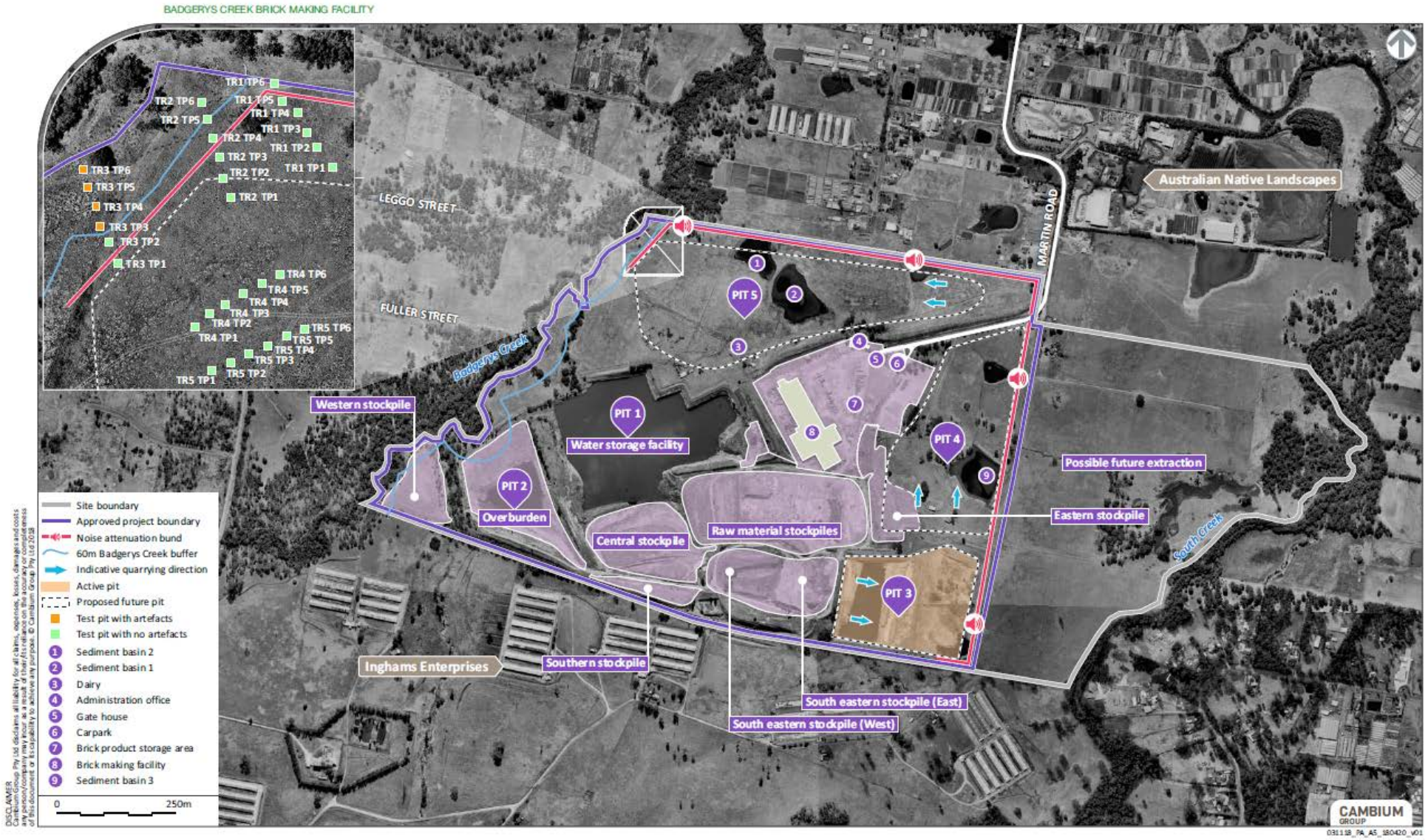


Figure 2: Phase 4 Rehabilitation

APPENDIX 5
ARCHAEOLOGICAL DEPOSIT AVOIDANCE ZONE



APPENDIX 6
STATEMENT OF COMMITMENTS

Issue	Commitment
General	1. The Proponent shall implement all practicable measures to prevent or minimise harm to the environment that may result from the construction, operation or rehabilitation of the project. 2. CSR will apply to amend EPL 684 to reflect the project. 3. The environmental management strategy and sub plans will be amended to reflect the project.
Air Quality	4. The Proponent will prepare an Air Quality and Green House Gas Management Plan (AQGHGMP) for the project to the satisfaction of the Director-General. The AQGHGMP will outline the purpose, methodology and expected outcomes of the dust monitoring, and will include the following content: ▪ Dust fraction to be measured, i.e. TSP, PM_{10}, $PM_{2.5}$ etc.; ▪ Equipment to be used to measure selected dust fraction; ▪ Frequency of the monitoring, i.e. sample collection schedule; ▪ Duration of the monitoring program; ▪ Location of the monitoring station/s; ▪ Standards/guidelines that are to be followed for location/construction of the monitoring station, equipment calibration, collection of samples and analysis of samples; ▪ Calibration methodology and schedule; ▪ Reporting procedure; ▪ Regulatory guidelines and compliance criteria; ▪ Action levels and contingency measures in the event that pollutant concentrations approach or are likely to exceed the relevant compliance criteria; and ▪ A consultation program that involves nearby agricultural producers and residents, in order to determine if the dust mitigation measures are being affective. 5. The AQGHGMP will detail measures to control dust and emissions from the Project Site including the following measures: ▪ Haul roads should be watered using water carts such that the road surface has sufficient moisture to minimise visible on-road dust generation but not so much as to cause pooling and mud/dirt track out to occur ▪ Unloading of trucks containing raw or unusable extracted material to be controlled using water sprays/dust suppression when generating excessive visible dust. ▪ Dust from existing stockpiles of unusable material and open pits to be controlled using water sprays with chemical additives (surfactants); ▪ Completed pits to be revegetated as soon as practicable after completion of quarrying activities. ▪ Disturbed soil surfaces to be revegetated in accordance with the RMP for the Project Site. ▪ Operational practices to be reviewed to ensure 'best practice' techniques are being employed and that operational equipment is working efficiently. 6. The existing HVAS will be moved to as close to the northern boundary of the property and the closest sensitive receiver as possible. 7. The existing deposited dust gauges will be relocated to appropriate positions as close to the property boundaries and nearest sensitive receivers as possible. ~~8.~~ If HVAS and deposited dust air quality monitoring identifies ongoing exceedances of the relevant air quality criteria then the reactive dust management program may need to be reinstated at the site.
Noise	9. The Proponent will implement all practicable measures to undertake the development in a way that minimises the noise generated. The Proponent has made the following commitments in relation to operation noise management: 10. The Proponent will conduct quarrying activities at the Project Site only between the following hours: ▪ 7.00 am to 6.00 pm Monday to Saturday. 11. The Proponent will remove overburden only between the following hours: ▪ 7.00 am to 6.00 pm Monday to Saturday. 12. The Proponent will operate the Brick making facility and storage yard at the Project Site 24 hours a day, Monday to Sunday. 13. The Proponent will receive and dispatch finished building products only between the following hours: ▪ 5.00 am to 10.00 pm Monday to Friday. ▪ 6.00 am to 6.00pm Saturday. 14. The Proponent will receive and dispatch raw material only between the following hours: ▪ 6.00 am to 10.00 pm Monday to Friday. ▪ 6.00 am to 6.00pm Saturday. 15. The Proponent will conduct cash sales only between the following hours:

Issue	Commitment
	▪ 6.00 am to 6.00 pm Monday to Saturday. 16. The Proponent will operate the sales selection/customer display centre only between the following hours: ▪ 8.00 am to 5.00 pm Monday to Sunday. 17. Construction works shall be limited to 7am to 6pm Monday to Friday and 8am to 1pm on Saturdays. 18. A CNVMP will be prepared and implemented during project construction. 18. The construction noise mitigation measures described in Chapter 5.5 of the preferred project noise impact assessment report (appended to the RTS) shall be implemented. 19. Vibration during construction will be managed through the CNVMP to ensure that vibration impacts comply with the limits prescribed in British Standard BS 7385 for structural damage and in Assessing Vibration: a technical guide (DECCW, 2006) for human response. 20. The Proponent and/or its appointed contractors will select and maintain bulk earthwork machinery as specified in the preferred project noise impact assessment report (appended to the RTS). 21. Broadband reversing alarms or other non-tonal vehicle movement and warning alarms shall be fitted to all machinery on site. The potential noise impact associated with reversing alarms shall be managed and minimised via a combination of proactive driver/operator training and operational procedures. 22. The Proponent shall implement a noise monitoring programme which would involve quarterly attended noise monitoring at a number of nearby identified receiver locations for 12 months after all Modification 3 and 4 activities are in full operation. If there are no exceedances of the project noise trigger levels during quarterly noise monitoring during the first year of monitoring then noise monitoring will cease. Additional noise monitoring would be undertaken in response to any noise complaints. 23. The Proponent shall undertake consultation with identified Martin Road residential receivers predicted to exceed the RNP criteria and conduct further investigation of their residences (as detailed in Section 2.3.3 and 4.1 of the RTS) to determine whether they qualify for and require the 'Type 1' treatment package from RMS's (2015) *At-receiver Treatment Guideline*. 23. Further investigations of the six residences potentially affected by road noise will be undertaken prior to increasing heavy vehicle movements along Martin Road above the approved heavy vehicle numbers and no greater than 180 truck movements in the daytime period. The investigation will determine whether the residences require the 'Type 1' treatment package from RMS's (2015) At-receiver Treatment Guideline. 24. Prior to construction of the Martin Road-Elizabeth Drive intersection, existing road noise levels would be qualified to determine if architectural treatment should be offered to receivers along Elizabeth Drive raising complaints about increased road noise levels. 24. The Proponent will maintain a noise complaint register.
Surface Water	**Stormwater management** 25. The Proponent shall manage surface water on the Project Site in accordance with the WMP prepared for the Project Site and revised for the project, including surface water management measures include in the Modification 3 and 4 EA and the RTS. 26. If during the operational phase of the quarry or on completion of the quarry operations, the proponent wishes to make use of the water from the pits/dams in the brick making process or for reuse at other premises offsite etc, a licence will be obtained from DPIE. 27. Sediment basins 4, 5 and 6 and the new basins at the raw material stockpile area and Pit 3 will be sized and operated in accordance with Landcom's (2004) Managing Urban Stormwater: Soils & Construction. If any of these basins are to be modified to perform additional stormwater treatment functions in future (other than sediment capture), then appropriate modelling and design of the basins will be required at that time. In this case monitoring of discharges from the basin at Pit 3 to South Creek will be required. 28. The site WMP will be revised prior to commencement of the modification to include the revised surface water management approach, and monitoring of any water discharged from the site. **Monitoring** 29. Electrical conductivity, pH, total nitrogen, total suspended solids, turbidity, total alkalinity, arsenic and copper will be monitored at the discharge points to Badgerys Creek and South Creek. Discharges will be monitored daily during the first month of continuous discharge, then weekly if the first month of data does not exceed concentration limits. Monitoring will revert to daily if any limits are exceeded and/or concentrations are reduced below limits.

Issue	Commitment
	30. Total dissolved solids, total phosphorus, arsenic, cadmium, chromium, lead, nickel, zinc and mercury will be sampled weekly during the first two months, which will reduce to monthly if there are no exceedances. 31. The analytes previously sampled in Pit 1 will be monitored at three depth levels from the surface to 6 m at two locations near the discharge point to Badgerys Creek. Water will be monitored weekly for three weeks prior to discharge, then monthly. This monitoring will continue for the life of the project, and in the perched treatment basin described above. 32. Similar sampling is also required for the new basin at Pit 3 if the basin is being used to treat Pit 3 water (other than sediment capture). The list of analytes may be able to be reduced according to the future quality of stormwater collected in Pit 3. **Licensing and approvals** 33. CSR will apply to the EPA to amend the EPL to incorporate the discharge rates and concentration limits for relevant physical and chemical stressors, and toxicants, at the discharge point to Badgerys Creek. 34. CSR will apply to the EPA to amend the EPL, if and when required, to incorporate appropriate discharge rates and concentration limits for discharges from the basin at Pit 3, for which time the basin provides additional water treatment other than sediment capture. 35. CSR will consult DPIE Water on the need for water licenses associated with the modification. 36. The EPA will be engaged, post approval, to determine whether the pit water must be classified in terms of the Protection of the Environment Operations Act 1997 (POEO Act) and to include the discharge point in the EPL. **Erosion and sediment control** 37. Erosion and sediment controls will be implemented at the pit areas once they are filled with VENM and rehabilitation has commenced. These measures will remain in place until surfaces are fully stabilised. 38. Erosion and sediment controls will be implemented along the unsealed VENM haul road, which will direct runoff to the pits or local sediment traps.
Groundwater	39. The Proponent shall prepare and implement a Groundwater Monitoring Program for the Project Site generally in accordance with the methodology provided in Chapter 11 of the 2011 EA, subject to consultation with the DPIE (water, lands and primary industry) and the satisfaction of the Director-General of the DP&I. 40. The WMP will be updated to include the groundwater monitoring network and a TARP for exceedances of groundwater criteria, which will be developed based on the baseline groundwater data. 41. The Proponent shall report the results of the Groundwater Monitoring Program to the Secretary of the DPIE on an annual basis. 42. The Proponent shall implement appropriate management measures in relation to groundwater as indicated by the Monitoring Program and agreed with the Secretary. 43. A licence to authorise any groundwater monitoring installation, required as part of this project, shall be obtained from the DPIE Water prior to any drilling commencing. 44. The proponent shall implement an alluvial aquifer mapping and assessment program to inform: ▪ The definition of the boundaries of the alluvial system. ▪ Adjustment to the extent of proposed pits to avoid impacts to the alluvial aquifer. ▪ The establishment of further mitigation measures (if required) to minimise potential impacts upon the alluvial aquifer. ▪ This program will commence within 12 months of recommencing quarrying operations and the results will be reported to the Secretary of the DPIE.
Rehabilitation	45. The site will be progressively rehabilitated in accordance with the approved rehabilitation strategy and rehabilitation management plan. 46. The rehabilitation strategy and rehabilitation management plan will be revised to incorporate the project, and any additional management strategies to ensure temporary stabilisation of exposed surfaces, permanent stabilisation strategies and progressive rehabilitation with groundcover vegetation. 47. The rehabilitation management plan will be revised to exclude plant species that are known to attract wildlife and grow to a size which will penetrate the OLS. 48. The Proponent shall carry out rehabilitation works at the Project Site in accordance with the RMP prepared for the Project Site. 49. The Proponent will prepare a Final Landform Rehabilitation Plan in consultation with the DPIE two years prior to the completion of all approved quarrying activities.
Traffic and Transport	50. The Proponent shall manage traffic movements to and from the Project Site generally in accordance with the following:

Issue	Commitment
	▪ Personnel operating trucks and vehicles to and from the Project Site would be required to undertake a site-specific health and safety induction, specifying operating hours and vehicle speed limits on Martin Road. ▪ A heavy vehicle protocol would be developed for the Project Site and distributed to relevant staff and contractors during induction procedures. The protocol would deal with such issues as timing of vehicle movements, idling of vehicles, speed limits and parking. ▪ Unnecessary vehicle movements would be minimised where possible. ▪ Deliveries would be scheduled on larger capacity 'Truck and Trailer' vehicles rather than 'Truck Only' vehicles where possible to minimise truck movements. ▪ A construction traffic management plan will be prepared and implemented to manage impacts on the road network, including the intersection, from construction vehicles. ▪ Traffic signals and road upgrades will be constructed at the Martin Road-Elizabeth Drive intersection prior to increasing heavy vehicle movements from the project above the approved heavy vehicle numbers. ▪ CSR will contribute to the upgrade and ongoing maintenance of Martin Road in accordance with the deed of agreement with LCC.
Cultural Heritage	51. The Proponent shall adopt the following measures in relation to the management of cultural heritage on the Project Site: ▪ The heat retainer hearth will continue to be protected by a fenced 10m exclusion zone. ▪ All Aboriginal heritage items collected during survey and test excavations will be reburied with the hearth in consultation with the RAPs. ▪ Should Aboriginal objects be uncovered during the course of the approved works, works shall cease. In cases where historical items have been uncovered, Heritage NSW is to be advised or should indigenous items be uncovered the National Parks and Wildlife Service shall be advised. ▪ Workers/contractors shall be informed of their obligations under the NPW Act 1974, namely that it is illegal to disturb, damage or destroy an Aboriginal object without the prior approval of the Secretary of DPC. ▪ Should human remains be found in, on, or under the land during construction, the responsible party shall: - Contact the local police. - Not disturb or excavate the remains. - Immediately cease all work at the particular location. - Notify the Heritage NSW (DPC) office as soon as practicable and provide any available details of the remains and their location. - Not recommence any work at the particular location until authorised in writing by the Heritage NSW. 52. The AHMP will be updated with the findings of the Modification 4 ACHA.
Ecology	53. The Proponent shall adopt the following measures in relation to the removal of any trees on the Project Site: ▪ The canopy of the trees to be visually inspected prior to clearing to assess for the presence of fauna. Where bird species are detected the tree is to be nudged prior to felling to encourage the fauna to vacate the tree prior to felling. Trees to be left in situ until the birds leave the canopy. ▪ Felled trees are to be left in-situ for at least 24 hours to allow fauna species to relocate. Qualified personnel are to be on hand to check for wildlife and relocate them. ▪ Felled wood is to be relocated to the remnant woodland (and not placed in piles) or chipped and used in rehabilitation areas. ▪ Should any wildlife be inadvertently injured during the proposed works, WIRES or an accredited veterinarian shall be contacted. ▪ A 60 m buffer area shall be provided along Badgerys Creek and the Badgerys Creek tributary, except where Pit 2 extends into these buffers. Rehabilitation works are to be undertaken in this area in accordance with the RMP. ▪ Five local native trees shall be planted for each mature native tree that is removed. The replacement trees shall consist of a diversity of local provenance tree species from the native vegetation community (or communities) that occur, or once occurred on the site. The plantings shall be located adjacent to the riparian vegetation along South Creek, Badgerys Creek and its tributary.
Aquatic biodiversity	54. A 40 m vegetated riparian zone will be maintained around the wetland adjacent to South Creek and 20 m zone will be maintained around the tributary to Badgerys Creek (except over Pit 2). 55. As the hydraulic modelling for the surface water assessment was indicative, geomorphology will be assessed in greater detail to validate the bed and bank materials of Badgerys Creek prior to finalisation of the pit dewatering strategy. This

Issue	Commitment
	will include quantification of bed and bank material and particle size and calculation of critical shear stress for the bed and bank to determine its sensitivity to erosion. 56. If the bed and bank materials are demonstrated to be sensitive to erosion, the optimum flow rate that can be achieved without impacting the creek bed and banks will be determined in a sediment transport model. 57. It will be necessary to gain further water quality and flow data to determine the impact of discharges on Badgerys Creek. Water quality will be monitored every month at the four Badgerys Creek and South Creek monitoring locations as described in Section 6.3.2 of the EA. This will include nitrogen speciation to determine which portion of nitrogen is bioavailable and could impact aquatic ecosystems. 58. A biological monitoring program will be developed to detect if the macroinvertebrate community is changed by exposure to discharge water. An in-stream vegetation monitoring program will be prepared and implemented to detect if the discharge is impacting vegetation community composition and mortality. 59. Monitoring for changes to instream vegetation and macroinvertebrates will be incorporated into a pit dewatering plan as a sub-plan to the existing water management plan. 60. CSR will compile a fauna relocation plan. This plan will develop strategies for aspects such as transferring aquatic fauna, acclimatising aquatic fauna to different water conditions and managing pest species. DPIE will be consulted during the development of this strategy.
Contamination	61. The potential presence of asbestos in the eastern edge of Pit 1 will be added to the site Asbestos Register. 62. A materials management plan will be prepared to ensure that surface water, backfilled material and imported soils are handled appropriately, do not pose a risk to human health or the environment and will be suitable for the proposed land use. The plan will provide procedures to appropriately quantify, classify, dispose of and report on potential contaminants. 63. A UFP will be prepared, providing guidance in the event that future below ground excavations identify contaminated materials (e.g. asbestos, staining, odours). The UFP will outline procedures for handling, assessing and managing any contamination that may be identified as part of Modification 4 works. If previously unidentified contaminated materials are encountered during construction and operation of the proposed modification, relevant statutory requirements, including potential soil testing and waste classification, will need to be complied with, and the material managed and disposed of appropriately. 64. Stored/stockpiled materials within the proposed disturbance footprints will be inspected and they will be recycled or disposed at facilities which can legally receive such materials. 65. Soil materials within the vicinity of the Modification 3 works will be assessed in accordance with NSW EPA (2014) *Waste Classification Guidelines* and either re-use them on site where suitable or dispose of them offsite to a landfill which can legally receive such materials. 66. Conduct a hazardous material survey on existing site structures prior to demolition/alteration activities.
Waste	67. The Proponent shall manage waste in relation to the project in accordance with the existing WMP for the Project Site. 68. The existing WMP will be updated to include the importation and handling of VENM. 69. All waste generated on site will be managed in accordance with the site's waste management plan that will follow the waste hierarchy of avoid, reduce, re-use, recycle and will be updated to include project works.
Visual amenity	70. Proposed lighting at the site will still comply with Australian Standard AS4282 (INT) 1995 - Control of Obtrusive Effects of Outdoor Lighting.
Mineral Resources	71. The proponent will provide annual production data to the water, lands and primary industries division of the Department of Planning, Industry and Environment, as and when requested.
Environmental Management	72. The Proponent shall prepare an EMS for the Project Site to provide environmental management practices and procedures to be followed during the operation of the project. The EMS shall include, but not necessarily be limited to: ▪ identification of statutory and other obligations that the Proponent is required to fulfil in relation to operation of the project; ▪ a description of the roles and responsibilities for all key personnel involved in environmental management of the project; ▪ the environmental policies and principles to be applied to the operation of the project; and ▪ describe in general terms how the environmental performance of the project would be monitored and managed.

APPENDIX B ENVIRONMENT PROTECTION LICENCE

Environment Protection Licence

Licence - 684

Licence Details	
Number:	684
Anniversary Date:	18-November

Licensee

PGH BRICKS & PAVERS PTY LIMITED

LOCKED BAG 1345

NORTH RYDE NSW 1670

Premises

BADGERYS CREEK

235 MARTIN ROAD

BADGERYS CREEK NSW 2171

Scheduled Activity

Ceramic works

Extractive activities

Mining for minerals

Fee Based Activity	Scale
Ceramics production	0-15000 T annual production capacity
Land-based extractive activity	0-30000 T annual capacity to extract, process or store
Mining for minerals	0-30000 T annual production capacity

Region

Metropolitan West - Sydney

4 Parramatta Square, 12 Darcy Street

PARRAMATTA NSW 2150

Phone: (02) 9995 5000

Fax: (02) 9995 6900

Locked Bag 5022

PARRAMATTA NSW 2124

Environment Protection Licence

Licence - 684

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Environment Protection Licence

Licence - 684

Information about this licence

Dictionary

A definition of terms used in the licence can be found in the dictionary at the end of this licence.

Responsibilities of licensee

Separate to the requirements of this licence, general obligations of licensees are set out in the Protection of the Environment Operations Act 1997 ("the Act") and the Regulations made under the Act. These include obligations to:

- ensure persons associated with you comply with this licence, as set out in section 64 of the Act;
- control the pollution of waters and the pollution of air (see for example sections 120 - 132 of the Act);
- report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

Variation of licence conditions

The licence holder can apply to vary the conditions of this licence. An application form for this purpose is available from the EPA.

The EPA may also vary the conditions of the licence at any time by written notice without an application being made.

Where a licence has been granted in relation to development which was assessed under the Environmental Planning and Assessment Act 1979 in accordance with the procedures applying to integrated development, the EPA may not impose conditions which are inconsistent with the development consent conditions until the licence is first reviewed under Part 3.6 of the Act.

Duration of licence

This licence will remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister. A licence may only be surrendered with the written approval of the EPA.

Licence review

The Act requires that the EPA review your licence at least every 5 years after the issue of the licence, as set out in Part 3.6 and Schedule 5 of the Act. You will receive advance notice of the licence review.

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

- an administrative fee; and
- a load-based fee (if applicable).

Environment Protection Licence

The EPA publication “A Guide to Licensing” contains information about how to calculate your licence fees. The licence requires that an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints), be submitted to the EPA. The Annual Return must be submitted within 60 days after the end of each reporting period. See condition R1 regarding the Annual Return reporting requirements.

Usually the licence fee period is the same as the reporting period.

Transfer of licence

The licence holder can apply to transfer the licence to another person. An application form for this purpose is available from the EPA.

Public register and access to monitoring data

Part 9.5 of the Act requires the EPA to keep a public register of details and decisions of the EPA in relation to, for example:

- licence applications;
- licence conditions and variations;
- statements of compliance;
- load based licensing information; and
- load reduction agreements.

Under s320 of the Act application can be made to the EPA for access to monitoring data which has been submitted to the EPA by licensees.

This licence is issued to:

PGH BRICKS & PAVERS PTY LIMITED
LOCKED BAG 1345
NORTH RYDE NSW 1670

subject to the conditions which follow.

Environment Protection Licence

Licence - 684

1 Administrative Conditions

A1 What the licence authorises and regulates

A1.1 This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation.

Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.

Scheduled Activity	Fee Based Activity	Scale
Ceramic works	Ceramics production	0 - 15000 T annual production capacity
Extractive activities	Land-based extractive activity	0 - 30000 T annual capacity to extract, process or store
Mining for minerals	Mining for minerals	0 - 30000 T annual production capacity

A2 Premises or plant to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
BADGERYS CREEK
235 MARTIN ROAD
BADGERYS CREEK
NSW 2171
LOT 54 DP 3050, LOT 55 DP 3050, LOT 56 DP 3050, LOT 57 DP 3050, LOT 58 DP 3050, LOT 59 DP 3050, LOT 1 DP 373863, PART LOT 1 DP 981161, LOT 1 DP 1035249, LOT 2 DP 1035249

A3 Information supplied to the EPA

A3.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.

In this condition the reference to "the licence application" includes a reference to:
a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and
b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.

Environment Protection Licence

2 Discharges to Air and Water and Applications to Land

P1 Location of monitoring/discharge points and areas

P1.1 The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.

Air

EPA identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
1	Discharge to air; Air emissions monitoring	Discharge to air; Air emissions monitoring	The stack serving the kiln shown as Point 1 - Kiln Exhaust Stack on drawing titled "Boral Badgerys Creek Air Emission Points" Dated 4/03/2009 Rev: 1 submitted to DECC on 4/03/09
2	Discharge to air; Air emission monitoring	Discharge to air; Air emission monitoring	The stack serving the dryer shown as Point 2 - Dryer Exhaust Stack on drawing titled "Boral Badgerys Creek Air Emission Points" Dated 4/03/2009 Rev: 1 submitted to EPA on 4/03/09

P1.2 The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.

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.

Water and land

EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
3	Discharge to waters and water quality monitoring	Discharge to waters and water quality monitoring	Outlet from Sediment Basin B as described in 'Water Pollution Impact Assessment for Discharge of Stormwater Runoff from Disturbed Areas at PGH Badgerys Creek (Version 2)', PGH Bricks, 04/02/2021

3 Limit Conditions

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.

Environment Protection Licence

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.

L2.2 Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.

L2.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table\s.

L2.4 Air Concentration Limits

POINT 1

Pollutant	Units of measure	100 percentile concentration limit	Reference conditions	Oxygen correction	Averaging period
Total Solid Particles	milligrams per cubic metre	100			
Hydrogen fluoride	milligrams per cubic metre	50			
Nitrogen Oxides	milligrams per cubic metre	2000			

L2.5 Water and/or Land Concentration Limits

POINT 3

Pollutant	Units of Measure	50 Percentile concentration limit	90 Percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
pH	pH				6.5-8.5
Turbidity	nephelometric turbidity units				50

L3 Waste

L3.1 The licensee must not cause, permit or allow any waste to be received at the premises, except the wastes expressly referred to in the column titled “Waste” and meeting the definition, if any, in the column titled “Description” in the table below.
Any waste received at the premises must only be used for the activities referred to in relation to that waste

in the column titled “Activity” in the table below.
Any waste received at the premises is subject to those limits or conditions, if any, referred to in relation to that waste contained in the column titled “Other Limits” in the table below.
This condition does not limit any other conditions in this licence.

Code	Waste	Description	Activity	Other Limits
NA	Waste	Any waste received on site that is below licensing thresh holds in Schedule 1 of the POEO Act, as in from time to time.		N/A
NA	General or Specific exempted waste	Waste that meets all the conditions of a recourse recovery exemption Clause 92 of the Protection of the Environment Operations (Waste) Regulation 2014	As specified in each particular resource recovery exemption	N/A

L4 Noise limits

L4.1 Noise from the premises (excluding mobile plant) must not exceed:
a) An LA10(15 minute) noise emission criterion of 55 dB(A)(0700 to 2200) Monday to Saturday and 0800 to 2200 Sundays and Public Holidays; and
b) An LA10(15 minute) noise emission criterion of 40 dB(A) at all other times,
except as expressly provided by this licence.

L4.2 Noise from the operation of the mobile plant must not exceed:
a) An LA10(15 minute) noise emission criterion of 50 dB(A)>(0700 to 2200) Monday to Saturday and (0800 to 2200) Sundays and Public Holidays; and
b) An LA10[15 minute) noise emission criterion of 40 dB(A) at all other times,
except as expressly provided by this licence.

L4.3 Noise from the premises is to be measured or computed at the most affected point on or within the residential property boundary or, if that is more than 30 metres from the residence, at the most affected point within 30 metres of the residence to determine compliance with condition L4.1. 5dB(A) must be added if the noise is tonal or impulsive in character.

L4.4 Noise from the operation of the mobile plant is to be measured or computed at the most affected point on or within the residential property boundary or, if that is more than 30 metres from the residence, at the most affected point within 30 metres of the residence to determine compliance with condition L4.2. 5dB(A) must be added if the noise is tonal or impulsive in character.

L5 Potentially offensive odour

L5.1 No condition in this licence identifies a potentially offensive odour for the purposes of section 129 of the

Protection of the Environment Operations Act 1997.

Note: Section 129 of the Protection of the Environment Operations Act 1997 provides that the licensee must not cause or permit the emission of any offensive odour from the premises but provides a defence if the emission is identified in the relevant environment protection licence as a potentially offensive odour and the odour was emitted in accordance with the conditions of a licence directed at minimising odour.

L6 Other limit conditions

L6.1 **Asbestos**

Note: The licensee must comply with all conditions as specified in this licence or where no specific condition are outlined in this licence, the licencee must comply with the Protection of the Environment Operations (Waste) Regulation 2005.

4 Operating Conditions

O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.
This includes:
a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

O2 Maintenance of plant and equipment

O2.1 All plant and equipment installed at the premises or used in connection with the licensed activity:
a) must be maintained in a proper and efficient condition; and
b) must be operated in a proper and efficient manner.

O3 Dust

O3.1 The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.

O4 Processes and management

O4.1 The licensee must ensure that any liquid and/or non-liquid waste generated and/or stored at the premises is assessed and classified in accordance with the EPA Waste Classification Guidelines as in force from time to time to time.

O4.2 The licensee must ensure that waste identified for recycling is stored separately from other waste.

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O5 Other operating conditions

O5.1 Water from pits 1, 2 or 3 must not be transferred to Sediment Basin A or Sediment Basin B, or discharged to waterways.

5 Monitoring and Recording Conditions

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.

M1.2 All records required to be kept by this licence must be:
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.

M1.3 The following records must be kept in respect of any samples required to be collected for the purposes of this licence:
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.

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:

M2.2 Air Monitoring Requirements

POINT 1

Pollutant	Units of measure	Frequency	Sampling Method
Chlorine	milligrams per cubic metre	Special Frequency 1	TM-7
Dry gas density	kilograms per cubic metre	Special Frequency 1	TM-23
Hydrogen fluoride	milligrams per cubic metre	Special Frequency 1	TM-9
Moisture content	percent	Special Frequency 1	TM-22
Molecular weight of stack gases	grams per gram mole	Special Frequency 1	TM-23
Nitrogen Oxides	milligrams per cubic metre	Special Frequency 1	TM-11

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Odour	odour units	Special Frequency 1	OM-8
Temperature	degrees Celsius	Special Frequency 1	TM-2
Total Solid Particles	milligrams per cubic metre	Special Frequency 1	TM-15
Type 1 substance	milligrams per cubic metre	Special Frequency 1	TM-12
Type 2 substance	milligrams per cubic metre	Special Frequency 1	TM-13
Velocity	metres per second	Special Frequency 1	TM-2
Volatile organic compounds	milligrams per cubic metre	Special Frequency 1	TM-34
Volumetric flowrate	cubic metres per second	Special Frequency 1	TM-2

POINT 2

Pollutant	Units of measure	Frequency	Sampling Method
Chlorine	milligrams per cubic metre	Special Frequency 1	TM-7
Dry gas density	kilograms per cubic metre	Special Frequency 1	TM-23
Hydrogen fluoride	milligrams per cubic metre	Special Frequency 1	TM-9
Moisture content	percent	Special Frequency 1	TM-22
Molecular weight of stack gases	grams per gram mole	Special Frequency 1	TM-23
Nitrogen Oxides	milligrams per cubic metre	Special Frequency 1	TM-11
Odour	odour units	Special Frequency 1	OM-8
Temperature	degrees Celsius	Special Frequency 1	TM-2
Total Solid Particles	milligrams per cubic metre	Special Frequency 1	TM-15
Type 1 substance	milligrams per cubic metre	Special Frequency 1	TM-12
Type 2 substance	milligrams per cubic metre	Special Frequency 1	TM-13
Velocity	metres per second	Special Frequency 1	TM-2
Volatile organic compounds	milligrams per cubic metre	Special Frequency 1	TM-34
Volumetric flowrate	cubic metres per second	Special Frequency 1	TM-2

M2.3 For the purpose of the above tables Special Frequency 1 means that when the plant is in operation the pollutants listed in the tables above for licence Discharge Poins 1 and 2 must be monitored at least once every six months.

M2.4 Water and/ or Land Monitoring Requirements

POINT 3

Environment Protection Licence

Pollutant	Units of measure	Frequency	Sampling Method
Aluminium (dissolved)	milligrams per litre	Monthly during discharge	Grab sample
Electrical conductivity	microsiemens per centimetre	Continuous during discharge	In line instrumentation
pH	pH	Continuous during discharge	In line instrumentation
Turbidity	nephelometric turbidity units	Continuous during discharge	In line instrumentation

M2.5 For the purpose of the above table, if monitoring results for aluminium (dissolved) exceed ANZG (2018) default guideline values (55µg/L for fresh water, pH >6.5), the licensee must notify the EPA within 7 days.

M3 Testing methods - concentration limits

M3.1 Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:
a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or
b) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or
c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.

Note: The *Protection of the Environment Operations (Clean Air) Regulation 2010* requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".

M3.2 Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.

M4 Recording of pollution complaints

M4.1 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.

M4.2 The record must include details of the following:
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.

M4.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M4.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M5 Telephone complaints line

M5.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.

M5.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

M5.3 The preceding two conditions do not apply until 3 months after: the date of the issue of this licence.

6 Reporting Conditions

R1 Annual return documents

R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:

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.

R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.

R1.3 Where this licence is transferred from the licensee to a new licensee:
a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and

ending on:
a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

R1.5 The Annual Return for the reporting period must be supplied to the EPA via eConnect *EPA* or by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').

R1.6 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.

R1.7 Within the Annual Return, the Statements of Compliance must be certified and the Monitoring and Complaints Summary must be signed by:
a) the licence holder; or
b) by a person approved in writing by the EPA to sign on behalf of the licence holder.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

Note: An application to transfer a licence must be made in the approved form for this purpose.

R2 Notification of environmental harm

R2.1 Notifications must be made by telephoning the Environment Line service on 131 555.

R2.2 The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.

Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.

R3 Written report

R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:
a) where this licence applies to premises, an event has occurred at the premises; or
b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence,
and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.

R3.2 The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.

R3.3 The request may require a report which includes any or all of the following information:
a) the cause, time and duration of the event;
b) the type, volume and concentration of every pollutant discharged as a result of the event;

c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
g) any other relevant matters.

R3.4 The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.

7 General Conditions

G1 Copy of licence kept at the premises or plant

G1.1 A copy of this licence must be kept at the premises to which the licence applies.

G1.2 The licence must be produced to any authorised officer of the EPA who asks to see it.

G1.3 The licence must be available for inspection by any employee or agent of the licensee working at the premises.

G2 Other general conditions

G2.1 **Completed Programs**

Program	Description	Completed Date
Stormwater management plan	Prepare stormwater management plan for site that includes fuel storage; sewage irrigation.	22-October-2002
Trial Use of Recycled Wastewater	Trial use of recycled wastewater in brick manufacturing. Reduce use of water by using recycled wastewater.	01-December-2008

Environment Protection Licence

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Dictionary

General Dictionary

3DGM [in relation to a concentration limit]	Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples
Act	Means the Protection of the Environment Operations Act 1997
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
AMG	Australian Map Grid
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
annual return	Is defined in R1.1
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
BOD	Means biochemical oxygen demand
CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
COD	Means chemical oxygen demand
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.
cond.	Means conductivity
environment	Has the same meaning as in the Protection of the Environment Operations Act 1997
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991
EPA	Means Environment Protection Authority of New South Wales.
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 2009.
general solid waste (non-putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997

Environment Protection Licence

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flow weighted composite sample	Means a sample whose composites are sized in proportion to the flow at each composites time of collection.
general solid waste (putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environmen t Operations Act 1997
grab sample	Means a single sample taken at a point at a single time
hazardous waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
licensee	Means the licence holder described at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997
MBAS	Means methylene blue active substances
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997
O&G	Means oil and grease
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997
premises	Means the premises described in condition A2.1
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence
reporting period	For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 mo nths. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
restricted solid waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
scheduled activity	Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997
special waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TM	Together with a number, means a test method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.

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TSP	Means total suspended particles
TSS	Means total suspended solids
Type 1 substance	Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements
Type 2 substance	Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements
utilisation area	Means any area shown as a utilisation area on a map submitted with the application for this licence
waste	Has the same meaning as in the Protection of the Environment Operations Act 1997
waste type	Means liquid, restricted solid waste, general solid waste (putrescible), general solid waste (non - putrescible), special waste or hazardous waste

Mr Tim Gilbert

Environment Protection Authority

(By Delegation)

Date of this edition: 01-March-2000

Environment Protection Licence

Licence - 684

End Notes

1	Licence varied by notice 1009191, issued on 27-Jun-2002, which came into effect on 22-Jul-2002.
2	Licence varied by change to legislation, issued on 05-Jul-2007, which came into effect on 05-Jul-2007.
3	Licence varied by notice 1076261, issued on 19-Sep-2007, which came into effect on 19-Sep-2007.
4	Licence varied by notice 1079904, issued on 28-Nov-2007, which came into effect on 28-Nov-2007.
5	Licence varied by notice 1082805, issued on 06-Mar-2008, which came into effect on 06-Mar-2008.
6	Condition A1.3 Not applicable varied by notice issued on <issue date> which came into effect on <effective date>
7	Licence varied by notice 1093859, issued on 18-Nov-2008, which came into effect on 18-Nov-2008.
8	Licence varied by change to FBA for summer pollutants, issued on 16-Jan-2009, which came into effect on 16-Jan-2009.
9	Licence varied by notice 1097146, issued on 20-Apr-2009, which came into effect on 20-Apr-2009.
10	Licence varied by notice 1524840 issued on 08-Sep-2014
11	Licence varied by notice 1528953 issued on 19-Mar-2015
12	Licence transferred through application 1530237 approved on 04-May-2015 , which came into effect on 04-May-2015
13	Licence varied by notice 1601711 issued on 23-Mar-2021

APPENDIX C MINING LEASE

Office of State Revenue
NSW Treasury

Client No: **1846988** **2372**
Duty: N/A Trans No: 1771
Asst details: Minerals
Signed: R. McLeod Date: 8.5.18

MINING LEASE

MINING ACT 1992

NO. **1771**

DATED 4 May 2018

MINISTER FOR RESOURCES

OF THE STATE

OF NEW SOUTH WALES

TO

PGH Bricks and Pavers Pty Ltd
ACN 168 794 821

Mining Lease

Section 63 of the *Mining Act 1992*

I, **Kevin Ruming, Director Strategic Resource Assessment and Advice** pursuant to section 63 of the *Mining Act 1992*, determine to grant a Mining Lease in satisfaction of **Mining Lease Application No. 536** (Act 1992) by granting a Mining Lease as described in Schedule 1 to **PGH Bricks and Pavers Pty Ltd, ACN 168 794 821**, subject to the conditions set out in Schedule 2.

The conditions set out in Schedule 2 are required to:

- ensure optimal resource recovery;
- prevent, minimise, and offset adverse environmental impacts;
- provide for the ongoing environmental management of the project; and
- ensure that the areas disturbed by mineral production and exploration activities are appropriately rehabilitated.

The rights and duties of a Lease Holder are those prescribed by the *Mining Act 1992*, subject to the terms and conditions of this Lease. This lease does not override any obligation on the Lease Holder to comply with the requirements of other legislation and regulatory instruments which may apply to the Lease Holder (including all relevant development approvals) unless specifically provided in the *Mining Act 1992* or other legislation or regulatory instruments.

Signed this 4th day of May 2018.

Kevin Ruming
Director Strategic Resource Assessment & Advice
As delegate for the Minister for Resources
Delegation dated: 8 December 2017

SCHEDULE 1

Description of Lease

Land: The lease area embraces all land described in the attached lease plan titled **M27432** and approved on **7 March 2018**.

Area:	**110.98 hectares**
Minerals/Ancillary Mining Activities:	**Clay/Shale**
Method:	**Open Cutting**
Term:	**13 years and 5 months**
Due expiry date:	**27 September 2031**

PLAN OF PORTION ML 3

PARISH: BRINGELLY

COUNTY: CUMBERLAND

MAP SHEET No. 9030-2-S PENRITH
9030-3-S WARRAGAMBA

REDUCTION RATIO 1: 4000

MINING LEASE APPLICATION No. 536 (ACT 1992)

MINING DIVISION: SYDNEY

HOLDER:
PGH BRICKS and PAVERS PTY LIMITED

APPLICATION DATE: 13-12-2016

MINING LEASE No.

STATUS:

METHOD: OPEN CUT

~~SURFACE EXCEPTION~~ / DEPTH RESTRICTION

EMBRACES THE SURFACE AND SOIL BELOW THEREOF TO A DEPTH OF 35 METRES

NOTES:

Azimuth: (X) - (Y)

Plans used in the course of this survey/~~compilation~~
DP 3050, DP 58964, DP 373863, DP 376252, DP 406215
DP 453765, DP 589918, DP 981161, DP 1035249

Survey declared on this plan for lines
A - B, D - VV

I MARK JOSEPH CASTELLETTI
of 1 MAHONY ROAD, CONSTITUTION HILL, 2145
a surveyor registered under the Surveying and Spatial Information Act 2002, hereby certify that the survey ~~/compilation~~ represented in this plan is accurate and has been completed in accordance with the Surveying and Spatial Information Regulation 2012 and the Surveyor General's Direction for Mining Surveys and was completed on 29-04-2016

Signature : M. Castelletti

Surveyors Reference : 755

FORM10

Survey Calcs : F.Schiavo

Plan Investigated : 07/03/2018

Plan Approved : 07/03/2018

Paper No : RM8:T16/1177

R17009256
D006390050

M27432

SURVEYING AND SPATIAL INFORMATION REGULATION 2012: CLAUSE 35(1)(B) & 61(2)						
MARK	M.G.A CO-ORDINATES		ZONE	CLASS	ORDER	ORIGIN
	EASTING	NORTHING				
PM 33800	292 108.426	6247 339.255	56	B	2	SCIMS
SSM 35556	292 327.466	6247 061.514	56	B	2	SCIMS
SSM 35557	292 207.486	6247 245.221	56	B	2	SCIMS
SOURCE: S.C.I.M.S. 06-04-2016			C.S.F.	1.000118		

DIAGRAM
NTS

SCHEDULE OF REFERENCE MARKS

COR.	BEARING	DIST.	DESCRIPTION	ORIGIN
A	7°51'30"	1.37	G. I. BOLT	PLACED
B	33°43'	0.34	G. I. BOLT	PLACED
C	72°36'	0.51	G. I. PIPE FD	DP 589918
G	346°54'	2.04	G. I. PIPE	PLACED
N	118°20'	1.32	G. I. PIPE	PLACED
O	291°30'	0.71	G. I. PIPE	PLACED
U	295°29'	2.39	G. I. PIPE	PLACED
X	248°41'	0.62	G. I. PIPE	PLACED
FF	191°48'	24.27	G. I. BOLT	PLACED
II	103°31'	28.61	G. I. BOLT	PLACED
MM	212°00'	0.60	G. I. BOLT	PLACED

MGA CO-ORDINATES OF ML2 CORNERS

COR	EASTING	NORTHING	COR	EASTING	NORTHING
A	292007.252	6247644.667	O	292427.199	6246934.565
B	292320.054	6247601.495	P	292533.29	6246999.918
D	292326.141	6247543.3	Q	292551.917	6247103.829
E	292379.454	6247465.365	R	292614.531	6247068.984
F	292487.966	6247396.814	S	292659.178	6247074.959
G	292674.206	6247389.369	T	292705.08	6247086.481
H	292684.002	6247352.68	U	292697.37	6247155.156
I	292614.922	6247341.406	V	292742.108	6247256.249
J	292612.73	6247365.663	W	292787.325	6247330.529
K	292501.388	6247340.779	X	293007.416	6247384.142
L	292457.277	6247333.03	Y	293006.917	6247381.149
M	292351.974	6247294.957	Z	293006.58	6247379.129
N	292262.59	6247225.433	AA	293007.264	6247379.015

COR	EASTING	NORTHING
BB	292968.083	6247147.441
CC	292940.073	6246984.777
DD	292906.270	6246779.759
EE	292856.569	6246473.398
FF	292853.332	6246449.27
GG	292652.556	6246478.411
HH	292262.818	6246535.557
II	292179.922	6246553.559
JJ	292139.249	6246588.604

COR	EASTING	NORTHING
KK	291966.949	6246618.36
LL	291842.000	6246661.729
MM	291523.047	6246766.921
NN	291262.365	6246852.896
OO	291319.22	6246952.328
PP	291394.915	6247021.24
QQ	291435.303	6247050.016

COR	EASTING	NORTHING
RR	291484.009	6247010.336
SS	291541.124	6247039.499
TT	291640.443	6247163.506
UU	291785.183	6247301.802
VV	291876.995	6247491.936

(A) - EASEMENT FOR GAS MAIN 2 WIDE (V612859)
SP - STEEL POST
ORP - OLD ROUND POST
RFP - ROUND FENCE POST

NOTES:
1. GNSS RTK OBSERVATIONS WERE USED TO DERIVE PART OF THIS SURVEY
2. LOCATION OF BANK OF BADGERYS CREEK DETERMINED FROM DP 58964

SCHEDULE OF SHORT BOUNDARIES

No.	BEARING	DIST/CHORD
1	189°27'10"	3.035
2	189°29'10"	2.05
3	99°29'10"	0.695

SCHEDULE 2

MINING LEASE CONDITIONS 2013

Definitions

1. Notice to Landholders

2. Rehabilitation

3. Mining Operations Plan and Annual Rehabilitation Report

4. Non-Compliance Reporting

5. Environmental Incident Report

6. Resource Recovery

7. Security

8. Cooperation Agreement

Note: Exploration Reports (Geological and Geophysical)

Definitions:

Words used in this mining lease have the same meaning as defined in the *Mining Act 1992* except where otherwise defined below:

Act means the *Mining Act 1992.*

Department means the Division of Resources and Geoscience within the Department of Planning and Environment.

Environment has the same meaning as in the *Protection of the Environment Operations Act 1997*.

Environmental incident notifications and reports means any notifications and reports required to be provided to relevant authorities under Part 5.7 or Part 5.7A of the *Protection of the Environment Operations Act 1997.*

Harm to the environment has the same meaning as in the *Protection of the Environment Operations Act 1997.*

Landholder for the purposes of these conditions does not include a secondary landholder and includes, in the case of exempted areas, the controlling body for the exempted area.

Minister means the Minister administering the Act.

MINING LEASE CONDITIONS 2013

1. Notice to Landholders

(a) Within a period of three months from the date of grant/renewal of this mining lease, the lease holder must serve on each landholder a notice in writing indicating that this mining lease has been granted/renewed and whether the lease includes the surface. A plan identifying each landholder and individual land parcel subject to the lease area, and a description of the lease area must accompany the notice.

(b) If there are ten or more landholders, the lease holder may serve the notice by publication in a newspaper circulating in the region where the lease area is situated. The notice must indicate that this mining lease has been granted/renewed; state whether the lease includes the surface and must contain a plan and description of the lease area. If a notice is made under condition 1(b), compliance with condition 1(a) is not required.

2. Rehabilitation

Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.

3. Mining Operations Plan and Annual Rehabilitation Report

(a) The lease holder must comply with an approved Mining Operations Plan (MOP) in carrying out any significant surface disturbing activities, including mining operations, mining purposes and prospecting. The lease holder must apply to the Minister for approval of a MOP. An approved MOP must be in place prior to commencing any significant surface disturbing activities, including mining operations, mining purposes and prospecting.

(b) The MOP must identify the post mining land use and set out a detailed rehabilitation strategy which:

(i) identifies areas that will be disturbed;

(ii) details the staging of specific mining operations, mining purposes and prospecting;

(iii) identifies how the mine will be managed and rehabilitated to achieve the post mining land use;

(iv) identifies how mining operations, mining purposes and prospecting will be carried out in order to prevent and or minimise harm to the environment; and

(v) reflects the conditions of approval under:

- the *Environmental Planning and Assessment Act 1979;*
- the *Protection of the Environment Operations Act 1997;* and

- any other approvals relevant to the development including the conditions of this mining lease.

(c) The MOP must be prepared in accordance with the *ESG3: Mining Operations Plan (MOP) Guidelines September 2013* published on the Department's website at www.resourcesandenergy.nsw.gov.au/miners-and-explorers/rules-and-forms/pgf/environmental-guidelines

(d) The lease holder may apply to the Minister to amend an approved MOP at any time.

(e) It is not a breach of this condition if:

(i) the operations which, but for this condition 3(e) would be a breach of condition 3(a), were necessary to comply with a lawful order or direction given under the *Environmental Planning and Assessment Act 1979*, the *Protection of the Environment Operations Act 1997,* the *Work Health and Safety (Mines and Petroleum Sites) Act 2013* and *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014* or the *Work Health and Safety Act 2011*; and *Work Health and Safety Regulation 2011*

(ii) the Minister had been notified in writing of the terms of the order or direction prior to the operations constituting the breach being carried out.

(f) The lease holder must prepare a Rehabilitation Report to the satisfaction of the Minister. The report must:

(i) provide a detailed review of the progress of rehabilitation against the performance measures and criteria established in the approved MOP;

(ii) be submitted annually on the grant anniversary date (or at such other times as agreed by the Minister); and

(iii) be prepared in accordance with any relevant annual reporting guidelines published on the Department's website at www.resourcesandenergy.nsw.gov.au/miners-and-explorers/rules-and-forms/pgf/environmental-guidelines

Note: The Rehabilitation Report replaces the Annual Environmental Management Report.

4. Non-Compliance Reporting

(a) The lease holder must notify the Department upon becoming aware of any breaches of the conditions of this mining lease or breaches of the Mining Act or Regulations;

(b) Notifications under condition 4(a) must be provided in the form specified on the Department's website within seven (7) days of the mining lease holder becoming aware of the breach.

5. Environmental Incident Report

The lease holder must provide environmental incident notifications and reports to the Secretary no later than seven (7) days after those environmental incident notifications and reports are provided to the relevant authorities under the Protection of the Environment Operations Act 1997.

6. Resource Recovery

The lease holder must optimise recovery of the minerals that are the subject of this mining lease to the extent economically feasible.

7. Security

The lease holder is required to provide and maintain a security deposit to secure funding for the fulfilment of obligations of all or any kind under the mining lease, including obligations of all or any kind under the mining lease that may arise in the future.

The amount of the security deposit to be provided has been assessed by the Minister at **$*2*,104,000**.

8. Cooperation Agreement

The lease holder must make every reasonable attempt, and be able to demonstrate its attempts, to enter into a cooperation agreement with the holder(s) of any overlapping title(s). The cooperation agreement should address but not be limited to issues such as:

- access arrangements
- operational interaction procedures
- dispute resolution
- information exchange
- well location
- timing of drilling
- potential resource extraction conflicts; and
- rehabilitation issues.

Exploration Reporting

Note: *Exploration Reports (Geological and Geophysical)*

The lease holder must lodge reports to the satisfaction of the Minister in accordance with section 163C of the Mining Act 1992 and in accordance with clause 59 of the Mining Regulation 2016.

Reports must be prepared in accordance with Exploration Reporting: A guide for reporting on exploration and prospecting in New South Wales.

SPECIAL CONDITIONS

Note: The standard conditions apply to all mining leases. The Division of Resources and Geoscience (DRG) reserves the right to impose special conditions, based on individual circumstances, where appropriate.

APPENDIX D WATER APPROVAL AND LICENCE

Department of Primary Industries Water

Statement of Approval

Water Management Act 2000

Approval details

Approval number	10WA109463
Status	CURRENT*
Approval kind	Water Supply Works
Water sharing plan	GREATER METROPOLITAN REGION GROUNDWATER SOURCES 2011
Date of effect	01/Jul/2011
Expiry date	08/Nov/2025
Approval holder(s)	Schedule 1
Water supply works	Schedule 2
Conditions	Schedule 3

Contact for service of documents

Name	PGH Bricks & Pavers Pty Ltd
Address	59-67 Cecil Road CECIL PARK NSW 2178

* **Note: An approval has effect for such period as is specified in the approval, or if the period is extended under section 105, that extended period. If an application for extension of an approval is lodged before the approval expires, the term of the expiring approval is extended until either the date of the final decision on the application, or a date fixed by the Minister for the approval, whichever is the later date. An approval which has expired can be the subject of an application to extend it but it needs to be accompanied by a statutory declaration of the reasons for the delay in making the application. If the Minister accepts these reasons the term of the approval is taken to have been extended, and the application may be dealt with, as if the application had been made before the approval expired.**

  It is an offence under the Water Management Act 2000 to breach a term or condition of the approval or to construct and use works to which the approval does not relate. It is also an offence to use works the subject of an approval if the approval has expired, been surrendered or cancelled.

Schedule 1 - Approval holders

The holders of this approval are:

Approval holder(s)	ACN (if applicable)
PGH Bricks & Pavers Pty Ltd	168 794 821

Important notice - change of landholder or contact

Please advise the Office in the event of any of the following, as soon as practicable:

- If there is a change in the ownership or occupation of the land benefited by this approval (see Schedule 2). Under the Water Management Act 2000, an approval is typically held by the owner or lawful occupier of the benefited land. Consequently, a change in occupation may cause a change in your legal obligations as an approval holder.*
- If there is a change to the contact person. You will be required to lodge a written statement signed by all the holders.*
- If there is a change to the mailing address for the nominated contact person. This should be done by the contact person in writing.

** An updated Statement of Approval will be issued free of charge*

Schedule 2 - Water supply works

Part A: Authorised water supply works

Subject to the conditions of this approval, in relation to each numbered work in the table, the holders of this approval are authorised to construct and use a water supply work of the type shown at the location specified:

Work 1

Specified work	EXCAVATION - GROUNDWATER
Specified location	1//373863 Whole Lot 1//1035249 Whole Lot
Management zone (if applicable)	
Water source	SYDNEY BASIN CENTRAL GROUNDWATER SOURCE
Water sharing plan	GREATER METROPOLITAN REGION GROUNDWATER SOURCES 2011

Schedule 3 - Conditions

The approval is subject to the following conditions:

Plan conditions

Water sharing plan ***Greater Metropolitan Region Groundwater Sources***

Take of water

MW0655-00001 Any water supply work authorised by this approval must take water in compliance with the conditions of the access licence under which water is being taken.

Water management works

MW0097-00001 If contaminated water is found above the production aquifer during the construction of the water supply work authorised by this approval, the licensed driller must:
A. notify the relevant licensor in writing within 48 hours of becoming aware of the contaminated water, and
B. adhere to the Minimum Construction Requirements for Water Bores in Australia (2012), as amended or replaced from time to time.

MW0487-00001 The water supply work authorised by this approval must be constructed within three (3) years from the date this approval is granted.

MW0044-00001 A. When a water supply work authorised by this approval is to be abandoned or replaced, the approval holder must contact the relevant licensor in writing to verify whether the work must be decommissioned.

B. The work is to be decommissioned, unless the approval holder receives notice from the Minister not to do so.

C. When decommissioning the work the approval holder must:
i. comply with the minimum requirements for decommissioning bores prescribed in the Minimum Construction Requirements for Water Bores in Australia (2012), as amended or replaced from time to time, and
ii. notify the relevant licensor in writing within sixty (60) days of decommissioning that the work has been decommissioned.

Monitoring and recording

MW0484-00001

Before water is taken through the water supply work authorised by this approval, confirmation must be recorded in the logbook that cease to take conditions do not apply and water may be taken.

The method of confirming that water may be taken, such as visual inspection, internet search, must also be recorded in the logbook.

If water may be taken, the:
A. date, and
B. time of the confirmation, and
C. flow rate or water level at the reference point in the water source
must be recorded in the logbook.

MW2338-00001

The completed logbook must be retained for five (5) years from the last date recorded in the logbook.

MW2336-00001

The purpose or purposes for which water is taken, as well as details of the type of crop, area cropped, and dates of planting and harvesting, must be recorded in the logbook each time water is taken.

MW2337-00001

The following information must be recorded in the logbook for each period of time that water is taken:
A. date, volume of water, start and end time when water was taken as well as the pump capacity per unit of time, and
B. the access licence number under which the water is taken, and
C. the approval number under which the water is taken, and
D. the volume of water taken for domestic consumption and/or stock watering.

MW0482-00001

Where a water meter is installed on a water supply work authorised by this approval, the meter reading must be recorded in the logbook before taking water. This reading must be recorded every time water is to be taken.

MW2339-00001

A logbook must be kept, unless the work is metered and fitted with a data logger. The logbook must be produced for inspection when requested by the relevant licensor.

Reporting

MW0051-00001

Once the approval holder becomes aware of a breach of any condition on this approval, the approval holder must notify the Minister as soon as practicable. The Minister must be notified by:
A. email: water.enquiries@dpi.nsw.gov.au,
or
B. telephone: 1800 353 104. Any notification by telephone must also be confirmed in writing within seven (7) business days of the telephone call.

Other conditions

Water management works

DK1198-00001

The approval holder must allow the relevant licensor or any person authorised by it, full and free access to the works, either during or after construction, for the purpose of carrying out inspection or test of the works and its fittings and shall carry out any work or alterations deemed necessary by the department for the protection and proper maintenance of the works, or the control of the water extracted and for the protection of the quality and the prevention from pollution or contamination of sub-surface water.

DK1208-00001

The approval holder must not construct or install works used for the purpose of conveying, distributing or storing water from the works authorised by this approval, that obstruct the reasonable passage of floodwaters flowing in, to, or from a river or lake.

Glossary

cease to take - Cease to take conditions means any condition on this approval, or on the access licence under which water is proposed to be taken, that prohibits the taking of water in a particular circumstance.

domestic consumption - Domestic consumption is the use of water for normal household purposes in domestic premises situated on the land.

licensor - WaterNSW or DPI Water, depending on which organisation administers your licences and/or approvals

logbook - A logbook is a document, electronic or hard copy, that records specific required information.

metered water supply work - A metered water supply work is a water supply work fitted with a data logger and a water meter that complies with Australian Standard AS 4747: Meters for non-urban water supply.

stock watering - Stock watering is the use of water for stock animals being raised on the land. It does not include the use of water for the raising of stock animals on an intensive commercial basis (kept in feedlots or buildings for all, or a substantial part, of the period during which the stock animals are being raised).

water meter - A water meter is a device that measures the volume of water extracted over a known period of time. Examples of a water meter include a mechanical meter, electromagnetic meter, channel meter with mobile phone, or an authorised meter equivalent.

General Notes

All conditions on an approval require compliance. An appeal to the Land and Environment Court against a decision to impose certain conditions on an approval can be made within 28 days after the date the decision is made. Conditions identified with the first letter "**D**" are those that can be appealed during the appeal period.

The words in this approval have the same meaning as in the *Water Management Act 2000*

Note: The words in this approval have the same meaning as in the WMA

END OF STATEMENT

APPENDIX E ENFORCEABLE UNDERTAKING

Varied Enforceable Undertaking to the Natural Resources Access Regulator

PGH Bricks & Pavers Pty Limited ACN 168 794 821

Varied Enforceable Undertaking to the Natural Resources Access Regulator

PGH Bricks & Pavers Pty Limited ACN 168 794 821

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Details

Date

Parties

Name	**Natural Resources Access Regulator**
Short form name	**NRAR**
Notice details	Level 11, 2-10 Valentine Avenue Parramatta NSW 2150 Email: kirsty.ruddock@nrar.nsw.gov.au Attention: Grant Barnes, Chief Regulatory Officer

Name	**PGH Bricks & Pavers Pty Limited** ACN 168 794 821
Short form name	**PGH**
Notice details	Triniti 3, Level 5, 39 Delhi Road, North Ryde NSW 2113 Email: dschroeder@csr.com.au Attention: Debbie Schroeder

Background

A The Natural Resources Access Regulator **(NRAR),** created by the *Natural Resources Access Regulator Act 2017* (NSW) **(NRAR Act),** is the regulator responsible for compliance and enforcement measures for natural resources management legislation in New South Wales. It has responsibility for compliance and enforcement of the specified functions of the Minister administering the *Water Management Act 2000* **(WM Act)** as specified in Schedule 2 of the NRAR Act.

B Section 336E of the WM Act (read with section 11 of the NRAR Act) empowers the NRAR to accept enforceable undertakings from parties alleged to have breached the WM Act.

C In 2015 PGH Bricks & Pavers Pty Limited (ACN 168 794 821) **(PGH)** acquired the mothballed brick plant on Lot 1 DP 373863 and Lots 1-2 DP 1035249, Lot 1 DP 981161 and Lots 54-59 DP 3050 in the suburb of Badgerys Creek within the Liverpool Local Government Area **(LGA), (Badgerys Creek Site).** The Badgerys Creek Site was established in accordance with the development consent granted on 30 September 1979 and modified by DA 764/2009 granted by Liverpool City Council, which commenced on 31 March 2009 **(Consent).**

D The Badgerys Creek Site covers an area of approximately 200 hectares and has previously been used for quarrying of local claystone for brick production, which ceased in March 2012. Existing features of the Badgerys Creek Site include a number of quarry pits that capture surface water around the brick plant and contain stored water.

E Existing features of the Badgerys Creek Site include two completed quarry pits (known as Pits 1 and 2), and an active quarry pit (known as Pit 3), all of which contain stored water as described in D above.

F PGH has entered into an agreement with Western Sydney Airport Corporation, being a proposal for the supply to and transfer of stored water by Western Sydney Airport Corporation from the Badgerys Creek Site to be utilised by Western Sydney Airport Corporation off site.

G Boral Bricks Pty Limited holds an aquifer water access license authorising the take of groundwater at the Badgerys Creek Site (WAL 24346). There are currently no surface water licences held by any person or entity in relation to the Badgerys Creek Site. As such, PGH has not accounted for rainfall runoff captured in quarry pits at any stage in relation to its obligations under the **WM** Act since it acquired the Badgerys Creek Site.

H The NRAR alleges that PGH does not hold sufficient surface water access licences and further alleges that PGH is not exempt under the WM Act from taking surface water at the Badgerys Creek Site. As such, the NRAR alleges PGH took water in contravention of s 60A of the WM Act by capturing water in the quarry pits between 2015 and the present time.

PGH acknowledges the NRAR's allegations in relation to the above matter, including that the allegations concern a contravention of s 60A of the WM Act over an extended period, and undertakes to carry out the commitments and preventative measures set out in this undertaking.

J PGH has offered the commitments set out in this undertaking.

K In the absence of published guidelines for an undertaking under the WM Act, this undertaking has been prepared in consideration of the requirements for an undertaking contained in the EPA's Guidelines on Enforceable Undertakings (2017).

L This Enforceable Undertaking was varied on 23 November 2020 with the consent of the NRAR for the purpose of extending the date for implementing the measures described in 1.2(c) and the reporting described in 1.2(d) and correcting the full name of PGH.

Varied Undertakings

1.1 Undertakings

Under section 336E of the WM Act (read with section 11 of the NRAR Act}, PGH has offered and the NRAR has accepted the following undertakings.

1.2 Surface Water Management and Monitoring

PGH acknowledges:

(a) PGH acknowledges that the alleged non-compliance relates to surface water at the Badgerys Creek Site only, and that the allegations do not extend to (or include) alleged non-compliance relating to groundwater take or use;

(b) Any other water take not contemplated by clause 1.2 must be licenced under the *Water Management Act 2000.*

PGH undertakes to:

(c) implement permanent measures to prevent, to the maximum extent which is practically possible using reasonable and feasible engineering methods, surface water in the form of rainfall runoff entering Pits 1-3 by **31 March 2021 (Rectification Period};**

(d) provide a written report to the NRAR relating to all measures implemented, including the success of, or the need to modify, the measures, to prevent, using reasonable and feasible engineering methods, surface water entering Pits 1-3 by **30 April 2021**;

(e) ensure adequate monitoring equipment, including water flow meters that comply with the metering equipment standards set out in Part 10 Division 3 of the *Water Management (General) Regulation 2018,* is installed and maintained (or otherwise available to PGH) to measure the daily volume of water transferred out of Pit 1, and any other pit, prior to any water being transferred offsite from Pit 1;

(t) record, or be provided, in an electronic format the daily volumes of water so transferred in accordance with 1.2(e);

(g) provide a copy of water monitoring data collected under clause 1.2(t):

(i) every 3 months from the date when water is first transferred, until the date that the transfer of water ceases (comprising a total transfer from the Badgerys Creek Site of a water volume not greater than 1200 megalitres **(ML)** (being the combined volume of water agreed to be stored in Pits 1-3 as at 26 March 2020 for a period of 36 months after acceptance of this undertaking by the NRAR, unless otherwise agreed);

(ii) within 7 business days if requested in writing by the NRAR (from time to time).

(h) obtain all necessary Water Access Licences to account for transfer or removal of surface water at the Badgerys Creek Site in excess of the volume of referred to in 1.2(g) should this occur.

(i) timeframes within this clause 1.2 may be varied with the written agreement of the NRAR.

1.3 Supply of water to external premises

PGH undertakes to:

(a) only supply water stored in Pit 1 on the Badgerys Creek Site to the Western Sydney Airport Corporation without charge in accordance with this undertaking and its written agreement with that entity (as may be varied from time to time);

(b) not to supply the water stored on the Badgerys Creek Site in Pit 1 or any other pit to any other person or entity other than as identified at clause 1.3(a).

1.4 Charge for past water taken at the Badgerys Creek Site

(a) PGH agrees that the NRAR will charge PGH for water taken from a surface water source in contravention of Part 2 Division 1A of the WM Act under section 60G of the WM Act and clause 20 of the *Water Management (General) Regulation 2018* **(Regulation)** (when read with section 11 of the NRAR Act).

(b) PGH undertakes to pay a charge imposed by the NRAR under s 60G of the WM Act for water taken in contravention of Part 2 Division 1A of the WM Act prior to the date that the NRAR accepts this undertaking in the amount of two times the value of water taken calculated in accordance with the Regulation.

(c) PGH undertakes to pay a charge imposed by the NRAR under s 60G of the WM Act for water taken in contravention of Part 2 Division 1A of the WM Act between the date that the NRAR accepts this undertaking and the date that the measures described at clause 1.2(c) have been implemented and surface water in the form of runoff has ceased entering into Pits 1-3 in the amount of two times the value of water taken calculated in accordance with the Regulation.

(d) PGH undertakes to pay the NRAR the amounts due under clause 1.4 within 4 weeks of receipt of the NRAR's invoices for these charges.

1.5 Reporting of compliance

(a) PGH will issue the NRAR a written report confirming that the groundwater inflow into the quarry pits on the Badgerys Creek Site is negligible, or that groundwater is otherwise being taken in compliance with the aquifer licence, 1 month after the date of acceptance of this undertaking by the NRAR. This report will be updated and provided to the NRAR every 6 months for a further 36 months after the date of acceptance of this undertaking by the NRAR, unless otherwise agreed in writing by the NRAR.

(b) PGH will issue the NRAR with a written report confirming that (using reasonable and feasible engineering methods to prevent surface water entering into Pits 1-3 in accordance with clause 1.2(c)) surface water in the form of runoff has ceased entering into Pits 1-3 at the quarry pits on the Badgerys Creek Site at the end of the Rectification Period. This report will be updated and provided to the NRAR every 6 months for a further 36 months after acceptance of this undertaking by the NRAR, unless otherwise agreed in writing by the NRAR.

(c) PGH will issue the NRAR with an annual written report on its compliance with the undertakings offered in this document within 12 months after acceptance of this undertaking by the NRAR, and every 12 months for a further 36 months after acceptance of this undertaking by the NRAR, unless otherwise agreed in writing by the NRAR.

1.6 Payment of costs

(a) PGH undertakes to pay the following:

(i) the NRAR's legal costs incurred in the preparation of this undertaking of $10,000.00 (including GST);

(ii) the NRAR's investigation costs of the allegation of $10,000.00 (including GST); and

(b) PGH undertakes to pay the NRAR the amounts due under this clause 1.6 within 4 weeks of receipt of the NRAR's invoices.

1.7 Acknowledgements

(a) PGH makes the following acknowledgments:

(i) PGH is making a genuine commitment to address the alleged contravention;

(ii) the NRAR may make this undertaking public by placing a copy of the executed undertaking on the NRAR's public register about enforcement action maintained under the NRAR Act (with personal details redacted);

(iii) this undertaking does not affect the NRAR's power to investigate a contravention arising from future conduct or to pursue a criminal prosecution in respect of future conduct, or to lay charges or exercise other civil or regulatory powers under the NRAR Act or WM Act;

(iv) this undertaking does not affect the rights or remedies available to any other person or entity, nor does it affect any statutory obligation under the WM Act;

(v) in the absence of published guidelines for an undertaking under the WM Act, this undertaking has been prepared in consideration of the requirements for an undertaking contained in the EPA's *Guidelines on Enforceable Undertakings (2017);*

(vi) no expenditure commitments made by PGH in this undertaking may be claimed as tax deductions;

(vii) this undertaking has no operative force until formally accepted by the NRAR and written notice of the decision (including reasons for the decision) are provided to PGH in accordance with section 336F of the WM Act;

(viii) this undertaking may only be withdrawn or varied with the written consent of the NRAR in accordance with the WM Act;

(ix) this undertaking, as it may be varied from time to time, will remain in force until completed or withdrawn in accordance with the WM Act; and

(x) the NRAR may take this undertaking into account in regulatory matters under the **WM** Act.

(b) PGH further acknowledges that the NRAR requires undertakings to contain new commitments only, and not expenditure commitments previously made or budgeted for prior to the undertaking being entered into. In light of this, PGH has disclosed to the NRAR that:

(i) while expenditure has not yet been committed to the implementation of the charge for past water take (as outlined in clause 1.4 of this undertaking), these commitments are in the process of development at the time that this undertaking was entered into; and

(ii) nevertheless, because these commitments are relevant to the agreement between PGH and the Western Sydney Airport Corporation more generally, as well as in relation to the allegations more particularly, they have been included as part of PGH's undertakings pursuant to this agreement.

1.8 Limits of action

(a) The NRAR acknowledges that the alleged non-compliance relates to surface water at the Badgerys Creek Site only, and that the allegations do not extend to (or include) alleged

non-compliance with groundwater take or use, subject to PGH complying with clause 1.5(a), 1.5(b) and 1.5(c).

(b) The NRAR and PGH have mutually agreed that, in light of PGH having entered into this undertaking and the commitments contained herein, the NRAR will take no further enforcement action in relation to the allegations outlined above.

(c) PGH nevertheless acknowledges that under s 336E(6) of the WM Act, the NRAR is not barred from bringing proceedings for the contravention or alleged contravention of the WM Act to which this undertaking relates.

(d) PGH also acknowledges that the NRAR is not barred from future enforcement or other actions arising as a result of any future contraventions or incidents, including with respect to the enforcement of this undertaking.

Signing page

EXECUTED as an undertaking.

Signed, sealed and delivered by **PGH Bricks & Pavers Pty Limited ACN 168 794 821 in** accordance with section 127(1) of the *Corporations Act 2001* (Cth) by authority of its directors:

Signature of Company Secretary

Signature

Sara-Ann Lom

Name of Director (print)

Jillian Irene Hardiman

Name of Company Secretary (print)

Signature of Director

Signature of Company Secretary

Name of Director (print)

Name of Company Secretary (print)

Accepted by the Natural Resources Access Regulator or its delegate pursuant to section 336E of the WM Act.

Date: 23 November 2020

Signature of Chief Regulatory Officer

Grant Barnes

Name of Chief Regulatory Officer (print)

Schedule 1- Letter from Western Sydney Airport Corporation

Western Sydney Airport

OFFICIAL

Reference No: WSA-Letter-0220-CSR

31 March 2020

Kirsty Ruddock
Director - Regulatory Investigations and Compliance
Natural Resources Access Regulator
Department of Industry NSW

Email : kirsty.ruddock@nrar.nsw.gov.au

Dear Ms Ruddock

Proposal for water extraction for Western Sydney International Airport construction activities - Lot 1 on DP1035249 and Lot 1 on DP373863

WSA Co Limited (**WSA**) is a government business enterprise established to develop and operate Western Sydney International (Nancy-Bird Walton) Airport (Western Sydney International) in accordance with a contract with the Commonwealth of Australia, located at Badgerys Creek, New South Wales.

WSA is currently developing the Western Sydney International site and its contractors require water for construction activities.

The property comprising Lot 1on DP1035249 and Lot 1 DP373863 contains an old quarry filled with water. The property is owned by PGH Bricks & Pavers Pty Limited (**PGH**).

WSA and PGH are proposing to enter into an agreement to enable WSA to have a right of access over PGH's property for its contractors to extract the water within the old quarry on terms and conditions to be set out in the agreement. The parties' completion of the agreement is subject to PGH being able to lawfully provide the water to WSA's contractor for its construction activities.

The WSA site is Commonwealth owned land.

If you have any queries regarding the proposed activities of WSA or the proposed agreement with PGH, please do not hesitate to contact me.

Yours sincerely,

Nancy Prochilo
WSA Co's Representative

wsaco.com.au PO Box 397 Liverpool NSW 1871 | ACN 618 989 272

APPENDIX F NOISE MANAGEMENT PLAN

APPENDIX G AIR QUALITY MANAGEMENT PLAN

APPENDIX H SOIL AND WATER MANAGEMENT PLAN

TITLE: SOIL AND WATER MANAGEMENT PLAN

Badgerys Creek Brick Manufacture and Quarry Operations
235 Martin Road, Badgerys Creek, NSW, 2171

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Badgerys Creek Clay Mine Surface Water Management Plan	
Name of Mine	Badgerys Creek Clay Mine
Name of Mine Operator (s)	PGH Bricks and Pavers Pty Ltd Triniti 3, Level 5, 39 Delhi Rd, Nth Ryde, NSW 2113
Name and Contact Details of the Mine Manager	Joe Gauci, (02) 9826 3964 jgauci@pghbricks.com.au
Name and Contact Details of the Environmental Representative	Debbie Cook, 0401 893 413 decook@pghbricks.com.au
Name and Contact Details of the Approved Suitably Qualified Person	Tara O'Brien VGT Environmental Compliance Solutions Pty Ltd 0429 334 771 tara@vgt.com.au
Signature of Approved Suitably Qualified Person	
Date	

Revision Table

Date	Version	Author	Reviewed	Approved
21/7/2019	BRK-BAD-3.10.7-P07_VGT10	TO	RM	RM
30/8/2019	BRK-BAD-3.10.7-P09_V1	TO	LGT	JB
22/9/2020	BRK-BAD-3.10.7-P09_V2	TO	LGT	JB
25/11/2020	BRK-BAD-3.10.7-P09_V3	TO	JB/DPIE	JB
28/01/2021	BRK-BAD-3.10.7-P09_V4	TO	JB	JB

1.0 Introduction

1.1. Purpose

In accordance with the Schedule 3 Condition 23 of the Project Approval, CSR Building Products Ltd (CSR)are required to develop and implement an onsite Soil and Water Management Plan which includes a Site Water Balance, and a Surface Water Management Plan. The Dewatering Management Plan (Condition 23B) and the Dewatering Infrastructure Plan (Condition 23A) will be addressed in a separate document. The aim of this Soil and Water Management Plan (SWMP) is to be a dynamic document which will be updated over the life of quarry operations until 27th September 2031.

The SWMP accounts for changes to site drainage over the life of the project that have been broadly addressed, within general measures, to be implemented onsite throughout the course of the quarry operations. Further erosion and sediment control measures will be specifically developed on an ongoing basis as extraction progresses and the need arises.

Table 1 summarises the Water Management conditions of approval, presented under Condition 23 Schedule 3 of the Project Approval (DPIE, 2020).

Table 1. *Summary of Project Approval Conditions*

Schedule and Clause	Condition of Project Approval	Location of where addressed in document
3 (23)	The Proponent must prepare a Soil and Water Management Plan for the project to the satisfaction of the Secretary. This plan must:	
3 (23)a	be prepared by a suitably qualified and experienced person/s approved by the Secretary;	Appendix C
3 (23)b	be prepared in consultation with the Council and DPIE Water;	Annexure to this report- Water Management Consultation and Correspondence
3 (23)c	be submitted to the Secretary for approval prior to commencing Phase 1, unless otherwise agreed by the Secretary; and	Approval for this plan will be obtained prior to commencing Phase 1

Schedule and Clause	Condition of Project Approval	Location of where addressed in document
3 (23)d (i)	include a: (i) Site Water Balance that includes details of: • sources and security of water supply; • water use and management on site; • adequacy of water storage facilities to contain all surface water runoff; • all existing Water Access Licences and potential Water Access Licences, including information on the relevant Water Sharing Plan and Water Sources; • any off-site water transfers; including those described in Condition 23A of this Schedule; • reporting procedures; and • measures to be implemented to minimise clean water use on site;	Section 2.2.1, Section 5.0, Section 4.2, Section 5.5 & Section 10.0,
3(23)d (ii)	Surface Water Management Plan, that includes: • a program for obtaining detailed baseline data on surface water flows and quality in water bodies that could potentially be affected by the project;	Section 4.2.4 and Section 4.5
	a detailed description of the surface water management system on site including the: • clean water diversion system; • erosion and sediment controls; • dirty water management system; and • water storages, including the area, depth and capacity of any in-pit sumps;	Section 4.0
	detailed plans, including design objectives and performance criteria, for: • reinstatement of drainage lines on the rehabilitated areas of the site; and • control of any potential water pollution from rehabilitated areas of the site;	Section 4.3, Figure 4

Schedule and Clause	Condition of Project Approval	Location of where addressed in document
	performance criteria for the following, including trigger levels for investigating any potentially adverse impacts on: • the water management system; • surface water quality in creeks and other water bodies that could potentially affected by the project (including Badgerys Creek and Badgerys Creek tributary); and • the stream health, vegetation health and channel stability of water bodies that could potentially affected by the project;	Section 4.4
	program to monitor and report on: • any surface water discharges; • the effectiveness of the water management system; • the quality of water discharged from the site to the environment; • surface water flows and quality in local watercourses; and • the stream health, riparian vegetation health and channel stability of creeks and other water bodies that could potentially be affected by the project;	Section 4.0 and Section 4.5
	A plan to respond to any exceedances of the performance criteria, and mitigate and/or offset any adverse surface water impacts of the project;	Section 6.0
3(23)d (iii)	Groundwater Management Plan that includes: • measures to ensure that the maximum extraction depth is not exceeded (see condition 23 of Schedule 3);	Section 6.0, Section 7.0, and Section 8.0
	• Measures to ensure that the maximum extraction depth is not exceeded (see condition 23 of Schedule 3);	Section 6.2
	• A protocol to obtain appropriate water licence(s) to cover the volume of any unforeseen groundwater inflows into the quarry from the quarry face or floor;	WAL 24346 obtained, Section 2.2
	• Groundwater assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts; and	Section 8.0
	• A monitoring program to manage potential impacts, if any, on any alluvium and associated surface water near the proposed extraction area that includes:	Section 7.0
	○ Monitoring of boreholes within the alluvial sediments adjacent to Badgerys and South Creeks and their tributaries, and in the Bringelly Shale bedrock aquifer;	Section 7.1

Schedule and Clause	Condition of Project Approval	Location of where addressed in document
	○ Monitoring of groundwater inflows into the quarry from the quarry face or floor, or into any pit sumps;	Section 7.2
	○ Monitoring the impacts of the project on baseflows to Badgerys and South Creeks and their tributaries;	Section 7.5
	○ Identification of a methodology for determining exceedances of the assessment criteria;	Section 8.0
	○ A plan to respond to any exceedances of the performance criteria and	Section 8.0
	○ A program to regularly report on monitoring.	Section 10.0
Management Plan Requirements		
5 (3)	The Proponent must ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:	
5 (3) a	a summary of relevant background or baseline data;	Section 4.2.4, Section 7.4
5 (3) b	a description of: • the relevant statutory requirements (including any relevant approval, licence or lease conditions); • any relevant limits or performance measures/criteria; and • the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;	Section 2.0, Section 4.4, Section 8.0 Section 4.4, Section 8.0
5 (3) c	a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Section 4.0, Section 9.0, Section 6.0, Section 7.0, Section 8.0, Section 10.0
5 (3) d	a program to monitor and report on the: • impacts and environmental performance of the project; and • effectiveness of any management measures (see (c) above);	Section 4.0, Section 9.0, Section 6.0, Section 7.0, Section 8.0, Section 10.0
5 (3) e	a 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;	Section 10.0
5 (3) f	a program to investigate and implement ways to improve the environmental performance of the project over time;	Section 11.0

Schedule and Clause	Condition of Project Approval	Location of where addressed in document
5 (3) g	a protocol for managing and reporting any: • incidents; • complaints; and • non-compliances with statutory requirements;	Section 10.0
5 (3) h	a protocol for periodic review of the plan; and	Section 11.0
5 (3) i	a document control table that includes version numbers, dates when the management plan was prepared and reviewed, names and positions of the person/s who prepared and reviewed the management plan, a description of any revisions made and the date of the Secretary's approval.	Included in Header

Table 2. *Statement of Commitments (Appendix 6 of Conditions of Consent)*

Schedule and Clause	Commitment	Location of where addressed in document
General		
1)	The Proponent will implement all practicable measures to prevent or minimise harm to the environment that may result from the construction, operation or rehabilitation of the Project.	This report and its implementation.
2)	CSR will apply to amend EPL 684 to reflect the project.	Section 2.2.1
3)	The environmental management strategy and sub plans will be amended to reflect the project.	This Report
Surface Water		
25)	**Stormwater Management** The Proponent shall manage surface water on the Project Site in accordance with the WMP prepared for the Project Site and revised for the project, including surface water management measures include in the Modification 3 and 4 EA and the RTS.	This Report
26)	If during the operational phase of the quarry or on completion of the quarry operations, the proponent wishes to make use of the water from the pits/dams in the brick making process or for reuse at other premises offsite etc, a licence will be obtained from DPIE.	Section 2.2.1
27)	Sediment basins 4, 5 and 6 and the new basins at the raw material stockpile area and Pit 3 will be sized and operated in accordance with Landcom's (2004) Managing Urban Stormwater: Soils & Construction. If any of these basins are to be modified to perform additional stormwater treatment functions in future (other than sediment capture), then appropriate modelling and design of the basins will be required at that time. In this case monitoring of discharges from the basin at Pit 3 to South Creek will be required.	Section 4.2.3
28)	The site WMP will be revised prior to commencement of the modification to include the revised surface water management approach, and monitoring of any water discharged from the site.	This Report Section 11.1
29)	**Monitoring** Electrical conductivity, pH, total nitrogen, total suspended solids, turbidity, total alkalinity, arsenic and copper will be monitored at the discharge points to Badgerys Creek and South Creek. Discharges will be monitored daily during the first month of continuous discharge, then weekly if the first month of data does not exceed concentration limits. Monitoring will revert to daily if any limits are exceeded and/or concentrations are reduced below limits.	Not Applicable Addressed in the Dewatering Management Plan

Schedule and Clause	Commitment	Location of where addressed in document
30)	Total dissolved solids, total phosphorus, arsenic, cadmium, chromium, lead, nickel, zinc and mercury will be sampled weekly during the first two months, which will reduce to monthly if there are no exceedances	Not Applicable Addressed in the Dewatering Management Plan
31)	The analytes previously sampled in Pit 1 will be monitored at three depth levels from the surface to 6 m at two locations near the discharge point to Badgerys Creek. Water will be monitored weekly for three weeks prior to discharge, then monthly. This monitoring will continue for the life of the project, and in the perched treatment basin described above.	Not Applicable Addressed in the Dewatering Management Plan
32)	Similar sampling is also required for the new basin at Pit 3 if the basin is being used to treat Pit 3 water (other than sediment capture). The list of analytes may be able to be reduced according to the future quality of stormwater collected in Pit 3.	Not Applicable The new basin at Pit 3 will not be required. See Section 4.2.3 for details of new dams to be constructed.
33)	**Licensing and approvals** 33.CSR will apply to the EPA to amend the EPL to incorporate the discharge rates and concentration limits for relevant physical and chemical stressors, and toxicants, at the discharge point to Badgerys Creek.	Section 2.2.1
34)	CSR will apply to the EPA to amend the EPL, if and when required, to incorporate appropriate discharge rates and concentration limits for discharges from the basin at Pit 3, for which time the basin provides additional water treatment other than sediment capture.	Not Applicable The new basin at Pit 3 will not be required. See Section 4.2.3 for details of new dams to be constructed.
35)	CSR will consult DPIE Water on the need for water licenses associated with the modification.	Section 2.2.1
36)	The EPA will be engaged, post approval, to determine whether the pit water must be classified in terms of the Protection of the Environment Operations Act 1997 (POEO Act) and to include the discharge point in the EPL.	Not Applicable Addressed in the Dewatering Management Plan
37)	**Erosion and Sediment Control** Erosion and sediment controls will be implemented at the pit areas once they are filled with VENM and rehabilitation has commenced. These measures will remain in place until surfaces are fully stabilised.	Table 12
38)	Erosion and sediment controls will be implemented along the unsealed VENM haul road, which will direct runoff to the pits or local sediment traps.	Table 12

Schedule and Clause	Commitment	Location of where addressed in document
Groundwater		
39)	The Proponent shall prepare and implement a Groundwater Monitoring Program for the Project Site generally in accordance with the methodology provided in Chapter 11 of the 2011 EA, subject to consultation with the DPIE (water, lands and primary industry) and the satisfaction of the Director-General of the DP&I.	Section 7.0
40)	The WMP will be updated to include the groundwater monitoring network and a TARP for exceedances of groundwater criteria, which will be developed based on the baseline groundwater data.	Figure Three Section 9.0
41)	The Proponent shall report the results of the Groundwater Monitoring Program to the Secretary of the DPIE on an annual basis.	Section 10.0
42)	The Proponent shall implement appropriate management measures in relation to groundwater as indicated by the Monitoring Program and agreed with the Secretary.	Section 7.0
43)	A licence to authorise any groundwater monitoring installation, required as part of this project, shall be obtained from the DPIE Water prior to any drilling commencing.	Section 2.0
44)	The proponent shall implement an alluvial aquifer mapping and assessment program to inform: ▪ The definition of the boundaries of the alluvial system. ▪ Adjustment to the extent of proposed pits to avoid impacts to the alluvial aquifer. ▪ The establishment of further mitigation measures (if required) to minimise potential impacts upon the alluvial aquifer. ▪ This program will commence within 12 months of recommencing quarrying operations and the results will be reported to the Secretary of the DPIE.	Appendix I Section 7.5

1.2. Objectives

The following objectives are informed by the conditions of approval and have been used to guide the basis for site water management for this report:

- Maximise the amount of undisturbed areas onsite;
- Separate clean and dirty water onsite;
- Maximise opportunities for onsite water reuse;
- Mitigate potential impacts on the Badgerys Creek by implementing a 50-metre buffer zone;
- Monitor both the alluvial aquifer and the deeper shale aquifer; and
- Report findings to Water NSW/NRAR and DPIE annually.

1.3. Background

CSR is operating an existing quarry in Badgerys Creek, extracting clay resources and using these to manufacture bricks for the construction industry. These quarrying and brick making activities have been undertaken on the site for over 30 years. In May 2018, a modification (Mod 2) to the development approval was granted by the Minister for Planning to continue operations on the site, including extracting from existing and future new pits, exportation of raw materials and importation and storage of finished brick products.

A MOD 3 and MOD 4 Application was submitted to DPIE in 2019 and approved on 11th August 2020. In September 2019 a Response to Submissions (RTS) was lodged that made changes to the MOD 3 & 4 application to address feedback received and this became known as the Preferred Project. Under the Preferred Project the respective applications allow for:

MOD 3

- The development of an advanced manufacturing facility;
- Re-commence operations at the site as approved in the Project Approval, and expel the current mothballed status of the site;
- An increase in the importation of raw materials from off-site for use in both the brick making and roof products manufacturing facilities; and
- Modifications to the approved noise bunds.

MOD 4

- The dewatering of Pit 1;
- Continued extraction of clay material from Pit 3 to a depth of 35 m below natural ground level;
- The importation of Virgin Excavated Natural Material (VENM) to backfill Pit 1-3 and to rehabilitate the site to facilitate future development.

1.4. Site Overview

The Badgerys Creek Brickworks (Site) is located at 235 Martin Road, Badgerys Creek, 41 kilometres to the south west of Sydney, within the Liverpool City Council Local Government Area (LGA) (see *Figure One)*. Primary access to the site is provided through Martin Road at the north eastern corner of the site. Features of the existing site are shown on *Figure Two.*

Under the approved operations expansion, CSR plans to excavate Pit 3 as modified, and rehabilitate Pits 1 and 2 by dewatering and backfilling. Brick making will recommence and the manufacturing areas will be developed as per Mod 3 and 4 and the Preferred Project, detailed in the October 2019 Return to Submission Document to DP&E. An underground pipeline will be installed under Badgerys Creek to transfer water (up to 10ML per day) from Pit 1 to a water storage Basin on the Western Sydney Airport (WSA) site.

Under the development, no surface water will be permitted to be captured within Pit 1, 2 and 3, aside from incident rainfall on the surface of the dams. Dirty surface water from the stockpile areas, construction and rehabilitation areas will be collected within a series of sediment basins to be constructed. Provision will also be made to allow for the treatment and discharge of this water to Badgerys Creek via modification to an existing EPL.

1.5. Alignment to Other Management Plans

1.5.1. Surface Water Plans

This Plan builds upon existing water management plans prepared by ERM (2002) and AECOM (2010) for the Site. AECOM was engaged to assess the impact that the proposed quarry expansion would have on water management at the site, in particular the ability to contain site runoff. The report was informed by water balancing modelling for achieving no offsite discharge over a 10-year period following excavation of the last pit (Pit 5) under the proposed operational expansion works. The AECOM assessment built upon the previous Soil and Water Management Plan prepared for the Site by ERM in 2002.

The plan also references the Mod 3 Surface Water Assessment undertaken by Advisian Pty Ltd in February 2019 and the Mod 4 Surface Water Management and Dewatering Strategy undertaken by Advisian Pty Ltd.

Any rehabilitation programs, rehabilitation strategies, and Rehabilitation Management Plans developed, in accordance with Conditions of Approval, will inform the objectives of this plan and water management outcomes.

1.5.2. Groundwater Plans

The original Groundwater Management Plan was prepared by Hyder Consulting Pty Ltd (April 2013). This report builds upon that report and considers consultation undertaken with the then OEH (now EPA), NOW (now Water NSW/NRAR), and DPIE.

1.6. Surface Water Consultation

Condition 23.b), Schedule 3 of the Mod 3 & 4 (The Preferred) Project Approval requires that the Water Management Plan be prepared in consultation with the NSW Department of Planning, Industry and Environment- Water (DPIE Water) and Liverpool Council. A draft copy of this Plan will be provided to each of these agencies for comment prior to submission of a final draft to the Department of Planning for approval. Telephone and Email consultation has been undertaken with representatives from Council, EPA and DPIE Water to support the development of this Plan.

A previous draft plan for Mod 2 has been submitted the DPIE post approval and comments were provided (see Annexure to this report- Water Management Consultation and Correspondence). An amended draft plan was submitted in August 2019 and further comments were in turn received from DPIE. The table below summarises these comments relevant to water management of the Site that require actions and where addressed in this report.

Table 3. ***DPIE Mod 2 Post Approval Environmental Management Plan Comments***

Relevant Consent Condition	Comment (from Appendix A)	Where Addressed in this Report
a) Be prepared by a suitably qualified and experienced person/s approved by the Secretary;	Append evidence of approval	Appendix C
b) Be prepared in consultation with the EPA and DPIE Water	Further consultation required	Annexure to this report- Water Management Consultation and Correspondence
A Site Water Balance that: includes details of: • sources and security of water supply;	See Table 5 – Please include the volumes of inflows and out flows of each source presented per annum and the total balance of inflows and outflows per annum.	Section 5.1
• water use on site;	Satisfied- Section 3 and Section 4	
• adequacy of water storage facilities to contain all surface water runoff; and	See Section 3.2, Figure 3 and Section 5.2.3 – The Department notes the SWMP indicates there will be environmental discharges without an EPL which allows for this. The Department requests PGH consult with the EPA about this matter. Furthermore, surface water monitoring will be required at any locations where discharges are	Section 3.6, Section 4.2.3 Only clean water is permitted to flow from the site.

Relevant Consent Condition	Comment (from Appendix A)	Where Addressed in this Report
• any off-site water transfers;	proposed, therefore current surface water monitoring locations are inadequate. See above.	No EPL will be sought at this stage.
(ii) Surface Water Management Plan, that includes: • a program for obtaining detailed baseline data on surface water flows and quality in water bodies that could potentially be affected by the project;	See Figure 4 – It appears water will be discharged downstream of the current monitoring points for Badgerys Creek. It also appears the site will discharge to an unnamed creek to the West of the project. As such current baseline data and proposed surface water monitoring is inadequate.	Figure Three, Figure Eight, Section 3.6, Section 4.2.3 Only clean water is permitted to flow from the site.
• a detailed description of the surface water management system on site including the: ○ clean water diversion system; ○ erosion and sediment controls; ○ dirty water management system; and ○ water storages, including the area, depth and capacity of any in-pit sumps;	Discussions with EPA and DPIE - Water to determine the controlled discharge program need to be finalised.	Section 4.2 Only clean water is permitted to flow from the site. No EPL approval to discharge will be sought at this stage.
• Detailed plans, including design objectives and performance criteria, for: ○ reinstatement of drainage lines on the rehabilitated areas of the site; and ○ control of any potential water pollution from rehabilitated areas of the site;	See Section 5.3 – Please consult with the EPA to finalise the EPL. Satisfied – Section 5.3.	Section 3.6, Section 4.2.3 Only clean water is permitted to flow from the site.
• Performance criteria for the following, including trigger levels for investigating any potentially adverse impacts on: ○ the water management system;	• See Section 5.4 – Finalise the industrial process water and EPL criteria.	No industrial water will be used on site. No EPL approval to discharge will be sought at this

Relevant Consent Condition	Comment (from Appendix A)	Where Addressed in this Report
○ surface water quality in creeks and other water bodies that could potentially affected by the project (including Badgerys Creek and Badgerys Creek tributary);	• See Section 5.4 – Further monitoring needs to be undertaken to establish the baseline health of Badgerys creek.	stage. Section 4.2.4, Section 4.5
○ the stream health, vegetation health and channel stability of water bodies that could potentially affected by the project;	• See Section 5.4 – The proposed monitoring locations for stream health are inadequate as Figure 4 indicates discharges will occur beyond the proposed downstream monitoring location.	Figure Three, Figure Eight, Section 4.4, Section 4.5 Only clean water is permitted to flow from the site.
• A program to monitor and report on:		
○ Any surface water discharges	See Section 5.5 – Any discharges including those from Sediment Dam 3 must be monitored.	Figure Three, Figure Eight,, Section 4.5
○ the effectiveness of the water management system;	See Section 5.5.2 – The proposed monitoring locations are inadequate as Figure 4 indicates discharges will occur beyond the proposed downstream monitoring location.	Only clean water is permitted to flow from the site.
○ the quality of water discharged from the site to the environment;	See Section 5.5.2 – Liaise with EPA regarding EPL requirements.	No EPL approval to discharge will be sought at this stage.
○ surface water flows and quality in local watercourses; and	See Section 5.5.2 – See above regarding monitoring locations.	
○ the stream health, riparian vegetation health and channel stability of creeks and other water bodies that could potentially affected by the project; and	See Section 5.5.2 – See above regarding monitoring locations.	
A plan to respond to any exceedances of the performance criteria, and mitigate and or offset any adverse surface water impacts of the project; and	See Section 5.5.3 – Please include a plan to respond to any exceedances of the performance criteria and mitigate and/or offset any adverse surface water impacts of the project.	Section 9.0

Relevant Consent Condition	Comment (from Appendix A)	Where Addressed in this Report
Other Comments		
Please hyperlink any referenced documents so that the SWMP may be read as a standalone document.		Until final documents are approved by DPIE hyperlinks are unable to be provided.
Please append consultation with the EPA and DPIE Water.		Annexure to this report- Water Management Consultation and Correspondence
Please update table of contents.		Table of Contents

The Plan was submitted to DPIE-Water and the following comments were received (see *Appendix E*).

Table 4. ***DPIE-Water Comments from Correspondence Dated 19/10/2020***

Comment	Where Addressed in this Report
The following updates be included in the next revision of each plan (no later than December 2020) and that the revised plans be submitted to the department for approval.	This Report
Soil and Water Management Plan (SWMP) The proponent shall update the management plan to align with the conditions of the most recent modification and include the following: **1** Include written evidence that the approved suitably qualified person, Ms O'Brien, either prepared or reviewed and approved the Soil and Water Management Plan.	See Site Contacts Table Revision Table located after the Table of Contents
2 Include written evidence that Liverpool City Council have had the opportunity to comment and/or give feedback on the SWMP.	Table 5 and Appendix F
3 Include additional measures/details to satisfy the following conditions: a. all existing Water Access Licences and potential Water Access Licences, including information on the relevant Water Sharing Plan and Water Sources; and	Section 2.0
b. any off-site water transfers, including those described in	Section 2.2.3, Appendix G & Appendix H
4 Detail all measures that will be implemented to minimise clean water use on site.	Section 5.3 & Section 5.5
5 Badgerys Creek downstream monitoring location is to be relocated further downstream to more accurately capture potential impacts of the project activities.	Figure Three and Figure Eight
6 Surface water monitoring locations and baseline water quality testing of South Creek are to be implemented, as has been done for Badgerys Creek.	Section 4.5, Figure Three and Figure Eight
7 Include the depths of all water storages.	Table 8
8 Baseline data for riparian vegetation and channel morphology are to be collected as soon as practicable and appropriately detailed response actions are determined.	Noted Table 20

Comments from Liverpool Council were also received via email (see *Appendix F*) on the 28th October 2020 and are summarised below.

Table 5. ***Liverpool Council Comments from Correspondence Dated 29/10/2020***

Comment	Where Addressed in this Report
Please note that Council has reviewed the submitted Soil and Water Management Plan (SWMP) for Badgerys Creek Quarry and Brick Making Project (MP10_0014) and advises the following: <u>Groundwater Management</u> 1. It is noted that Condition 23 of the approval required the SWMP to include a Groundwater Management Plan that addressed specific criteria. However, VGT Environmental Compliance Solutions Pty Ltd indicated that the Groundwater Management Plan would be provided as a separate document. This approach appears to be inconsistent with the condition of consent which requires the SWMP to comprise both the Surface Water Management Plan and Groundwater Management Plan.	This Report
<u>Wastewater Management</u> 2. Section 2.2.1 of the SWMP refers to requirements applicable to the operation of wastewater treatment and effluent irrigation systems at the site. VGT Environmental Compliance Solutions Pty Ltd indicated that approval requirements for any upgrades to the wastewater treatment system will be investigated during the detailed design of the wastewater treatment system. Whilst approval requirements for the operation of the onsite sewage management system were outlined, consideration was not given to the installation requirements for the systems. Under Section 68 of the *Local Government Act 1993,* approval is required to install, construct or alter a waste treatment device and operate a system of sewage management at the premises. "Operate a system of sewage management" means hold or process, or re-use or discharge, sewage or by-products of sewage (whether or not the sewage is generated on the premises on which the system of sewage management is operated). In accordance with the Liverpool Development Control Plan 2008, a new system must be installed where the	Section 2.2.1

Comment	Where Addressed in this Report
existing system does not have adequate treatment capacity for all potential flows. It should be noted that sewage pump-out facilities are not supported by Council. The Application must be supported by a wastewater report prepared by a suitably qualified and experienced environmental or wastewater consultant to identify the site area available for development and determine if on-site effluent disposal is feasible when considering potential risks to public health and the environment. The detailed wastewater report shall be prepared by an Environmental Scientist or Engineer with a minimum of a bachelor's degree qualification and extensive industry experience within an on-site sewage management context. Note: There is currently no certification body for this field. The Applicant is encouraged to contact Council to discuss these requirements in further detail.	
<u>Referral to NSW EPA for Review and Comment</u> The proposed development is a scheduled activity under the *Protection of the Environment Operations Act 1997* and subject to an existing EPL issued by the NSW EPA. It is requested that the NSW EPA reviews the SWMP to determine that the proposed development is capable of being operated in an environmentally satisfactory manner consistent with the current EPL. Sampling and analysis methods must comply with the NSW EPA Approved Methods for the Sampling and Analysis of Water Pollutants in NSW dated 2004. The proposed discharge criteria for the sedimentation basins include a pH between 6.5 and 8.0 and turbidity less than 150 NTU. It is strongly recommended that water quality criteria are based on the document titled 'Managing Urban Stormwater: Soils & Construction' published by LandCom dated 2004. In this regard, the water quality discharge criteria for turbidity NTU must equal less than 50 mg/L Total Suspended Solids (TSS). If NTU is to be used in place of TSS, a statistical correlation which identifies the relationship between NTU and TSS must be established to the satisfaction of the NSW EPA.	This Report will be forwarded to the EPA for comment. Section 4.5.2 Section 4.4

1.7. Groundwater Consultation

A draft copy of the original Water Management Plan (Hyder Consulting Pty Ltd, 11 April 2013) was submitted to EPA and DoI Water, with feedback provided by DPIE. Telephone consultation was undertaken by Hyder with representatives from OEH and NOW to support the development of the Plan.

A previous draft plan has been submitted the DPIE post approval and comments were provided. An amended draft plan was submitted in August 2019 and further comments were in turn received from DPIE. The table below summarises these comments relevant to groundwater management of the Site that require actions and where addressed in this report.

Table 6. ***DPIE Post Approval Environmental Management Plan Comments-2019***

Relevant Consent Condition	Comment (from Appendix A)	Where Addressed in this Report
(iii) Groundwater Management Plan that includes: groundwater assessment criteria, including trigger levels or investigating any potentially adverse groundwater impacts; and	Not Satisfied	Section 8.0, Section 9.0
a monitoring program to manage potential impacts, if any, on any alluvium and associated surface water source near the proposed extraction area that includes: • monitoring of groundwater inflows into the quarry from the quarry face or floor, or into any in-pit sumps; • monitoring the impacts of the project on baseflows to Badgerys and South Creeks and their tributaries; • identification of a methodology for determining exceedances of the assessment criteria;	See Sections 6 to 9 – Further details of the proposed monitoring program required. The Department recommends a greater frequency monitoring then annually. Not Satisfied	Section 7.0

Relevant Consent Condition	Comment (from Appendix A)	Where Addressed in this Report
Other Comments		
Please hyperlink any referenced documents so that the SWMP may be read as a standalone document.		Until final documents are approved by DPIE hyperlinks are unable to be provided.
Please append consultation with the EPA and DPIE Water.		Appendix E
Please update table of contents.		Table of Contents

The Plan was submitted to DPIE-Water and the following comments were received (see *Appendix E*).

Table 7. ***DPIE-Water Comments from Correspondence Dated 19/10/2020***

Comment	Where Addressed in this Report
The proponent shall update the management plan to align with the conditions of the most recent modifications and include the following:	
1. Detail groundwater inflow volumes and the methodology used to calculate them for all current and proposed pits and how the proponent will ensure that the approved water access licence shares are adequate for all pits.	Section 7.2
2. Detail groundwater quality baseline data and associated trigger levels.	Section 7.4, Section 7.5
3. Ensure that groundwater sampling and reporting includes the same suite of analytes (more is also acceptable) as the surface water program.	Section 7.4, Section 7.5

2.0 Statutory Requirements and Guidelines

2.1. Environmental Planning and Assessment Act 1979

The Mod 2 project was declared a 'major development' under the then provisions of Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act) and State Environmental Planning Policy (Major Development) 2005.

An Environmental Assessment for both Concept Plan and Project Application was approved in September 2011 and was made subject to Conditions of Approval issued by the DoPI on 27th September 2011. This plan addresses Condition 23 of the Conditions of Approval as modified (Mod 2) on 5th May 2018.

Part 3A (Major Infrastructure and Other Projects) of the EP&A Act was repealed by the NSW Environmental Planning and Assessment Amendment Act 2011 (Part 3A Repeal Act) in October 2011.

Under the Part 3A Repeal Act, projects deemed to be transitional Part 3A projects continue to be subject to Part 3A of the EP&A Act. The definition of transitional projects includes certain projects that were the subject of an existing approval under Part 3A.

This applies to Modification 3 and 4 because there is an existing Project Approval granted under Section 75J of Part 3A of the EP&A Act.

The transitional arrangements in the EP&A Act were repealed by the Environmental Planning and assessment Bill 2017. This moved transitional Part 3A projects to the current State significant development and State significant infrastructure pathways, and applications to modify such projects can no longer be made under Section 75W. This modification application has been made within the transitional timeframe and is not affected by the above arrangements.

The quarrying and brick making operations will continue to be subject to the provisions of the EP&A Act for any subsequent changes or modifications to the operations. Additionally, the operations will need to be able to demonstrate compliance against the current Conditions of Approval issued under the provisions of the EP&A Act.

2.2. Water Management Act 2000 and Water Management (General) Regulation 2018

The Water Management Act 2000 No 92 (WM Act) is intended to ensure that water resources are conserved and properly managed for sustainable use, benefiting both present and future generations.

The Water Management (General) Regulation 2018 (The Regulation) specifies procedural, technical and licence requirements under the Water Management Act 2000, as well as the functions and powers of water supply authorities.

2.2.1. Licencing and Approvals

Water sharing plans (WSP) prepared in accordance with the WM Act include rules for protecting the environment and administrating water licencing and trading.

The Water Management (General) Regulation 2018 (The Regulation) affords certain exemptions from licencing for Excluded Works.

Under Schedule 1 Excluded Works, Clause 3 states:

> *'Dams solely for the capture, containment and recirculation of drainage and/or effluent, consistent with best management practice or required by a public authority (other than Landcom or the Superannuation Administration Corporation or any of their subsidiaries) to prevent the contamination of a water source, that are located on a minor stream.'*

Exemption from licencing for Excluded Works is detailed in Schedule 1, Part 1, Clause 12 which states:

> *'(1) Any landholder—in relation to the taking of water from or by means of a work referred to in item 1, 2, 3, 4, 6, 7 or 9 in Schedule 1 that is situated on the land, for the purposes and in the circumstances specified in Schedule 1 in respect of the work.'*

Sediment basins to be constructed on the site, to comply with the Enforceable Undertaking (see *Section 2.2.3*) are for the purpose of the capture, containment and recirculation of drainag. They are consistent with the definition of excluded works and are exempt from licensing.

The water held by the pits, although greater than the Harvestable Rights, (as discussed in Section 2.2.2) has been exempt from licensing as agreed with NRAR in the Enforceable Undertaking (see Section 2.2.3). Pit water will be transferred to the Western Sydney Aerotropolis (WSA) in accordance with the Dewatering Infrastructure Plan (condition 23A of consent) and the Dewatering Management Plan (condition 23B).

All existing farm dams and Sediment Dams 1 to 3 were constructed prior to 1 January 1999 and therefore, do not need to be licenced according to DPI Water under the Water Management Act 2000. This is confirmed through inspection of aerial photography from 1986.

Plate 1. Google Earth Pro Aerial Imagery from 31st December 1984

The Badgerys Creek Mine is in the South Creek and Badgerys Creek catchments and has a groundwater water access licence (WAL) issued under the WM Act (WAL 24346). This permits the potential take of groundwater from seepage within the pit excavations. Test Bore licences, for the eight monitoring bores installed in 2019, are not required in accordance with Part 1 of Schedule 4 of the Water Management (General) Regulation 2018 that provides exemptions from access licencing for certain aquifer interference activities.

From a surface water perspective, the need for the following other licensing has been assessed for the Mod 3 and 4 Project:

- Environmental Protection Licence Variation (EPL) from the EPA for site discharges;
- Approval from DPI Water (NRAR) to construct the proposed sediment basins and future extraction pits; and
- Licensing required by Liverpool City Council to operate wastewater treatment and effluent irrigation systems. The need for licencing of any upgrades to the wastewater treatment system will be investigated further during detailed design of the wastewater treatment system and any necessary licences obtained prior to the use of these systems.

The brick manufacturing operations have not recommenced, and the current wastewater treatment has sufficient capacity for the small number of staff expected on site for the proposed rehabilitation and mining operations. Prior to commencement of the manufacturing facility, PGH will engage a suitably qualified wastewater consultant and provide a separate application to Council for any upgrades to the wastewater treatment system.

2.2.2. Harvestable Rights

Harvestable rights orders made by the Minister under section 54 of the WMA give a landholder the right to capture 10% of the average regional rainwater runoff on the land by means of a dam or dams having not more than the total capacity calculated in accordance with Schedule 1 of the orders, providing such structures are located on minor streams only (i.e. first and second order streams). This water can, in most cases, be used for any purpose. Water held over the Harvestable Rights will require a WAL unless an exemption applies or dam construction predates the WMA 2000.

The maximum capacity of a harvestable right dam(s) for a landholding is calculated by multiplying the area of the land holding by a location specific multiplier value. This is available by using the online calculator provided on the Water NSW website (http://www.water.nsw.gov.au/waterlicensing/basic-water-rights/harvesting-runoff/calculator).

The landholding owned by CSR that is attributable to the Project for purposes of harvestable rights is approximately 200 hectares (ha). Accordingly, the maximum harvestable right capacity based on application of the online calculator is 16 megalitres (ML).

Further information on how harvestable rights relates to the existing and proposed water storages at the site is provided in *Section 3.5*.

2.2.3. Enforceable Undertaking

An Enforceable Undertaking (EU) was entered with NRAR in June 2020 and requires that no surface water is retained on the site unless it is licenced to be retained. To this end, it is proposed to;

- Prevent surface water from entering the current mine voids as far as possible;
- Contain, treat and discharge captured surface water on the disturbed areas via a series of sediment dams to be constructed, when EPL criteria is met. Note, a variation to the existing EPL to discharge surface water will be sought; and
- Dewater the mine voids. Investigations into the feasibility of discharge to Badgerys Creek or transfer to the Western Sydney Airport precinct for reuse in construction are being investigated.

The Mod 3 & 4 consent conditions require the preparation of Dewatering Infrastructure Plan (see Appendix G) and a Dewatering Management Plan (see Appendix H) which outline the works to be undertaken under the EU. Both plans are required to be approved by the Secretary.

2.3. **Protection of Environment Operations Act 1997**

The objectives of the Protection of Environment Operations Act 1997 (PoEO Act) are to protect, restore and enhance the quality of the environment. Some of the mechanisms that can be applied, under the PoEO Act, to achieve these objectives include reduction of pollution at source, monitoring and reporting of environmental quality.

Section 120 deems it an Offence to pollute waters. Pollution is defined as a change in water quality.

A mine or quarry is a 'scheduled activity' under the POEO Act if it exceeds the thresholds set out in Schedule 1 of that Act. An environment protection licence (EPL) under the POEO Act must be obtained prior to the commencement of any works associated with a scheduled activity.

The Site is subject to an existing EPL (EPA Licence No. 684) which would need to be reviewed and updated based upon the proposed continued operations. An application would be made for a variation to the existing EPL to reflect the proposed future operations at the site. Clause 75V of the EP&A Act provides that, subsequent to the granting of Project Approval, an EPL cannot be refused and must be substantially consistent with the terms of Project Approval.

A variation to the EPL with regard to discharge surface water to Badgerys Creek will be sought. As is typically noted by the EPA on similar EPLs, the monitoring of overflows would not be required in times when rainfall exceeds a 90th percentile rainfall event (i.e., 48.8 mm in five days).

The purpose of including the basins into the EPL would be to ensure that any controlled discharge from the basins in lesser rainfall events would be monitored against the EPL discharge license limits for agreed parameters (typically pH, TSS and/or turbidity, and oil & grease.

2.4. State Environmental Planning Policy (Sydney Region Growth Centres) 2006

Water management procedures developed for the Site are designed to facilitate site rehabilitation objectives, which will align to development considerations identified in the Growth Centres SEPP as they become defined for the surrounding area.

These considerations would include assessing implications of development controls and objectives for:

- Environment conservation and recreation zones;
- Flood prone and major creeks land;
- Vegetation; and
- Cultural heritage landscape areas.

2.5. Western Sydney Aerotropolis- Land Use and Infrastructure Implementation plan (Stage 1)

The site also straddles two zones within the plan, Flexible Employment and Mixed Flexible Employment and Urban Land. The engineered backfilling of the quarry pits proposed in Modification 4 will provide a final landform that facilitates intensified redevelopment of the site in accordance with these zones.

2.6. Liverpool LEP

The PGH site is zoned RU1 Rural – Primary Production under the Liverpool Local Environment Plan 2008 (LEP). The objectives of this zone are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To ensure that development does not unreasonably increase the demand for public services or public facilities.
- To ensure that development does not hinder the development or operation of an airport on Commonwealth land in Badgerys Creek.
- To preserve bushland, wildlife corridors and natural habitat.

The existing development on the site was approved prior to the gazettal of LLEP 2008 as a 'clay extraction and brick and clay products industry'.

Works involving extractive industries are permitted by Council with consent. The Project has been granted Project Approval by the then Department of Planning and Infrastructure.

Water management objectives outlined within this report align with the objectives of the LEP with the final rehabilitated site objectives being compatible with the surrounding land fabric.

2.7. Managing Urban Stormwater: Soils and Construction Vol1 and Vol 2E (Mines and Quarries)

Design details for stormwater and sediment control structures for mine and quarry sites are detailed in Volume 1 of the Managing Urban Stormwater: Soils and Construction Guidelines (the Blue Book). Additional measures are outlined within Managing Urban Stormwater, Soils and Construction, Volume 2E Mines and Quarries (DECC, 2008).

2.8. National Water Quality Management Strategy: Australia and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000)

The Australian and New Zealand Environment Conservation Council (ANZECC) 2000 Guidelines identify water quality criteria to support water use objectives and inform investigation thresholds for receiving waters.

The ANZECC guidelines have been considered in this WMP on the basis of current uses of receiving waters to inform water quality criteria through performance and trigger values for on and off site uses. These uses include:

- Stock and Domestic (off site)
- Industrial (on site)
- Aquatic ecosystems (off site).

Application of water use objectives have been used to inform the most sensitive water use for the site, and thereby focus on maintaining water quality to enable continued use for all objectives.

In addition, baseline water quality data has been obtained and where relevant, used to develop water quality criteria specific to the receiving waters.

3.0 Catchment Description

3.1. Geology

The geology of the Site comprises the Wianamatta Group. This Group comprises Bringelly Shale, which is mined within the Site (AECOM, 2010).

The Wianamatta Group extends to a depth of up to 110 m within the southern Sydney Basin and is underlain by, Hawkesbury Sandstone which is known to contain significant amounts of groundwater in some parts of the Sydney Basin. According to AECOM (2010) extraction activities are unlikely to impact this source of groundwater as the depth of extraction will be limited to 35 m.

The creek systems adjacent to the Site (Badgerys Creek and South Creek) are flanked by Quaternary alluvial deposits comprising medium grained sands, clays and silts.

3.2. Hydrogeology

The Site is underlain by the Bringelly Shale. Bringelly Shale is typically characterised by low permeability and groundwater velocities. Groundwater associated with the Wianamatta Group is characteristically saline due to its formation within a marine environment and is generally unsuitable for extraction and use.

Groundwater flow within the alluvial sediments flanking Badgerys Creek and South Creek adjacent to the Site are highly responsive to rainfall and stream flow (AECOM, 2010), thus stringent water management controls are required within these areas.

3.3. Groundwater Sources

There are three major sources of groundwater in the site that require managing on the site.

3.3.1. Alluvial Materials Adjacent to Badgerys Creek and South Creek

Alluvial sediments are present on the east and west of the Site and are likely to contain higher quantities of groundwater when compared to shale units. These alluvial deposits are important in the maintenance of local groundwater dependent ecosystems and base flows for these creek systems. There is potential for these water sources to be impacted on by excavation works in Pit 4 and Pit 5. This area was the subject of the Alluvial Aquifer Assessment (*Section 7.5*).

3.3.2. Bringelly Shales

The Bringelly Shale unit within the Wianamatta Shale Group is the source of clay and shale materials to be excavated for brick-making purposes. Characterised by low permeability this unit is located across the majority of the site and shows limited localised occurrence of groundwater within the shale units.

3.3.3. Deep Groundwater

Located greater than 100m below the surface of the Site in the Hawkesbury Sandstone geological unit this source of groundwater is unlikely to be intercepted or impacted upon. No controls are proposed for management of the groundwater associated with this geology as the maximum depth of excavation is approximately 35m.

3.4. Overview of Regional Surface Water Catchments

The Site is located within the South Creek sub-catchment which is part of the greater Hawkesbury- Nepean catchment area. The South Creek sub-catchment covers an area of 620 km² and is mostly made up of small rural farms, some light industrial and commercial and residential development. The portion of South Creek sub-catchment in the Liverpool LGA includes three major creeks; Kemps Creek, South Creek and Badgerys Creek. The main issues affecting the South Creek sub- catchment include loss of vegetation, poor water quality and high soil salinity.

South Creek is located approximately 300 metres to the east of the south eastern corner of the site and flows in a northerly direction. Land along the eastern portion of the Site is contained within the South Creek sub-catchment. South Creek is an intermittent creek of average health and has a small tributary in the eastern portion of the Site, named South Creek Tributary. South creek is characterised by frequent erosion and high abundance of weed species along the creek edge. The creek provides a source of water supply for cattle which graze on the eastern portion of the Site (AECOM, 2010).

Badgerys Creek is a permanent stream located along the western perimeter of the Site that is also located within the South Creek sub-catchment. The western property boundary of the Site adjoins Badgerys Creek and a small tributary of Badgerys Creek. Badgerys Creek is reported to be of average health, characterised by scattered erosion and high abundance of weed species (ERM, 2002).

3.5. Harvestable Rights and Water Storages

The maximum harvestable right capacity for the site based on application of the online calculator is 16 megalitres (ML).

All existing farm dams and Sediment Dams 1 to 3 were constructed prior to 1 January 1999 and therefore, do not need to be licenced according to DPI Water under the Water Management Act 2000. This is confirmed through inspection of aerial photography from 1986. The approximate water storage capacity in the existing pits, basins and farm dams is provided in *Table 8*.

Existing water storages within the extraction pits have been created as a by-product of the material extraction process. With regard to the Enforceable Undertaking, the pit voids are considered by NRAR to contain more than the harvestable rights and must be dewatered as agreed in the EU or licenced.

Table 8. ***Existing Water Storages within the Project Site***

Water Storage	Water Storage Capacity (ML)	Maximum Depth of Water Storage* (m)
Pit 1	1,590	38m RL
Pit 2	476	36m RL
Pit 3	236	42m RL
Sediment Dam 1	16.8	58m RL
Sediment Dam 2	14.7	56m RL
Sediment Dam 3	19.7	54m RL
Small Farm Dam (NE of Sediment Dam 1)	~4	59m RL
Small Farm Dam (N of Sediment Dam 3)	~5	54m RL

*From Crossmuller survey-Ref. 3

3.6. Topography and Surface Drainage

The site slopes naturally away from the centre of the site to the east towards South Creek, and to the west and north west towards Badgerys Creek. Areas of higher elevation are located within the central (65 m AHD) and southern (85 m AHD) portions of the site, while low points are found in the north western and south western portions of the site (50 m AHD), and on the eastern portion (55m AHD). Several existing dams are located across the site, which are used as sediment basins for surface runoff (*Figure Two)*.

Flows entering South Creek from the existing site comprise:

- Surface run-off from the vegetated undisturbed south eastern portion of the site; and
- Overflow of Sediment Dam 3 via an ephemeral drainage line and the undisturbed areas to the north of Sediment Dam 3 used for agricultural purposes.

Flows entering Badgerys Creek from the existing site comprise:

- Surface run-off from the area of land used for agricultural purposes; and
- Overflow via ephemeral drainage channel from Sediment Dam 1, which in turn is fed from Sediment Dam 2 overflow, which receives run off from site features described in *Table 9.*

Rehabilitation of the Western Stockpile, undertaken in March 2006 has minimised stockpile run off into Badgerys Creek, an action measure prescribed in the SWMP (ERM, 2002). All other surface runoff is contained within the site.

3.7. Existing On-Site Water Catchments

These are outlined in *Table 9* below and shown in *Figure Three*.

Table 9. ***Existing On-Site Water Catchment Areas***

Water Storage Area	Catchment Area	Catchment Description
Sediment Dams 1 and 2	17.3 Hectares (both dams) 10.2 Hectares (Sediment Dam 1)	*Clean Water* Sediment Dam 1 collects runoff from the brick product storage area, gate house, pallet storage area and overland flow. Sediment Dam 1 spills to Sediment Dam 2 in overflow events, which in turn spills into Badgerys Creek via an ephemeral drainage line.
Sediment Dam 3	17.0 Hectares	*Clean Water* Collects overland runoff from the south and west of the dam, as well as runoff from the brick plant roof located to the centre of the site. Overflow from Sediment Dam 3 will enter South Creek via an ephemeral drainage line.
Pit 1	43.8 hectares	*Dirty Water* Runoff is collected from a portion of the raw materials stockpile, the waste and overburden stockpiles to the north of the pit, and the heavy vehicle storage area.
Pit 2	7.2 Hectares	*Dirty Water* Run off is limited to quarrying area within Pit 2 and stored in a localised basin.
Pit 3	6.1 Hectares	*Dirty Water* Run off is limited to the quarrying area within the Pit 3 and stored a localised basin.

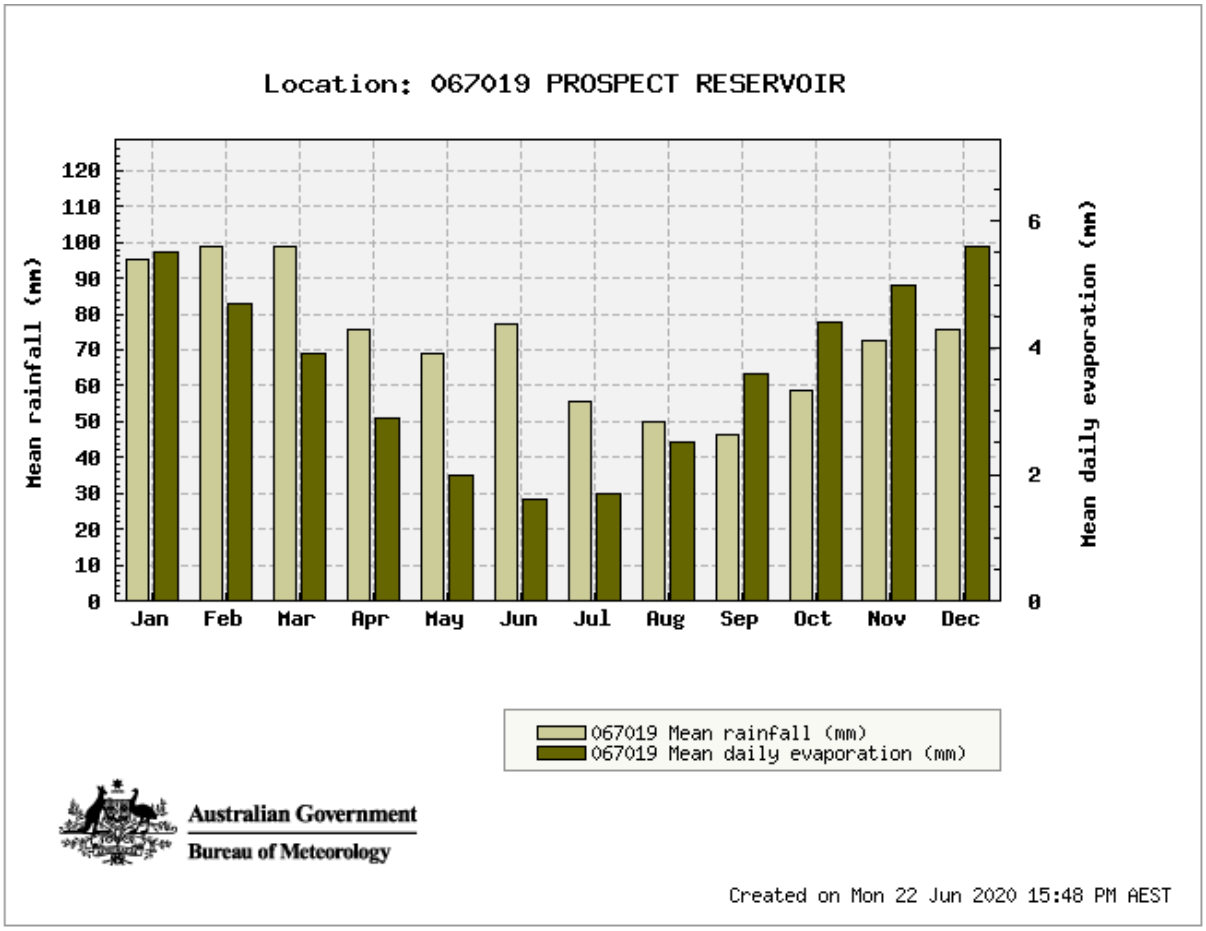
3.8. Rainfall and Evaporation

A summary of average monthly rainfall and evaporation rates for Prospect reservoir (Station Number 067019), located approximately 13km from the site is provided in *Graph 1.* Further details of water balance modelling are presented in *Section 5.0*.

Rainfall

Mean monthly rainfall data for the Prospect reservoir station (years 1887 to 2020) shows relatively stable rainfall all year round, with summer months typically wetter (approximately 70mm – 100mm per month) than the winter months (50mm – 70 mm per month).

Graph 1: Mean Rainfall and Evaporation at Station 067019 from 1887 to 2020 (Source: www.bom.gov.au)



Evaporation

Data in *Graph 1* shows a high range of evaporation throughout the year, with winter retaining more water (approximately 30 – 50 mm per month lost through evaporation) than the summer months (approximately 160 – 200 mm lost per month). There is a potential for net loss of rainfall across the site during the summer and early autumn months.

4.0 Surface Water Management Plan

4.1. Introduction

The water management actions presented in this section build upon actions included in an existing soil and water management plan for the site prepared by ERM (2002) which was subsequently updated by AECOM (2010) as part of the environmental assessment for expansion of quarrying operations on the site.

The progressive expansion of the site operations will result in changes to site drainage over the life of the project. The management actions to be implemented throughout the operational phases of the project have been developed to account for progressive changes in storage, morphology and water flows on site.

Sustainable water management actions have been developed for the site which is based around separation of clean and dirty water flows, capturing stormwater runoff for use in the quarry process, dust suppression and environmental controls. Further opportunities will also be pursued for re-use of water to minimise onsite potable water use after gaining appropriate water licences to use this water. All management actions contained within this Plan are consistent with the legislative and best practice requirements identified in *Section 2.0.*

4.2. Surface Water Management System

An overview of the onsite surface water management system consisting of clean water diversion, erosion and sediment controls and water storages is outlined in *Sections 4.2.1* to *4.2.3*. A summary of actions in accordance with Site surface water flows, presented in *Figure Eight* and is detailed in *Table 12*.

4.2.1. Clean Water Diversion System

Clean water onsite is defined as runoff that has not come into contact with any disturbed area of the site. As detailed in *Table 12*, the objective of site water management with respect to clean water is to minimise disturbed areas within the site and separate these areas from undisturbed by manipulating ground contours and implementing controls to divert clean water off site while diverting runoff from disturbed areas to the proposed sediment dams.

4.2.2. Erosion and Sediment Controls

All erosion and sediment controls documented in this Plan have been developed in accordance with Managing Urban Stormwater: Soils and Construction (Landcom, 2004) and Volume 2E Mines and Quarries (DECC, 2008) (the Blue Book). The intent of erosion and sediment controls for the site is to minimise the mobilisation of sediment onsite, and where this is not achievable, to reduce sediment transport around and off the site. Priority areas for the application of erosion and sediment controls around the site are discharge points to local watercourses (Badgerys Creek, Badgerys Creek Tributaries, South Creek and South Creek Tributaries), disturbed downslopes, and the integrity of natural and formalised drainage channels responsible for the movement of clean and dirty water.

All disturbed long-term stockpile areas and disturbed areas outside access roads will be seeded to ensure establishment of groundcover in accordance with Blue Book requirements. As required, erosion and sediment control measures will be maintained to ensure effectiveness and promote ongoing compliance with the EPL.

4.2.2.1. *Soil Characterisation*

The catchment area and dam volumes for the site were estimated using the NSW Managing Urban Stormwater handbook, also known as the Blue Book (see *Section 4.2.3*). Several assumptions have been made as listed below.

The Soil Hydrological Group for the soil materials is assumed to be D, very high run-off potential. Water moves into and through these soils very slowly when thoroughly wetted. They regularly shed run-off from most rainfall events.

Conservatively, sediment retention basins are designed using the Type D Soils calculations. This includes the sediment storage zone calculation using the estimated soil loss for the site over two months.

The likely soil loss is calculated with the Revised Universal Soil Loss Equation (RUSLE). The values of the other RUSLE factors are: P of 1.3 and the C is assumed to be 1.0 for bare soil. Calculations can be found in *Appendix D.*

The potential soil loss of the site has been calculated using *Managing Urban Stormwater, Soil and Construction, Volume 2E Mines and* Quarries for a 90th percentile, 5-day rainfall event assuming a non-sensitive receiving environment. Important site physical characteristics are identified in the table below.

Table 10. *Constraints and Characteristics*

Constraint/Opportunity	Value
IFD:2-year, 6 hour storm	8.02 (from the BOM IFD data)
Slope Gradients	Low to Moderate (Average 5%)
Soil Erodibility	High (assumed)
Calculated Soil Loss	Up to 253 tonnes/Ha/yr depending on particular mine slopes.
Soil Loss Class	3
Soil Texture Group	Type D
Soil Hydrological Group	D
Runoff Coefficient	0.69 (Soil Hydrological Group D)

4.2.3. Dam Catchments, Water Storages and Discharge

To date, the activities at the facility have been limited and the opportunity for interactions with the environment were limited. There are a number of water management structures within the operational boundary of the Site. These structures consist of Pit 1, Pit 2, Pit 3, three sedimentation Dams and two farm dams. Due to the complexity of the works proposed on the site, the surface water management system will consist of a number of phases (as described in the RTS Mod 3- October 2019) to accommodate the development elements as they proceed.

4.2.3.1. *Phase 1 Works (Years One to Six)*

As a result of an Enforceable Undertaking and discussions with Natural Resources Access Regulator (NRAR), Pits 1, Pit 2 and Pit 3 will not be permitted to receive surface water from the site. As a result, surface water received over the disturbed areas will require diversion to several sediment dams proposed to be constructed in strategic locations, utilising naturally occurring depressions where possible. Options for the sediment basin locations are shown in *Figure Eight* and will be constructed in accordance with Blue Book requirements for a 5 day, 90th% design storm. The system will allow for capture of surface water over the disturbed areas in primary sedimentation dams and treatment of the captured water in a final sediment dam prior to discharge to Badgerys Creek. Drains designed for a 1 in 10-year design storm will be constructed, where required, to convey surface water to the sediment dams and to transfer between dams. Where topography does not permit gravity feeding of water transfers between dams, water will be pumped overland via temporary pipes.

Concurrently Pit 2 and Pit 3 will be dewatered into Pit 1 over seven and three weeks respectively. Pit 1 will also commence dewatering by pumping water to the WSA site via a pipeline installed under Badgerys Creek, up to 10ML per day. Alternatively, water from Pit 1 could be discharged separately or concurrently, when EPL quality parameters are met, into Badgerys Creek at a rate of 100,000L/hr 24 hours a day seven days a week. It is expected to take one to three years to dewater Pit 1.

Extraction of Pit 3 will recommence initially, and captured surface water will be pumped into the sediment dam system to be eventually discharged to Badgerys Creek. Extraction and backfilling operations will be undertaken concurrently where possible. Once the Pit 3 backfilling operations are completed and the formerly disturbed surface has sufficient coverage (vegetation or otherwise sealed), surface water will be permitted to enter South Creek via overland flows.

When commenced, backfilling of Pit 2 is expected to have a duration of approximately 4 years. Surface water captured over this Pit 2 disturbed area will be captured in the void and pumped into the final sedimentation dam for treatment prior to discharge. As the void backfilling nears completion, the surface water will be diverted directly to the final sedimentation dam until the formerly disturbed surface has sufficient coverage (vegetation or otherwise sealed) to minimise entrainment of sediment. Surface water may then be diverted via overland flow to Badgerys Creek.

When commenced, backfilling of Pit 1 is expected to have a duration of two to seven years depending on VENM availability. Surface water captured within the former void during backfilling operations will be pumped to the final sedimentation dam for treatment and

discharge in accordance with EPL conditions as required. As the backfilling operation of Pit 1 is completed, the surface water will be diverted directly to the final sedimentation dam until the formerly disturbed surface has sufficient coverage (vegetation or otherwise sealed) to minimise entrainment of sediment. Surface water may then be diverted via overland flow to Badgerys Creek.

Pit 1 and Pit 2 areas are then available for future development.

It is likely that TfNSW would realign and extend Martin Road southwards through the site during this phase (see *Figure Four* to *Figure Seven*). If extraction from Pit 3 is not complete prior to the road construction, an underpass to allow haulage of extracted material and transfer of sediment laden water captured in the pit will be considered. Alternatively, the pit water may be treated and discharged to South Creek should the EPL be varied to allow an additional discharge point.

4.2.3.2. *Phase Two (Seven to Ten Years)*

Extraction from Pit 3 will continue eastward whilst backfilling of the Pit commences where mining is complete in the west. Surface water from the Pit 1 and Pit 2 catchments should be effectively clean water as the rehabilitation works are completed. Overland flows would then be restored to Badgerys Creek from these catchments.

The sediment dam infrastructure constructed in Phase 1 will largely be retained to assist with the management of surface water collected over the raw material stockpile area.

4.2.3.3. *Phase Three (Eleven to Thirteen Years)*

Extraction of Pit 3 has been completed in Phase 2 and only backfilling activities in Pit 3 will continue. By the end of this phase, Pit 3 backfilling and rehabilitation will be completed. Surface water collected on the site would be considered to be clean and may be diverted directly to South Creek as overland flows.

Pit 3 area is available for future development.

As stated previously, the sediment dam infrastructure constructed in Phase 1 will largely be retained to assist with the management of surface water collected over the raw material stockpile area and discharged into Badgerys Creek via the EPL.

4.2.3.4. *Phase Four (Fourteen Years Onwards)*

The backfilling and rehabilitation operations have been completed in the previous phases.

The sediment dam infrastructure constructed in Phase 1 will continue to assist with the management of surface water collected over the raw material stockpile area.

4.2.3.5. *Proposed Water Storages*

It is proposed to construct a number of Sediment Dams designed to capture the 90th percentile 5-day storm event in order to manage the surface water on the disturbed area whilst preventing surface water from entering the pit voids. The pit voids would be dewatered separately. Several options are being considered (as shown in *Figure Eight*) but the intent is to capture dirty water in primary dams located in strategic locations and then either gravity feed or pump the water to a final sediment dam located in the north western portion of the site for treatment to remove sediment. Water that meets the EPL criteria would then be released into Badgerys Creek at a controlled rate with adequate erosion protection to the discharge point.

Table 11. *Proposed Water Storages within the Project Site*

Water Storage	Water Storage Capacity (ML)	Volume required for Design Storm Event (5-day 90th % ile) (ML)
Pit 1	Nil (once dewatered captured water to be transferred to the Sediment Dams)	9
Pit 2	Nil (once dewatered captured water to be transferred to the Sediment Dams)	3
Pit 3	Nil (once dewatered captured water to be transferred to the Sediment Dams)	2
Sediment Dam1 (clean water)	16.8	Not Required
Sediment Dam 2 (clean water)	14.7	Not Required
Sediment Dam 3 (clean water)	19.7	Not Required
Small Farm Dam 1 (NE of Sediment Dam 1) (clean water)	~4	Not Required
Small Farm Dam 2 (N of Sediment Dam 3) (clean water)	~5	Not Required
Sediment Basin A	15	9.7
Sediment Basin B	7.5	Nil

Note: Pit volumes obtained from Crossmuller Technology Report 2017.

As can be seen from the table above, the proposed sediment basins have sufficient capacity to contain the design storm including transfer of water captured in the Pits to the sediment basins during backfilling operations.

Table 12. ***Water Management Systems Summary***

Site Feature/ Description	Description	Clean Water Management	Erosion and Sediment Control	Water Storage	Comment
Pit 1	Collects runoff from incident rainfall collected over the dam surface and immediate void slopes. Will be dewatered and backfilled for future development.	Clean water management not required during the dewatering and backfilling phase as all catchment water is runoff from disturbed areas. Once final contours have been achieved and the groundcover C-Factor of 0.01 (equivalent to 70% groundcover) is achieved, the surface water received in the area is considered clean and may be diverted directly to Badgerys Creek as overland flows.	<u>Dewatering</u> Prior to dewatering of Pit 1, surface water will be diverted as far as possible around Pit 1 and directed to the Sediment Dams for collection and treatment prior to discharge as per EPL conditions. Any drains constructed to facilitate the diversion of surface water around Pit 1 are to be designed with sufficient capacity for the 1 in 10-year ARI. <u>Backfilling</u> During the backfilling phase, erosion and sediment controls will be applied to the disturbed surfaces and may include; • Installation of silt fences where appropriate • Delineating areas to be disturbed and not encroaching beyond these areas. • Drains are to be designed with sufficient capacity for the 1 in 10-year ARI. • Ensuring the groundcover C-Factor of 0.01 (equivalent to 70% groundcover) is achieved as soon as possible on rehabilitated areas. • Sediment laden water collected in the void during the backfilling phase is pumped into the sediment dams and treated prior to discharge to Badgerys Creek as per the EPL conditions.	Pit 1 will be dewatered and not used as a water storage. Dewatering will be achieved via transfer to the WSA water storage area using a dedicated above ground pipeline and/or direct discharge to Badgerys Creek when EPL conditions are met. Sediment laden water collected in the void during the backfilling phase is pumped into the sediment dams and treated prior to discharge to Badgerys Creek as per the EPL conditions. Installing infrastructure (e.g. pumping station and rising mains) for the active transport of water between Pit 1 and Sediment Dams used for water storage. Investigate reuse methods including reuse in the brick production process and offsite reuse in industry and agriculture with appropriate licencing. Inspections of water storage structures after rainfall events exceeding 25mm in a 24-hour period.	As site morphology changes over time, sustain formalised drainage pathways to water storage areas so as to minimise flow velocity and slope length, thereby reducing erosion and sedimentation potential. Where structures or systems are found not to be functioning effectively, they will be restored to ensure that they align with requirements outlined in this Plan. Regular water testing will be undertaken (as outlined in this plan) to ensure that controls are adequate and Badgerys Creek and South Creek are not adversely impacted.

Site Feature/ Description	Description	Clean Water Management	Erosion and Sediment Control	Water Storage	Comment
Proposed Disturbed Area Sediment Dam System (see Figure Eight for proposed locations and configurations)	Collects runoff from raw materials stockpile, eastern stockpile, south eastern stockpile (east and west), Pit 3 and the central stockpile.	Clean water management not required as all catchment water is runoff from disturbed area. Direct dirty water towards water storage areas and away from clean water flow paths.	Maintain stabilised diversion channels to Sediment Dams from stockpile area through the use of contour berms. Clean out/maintain pipe transporting runoff from Eastern Stockpile to Sediment Dams. Maintain contoured drainage pathways around stockpile areas (East West and central) to Sediment Dams via formalised drainage channels. Install silt fence where appropriate. Maintain stabilisation of long-term overburden and topsoil stockpiles and bunds in accordance with the Blue Book (SD 4-1). Drains are to be designed with sufficient capacity for the 1 in 10-year ARI. Delineating areas to be disturbed and not encroaching beyond these areas.	All water from disturbed areas onsite to be diverted to the Sediment Dams. Installing infrastructure (e.g. pumping station and rising mains) for the active transport of water between Sediment Dams when multiple-Sediment Dams are used for water storage and treatment. Investigate reuse methods including reuse in the brick production process and offsite reuse in industry and agriculture with appropriate licencing. Inspections of water storage structures after rainfall events exceeding 25mm in a 24-hour period.	As stockpile site morphology changes over time, sustain formalised drainage pathways around stockpiles to water storage areas so as to minimise flow velocity and slope length, thereby reducing erosion and sedimentation potential. Where structures or systems are found not to be functioning effectively, they will be restored to ensure that they align with requirements outlined in this Plan. Regular water testing will be undertaken (as outlined in this plan) to ensure that controls are adequate and Badgerys Creek and South Creek are not adversely impacted.

Site Feature/ Description	Description	Clean Water Management	Erosion and Sediment Control	Water Storage	Comment
Pit 2	Pit 2 contains a sediment basin and pump out facilities. Runoff flowing to Pit 2 is currently pumped into Pit 1. Pit 2 will be dewatered to Pit 1 and backfilled for future development.	Clean water management not required during the dewatering and backfilling phase as all catchment water is runoff from disturbed areas. At the completion of rehabilitation (including revegetation), surface flows will be returned to Badgerys Creek as clean water. Once final contours have been achieved and the groundcover C-Factor of 0.01 (equivalent to 70% groundcover) is achieved, the surface water received in the area is considered clean and may be diverted directly to Badgerys Creek as overland flows.	<u>Dewatering</u> Prior to dewatering of Pit 2, surface water will be diverted as far as possible around Pit 2 and directed to the Sediment Dams for collection and treatment prior to discharge as per EPL conditions. Any drains constructed to facilitate the diversion of surface water around Pit 2 are to be designed with sufficient capacity for the 1 in 10-year ARI. <u>Backfilling</u> During the backfilling phase, erosion and sediment controls will be applied to the disturbed surfaces and may include; • Installation of silt fences where appropriate • Delineating areas to be disturbed and not encroaching beyond these areas. • Drains are to be designed with sufficient capacity for the 1 in 10-year ARI. • Ensuring the groundcover C-Factor of 0.01 (equivalent to 70% groundcover) is achieved as soon as possible on rehabilitated areas. Sediment laden water collected in the void during the backfilling phase is pumped into the sediment dams and treated prior to discharge to Badgerys Creek as per the EPL conditions.	Pit 2 will be dewatered by transfer of water to Pit 1 and not used as a water storage. Sediment laden water collected in the void during the backfilling phase is pumped into the sediment dams and treated prior to discharge to Badgerys Creek as per the EPL conditions. Installing infrastructure (e.g. pumping station and rising mains) for the active transport of water between Pit 2 and Sediment Dams used for water storage. Investigate reuse methods including reuse in the brick production process and offsite reuse in industry and agriculture with appropriate licencing. Inspections of water storage structures after rainfall events exceeding 25mm in a 24-hour period.	As site morphology changes over time, sustain formalised drainage pathways to water storage areas so as to minimise flow velocity and slope length, thereby reducing erosion and sedimentation potential. Where structures or systems are found not to be functioning effectively, they will be restored to ensure that they align with requirements outlined in this Plan. Regular water testing will be undertaken (as outlined in this plan) to ensure that controls are adequate and Badgerys Creek and South Creek are not adversely impacted.

Site Feature/ Description	Description	Clean Water Management	Erosion and Sediment Control	Water Storage	Comment
Pit 3	Collects run-off from the disturbed area in Pit 3. Pit 3 will be dewatered to Pit 1. Extraction will recommence in Pit 3 and backfilling for future development.	Clean water management not required during the dewatering, extraction and backfilling phase as all catchment water is runoff from disturbed areas. Once final contours have been achieved and the groundcover C-Factor of 0.01 (equivalent to 70% groundcover) is achieved, the surface water received in the area is considered clean and may be diverted directly to Badgerys Creek or South Creek as overland flows.	<u>Dewatering</u> Prior to dewatering of Pit 3, surface water will be diverted as far as possible around Pit 3 and directed to the Sediment Dams for collection and treatment prior to discharge as per EPL conditions. Any drains constructed to facilitate the diversion of surface water around Pit 3 are to be designed with sufficient capacity for the 1 in 10-year ARI. <u>Extraction</u> During the extraction phase water captured in the pit is pumped into the sediment dams and treated prior to discharge to Badgerys Creek as per the EPL conditions. Establishment of water storage areas and stabilisation of drainage channels prior to excavations or other soil disturbance activities within the catchment. Drains are to be designed with sufficient capacity for the 1 in 10-year ARI. Strip topsoil when moist, Handle topsoil only once. Maintain stabilisation of topsoil and overburden stockpiles and bunds in accordance with the Blue Book (SD 4-1). Treat stockpiles and bunds with surface roughening, soil surface mulching. Overburden and topsoil stockpiles are to be stabilised via vegetation or other means within 20 days of completion of construction such that a C factor of 0.01 (equivalent to 70% groundcover) is achieved. <u>Backfilling</u> Sediment laden water collected in the void during the backfilling phase is pumped into the sediment dams and treated prior to discharge to Badgerys Creek as per the EPL conditions. During the backfilling phase, erosion and sediment controls will be applied to the disturbed surfaces and may include; • Installation of silt fences where appropriate • Delineating areas to be disturbed and not encroaching beyond these areas. • Drains are to be designed with sufficient capacity for the 1 in 10-year ARI. • Ensuring the groundcover C-Factor of 0.01 (equivalent to 70% groundcover) is achieved as soon as possible on rehabilitated areas.	Pit 3 will be dewatered by transfer of water to Pit 1 and not used as a water storage. Sediment laden water collected in the void during the extraction and backfilling phase is pumped into the sediment dams and treated prior to discharge to Badgerys Creek as per the EPL conditions. Installing infrastructure (e.g. pumping station and rising mains) for the active transport of water between Pit 3 and Sediment Dams used for water storage. Investigate reuse methods including reuse in the brick production process and offsite reuse in industry and agriculture with appropriate licencing. Inspections of water storage structures after rainfall events exceeding 25mm in a 24-hour period.	As site morphology changes over time, sustain formalised drainage pathways to water storage areas so as to minimise flow velocity and slope length, thereby reducing erosion and sedimentation potential. Where structures or systems are found not to be functioning effectively, they will be restored to ensure that they align with requirements outlined in this Plan. Regular water testing will be undertaken (as outlined in this plan) to ensure that controls are adequate and Badgerys Creek and South Creek are not adversely impacted.
Sediment Dam 3	Collects overland clean water runoff from the south and west of the Dam, as well as clean water runoff from the brick making facility. Overflow from Sediment Dam 3 currently	Maintain integrity of the clean water catchment.	Delineating areas to be disturbed and not encroaching beyond these areas.	Sediment Dam 3 to contain clean water runoff from the eastern portion of the site. Inspections of water storage structures after rainfall events exceeding 25mm in a 24-hour period.	Where structures or systems are found not to be functioning effectively, they will be restored to ensure that they align with requirements outlined in this Plan.

Site Feature/ Description	Description	Clean Water Management	Erosion and Sediment Control	Water Storage	Comment
	enters South Creek via an ephemeral drainage line.				
Sediment Dams 1 and 2	Collects clean water runoff from the brick product storage area, brick making facility, gate house and overland flow. Sediment Dam 1 spills to Sediment Dam 2 in overflow events, which in turn spills into Badgerys Creek via an ephemeral drainage line. No works are proposed for this sediment Dam.	Maintain integrity of clean water catchment.	Delineating areas to be disturbed and not encroaching beyond these areas.	Initially all clean water runoff from the brick storage area, factory and undisturbed agricultural land to flow into Sediment Dam 1 & 2 and Badgerys Creek. Inspections of water storage structures after rainfall events exceeding 25mm in a 24-hour period.	Where structures or systems are found not to be functioning effectively, they will be restored to ensure that they align with requirements outlined in this Plan.
Noise Attenuation Bunds	Perimeter bunds will be established and once stabilised with vegetation, will convey clean surface water flows directly to South Creek or Badgerys Creek.	Direct dirty water towards water storage areas and away from clean water flow paths.	Establishment of water storage areas and stabilisation of drainage channels prior to excavations or other soil disturbance activities within the catchment. Delineating areas to be disturbed and not encroaching beyond these areas. Construct sediment fencing along outer edge of noise attenuation berm extending along the eastern, northern and a portion of the western and southern site Implement and maintain controls to manage runoff from access roads within the site. Establishment and regular maintenance of sediment fences to contain sediment downslope of disturbed areas in accordance with Blue Book sediment fence guidance (SD 6-8). Bunds are to be stabilised via vegetation or other means within 20 days of completion of construction such that a C factor of 0.01 (equivalent to 70% groundcover) is achieved. Drains are to be designed with sufficient capacity for the 1 in 10-year ARI.	Not applicable,	Where structures or systems are found not to be functioning effectively, they will be restored to ensure that they align with requirements outlined in this Plan.

Site Feature/ Description	Description	Clean Water Management	Erosion and Sediment Control	Water Storage	Comment
Stockpile, Access Tracks, Haul Roads and Overburden Areas	Surface water retained on these areas will be directed to the sediment basins.	Direct dirty water towards water storage areas and away from clean water flow paths.	Establishment of water storage areas and stabilisation of drainage channels prior to excavations or other soil disturbance activities within the catchment. Maintain stabilisation of stockpiles and bunds in accordance with the Blue Book (SD 4-1). Treat stockpiles and bunds with surface roughening, soil surface mulching. Overburden and topsoil stockpiles are to be stabilised via vegetation or other means within 20 days of completion of construction such that a C factor of 0.01 (equivalent to 70% groundcover) is achieved. Delineating areas to be disturbed and not encroaching beyond these areas. Establishment and regular maintenance of sediment fences to contain sediment downslope of disturbed areas in accordance with Blue Book sediment fence guidance (SD 6-8). Drains are to be designed with sufficient capacity for the 1 in 10-year ARI.	All water from disturbed areas onsite to be diverted to sediment basins. Installing infrastructure (e.g. pumping station and rising mains) for the active transport of water between Sediment Basin used for water storage. Investigate reuse methods including reuse in the brick production process and offsite reuse in industry and agriculture with appropriate licencing. Inspections of water storage structures after rainfall events exceeding 25mm in a 24-hour period.	Where structures or systems are found not to be functioning effectively, they will be restored to ensure that they align with requirements outlined in this Plan.
Brick Plant, Offices, Brick Storage Areas	Surface water retained on these areas will be directed to Sediment Dams 1, 2 or 3.	Maintain integrity of clean water catchment.	Establishment and regular maintenance of sediment fences to contain sediment downslope of disturbed areas in accordance with Blue Book sediment fence guidance (SD 6-8). Maintaining stable site access with vehicle wash-down register. Drains are to be designed with sufficient capacity for the 1 in 10-year ARI.	Initially all clean water runoff from the brick storage area, factory and undisturbed agricultural land to flow into Sediment Dam 1 & 2 and Badgerys Creek. Sediment Dam-3 to contain clean water runoff from the eastern portion of the site. Inspections of water storage structures after rainfall events exceeding 25mm in a 24-hour period.	Where structures or systems are found not to be functioning effectively, they will be restored to ensure that they align with requirements outlined in this Plan.
Undisturbed Areas (e.g. north west and east) including Farm Dams 4 and 5.	These comprise of areas to the north west and east of the site currently used for grazing.	Clean water management not required as all catchment water is runoff from undisturbed areas.	Delineating areas to be disturbed and not encroaching beyond these areas.	Inspections of water storage structures after rainfall events exceeding 25mm in a 24-hour period.	Where structures or systems are found not to be functioning effectively, they will be restored to ensure that they align with requirements outlined in this Plan.
Badgerys Creek	Receives overland flows from clean water catchments as well as the proposed controlled discharge from the site.	Maintain integrity of clean water catchment.	<u>Dewatering and Discharge</u> Delineating areas to be disturbed and not encroaching beyond these areas. Any drains constructed to facilitate the discharge of surface water are to be designed with sufficient capacity for the 1 in 10-year ARI. Discharge point to be protected from erosion through energy dissipation devices and adequate erosion protection. Discharge flows not to exceed the 1 in 10-year ARI flow rate for Badgerys Creek.	Not applicable	Regular water testing will be undertaken (as outlined in this plan) to ensure that controls are adequate, and Badgerys Creek is not adversely impacted. Where structures or systems are found not to be functioning effectively, they will be restored to ensure that they align with requirements outlined in this Plan
South Creek	Receives overland flows from clean water catchments.	Maintain integrity of clean water catchment.	Delineating areas to be disturbed and not encroaching beyond these areas.	Not applicable	Regular water testing will be undertaken (as outlined in this plan) to ensure that controls are adequate, and South Creek is not adversely impacted. Where structures or systems are found not to be functioning effectively, they will be restored to ensure that they align with requirements outlined in this Plan

4.2.4. Baseline Water Quality

Baseline water quality data has been gathered on a quarterly basis for Badgerys Creek whilst the site has been in a state of low activity. Samples have been taken in Badgerys Creek upstream and downstream of the confluence of the tributary (natural drainage line) from Pit 1 to Badgerys Creek (See *Figure Three*). The 'Confluence' had also been sampled with the intention that this was likely to be approved in the future as an EPL Discharge Point. Badgerys Creek at this location does not experience permanent flows. Water, where available for sampling, was located in isolated ponds. No discharges from Pit 1 have been undertaken and the results of the 'Confluence' site are reflective of Badgerys Creek into which it is linked. Water quality of the Pits has also been sampled periodically. The results are summarised below and have been used to assist in the establishment of performance criteria and trigger levels as discussed below. Note, the discharge point under Mod 3 and Mod 4 (the Preferred Project) is likely to be located upstream of the Confluence and upstream sampling locations.

4.2.5. Discharge of Water from Sediment Basins

4.2.5.1. *Determining Need for Discharge*

The need to discharge will be determined on the need maintain sufficient capacity for the design storm event.

4.2.5.2. *Maintaining Dam Levels*

The Sedimentation Basins will be pegged to indicate the maximum sediment level that can be contained within the dam before desilting is required. A peg will also be installed to indicate when there is insufficient capacity remaining in the dam for the design storm event.

4.2.5.3. *Treatment of Water to be Discharged*

The following outlines the procedure for preparing water for discharge from the Sedimentation Basins:

- The water in the Sediment Basins will be sampled and tested for pH and Turbidity;
- If the sampled water meets the criteria listed in *Section 4.2.5.4,* the dam is suitable for discharge and may be emptied (see below for discharge procedure);
- If the sampled water does not meet the required criteria, the dam will be treated with flocculants and/or buffers and sufficient time allowed for sediment to settle is given before additional sampling and testing is conducted;
- The above steps will be repeated until the water is of a suitable quality.
- The treatment, testing and discharge of the water may be achieved via batch treatment or continually via a suitably designed automated treatment system.

4.2.5.4. *Discharge Criteria*

The discharge criteria will be that outlined in the EPL once varied to permit discharge. The proposed concentration limits are:

- The pH is between 6.5 to 8.0; and
- Turbidity is <150NTU.

4.2.5.5. *Discharge of Water*

Once the water has been determined to be of suitable quality to discharge, the water will be pumped to an energy dissipater located adjacent to Badgerys Creek.

No concentrated flows will be permitted to leave the site. The discharge pipe will be fed into an energy dissipater to minimise erosion impacts from the discharged water. The discharge will be supervised to ensure there is no adverse impacts noted such as visible sediment in discharge water, erosion and gullying, flooding etc. If impacts are noted discharge will cease immediately and remedial action undertaken.

The controlled discharge rate downstream from Basin C will be much lower than the rate expected by a 1 in 10-year ARI event expected in Badgerys Creek (catchment of approximately 1,670 Ha) prior to development as can be seen in the table below. Note, the soils are assumed to be hydrological group D, very high runoff potential. It should be noted that the flows will essentially be restored to the downstream environment once rehabilitation is completed.

Table 13. ***Flow Rates for 1 in 10-year storm event***

Catchment	Flow rate (cubic metres per second)
Estimated Catchment(~1,670Ha)	86*
Controlled discharge over 24 hours (estimated)	0.2

*Calculated using the Blue Book and IFD data.

4.2.6. Discharge of Water from Pits

The discharge of water from the Pits is described in the Dewatering Infrastructure Plan and the Dewatering Management Plan.

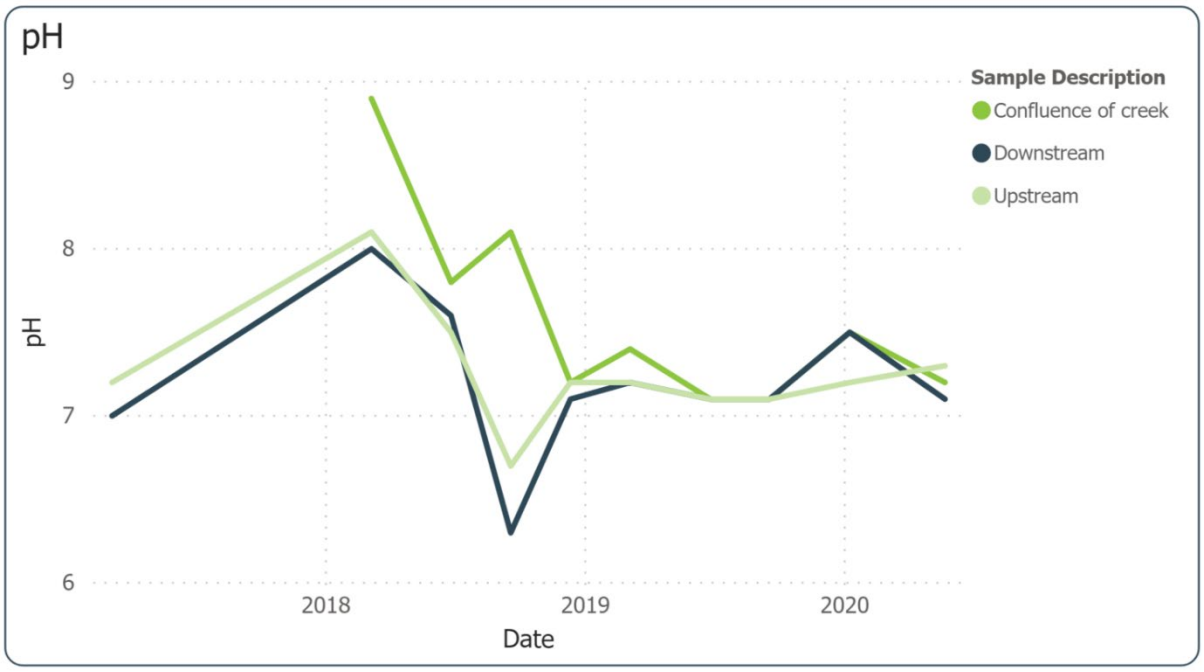
Table 14. *Badgerys Creek Baseline Water Quality*

Date	Sample ID	Sample Description	Temp. (ºC)	pH	Conductivity (µS/cm)	Ammonia (mg/L	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Dissolved Oxygen (mg/L)	NO_x (mg/L)	Reactive Phosphorus (mg/L)	Comments
2/12/2015	2320/1	Upstream	22.7	7.2	1,650	**0.25**	**2.6**	**1.12**				Not running
2/12/2015	2320/2	Downstream	23.4	7.5	**2,390**	**0.16**	**1.8**	**0.54**				Stagnant, scum, rainbow effect, casuarinas above
6/03/2017	3888/1	Upstream	21.5	7.2	**3,460**	**0.48**	**14**	**1.3**				No Visible Oil and Grease
6/03/2017	3888/2	Downstream	21.4	7.0	1,730	**0.15**	**19**	**0.4**				No Visible Oil and Grease
19/09/2017	4808/1	Tributary Confluence	17.6	8.2	1,970	**0.035**	**1.3**	<0.05	9	<0.005	<0.01	-
19/09/2017	4808/2	Upstream	-	-	-	-	-	-	-	-	-	Dry, could not sample
19/09/2017	4808/3	Downstream	13.4	7.5	**3,820**	**0.05**	**0.7**	<0.05	7.1	<0.005	<0.01	Shaded
6/03/2018	5446/1	Tributary Confluence	23.6	8.9	**3,620**	**0.068**	**5.6**	**1.3**	18.9	0.005	**0.54**	No discharge form Quarry. Greenish
6/03/2018	5446/2	Upstream	22.2	8.1	1,700	0.014	**1.1**	**0.1**	9.7	<0.005	**0.055**	Not flowing or connected
6/03/2018	5446/3	Downstream	21.7	8.0	**3,710**	0.02	**1.9**	**0.3**	10.2	0.01	**0.27**	Not flowing or connected
26/06/2018	6039/1	Tributary Confluence	7.9	7.8	**2,290**	**1.3**	**6.6**	**1.9**	6.1	<0.005	**0.05**	No flow, not discharging, algae, turbid
26/06/2018	6039/2	Upstream	6.6	7.5	1,300	0.01	**1.5**	**0.3**	8.3	<0.005	0.01	No flow, turbid, algae
26/06/2018	6039/3	Downstream	**5.9**	7.6	**3,180**	**0.082**	**3.6**	**0.07**	6.1	**0.05**	0.014	Clear, no flow, isolated pond
18/09/2018	6399/1	Tributary Confluence	15.7	8.1	**2,490**	<0.005	**1.1**	**0.3**	16	<0.005	**0.037**	Not discharging, isolated pond, very shallow, algae

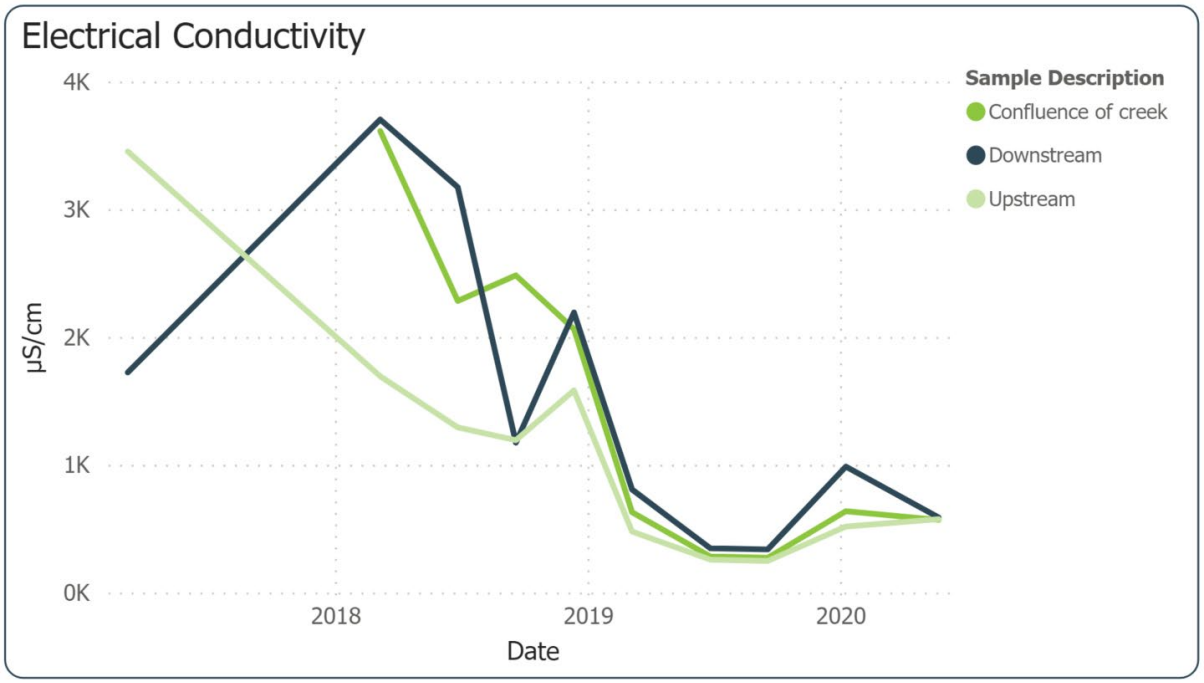
Date	Sample ID	Sample Description	Temp. (ºC)	pH	Conductivity (µS/cm)	Ammonia (mg/L	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Dissolved Oxygen (mg/L)	NO_x (mg/L)	Reactive Phosphorus (mg/L)	Comments
18/09/2018	6399/2	Upstream	14.0	6.7	1,200	**0.06**	**0.8**	**0.09**	9.6	0.01	**0.048**	Isolated pond, algae
18/09/2018	6399/3	Downstream	10.9	**6.3**	1,180	**0.29**	**1.9**	**0.07**	6.6	**0.50**	**0.03**	Isolated pond
11/12/2018	6778/1	Tributary Confluence	22.9	7.2	2,070	**0.041**	**1.9**	**0.5**	3.3	0.006	**0.48**	Most water in creek since sampling began
11/12/2018	6778/2	Upstream	22.2	7.2	1,590	0.01	**1.2**	**0.2**	5.4	0.01	**0.32**	Most water in creek since sampling began
11/12/2018	6778/3	Downstream	21.5	7.1	2,200	**0.038**	**1.5**	**0.2**	4.1	0.01	**0.3**	Most water in creek since sampling began
5/3/2019	7090/1	Tributary Confluence	24.4	7.4	636	<0.005	**0.6**	**0.1**	3.9	<0.005	**0.088**	
5/3/2019	7090/2	Upstream	22.8	7.2	485	<0.005	**0.7**	**0.2**	3.0	0.007	**0.110**	
5/3/2019	7090/3	Downstream	23.2	7.2	814	<0.005	**0.7**	**0.09**	3.9	0.007	**0.083**	
26/6/2019	7635/1	Tributary Confluence	10.7	7.1	290	**0.029**	0.4	**0.08**	7.5	0.040	**0.068**	Not flowing in from quarry
26/6/2019	7635/2	Upstream	10.4	7.1	265	0.010	0.4	**0.08**	7.1	**0.060**	**0.076**	Creek connected with plenty of water US to DS
26/6/2019	7635/3	Downstream	11.8	7.1	354	**0.025**	0.5	<0.05	6.6	**0.060**	**0.048**	
17/09/2019	8013/1	Tributary Confluence	12.1	7.1	279	0.005	0.5	**0.08**	7.4	<0.005	**0.036**	
17/09/2019	8013/2	Upstream	10.9	7.1	255	<0.005	0.5	0.05	7.1	0.006	**0.03**	
17/09/2019	8013/3	Downstream	10.8	7.1	345	**0.028**	**0.6**	<0.05	6	0.03	**0.027**	

Date	Sample ID	Sample Description	Temp. (ºC)	pH	Conductivity (µS/cm)	Ammonia (mg/L	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Dissolved Oxygen (mg/L)	NO_x (mg/L)	Reactive Phosphorus (mg/L)	Comments
8/01/2020	8433/1	Tributary Confluence	24.3	7.5	644	0.013	**1.2**	**0.1**	4.8	0.01	<0.005	
8/01/2020	8433/2	Upstream	23.3	7.2	524	**0.081**	**1.3**	**0.2**	3.3	<0.005	**0.027**	
8/01/2020	8433/3	Downstream	22.6	7.5	993	**0.094**	**1.5**	**0.07**	3.7	**0.1**	0.013	
21/05/2020	9069/1	Tributary Confluence	15.8	7.2	576	**0.071**	**1.2**	**0.2**	3.9	0.03	**0.064**	
21/05/2020	9069/2	Upstream	15.7	7.3	582	**0.039**	**1.5**	**0.3**	6.1	0.04	**0.12**	
21/05/2020	9069/3	Downstream	16.2	7.1	595	**0.075**	**1.0**	**0.1**	5.6	**0.06**	**0.033**	
Average			17.3	7.4	1,491	0.107	2.4	0.31	6.9	0.036	0.106	**Note: Results in bold where in outside of ANZECC criteria**
Minimum Value			5.9	6.3	255	0.000	0.4	0.00	3.0	0.000	0.000	
Maximum Value			24.4	8.9	3,820	1.300	19.0	1.90	18.9	0.500	0.540	
95% Confidence Interval Minimum Value			15.3	7.2	-	-	-	-	-	-	-	
95% Confidence Interval Maximum Value			19.3	7.5	1,875	**0.188**	**3.8**	**0.47**	8.2	**0.070**	**0.159**	
ANZECC (Criteria for South-East Australia Lowland Rivers Physical and Chemical Stressors)			-	6.5-8.0	125-2,200	0.02	0.5	0.05	-	0.04	0.02	

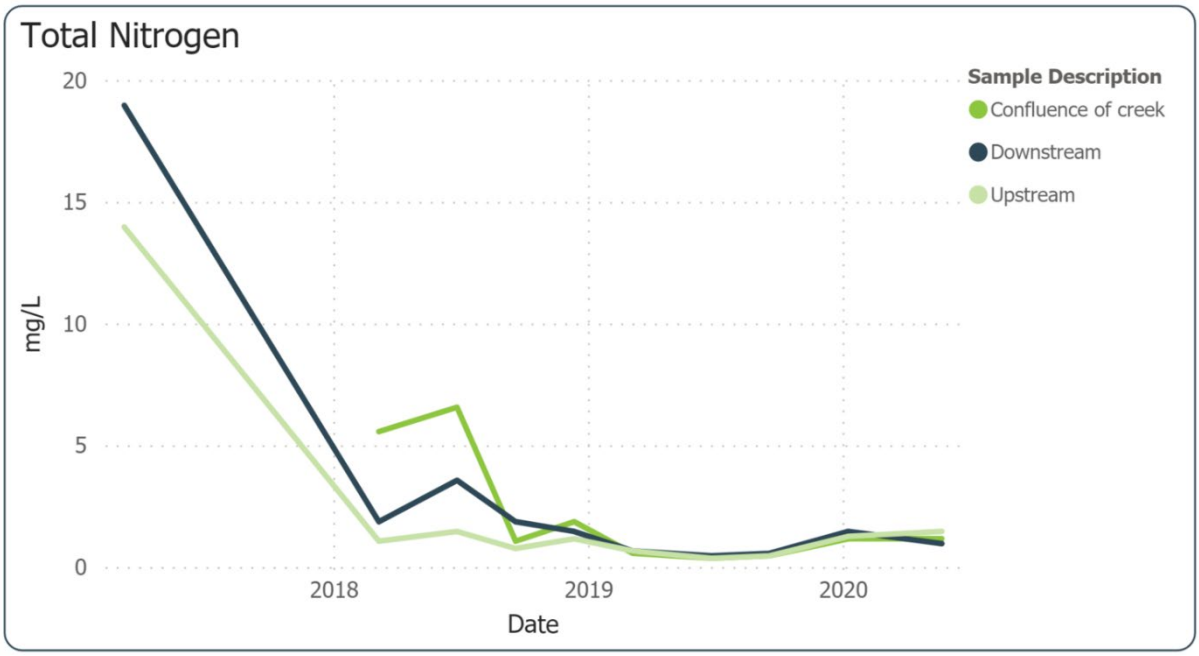
Graph 2: Results for pH of Badgerys Creek



Graph 3: Results for Electrical Conductivity of Badgerys Creek



Graph 4: Results for Total Nitrogen of Badgerys Creek



Graph 5: Results for Total Phosphorus of Badgerys Creek

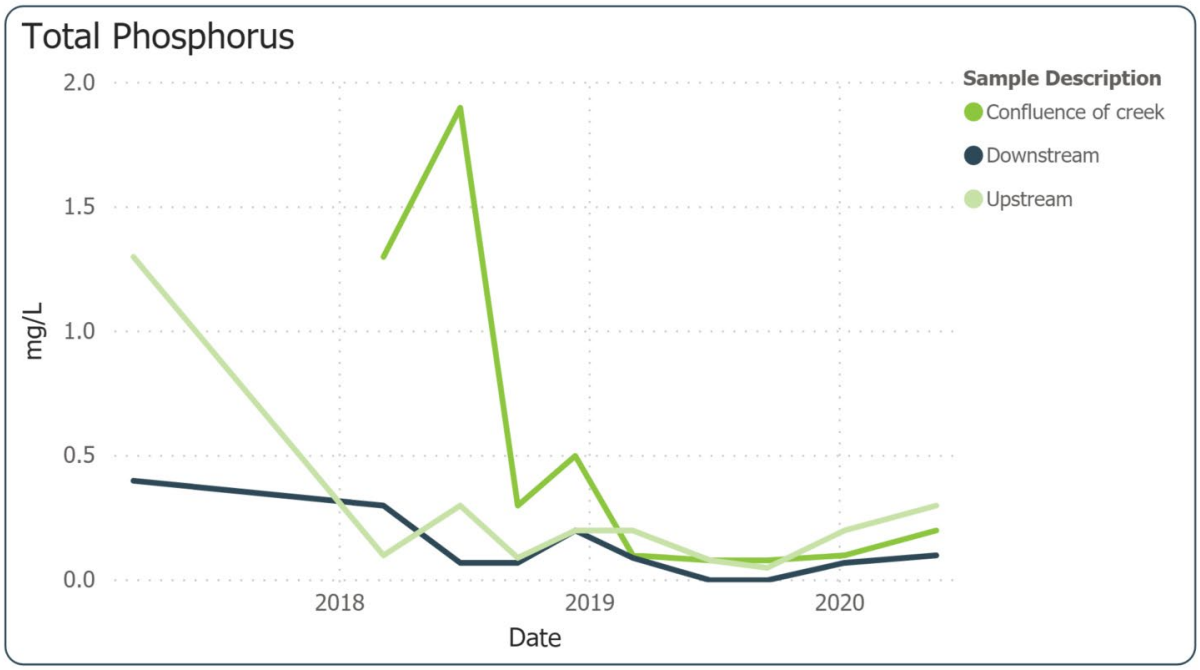


Table 15. *Pit 1 Baseline Water Quality*

Date	Sample ID	Sample Description	Temp. (ºC)	pH	Conductivity (µS/cm)	Comments
2/12/2015	2320/3	Pit 1	26.5	**8.7**	2,170	Clear, not discharging
1/12/2016	3648/2	Pit 1	22.9	**8.8**	2,030	-
6/03/2017	3888/3	Pit 1	24.5	**8.8**	2,080	No Visible Oil and Grease
Average			24.6	8.8	2,090	**Note: Results in bold where in exceedance of ANZECC criteria.**
Minimum Value			22.9	8.7	2,030	
Maximum Value			26.5	8.8	2,170	
ANZECC (Criteria for South-East Australia Lowland Rivers Physical and Chemical Stressors)			-	6.5-8.0	125-2,200	

Table 16. *Pit 2 Baseline Water Quality*

Date	Sample ID	Sample Description	Temp. (ºC)	pH	Conductivity (µS/cm)	Comments
2/12/2015	2320/4	Pit 2	26.6	**8.7**	**3,110**	Clear, not discharging
1/12/2016	3648/1	Pit 2	22.8	**8.8**	**2,890**	
6/03/2017	3888/4	Pit 2	25.5	**8.7**	**3,170**	No Visible Oil and Grease
Average			25.0	8.7	3,060	**Note: Results in bold where in exceedance of ANZECC criteria.**
Minimum Value			22.8	8.7	2,890	
Maximum Value			26.6	8.8	3,170	
ANZECC (Criteria for South-East Australia Lowland Rivers Physical and Chemical Stressors)			-	6.5-8.0	125-2,200	

Table 17. ***Pit 3 Baseline Water Quality***

Date	Sample ID	Sample Description	Temp. (ºC)	pH	Conductivity (µS/cm)	Comments
2/12/2015	2320/5	Pit 3	26.4	**9.2**	2,070	Clear, not discharging
6/03/2017	3888/5	Pit 3	24.0	**9.3**	1,910	No Visible Oil and Grease
Average			25.2	9.3	1,990	**Note: Results in bold where in exceedance of ANZECC criteria.**
Minimum Value			24.0	9.2	1,910	
Maximum Value			26.4	9.3	2,070	
ANZECC (Criteria for South-East Australia Lowland Rivers Physical and Chemical Stressors)			-	6.5-8.0	125-2,200	

As can be seen in *Table 14* above, the background water quality of Badgerys Creek has frequently been in exceedance of nearly all parameters as set out under the ANZECC- *Criteria for South-East Australia Lowland Rivers, Physical and Chemical Stressors*. This is consistent with the highly disturbed nature of the water course and the naturally saline geology in which it lies.

There has been a noticeable drop in the conductivity of Badgerys Creek in the last two monitoring quarters, with results below the ANZECC criteria. A review of BOM rainfall data for the Badgerys Creek Airport revealed that significant rainfall was received in the latter part of 2018 and aerial photography confirms that the creek has transformed from dry in early 2018 to a wet flowing system since late September 2018 to the present. This is likely to have washed accumulated salts from the creek bed downstream and resulted in a less saline environment.

Nutrients have also decreased in response to the higher rainfall and continued flows in the creek, however they still often exceed the ANZECC criteria.

Monitoring will continue in order to assess the changes in the water quality of the creek over different rainfall conditions in order to refine the baseline data and derive performance criteria and trigger values for the site.

Chlorophyll (A) has not been included in the testing regime due to the extensive presence of algae in Badgerys Creek.

4.3. Rehabilitated Area Design Objectives and Performance Criteria

Design objectives and performance criteria for reinstatement of drainage lines on any rehabilitated areas of site as well as control of any pollution from rehabilitated areas of the site are shown in *Table 18*. Design objectives are expected to be achieved progressively as rehabilitation phases are completed. Timing is dependent on the backfilling operations progress and extraction activities, however at the completion of the project, all objectives should be achieved.

Table 18. ***Design Objectives and Performance Criteria for Rehabilitated Areas***

Aspect	Objectives	Performance Criteria
Decommissioning	Sediment runoff to be contained prior to treatment (if required) and release.	Temporary Sediment Dams to be constructed, if required, will be designed to Best Practice according to the 'Blue Book' Criteria for a 5 day 90th percentile storm event. All drains and reinstated drainage lines will be designed for the 1 in 10-year design storm event and do not re-entrain sediment. All spillways will be designed for the 1 in 100-year design storm event and do not re-entrain sediment.
	Domain landform is safe, stable and non-polluting, fit for the purpose of the intended final land use	Landform drains towards final water bodies or temporary sedimentation dams installed during the landform establishment phase. All drains and reinstated drainage lines will be designed for the 1 in 10-year design storm event and do not re-entrain sediment. Slopes are generally no greater than 3m horizontal to 1m vertical or will blend into the surrounding natural slopes. Slope lengths shall not exceed 35m for a 3m Horizontal: 1m Vertical batter before a cross-drain is installed.
Growth Medium Development	Suitable planting medium is established.	Site preparation for topsoiling involves ripping along the contours to a depth of 10 to 20cm. Topsoil is applied to a depth of 5 to 10 cm.

Aspect	Objectives	Performance Criteria
Ecosystem Establishment	The rehabilitated area does not constitute an erosion hazard.	Groundcover including topsoil, vegetation or similar etc. will endeavour to have a C factor of 0.01 or less (equivalent of 70% groundcover by vegetation). The required C factor will be achieved temporarily (whilst awaiting establishment of vegetation) by mulch, spray grass or suitable soil binders. Water Quality meets the objective of Section 120 of the Protection of the Environment Operations Act 1997.
Ecosystem Sustainability	Clean water flows are restored to downslope areas.	Temporary Sediment Dams are removed, if required, and both overland flows and reinstated drainage lines convey clean water. Water Quality meets the objective of Section 120 of the Protection of the Environment Operations Act 1997. Groundcover is maintained at a C factor of 0.01 or less (equivalent of 70% groundcover by vegetation).

4.4. Site Performance Criteria

Baseline criteria for assessment of performance of the Site with regard to the on-site water management system as well as potential off-site impacts on water quality and stream health are shown in *Table 19*. The off-site performance criteria and trigger values for water quality and stream health reflect the degraded environmental values in Badgerys Creek (AECOM, 2010).

Table 19. ***Site Trigger Levels and Performance Criteria***

Aspect	Trigger Level	Performance Criteria
Creeks and Other Water Bodies		
Water Quality in Creeks	Trigger levels are under development and the values listed below are indicative and will be subject to further refinement as more data becomes available. It should be noted that the site at present does not discharge to the creeks and therefore all monitoring to date is for background data gathering purposes. pH: 6.5 – 8.0 (ANZECC). Turbidity <150 NTU* OR Total Suspended Solids (TSS) <50mg/L. Note: it is proposed to use turbidity measurements to monitor the quality of the water in lieu of TSS.	No exceedance of the trigger levels due to site activities.
Stream Health	Visual baseline to be established in close vicinity to the following points: • Discharge Point into Badgerys Creek; • 100 m upstream of the discharge point into Badgerys Creek. • 100 m downstream of the confluence point of Badgerys Creek tributary and Badgerys Creek Establish transect for assessment of changes to channel morphology, including geo-referenced photo point monitoring at each of the three above points Condition assessment of riparian vegetation to establish baseline photo point monitoring at each of the three above points	No significant visual variation from baseline identified in biannual spring and no significant observed variation from baseline vegetation condition identified in biannual spring and autumn monitoring

*The measurement of Turbidity (with a limit of 150 NTU), in place of Total Suspended Solids, is consistent with EPL limits on similar sites operated by PGH. It is expected that Badgerys Creek will apply the same principles to permit the measurement of turbidity on discharge in the EPL, which may include a statistical correlation which identifies the relationship between Turbidity and TSS.

4.5. Surface Water Monitoring Program

A monitoring program to assess performance and effectiveness of the surface water system, including surface water quality flows, sediment and erosion controls, water quality in Badgerys Creek stream health and a plan for responding to any exceedances of performance criteria is documented below.

South Creek has not been monitored to date as current overland flows and overflows from Sediment Dam 3 and Farm Dam 5 are considered clean water. Monitoring will commence as soon as practical both upstream and downstream in South Creek in order to establish baseline data.

4.5.1. Surface Water Management System Effectiveness

The site environmental officer or other delegated PGH representative will undertake regular inspections to assess the integrity of on-site sediment and erosion control systems. This will comprise assessment of permanent structures as well as those temporarily installed by contractors working in specific areas.

Maintenance actions applicable to the Badgerys Creek brick works site include the following:

- Inspection of permanent structures, such as water storage pits and sedimentation basins, are undertaken after rainfall events exceeding 25 mm in a 24-hour period.
- Inspection of temporary structures around construction areas, overburden stripping areas and unconsolidated stockpiles will be undertaken prior to the commencement of works and thereafter following 25 mm rainfall events and on a weekly basis.
- Inspections will include visual observations to check for erosion of surfaces on site as well as sedimentation within the water management network. An erosion and sediment control maintenance check list is provided in *Appendix B.* The checklist will be updated as required to account for changes to the site management.

Where structures or systems are found not to be functioning effectively this will be restored to ensure that they align with requirements outlined in this Plan as well as legislative and best practice requirements documented in *Section 2.0*.

4.5.2. Surface Water Flows, Quality and Stream Health

A monitoring program, presented in *Table 20,* has been developed to meet two objectives as documented in the Project conditions of approval:

- Report on impacts and environmental performance of the project.
- Assess the effectiveness of surface water management actions in meeting their objectives as documented above.

In addition, the surface water will be assessed for similar parameters to the groundwater, as discussed in the Groundwater Management Plan, in order to establish the extent of any potential influences between the ground water and surface water. Sampling and analysis

methods will comply with the NSW EPA Approved Methods for the Sampling and Analysis of Water Pollutants in NSW dated 2004, or as may be updated from time to time.

This monitoring program will be implemented from the approval of this Plan and sustained for the next five years and will be subject to review thereafter.

Table 20. ***Proposed Surface Water Monitoring Program***

Action Description	Location	Performance Criteria	Target	Frequency
Monitor stream health (including water quality) at three locations: a Discharge Point b Upstream from of Discharge Point c Downstream from Discharge Point	Discharge Point into-Badgerys Creek; Upstream of discharge; Downstream of discharge; South Creek Upstream; South Creek Downstream Note: there is currently no discharge to South Creek.	See Section 4.2.4 & 4.4. pH: 6.5 – 8.0 (ANZECC) Turbidity <150 NTU	No deterioration in water quality within Badgerys Creek or South Creek due to site activities.	Quarterly and following rainfall events exceeding 25mm in a 24-hour period.
Monitor surface waters prior to discharge.	Sediment Basins	pH: 6.5 – 8.0 (ANZECC) Turbidity <150 NTU	No deterioration in water quality within Badgerys Creek due to site activities.	As required on discharge.
Monitor geomorphology and riparian vegetation condition in Badgerys Creek	Badgerys Creek	N/A Baseline has not been established to date. To be established as soon as practical.	No deterioration from baseline for riparian vegetation condition and morphology	Quarterly
Monitor on-site rainfall, all water used on site, brought to site, discharged from site, transfers from site and water storage pit levels. This information will be used to update site water balance where deviations occur	Site wide	N/A	N/A	Ongoing

All monitoring, testing and assessment will be undertaken in accordance with:

- Australian Guidelines for Water Quality Monitoring and Reporting (ANZECC, 2000)
- Australian Standard AS 5667.1998 Water Quality Sampling.

Monitoring documentation will include:

- Sample dates
- Field sampling records
- Instrument calibration records
- Sample of chain of custody records
- Analytical requests.

All laboratory analysis will be undertaken at a NATA accredited laboratory under chain of custody.

5.0 Site Water Balance

5.1. Overview of Inflows and Outflows

An overview of annual inflows and outflows to the site is shown in *Table 21 and is based on data supplied in the AECOM 2010 report* [Ref. 1].

Table 21. ***Existing Site Water Inflows and Outflows Per Annum***

Inflows	ML per annum	Outflows	ML per annum
Initial system storage	1,140	Evaporation from water body surfaces	187
Direct rainfall received over whole of the site	1,238	Seepage Losses (assumed to be negligible)	Nil
Groundwater inflows (negligible)	Nil	Dust suppression	Nil
Potable water (for amenities)	3	Spills (from Pits 1, 2 and 3)	Nil
		Potable water though the sewer system (for amenities)	Nil
		Site runoff (surface water not retained in dams including undisturbed areas)	73
		Discharge	Nil
Total	2,381	Total	271
Net Water Remaining		**2,110 ML**	

Table 21 provides an approximation of the annual water balance based on the following assumptions.

- The initial system storage has been taken from the Crossmuller report [Ref. 3];
- The historical annual rainfall of 884mm [Ref. 1] has been applied to the whole site;
- Potable water usage has been reduced from that estimated in the AECOM 2010 report due to the continued closure of the brickworks and presence of only maintenance staff on the site;
- Evaporation has been averaged using AECOM 2010 data and taken to be 3mm per day over the current surface areas of the water bodies;
- Dust suppression usage has been estimated as 30KL/day for 5 days a week per annum of potable water when the site is operational;
- Site runoff includes surface water runoff into Badgerys and South Creek over the undisturbed areas that is considered clean water;

- Site runoff also includes clean water overflow from the Sediment Dam 1 and 2 system catchment and the Dam 3 system catchment which includes the concrete hardstand areas and roof area of the non-operational brickworks that do not contribute to the sediment load. These dams have been assumed to be at full capacity for the calculation and all surface water received overflows offsite; and
- Rainfall captured within Pits 1, 2 and 3 remains on site and there are no discharges at present off-site from these dams.

It is clear from Table 21 that there is currently not a deficit of water available to the site.

As a result of the Enforceable Undertaking with NRAR, Pits 1, 2 & 3 will be isolated from receiving surface water and dewatered. Dewatering is estimated to be at a rate of 100,000L/hr 24 hours a day, seven days a week to Badgerys Creek or alternatively to the WSA at up to 10ML per day. The sediment basins to be constructed to capture the site surface water will discharge water to Badgerys Creek under EPL conditions and will not retain water on the site. The following water balance investigates the volumes of water expected to be held on site during the proposed backfilling and extraction operations.

The inflows and outflows will be reviewed once extraction operations commence.

5.2. Ten Year Water Balance

A water balance has been undertaken for the development as proposed in Mod 3 and 4 (the Preferred Project). In this scenario Pits 2 and 3 are to be emptied into Pit 1 to allow for extraction in Pit 3 and backfilling of Pit 2. Pit 1 will then be transferred to the WSA or discharged to Badgerys Creek. Sediment Basins A and B will be constructed and will capture water over the disturbed areas, isolated from the Pits, with final discharge to Badgerys Creek. Water captured over the Pits, once emptied will be transferred to the Basin system for discharge whilst backfilling operations are undertaken.

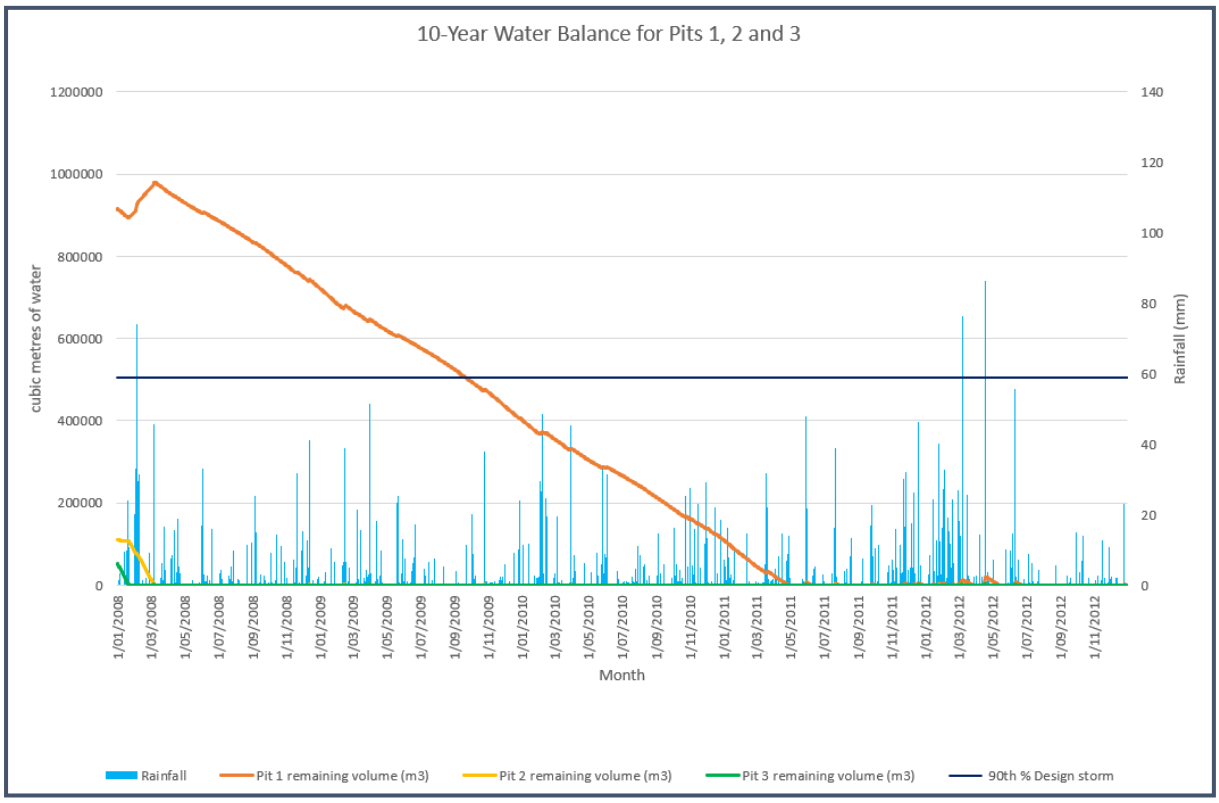
The water balance was modelled over a 10-year critical period from 2008 to 2017 that includes average and both wet and dry conditions. Assumptions made for the water balance model are listed below.

- The initial system storage has been taken from the Crossmuller report [Ref. 3];
- The average rainfall over the critical 10-year period is 909mm and compares with the historical annual rainfall of 884mm [Ref. 1];
- Daily evaporation has been taken from the Prospect Reservoir (BOM station 067019). The pits are assumed to have vertical sides for the purposes of calculating evaporation rates;
- Dust suppression usage has not been included as it will utilise potable water;
- Surface water runoff into Badgerys and South Creek over the undisturbed areas that is considered clean water are not included;
- Pit 1 will be dewatered at an average rate of 29,000L/hr (noting that the maximum pump rate of 10ML/day may not apply each day in practice), 24hrs/day, to the WSA

over a 3yr period to as the water is required for their operation. Alternatively Pit 1 will be dewatered to Badgerys Creek @ 100,000lt/hr, 24hrs/day to Badgerys Creek;

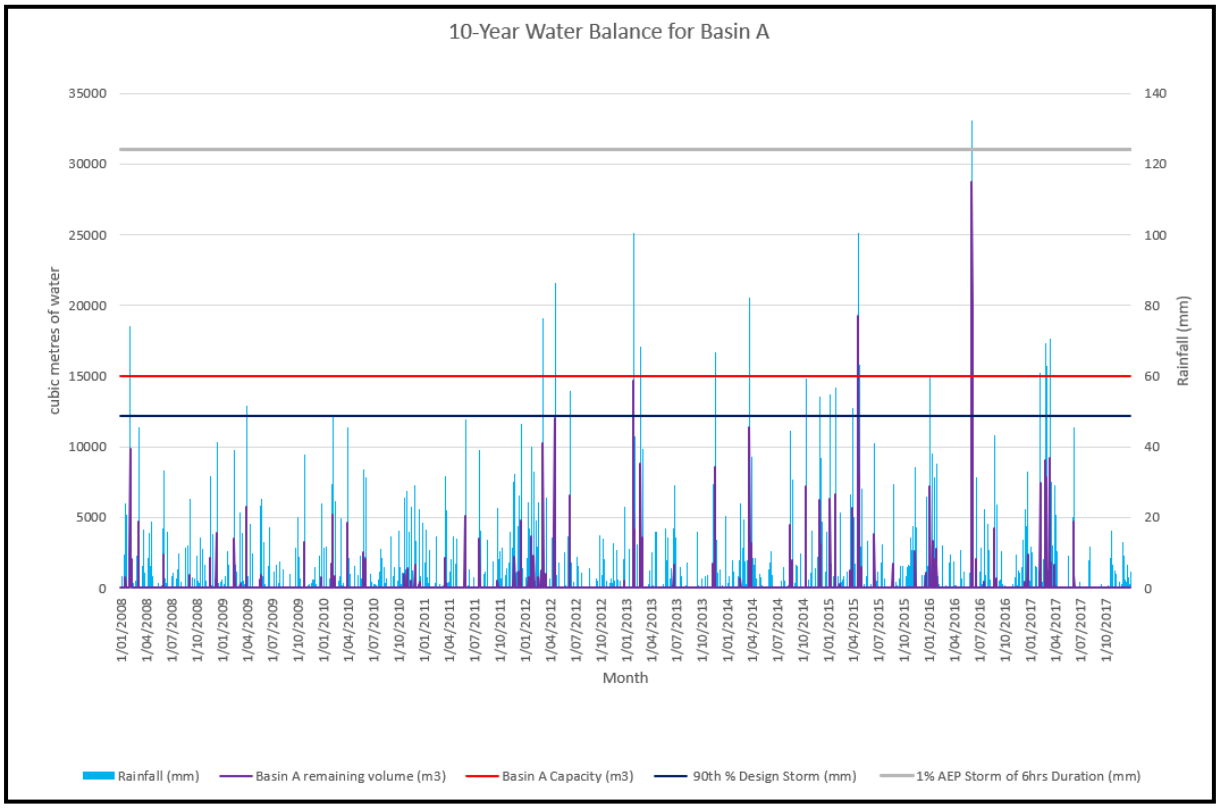
- Pit 2 and 3 will be dewatered at a rate of 100,000L/hour, 24 hours per day, to Pit 1, concurrently with dewatering Pit 1. Pit 3 will be dewatered first, then Pit 2;
- Water from Sediment Basin A will be transferred to Sediment Basin B as required at a rate of 6000L/min, 24 hours per day;
- Water from Sediment Basin B will be transferred to Badgerys Creek as required at a rate of 17,000m^3 per day i.e. the dam is emptied over a 24-hour period;
- Once Pit 3 is dewatered, subsequent rainfall captured in the Pit will be transferred to Sediment Basin A and transferred as above;
- Once Pits 1 and 2 are dewatered, subsequent rainfall captured in the pits will be transferred to Sediment Basin B for treatment and discharge; and
- The catchments for each pit/basin have been taken from the *High Definition Design Pty* Ltd design drawings **Ref. 5** (see *Figure Eight*) and are as follows;
    - Pit 1- 24.1Ha;
    - Pit 2- 7.9Ha;
    - Pit 3- 5.9Ha;
    - Sediment Basin A- 26.4Ha;
    - Sediment Basin C- 0.9 Ha (dam surface area only).

Graph 6: Dewatering Water Balance Modelling for Pit 1,Pit 2 and Pit 3

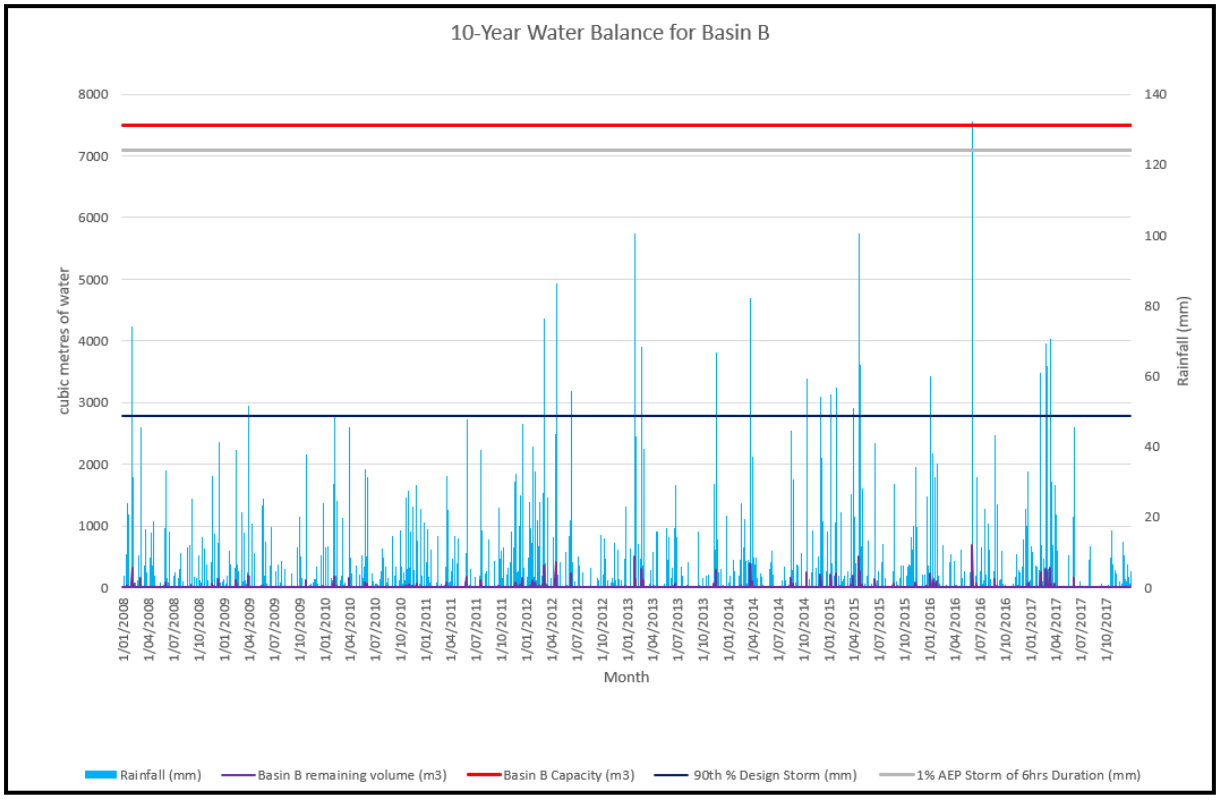


As can be seen from Graph 6: Dewatering Water Balance Modelling for Pit 1,Pit 2 and Pit 3, dewatering of Pits 2 and 3 will take several months each and Pit 1 will take approximately three years based on rainfall for the critical period between 2008 and 2017.

Graph 7: Sediment Basin A 10-year Water Balance



Graph 8: Sediment Basin B 10-year Water Balance



As can be seen from the graphs above, Sediment Basins A and B are not expected to overtop in rainfall events below the 5-day, 90th percentile design storm. Where the modelling suggested they overtop, rainfall over a 2-3-day period was in exceedance of 230mm, well above the 124mm of a 1%AEP. The frequency of overtopping is well below the Blue Book acceptable criteria of 2-4 uncontrolled overflows per year.

5.3. Water Use On-Site

Water usage for the Badgerys Creek quarry was reported to be approximately 24.5 ML pa projected to increase by up to 30ML pa over the next 5 years (AECOM, 2010). The majority of this increase in usage was associated with demand from the brick making facility. At present the usage is very low as the brickworks remains closed and extraction has not commenced.

Potable water is used in the brick making process. It should be noted that at present the brickmaking facility is not operational and has therefore not been accounted for in the existing site water balance in *Table 21*. Potable water is used for drinking water, toilet flushing and other amenities. As the brick facility is not operational the potable water used on site is minimal with only care and maintenance staff utilising the facilities.

Dust suppression needs will be met by potable water in the initial stages of the development.

A summary of proposed water usage is presented in *Table 22*.

Table 22. *Proposed Water usage on Site*

Usage Activity	Source	Approximate water usage (KL/day)
Dust Suppression	Potable Water	30
Brick making process	Potable Water	22
Offices and amenities	Potable water	12

5.4. Water Sources and Security of Supply

The existing site contains approximately 57 hectares of pervious land with the remainder of the site impervious (AECOM, 2010). Water supply storage facilities, including sedimentation dams as well as surface water flows are presented in *Figure Three* based on current operations for the site. On-site water storage and supply structures applicable to the 5-year horizon for this Plan are presented in *Table 23.*

Table 23. ***Proposed Water storage and supply structures and on-site water flows***

Water Storage and Supply Structures	Water Flows
Sediment Dam 3	Receives roof drainage from the brick making facility flows via the gutter, downpipe, external perimeter open drain, pipe, thence a grass swale to Sediment Dam 3.
Sediment Dam 1 and 2	Sediment Dam 1 overflows into Sediment Dam 2. The catchment of Sediment Dam 1 includes the area around the brick making facility, gate house, pallet storage area and a small overland flow component.

Potable water will be utilised to supply water needed for the brickworks, offices and dust suppression activities. A Water Access Licence (WAL) may be sought to supply dust suppression water from the Sediment Dams as the development proceeds.

5.5. Measures for Minimisation of Potable Water Use On-Site

As the site does not currently hold a Water Access Licence (WAL) for the re-use of surface water on the site and in view of the Enforceable Undertaking requirement to dewater the pits, the use of potable water is unavoidable. Outside of the EU works, all dirty water will be treated, if required, and returned to the downstream environment. It is not intended to be reused on the site. This may be reviewed as site requirements change.

5.6. Reporting Procedures

Any changes to the current site water balance will be presented in the Annual Rehabilitation Report (ARR). Provisions will be made to ensure that the water balance is updated on an annual basis or when appropriate. Potential options for minimisation of potable water use on site will also be reported in the first ARR.

Table 24. *Trigger Action Response Plan*

Rehabilitation Threat	Potential Adverse Outcome	Trigger level	Actions to be implemented	Evidence / Reference
Overland flows from clean water catchments on the site are not consistent with the baseline ecological, hydrological and geomorphic conditions of the surrounding environment.	Significant variation from baseline riparian vegetation condition.	Significant observed variation from baseline vegetation condition identified in biannual spring and autumn monitoring (to be undertaken). *Note: Trigger levels will be developed once baseline data has been obtained.*	• Assess the variation and determine the root cause of the variation • Develop and implement a response management plan in consultation with suitably qualified experts, DPIE and OEH if the root cause is determined to be due to site activities.	
	Significant variation in baseline channel morphology.	Significant visual variation from baseline identified in biannual spring (to be undertaken). *Note: Trigger levels will be developed once baseline data has been obtained.*	• Assess the variation and determine the root cause of the variation • Develop and implement a response management plan in consultation with suitably qualified experts and DPIE if the root cause is determined to be due to site activities.	

Rehabilitation Threat	Potential Adverse Outcome	Trigger level	Actions to be implemented	Evidence / Reference
Sediment dams overtop into the Badgerys or South Creeks.	The site is a source of water pollution adversely impacting aquatic ecology.	Sedimentation Dams observed to be unable to contain the design storm event i.e. 90th percentile 5-day storm event. *Note: dams will have indicators installed to record the trigger capacities.*	• Re-use a much water as possible on site i.e. dust suppression, water revegetation etc once appropriate water licencing is in place. • Flocculate the Sediment Dam at risk of overtopping with approved methods to reduce sediment load in water that may potentially spill off-site. • Variation of the EPL to include off-site discharge where appropriate. • Liaise with EPA and DPIE to seek advice on potential actions to be taken.	Reports to EPA and DPIE. Annual Review documents. Approved MOP. This Water Management Plan.
	Significant variation from baseline riparian vegetation condition.	Trigger Levels are yet to be determined as no baseline data available yet.	Actions to be implemented are yet to be determined.	To be determined.
	Significant variation in baseline channel morphology.	Trigger Levels are yet to be determined as no baseline data available yet.	Actions to be implemented are yet to be determined.	To be determined.

Rehabilitation Threat	Potential Adverse Outcome	Trigger level	Actions to be implemented	Evidence / Reference
The landform, whether through extraction or rehabilitation activities, is not properly protected from erosion.	The landform is a source of pollution due to sediment entrainment adversely impacting aquatic ecology.	Surface water monitoring records indicate that water quality levels are outside the performance criteria. Visual inspection indicates that the final landform is the source of unacceptable levels of sedimentation or is actively eroding.	• Site manager to identify site of erosion and remediate through additional\ earthworks, soil works including addition of ameliorants, supplementary revegetation or another stabilisation method. • If the above is unsuccessful, a suitably qualified professional in sediment and erosion control will be engaged to prepare and assessment report and recommendation	Managing Urban Stormwater 'Blue Book' 2004 CPESC Report.

6.0 Groundwater Management Plan

6.1. Pit Water Management Measures

Water collected within the current excavations will be managed in accordance with the EU, the Dewatering Infrastructure Plan and the Dewatering Management Plan. Once emptied, any surface water or groundwater seepage collected within the pits will be managed in accordance with the Surface Water Management Plan (SWMP). Pits 1 and 2 will be backfilled and potential groundwater seepage will be eliminated.

6.2. Depth of Extraction

A registered surveyor will mark out the boundaries of the approved extraction areas. These boundaries will be marked on site using large pegs with high visibility markings and a written explanation as to what they represent (eg NE cnr Pit 3) prior to the commencement of quarrying in each extraction area.

Within these extraction areas, PGH will not extract any extractive materials or carry out any work in the extraction area below 35 m below the pre-existing natural surface of the ground, other than construction of approved bores or in-pit sumps. The depth of extraction will be confirmed annually via survey.

6.3. Spill Management Measures

Measures will be implemented to provide for the appropriate storage of fuels and hazardous chemicals, implementation of appropriate work procedures as well as regular inspections and maintenance of equipment and plant to minimise potential for contamination of groundwater associated with spills.

Fuels and hazardous chemicals will be contained and bunded in accordance with relevant Australian Standards. Maintenance of equipment and plant will be undertaken only on sealed, bunded hard stands, or off-site. Spill kits will be located appropriately around the site and within select mobile equipment, and the use of these included in site inductions.

The site Maintenance Manager (within the brick manufacturing area) and the Quarry Manager (within the active excavations) will be responsible for the implementation, use and up-keep of these management features, and for undertaking inspections at least annually, and before and after adverse storm events.

7.0 Groundwater Monitoring Program

A monitoring program to determine baseline characteristics of the alluvium and associated surface water source near the proposed extraction areas has been undertaken. The purpose of this monitoring program was to inform the Alluvial Aquifer Assessment (see *Appendix I*) which was completed in January 2019, and determine impact assessment criteria against which the performance of the project can be assessed.

7.1. Background Monitoring

A total of 8 standpipe piezometers have been installed to augment monitoring installations in place from previous programs (5 boreholes were located in March 2018), as shown on *Figure Three*. Drilling was undertaken by Highland Drilling using a track mounted multi-purpose rig set up with 110mm auger flighted drill rods and air core rods utilising a 110mm air hammer with an auxiliary compressor. Monitoring installations are 50mm Class 18 tubular PVC with screened intervals.

Paired standpipes were installed at multiple locations which aims to investigate separation of groundwater or the existence of perched water tables between the shallow regolith and the base levels of the proposed excavations (near to the base of the Bringelly Shale). The program also aims at investigating the presence of alluvium that may be associated with either South Creek or Badgerys Creek. (Fulton, Jan 2019)

Table 25. ***Installed Groundwater Monitoring Bores***

Borehole Description	Easting	Northing	Depth Installed (m)	Screen Interval (m)	Surface Elevation (mAHD)
MW1	292234	6246988	31.55		63.99
MW2 (NE dam)	291981	6247251	27.46		64
MW3A	292325	6247237	9.3		64
MW3B (Concrete Pad)	292320	6247213	8.36		64
BW1A	291741	6247174	8	5 – 8	56.06
MW4 (NW corner Dam)	291752	6247168	24.28		56.43
BW2A	291911	6247442	8	5 – 8	56.29
BW2B	291914	6247440	33	27 – 33	56.40
BW3	292585	6247552	33	27 – 33	64.10
BW4A	293602	6247294	6	3 – 6	49.04
BW4B	293602	6247295	33	27 – 33	49.06
BW5A	293098	6246559	7	4 – 7	45.56
BW5B	293098	6246561	33	27 – 33	46.51

MW Bores – No record of bore construction. Depth installed measured onsite.

Groundwater level loggers have been installed in five monitoring bores to allow baseline trends to be collected. A baseline water quality sampling and testing program has

commenced. This background data will be presented annually to the relevant parties in accordance with *Section 7.0*.

7.2. Groundwater Inflows to Quarrying Operation

The EIS determined that the maximum depth of extraction of 35 metres is into very low permeability rock and that no significant groundwater would be encountered, as has been previous experience at the site. Groundwater in the top 35 metres is considered a fractured bedrock aquifer (associated with fractures rather than within the rock itself). The Hawkesbury Sandstone Aquifer lies more than 100 metres below the surface and is not threatened by the development.

The project has a current groundwater licence allocation of 25 ML per annum (WAL24346). Groundwater inflows into Pit 1 through the Wianamatta Shales from the Sydney Basin Central Groundwater Source have been predicted to be 21 ML per annum in the Groundwater Assessment (Fulton, Jan 2019), which is less that the WAL allocation. However, Pit 1 will be backfilled in accordance with the Mod 3 & 4 consent and will not contribute significantly, if at all, to groundwater inflows. Pit 3 is the only consented extraction area and is not expected to encounter significant groundwater at the consented depth of extraction of 35 metres below the pre-existing natural surface of the ground. The Pit Inflow modelling in the Ground Water Assessment (Fulton, Jan 2019) predicted that with the filling of Pit 1, the contribution of Pit 3 and 4 (approximately the amended Pit 3 area in Mod 3 & 4 consent) inflows would be less than 25 ML per annum.

Notwithstanding the above, any visible flows observed during excavation activities will be measured by capturing a measured volume over a known time period; for example, the time taken for a 25L bucket to be filled. If the seepage is too small to be collected, it shall be recorded using photography and GPS location. The dates and period of time for which the flow is observed will also be recorded. If the flow rate changes during the time period observed, the rate will be measured again.

Pumping from any excavation will be recorded in a logbook. Records will include date, time of commencement and cessation of pump, flow rate and/or water level at a reference point in the water source.

This data coupled with rainfall and evaporation from the preceding 12 months will be used to update the Site Water Balance (as described in the Soil and Water Management Plan). Any differences between the predicted model and the actual results would be used to estimate the groundwater inflows.

This will be reported as outlined in *Section 10.0.*

7.3. Groundwater Levels

Quarterly groundwater quality monitoring of the bores will be undertaken for the analytes listed in *Section 7.4.* Groundwater levels will continue to be continuously logged in the five bores where automatic loggers have been installed. Levels in other bores will be measured at least quarterly.

7.4. Groundwater Quality

7.4.1. Groundwater Assessment (Fulton 2019)

Groundwater quality testing and criteria has been informed by the Groundwater Assessment Ref. 7. It includes quarterly testing of groundwater monitoring bores, in-pit collected waters, and surface creek waters so that collected sources can be estimated. Parameters include:

- pH, EC and total dissolved solids (TDS);
- Major cations and anions;
- Dissolved metals (Aluminium, Arsenic, Chromium, Copper, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Zinc, Boron, Iron); and
- Petroleum hydrocarbons

Analysis of the groundwater from the Groundwater Assessment is reproduced below.

Table 26. ***Groundwater Quality Summary from the 2019 Groundwater Assessment***

Table 3-4: Analytical Groundwater Chemistry Results

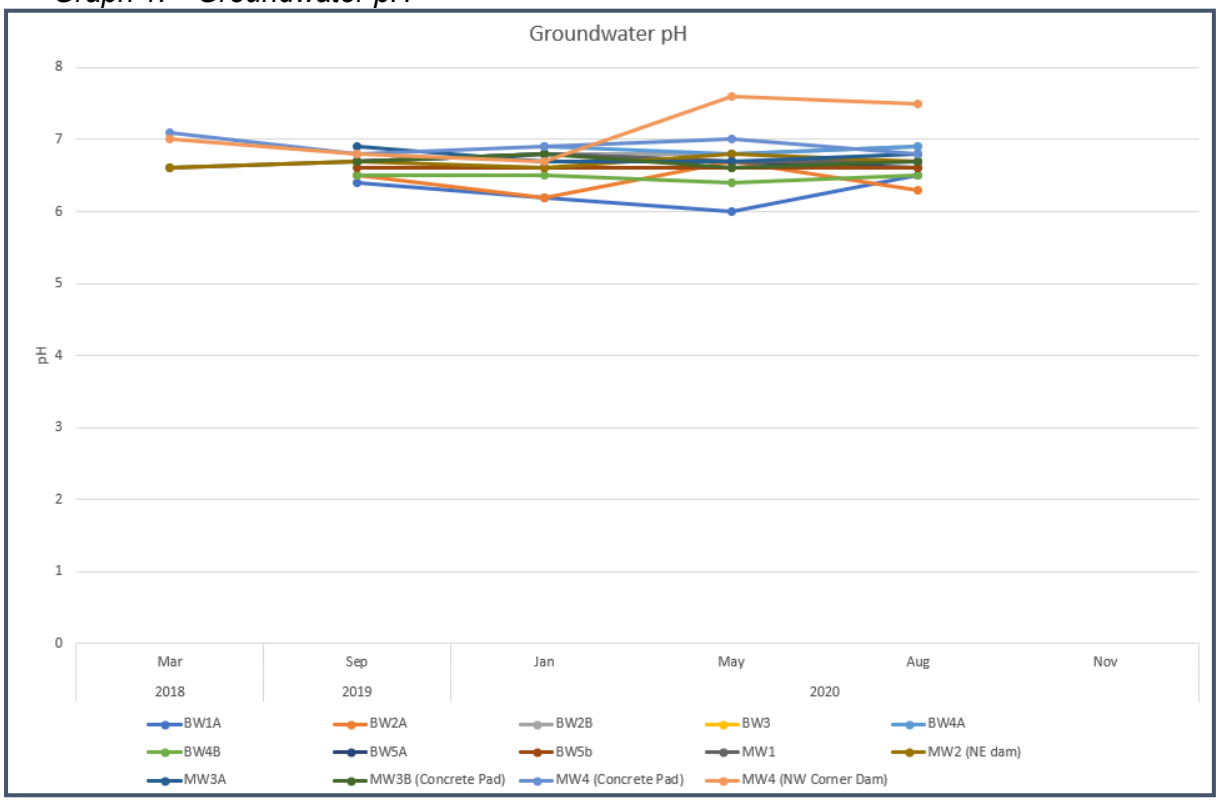
	BC1	MW4	BC2a	BC2b	BC3	BC4a	BC4b	BC5b	MW1
pH	6.97	7.3	6.92	7.12	7.1	7.68	7.05	7.14	7.12
Electrical Conductivity µS/cm	28800	24900	31600	21700	23100	20000	20700	21100	10200
Total Dissolved Solids	17200	18200	24700	13300	13700	13800	13000	14200	5130
Hydroxide ($CaCO_3$)	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate ($CaCO_3$)	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	256	675	224	815	637	526	799	646	469
Total $CaCO_3$	256	675	224	815	637	526	799	646	469
Sulfate as $SO4^-$	1320	1050	816	341	53	210	<1	<1	398
Chloride	10400	8600	11500	7490	8290	6940	7290	7540	3120
Calcium	112	254	103	429	486	232	483	671	110
Magnesium	1170	912	1340	388	411	453	311	328	291
Sodium	5070	4300	5570	4020	4110	3550	3770	3670	1600
Potassium	10	15	3	55	71	11	65	71	23
Aluminum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	<0.001	0.001	<0.001	0.044	0.005	<0.001	0.009	0.003	<0.001
Chromium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	0.008	0.002	0.082	<0.001	<0.001	0.001	<0.001	0.364	0.017
Lead	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	4.02	0.436	0.662	0.742	0.541	1.92	0.2	0.252	0.265
Molybdenum	0.002	<0.001	<0.001	0.001	0.002	0.001	<0.001	0.002	0.004
Nickel	0.106	0.004	0.024	0.003	0.002	0.061	0.003	0.082	0.042
Selenium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silver	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	0.141	0.015	0.027	<0.005	<0.005	0.207	0.03	0.081	0.015
Boron	<0.05	0.06	<0.05	0.19	0.15	0.14	0.07	0.06	0.08
Iron	<0.05	<0.05	<0.05	0.08	0.66	<0.05	0.78	<0.05	<0.05

The Groundwater Assessment found that all the groundwaters tested were below applicable criteria with the exception of Iron and Manganese (highlighted in red).

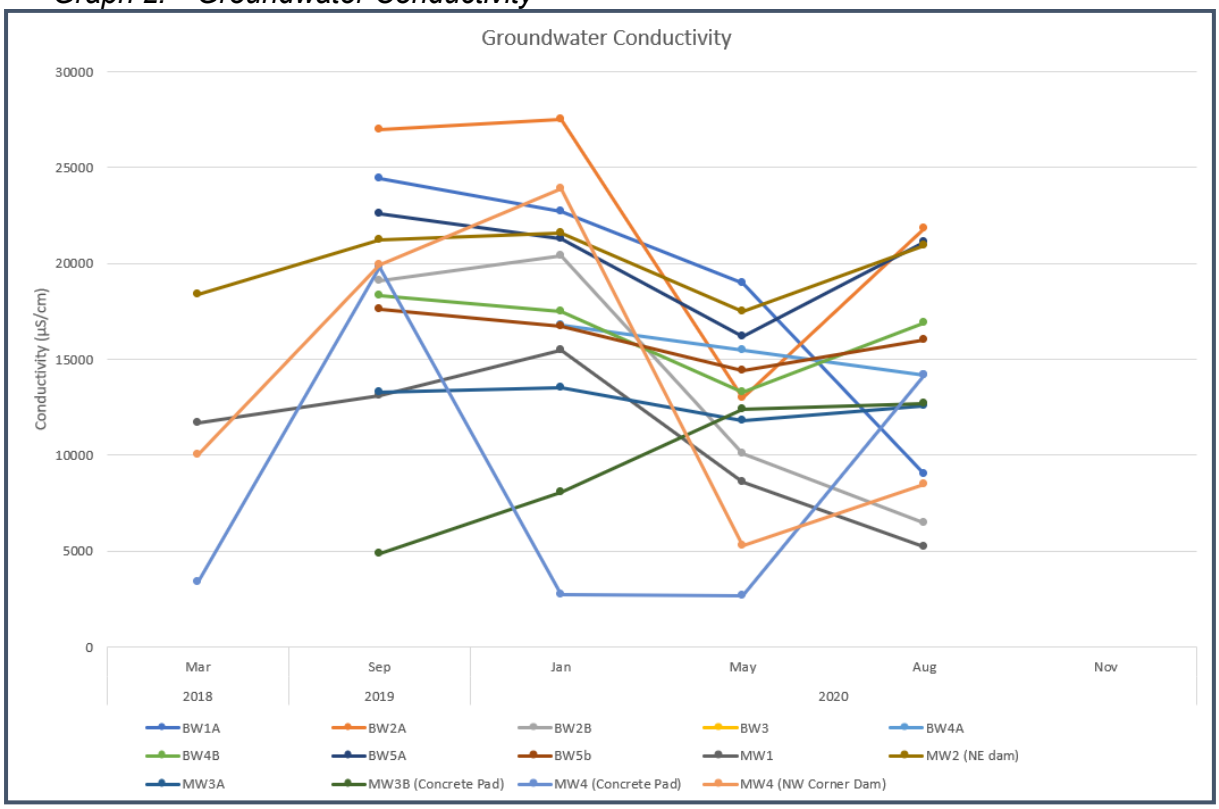
7.4.2. Quarterly Monitoring

Further monitoring has been undertaken quarterly and the results are graphed below.

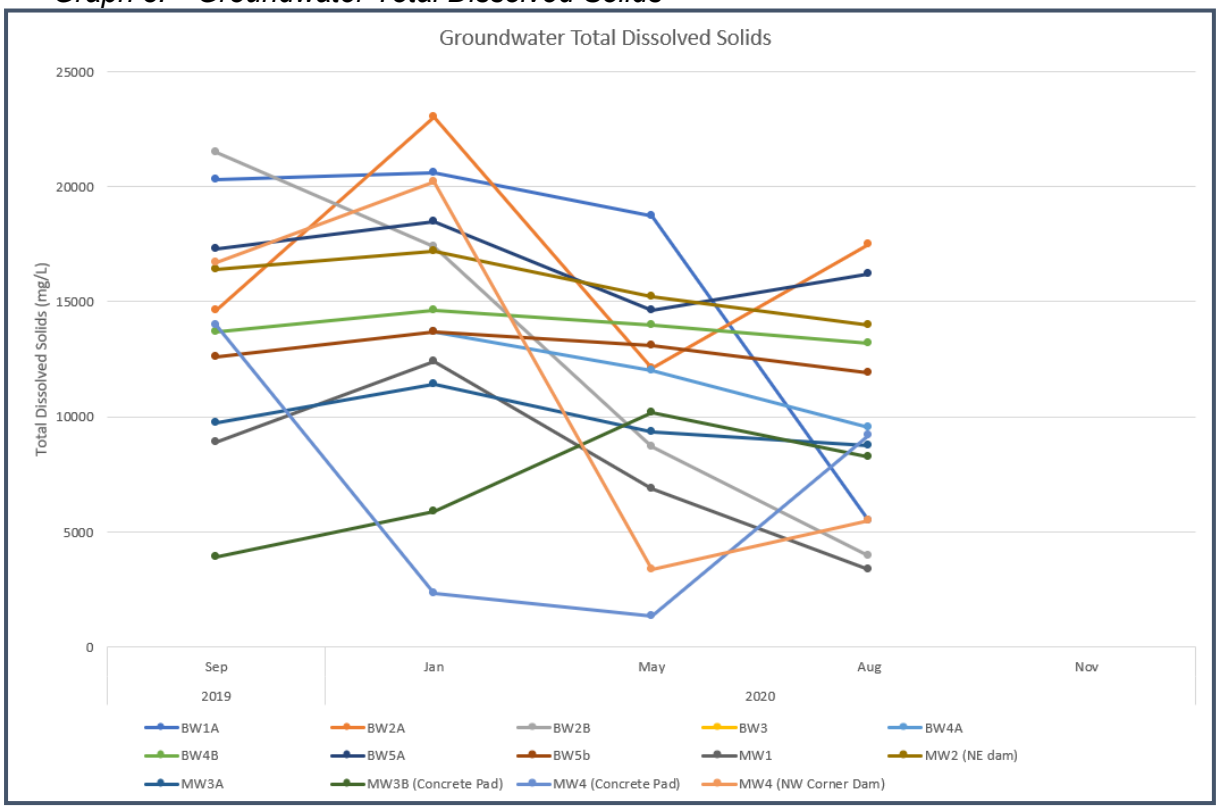
Graph 1. Groundwater pH



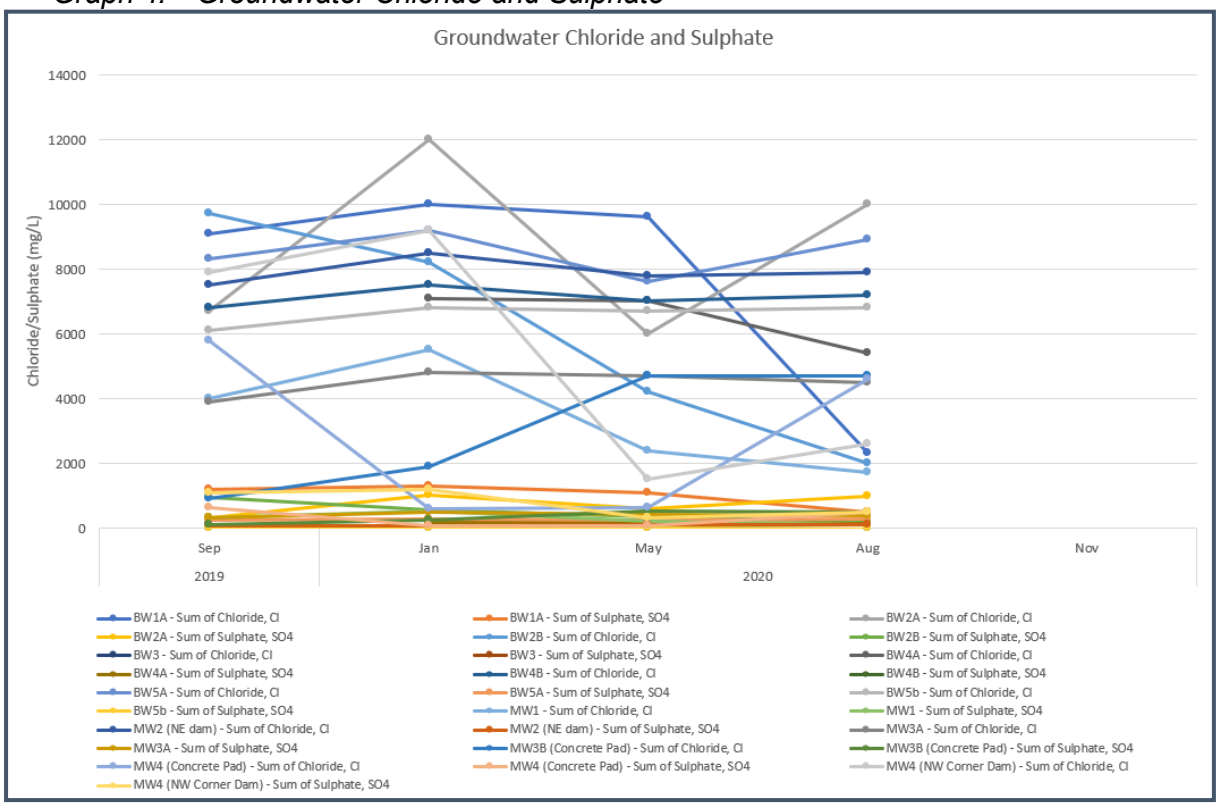
Graph 2. Groundwater Conductivity



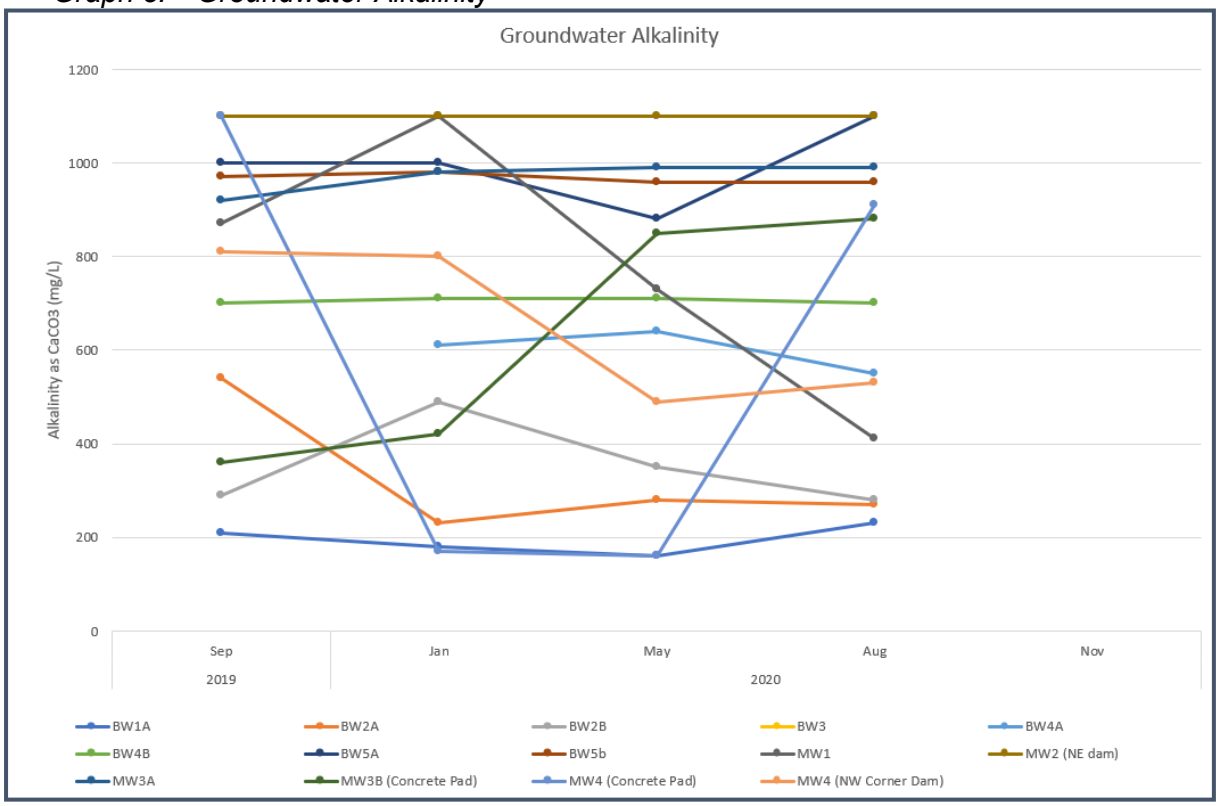
Graph 3. Groundwater Total Dissolved Solids



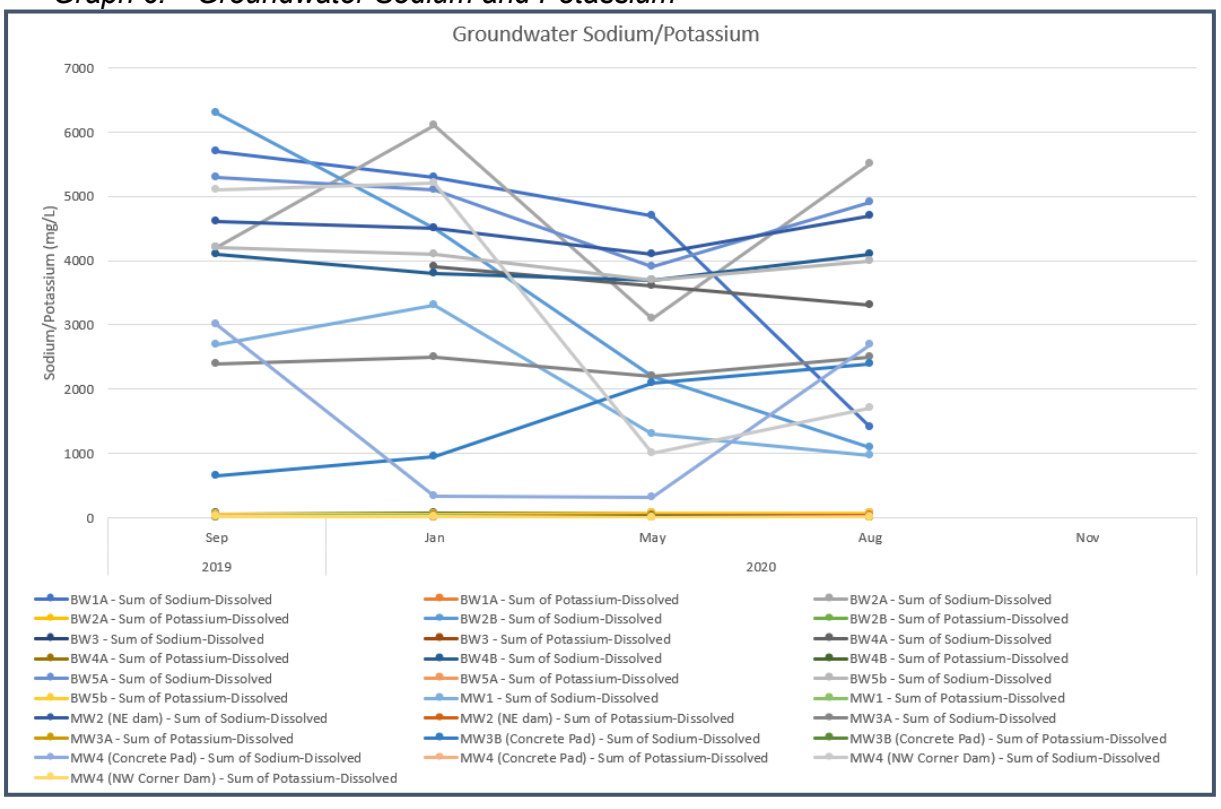
Graph 4. Groundwater Chloride and Sulphate



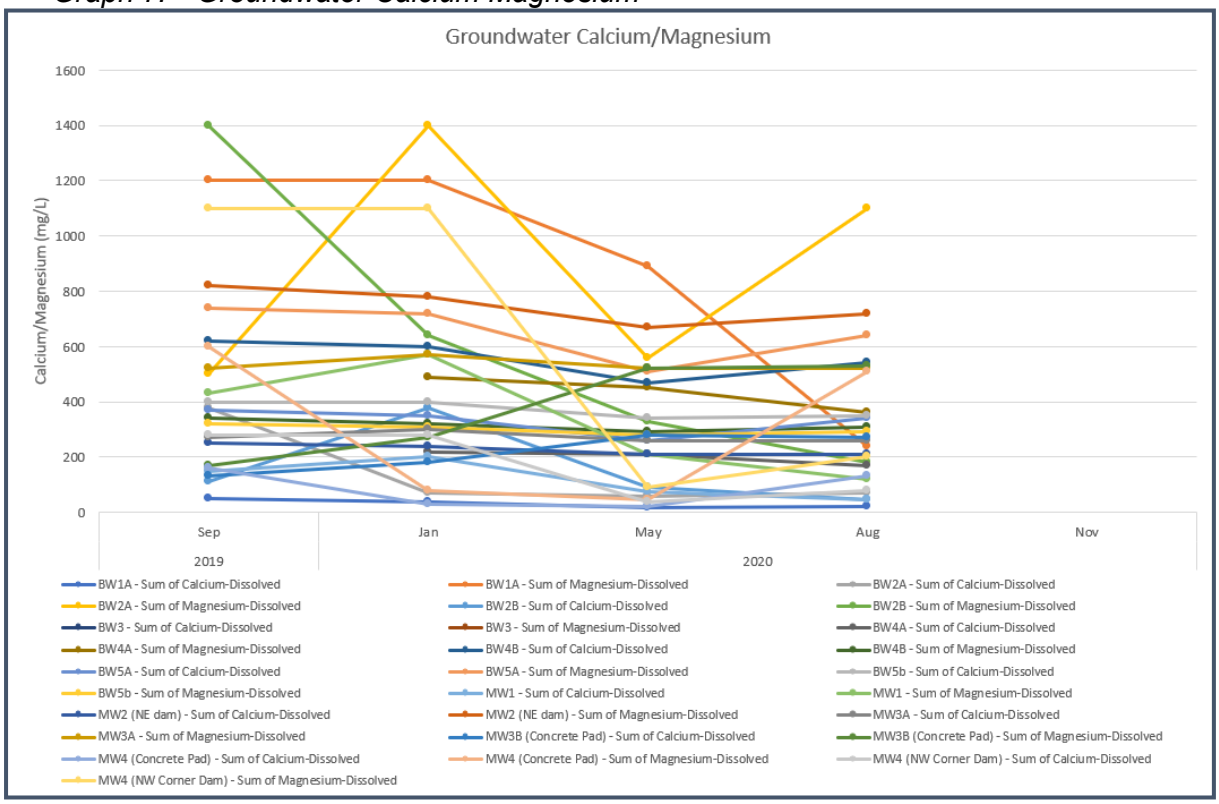
Graph 5. Groundwater Alkalinity



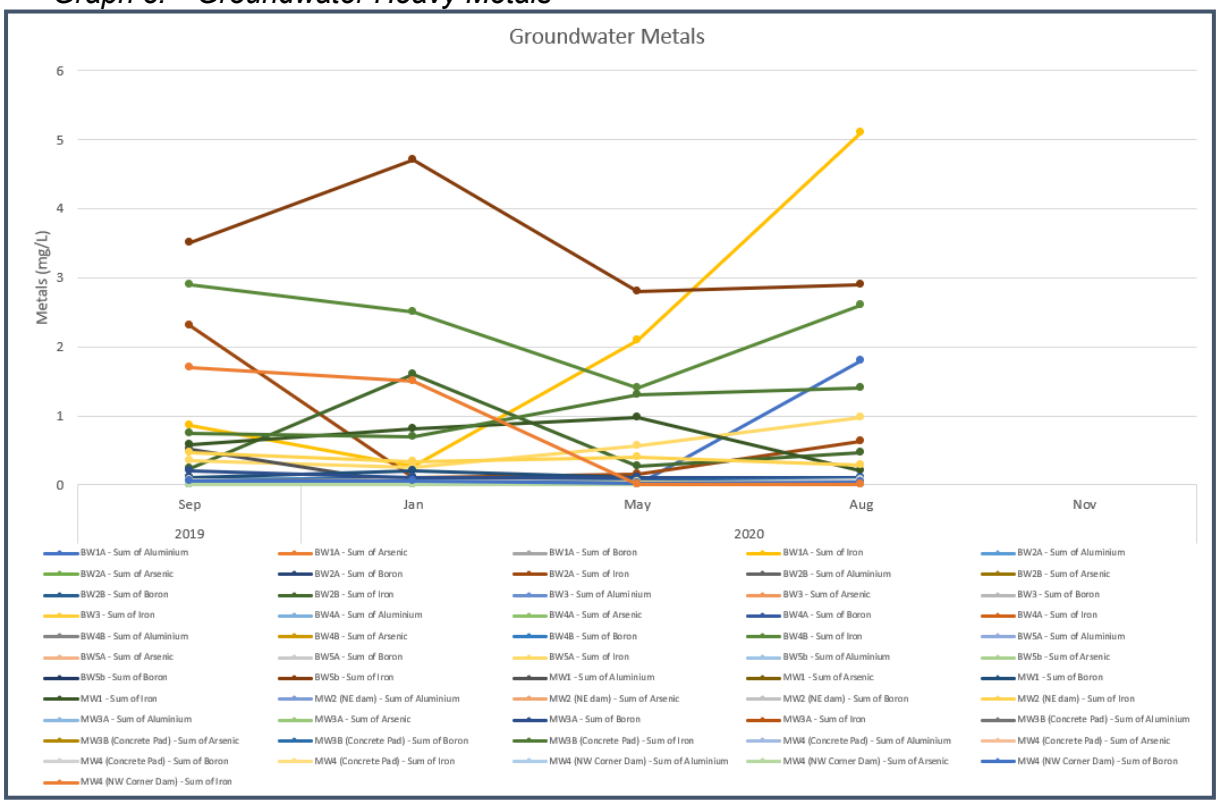
Graph 6. Groundwater Sodium and Potassium



Graph 7. Groundwater Calcium Magnesium



Graph 8. Groundwater Heavy Metals



The results of the quarterly monitoring have been compared to The Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018 (ANZG) for 95% protection of aquatic ecosystems. The results are generally within the guideline values, where they are provided. Several metal species exceeded the guideline values. Aluminium is exceeded in MW1 and BW1a on a single occasion each. Copper was repeatedly found in all bores at a level above the criteria, as was Zinc. Manganese was exceeded in bores BW4a and BW1a on occasion, both of which are adjacent to South Creek and Badgerys Creek respectively. Similarly, Nickel is in exceedance a number of times in BW1a, BW2b, BW2a, BW4a, which are all located adjacent to the creeks and distant from the manufacturing facility. These exceedances are attributed to naturally occurring geological strata impacts to the groundwater.

Monitoring for the above analytes will continue on a quarterly basis.

7.5. Alluvial Aquifer Assessment

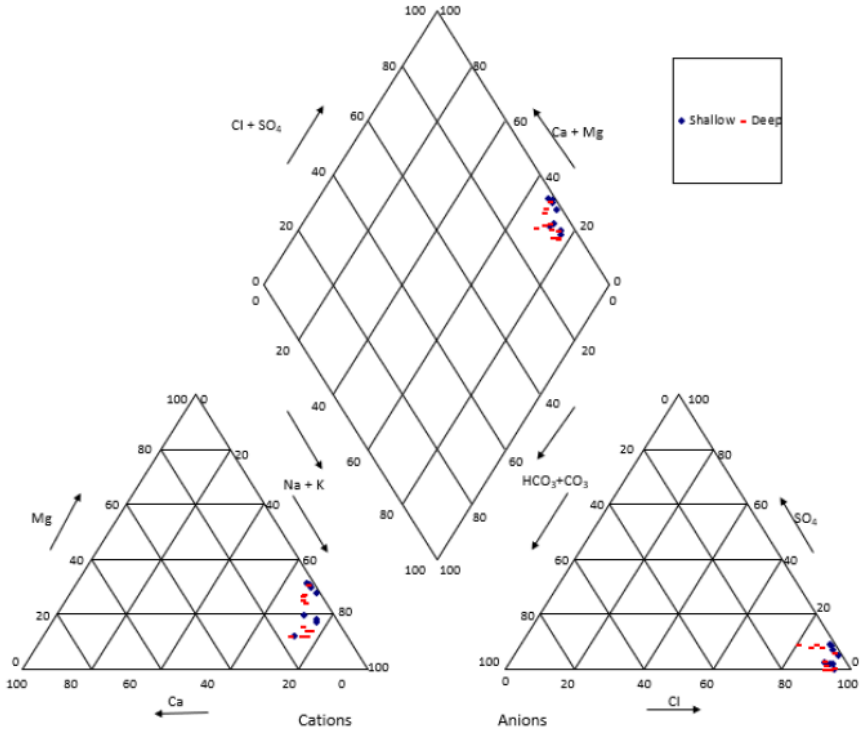
PGH engaged Groundwater Exploration Services Pty Ltd, whose appointment has been approved by the Secretary, to prepare a Groundwater Assessment (see *Appendix I*) which included an Alluvial Aquifer Assessment (AAA) for the project to the satisfaction of the Secretary. This assessment addressed:

- a program to monitor groundwater from boreholes that have been constructed in the alluvial sediments adjacent to Badgerys and South Creeks and their tributaries, and in the Bringelly Shale bedrock aquifer;
- alluvial mapping to delineate the presence and extent of alluvial sediments and alluvial aquifers between Badgerys Creek and the proposed Pit 5 extraction area;
- mitigation and management measures to ensure alluvial sediments and alluvial aquifers are not impacted by the project, including:
  - appropriate buffer setback distances between the alluvial sediments and the Pit 5 extraction area; and
  - any resulting adjustments to the Pit 5 extraction area.

The Assessment has been submitted for approval.

The AAA specified target analytes that would assist in the assessment of recharge-discharge processes and allow for comparison of water sample derived from different environments within the hydrological cycle (see *Section 7.4*). Piper Diagrams were plotted and found that all samples were grouped closely to the right-hand site of the diagram which is indicative of a sodium chloride type groundwater (see *Graph 9*). There is very little variation between shallow and deeper bores. Monitoring will continue as outlined in *Section 7.0*.

Graph 9: Piper Diagram from the Alluvial Aquifer Assessment



The alluvium was mapped in the assessment and the report found very little evidence of an alluvium footprint encroaching beyond the extent of the creek itself. Any flood related deposition appears to be limited to the upper metre of the soil profile and is not saturated or in connection with either creek system. The proposed Pit 5 (now not proceeding) would not have encroached into the alluvium of Badgerys Creek or South Creek and the assessment concluded that there is little chance of impacting on an associated alluvial groundwater resource. The Pit 5 extent did not encroach on the current 60 metre buffer from Badgerys Creek nor did it encroach on the estimated alluvium extent.

8.0 Groundwater Assessment Criteria

Groundwater assessment criteria can only be interim until the baseline data has been established. Initial testing indicates that the groundwater on the site is highly saline, therefore the highest potential for adverse impacts are in rising groundwater table affected soils, and if extraction activities were to contaminate the groundwater table, for example, with oil or fuel spills.

Interim baseline data is summarised below and is based upon the average of results obtained to from March 2018 to August 2020.

Table 27. ***Interim Baseline Groundwater Quality***

Analyte	Units	Average based on all bores	Range of Results	95% Confidence Interval
pH	-	6.8	6.0-10.7	Not Applicable
Electrical Conductivity	µS/cm	15,000	2,660-27,500	13,600-16,600
Total Dissolved Solids	mg/L	12,300	1,340-23,000	10,800-13,800
Total Alkalinity as $CaCO_3$	mg/L	683	160-1,100	595-771
Sulphate as SO_{4-}	mg/L	381	<1-1,300	282-481
Chloride	mg/L	6,010	580-12,000	5,240-6,780
Calcium	mg/L	222	16-620	180-264
Magnesium	mg/L	542	45-1,400	450-636
Sodium	mg/L	3,390	320-6,300	2,960-3,830
Potassium	mg/L	28	2-74	22-33
Aluminium	mg/L	0.048	<0.01-1.8	<0.001-0.119
Arsenic	mg/L	0.001	<0.001-0.005	<0.001-0.001
Chromium	mg/L	<0.001	<0.001-0.005	<0.0001-0.0004
Copper	mg/L	0.085	<0.001-2.50	<0.001-0.187
Lead	mg/L	<0.001	<0.001-0.008	<0.0001-0.0005
Manganese	mg/L	0.814	0.025-3.30	0.608-1.02
Molybdenum	mg/L	<0.001	<0.001-0.002	<0.001-0.001
Nickel	mg/L	0.006	<0.001-0.021	0.004-0.007
Selenium	mg/L	<0.001	<0.001-0.002	<0.0001-0.0001
Silver	mg/L	<0.001	Not Detected	-
Zinc	mg/L	0.061	0.003-0.42	0.042-0.080
Boron	mg/L	0.08	<0.02-0.2	0.05-0.07
Iron	mg/L	0.17	<0.01-5.1	0.66-1.34

Analyte	Units	Average based on all bores	Range of Results	95% Confidence Interval
Benzene	µg/L	Not detected	Not detected	-
Toluene	µg/L	Not detected	Not detected	-
Ethyl Benzene	µg/L	Not detected	Not detected	-
m+p-xylene	µg/L	0.1	<2-3	Not detected - <2
o-xylene	µg/L	Not detected	Not detected	-
Naphthalene	µg/L	Not detected	Not detected	-
TRH C6 - C9	µg/L	<10	<10-20	Not detected - <10
TRH C10 - C14	µg/L	6	<50-150	Not detected - 51
TRH C15 - C28	µg/L	15	<100-190	Not detected - 99
TRH C29 - C36	µg/L	7	<100-380	Not detected - 111
TRH C6 - C10	µg/L	0.5	<100-23	Not detected - 111
TRH C6 - C10 (less BTEX)	µg/L	0.4	<10-19	Not detected - <10
TRH >C10 - C16	µg/L	6	<50-120	Not detected - 66
TRH >C16 - C34	µg/L	24	<100-540	Not detected - 249
TRH >C34 - C40	µg/L	Not detected	Not detected	-
TRH >C10 - C40 (sum)	µg/L	30	<100-540	Not detected - 301

As more data becomes available, trigger levels will be further refined, and the Groundwater Management Plan updated accordingly.

Table 28. ***Interim Groundwater Assessment Criteria***

Parameter	Trigger Level for Investigation	Responsibility/Action
Depth below ground level	Change of greater than 10% from previous recordings that is not related to rainfall	HSE Officer / Investigate root cause, notify in accordance with CSCP
pH	pH outside the range of 6.5 to 8.0	HSE Officer / Investigate root cause, notify in accordance with CSCP
Electrical Conductivity	Greater than 28,000µS/cm	HSE Officer / Investigate root cause, notify in accordance with CSCP
Dissolved Metals	Levels change to greater than 30% when compared to background levels.	HSE Officer / Investigate root cause, notify in accordance with CSCP
Petroleum Hydrocarbons	Change of greater than 30% over background readings	HSE Officer / Investigate whether a spill has occurred, or source is off site. Notify in accordance with CSCP.

9.0 Response Plan for Exceedances of Performance Criteria

9.1. Environmental and Rehabilitation Risk Assessment

A risk assessment of water management issues has been undertaken in accordance with standard risk assessment practices outlined in ISO 31000.2009 *Risk Management – Principles and Guidelines*. The Consequence/Likelihood Matrix has been used with the following scale definitions:

Table 29. *Consequence/Likelihood Matrix*

			Consequence				
			1	2	3	4	5
			Insignificant	Minor	Moderate	Major	Severe
Likelihood	E	Almost Certain	IV	III	II	I	I
	D	Likely	IV	III	III	II	I
	C	Possible	V	IV	III	II	II
	B	Unlikely	V	IV	III	III	II
	A	Rare	V	V	IV	III	II

Likelihood Scale

E	Almost Certain	Expected to occur within weeks
D	Likely	Will probably occur, has happened within recent months
C	Possible	Might occur at sometime within next 2-3 months
B	Unlikely	Could occur within 6-12 months although unlikely
A	Rare	Might occur at some time in exceptional circumstances

Consequence

5	Severe	Irreversible long term environmental harm.
4	Major	Prolonged environmental impact with significant remedial measures required.
3	Moderate	Moderate environmental impacts with immediate remedial measures effective.
2	Minor	Minimal environmental harm with minor remediation activities
1	Insignificant	Little or no environmental harm. Remediation not required.

A summary of hazards or threats identified for the site water management is given below, along with a risk assessment. A Trigger Action Response Plan (TARP) has been developed (see Section 4.4 and 8.0). A TARP identifies proposed contingency strategies in the event of unexpected variations in performance outcomes. These risks have been determined on the assumption that procedures and mitigation measures outlined in this report and other standard procedures that could be reasonably expected have been undertaken.

Table 30. ***Analysis of Water Management Threats***

Water Management Threat	Potential Adverse Outcome	Likelihood	Consequence	Risk
Overland flows from clean water catchments on the site are not consistent with the baseline ecological, hydrological and geomorphic conditions of the surrounding environment.	Significant variation from baseline riparian vegetation condition.	Rare	Insignificant	V
	Significant variation in baseline channel morphology.	Rare	Insignificant	V
Sediment dams overtop into the Badgerys or South Creeks.	The site is a source of water pollution adversely impacting aquatic ecology.	Rare	Minor	V
	Significant variation from baseline riparian vegetation condition.	Rare	Minor	V
	Significant variation in baseline channel morphology.	Rare	Minor	V
The landform, whether through extraction or rehabilitation activities, is not properly protected from erosion.	The landform is a source of pollution due to sediment entrainment adversely impacting aquatic ecology.	Unlikely	Minor	IV
There is the potential for spills and contamination by metals and hydrocarbons from machinery and waste disposal.	Contamination of groundwater and/or impact on Groundwater Dependant Ecosystems	Rare	Minor	V
The development encroaches into the alluvial aquifer.	Loss of integrity of the aquifer	Rare	Minor	V

Monitoring of water quality has occurred consistently since 2017, with very little data available prior to that date. At this stage monitoring of Badgerys Creek water quality is to provide background data for establishing performance criteria and it has been noted that the water quality in Badgerys Creek is inconsistent. As the site is not discharging the variability of the water quality is not due to the site operations but rather due to variations in rainfall, stream flow and other upstream influences. For this reason, monitoring will continue to ascertain the baseline variations.

Similarly, no monitoring of the creek health has been undertaken to date and consequently no baseline data on the vegetation and morphology of the creek is available.

Possible responses to exceedances are outlined in the table below. Further refinements of responses will occur once sufficient baseline data has been obtained. Any exceedances recorded will be reported through the Annual Review.

10.0 Reporting Protocol and Contingency Planning

Reporting Protocols are described within the Environmental Management Strategy and are not included in this report.

The results of investigations and subsequent implementation of controls, safeguards and management measures will be integrated into the overall quarry Environmental Management System to minimise the potential for future occurrences.

10.1. Non-compliances and Exceedances of Performance Criteria

In the event of any incident, non-compliance or exceedance of performance criteria, DPIE will be notified immediately along with any other relevant agency such as the EPA and NRAR. Further investigation by an appropriately qualified representative, will be initiated to characterise the source of exceedance and to recommend and implement solutions to mitigate any potential impacts. Additional monitoring may be required to identify the source of the impact and monitor the effectiveness of the remedial solution. An Incident Report will be submitted within 7 days in accordance with the procedures outlined in the EMS and the Community and Stakeholder Consultation Plan.

Consultation will be undertaken with authorities to notify them of any breaches to any regulatory requirements applicable to the Site as well as in the development of remedial strategies.

The results of investigations and subsequent implementation of controls, safeguards and management measures will be integrated into the overall quarry Environmental Management System to minimise the potential for future occurrences.

10.2. Emergency Incident Plan

Incidents and non- compliance reporting are described within the Environmental Management Strategy and PIRMP and are not included in this report.

Similarly, complaints will be addressed through the site complaints register as described in the Environmental Management Strategy.

11.0 Plan Review and Implementation

11.1. Review

Water management actions included within this Plan will be reviewed annually and updated where necessary. The ARR will provide the main mechanism for driving continual improvement in the performance of the Site. A review will also be undertaken within 3 months of the following:

- the submission of an annual review of the Environmental Management Strategy (EMS);
- the submission of an Incident Report;
- the submission of an audit report;
- any modification to the conditions of approval (unless the condition requires otherwise); or
- Prior to commencing excavations in a new pit.

This is in accordance with the intent of the conditions of approval to ensure that strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the project.

11.2. Implementation

11.2.1. Responsibilities

The Site Environmental Officer or other suitably qualified delegate will be responsible for the implementation of the requirements of this Plan.

11.2.2. Allocation of Resources

Resources and materials will be allocated to the timely implementation of actions documented within this Plan. Resources and materials will also be allocated for the routine and emergency maintenance of environmental protection works.

11.3. Induction and Environmental Awareness Training

11.3.1. Site Induction

Environmental matters will be highlighted in the site induction for all personnel, including subcontractors. Staff will be made aware of their responsibilities under relevant environmental legislation.

11.3.2. Training

Informal training of water management issues applicable to the Site will be undertaken with site personnel.

12.0 References

Ref. 1. AECOM. (November 2010). Badgerys Creek Environmental Assessment for Continued Operation of Quarry and Brick Making Facility.

Ref. 2. AECOM Australia (AECOM), (2010). Environmental Assessment – Appendix C: Soil and Water Management Plan: Addendum Soil and Water Management Plan. AECOM Australia, NSW, May 2010.

Ref. 3. Element Environment. (2017). Badgerys Creek Brick Making Facility Modification 2 Environmental Assessment.

Ref. 4. ERM (2002). Soil and Water Management Plan: Badgerys Creek Brickworks Soil and Water Management Plan. ERM, NSW Australia, October 2002.

Ref. 5. Crossmuller (2017) Pit Volume Survey Report CSR Badgerys Creek.

Ref. 6. Department of Environment and Climate Change NSW (2008) Managing Urban Stormwater: Soils and Construction. Volume 2E Mines and Quarries. NSW, Australia.

Ref. 7. Fulton, A. (Jan 2019). Technical Report Groundwater Assessment, CSR Advanced Manufacturing Hub, DRAFT.

Ref. 8. High Definition Design Pty Ltd (2020) Detention Basin Design Option Drawings

Ref. 9. Hyder Consulting Pty Ltd. (11 April 2013). Badgerys Creek Brickworks Water Management plan

Ref. 10. Landcom (2004) Soils and Construction: Managing Urban Stormwater. Volume 1. NSW, Australia.

Ref. 11. NSW Department of Planning and Infrastructure (DoPI), (2011). Project Approval No 10_0014. NSW Government, Sydney, September 2011.

Ref. 12. NSW Department of Planning and Infrastructure (DoPI) (2011a). Major Project Assessment: Boral Badgerys Creek Quarry and Brick Making Facility (10_0033 and 10_0014), September 2011.

Appendix A: Figures

Plan of:	Water Management Plan for Badgerys Creek Brick Manufacture & Quarry Operations 2020 - Site Location	***Location:***	235 Martin Road, Badgerys Creek, NSW	***Source:***	nearmap - Image Date 28/05/2020 & Google Maps 2018	***Our Ref:***	9060_BB_WMP2020_C001_V0_F1.cdr
		Consent:	MP10_0014				
Figure:	ONE	***Council:***	Liverpool City Council	***Survey:***	N/A	***Plan By:***	JD
Sheet:	1 of 1	***Tenures:***	ML 1771 *(Act 1992)*	***Projection:***	N/A	***Project Manager:***	TO
Version/Date:	V0 07/07/2020	***Client:***	PGH Bricks & Pavers Pty Ltd	***Contour Interval:***	N/A	***Office:***	Thornton

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N

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Approx Scale: 0 2 4km

Approx Scale: 0 500m

Legend

Property Boundary

Mine Lease Boundary *(ML1771)*

Plan of:	Water Management Plan for Badgerys Creek Brick Manufacture & Quarry Operations 2020 - Site Layout	***Location:***	235 Martin Road, Badgerys Creek, NSW	***Source:***	nearmap - Image Date 28/05/2020, Client & Boral Badgerys Creek EIS AECOM Figure 7 November 2010	***Our Ref:***	9060_BB_WMP2020_C002_V1_F2.cdr
Figure:	TWO	***Council:***	Liverpool City Council	***Survey:***	Client Supplied	***Plan By:***	TO/JD
Sheet:	1 of 1	***Tenures:***	ML1771 *(Act 1992)*	***Projection:***	N/A	***Project Manager:***	TO
Version/Date:	V1 10/11/2020	***Client:***	PGH Bricks & Pavers Pty Ltd	***Contour Interval:***	N/A	***Office:***	Thornton

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N

0 50 100 150 200 250m

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Badgerys Creek Downstream
Discharge Point
Badgerys Creek Upstream
BW2a
BW2b
BW1a
BW3
BW4a
BW4b
BW5a
BW5b
MW1
MW2 (NE Dam)
MW3a
MW3b (concrete pad)
MW4 (concrete pad)
MW4 (NW Corner Dam)
SEDIMENT DAM 1
SEDIMENT DAM 2
SEDIMENT DAM 3
FARM DAM 4
FARM DAM 5
PIT 1
PIT 2
PIT 3
OFFICE
WEIGHBRIDGE
GATE HOUSE
CARPARK
DAIRY
BRICK PRODUCT STORAGE AREA
BRICK MAKING FACILITY
RAW MATERIAL STOCKPILE
WESTERN SP
CENTRAL SP
SOUTHERN SP
SOUTH EASTERN (WEST) SP
SOUTH EASTERN (EAST) SP
EASTERN SP
MARTIN ROAD
Badgerys Creek
South Creek Upstream
South Creek

LEGEND

Feature/Domain		Monitoring	
	Property Boundary		Surface Water Monitoring Location
	Mine Lease Boundary *(ML1771)*	MW1	Groundwater Monitoring Location
	Water Management Area		
	Drainage Line/Creek		
	60m Badgerys Creek Buffer		
	Contour		

Plan of:	Water Management Plan for Badgerys Creek Brick Manufacture & Quarry Operations 2020 - Existing Surface Water Management	***Location:***	235 Martin Road, Badgerys Creek, NSW	***Source:***	nearmap - Image Date 28/05/2020 & Client Supplied	***Our Ref:***	9060_BB_WMP2020_C003_V1_F3.cdr
Figure:	THREE	***Council:***	Liverpool City Council	***Survey:***	Photomapping 2015, Craig & Rhodes 2017	***Plan By:***	TO/JD
Sheet:	1 of 1	***Tenures:***	ML 1771 *(Act 1992)*	***Projection:***	MGA	***Project Manager:***	TO
Version/Date:	V1 10/11/2020	***Client:***	PGH Bricks & Pavers Pty Ltd	***Contour Interval:***	1m	***Office:***	Thornton

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N

0 40 80 120 160 200m

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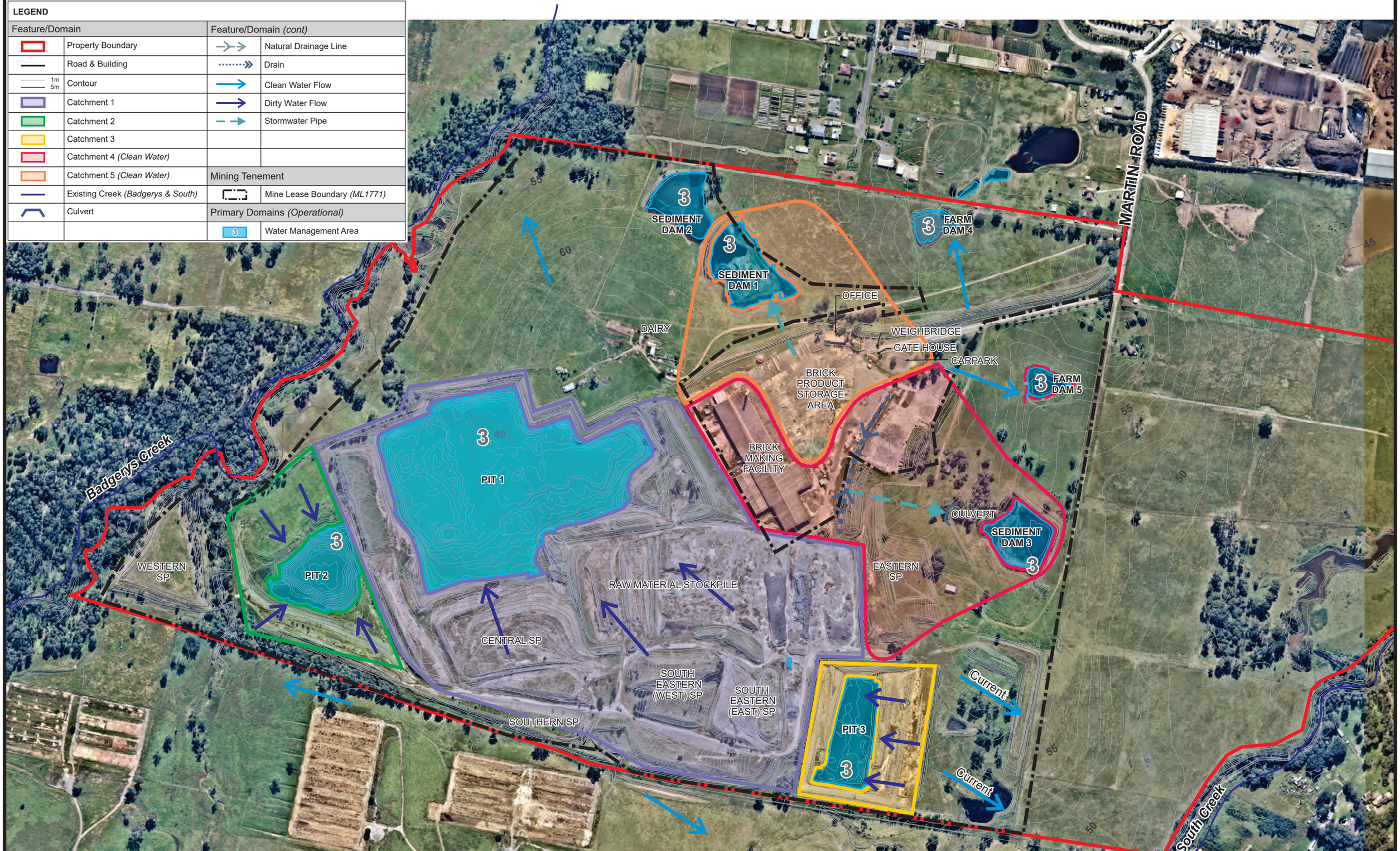
LEGEND

Feature/Domain		Feature/Domain *(cont)*	
	Property Boundary		Natural Drainage Line
	Road & Building		Drain
1m 5m	Contour		Clean Water Flow
	Catchment 1		Dirty Water Flow
	Catchment 2		Stormwater Pipe
	Catchment 3		
	Catchment 4 *(Clean Water)*		
	Catchment 5 *(Clean Water)*	Mining Tenement	
	Existing Creek *(Badgerys & South)*		Mine Lease Boundary *(ML1771)*
	Culvert	Primary Domains *(Operational)*	
		3	Water Management Area



Plan of:	Water Management Plan for Badgerys Creek Brick Manufacture & Quarry Operations 2020 - Preferred Project Phase 1 - Years 1 to 6	***Location:***	235 Martin Road, Badgerys Creek, NSW	***Source:***	CSR Advanced Manufacturing Hub Response to Submissions Report 2019 Figure 2.2	***Our Ref:***	9060_BB_WMP2020_C004_V0_F4.cdr
Figure:	FOUR	***Council:***	Liverpool City Council	***Survey:***	N/A	***Plan By:***	SK/JD
Sheet:	1 of 1	***Tenures:***	ML1771 *(Act 1992)*	***Projection:***	N/A	***Project Manager:***	TO
Version/Date:	V0 07/07/2020	***Client:***	PGH Bricks & Pavers Pty Ltd	***Contour Interval:***	N/A	***Office:***	Thornton

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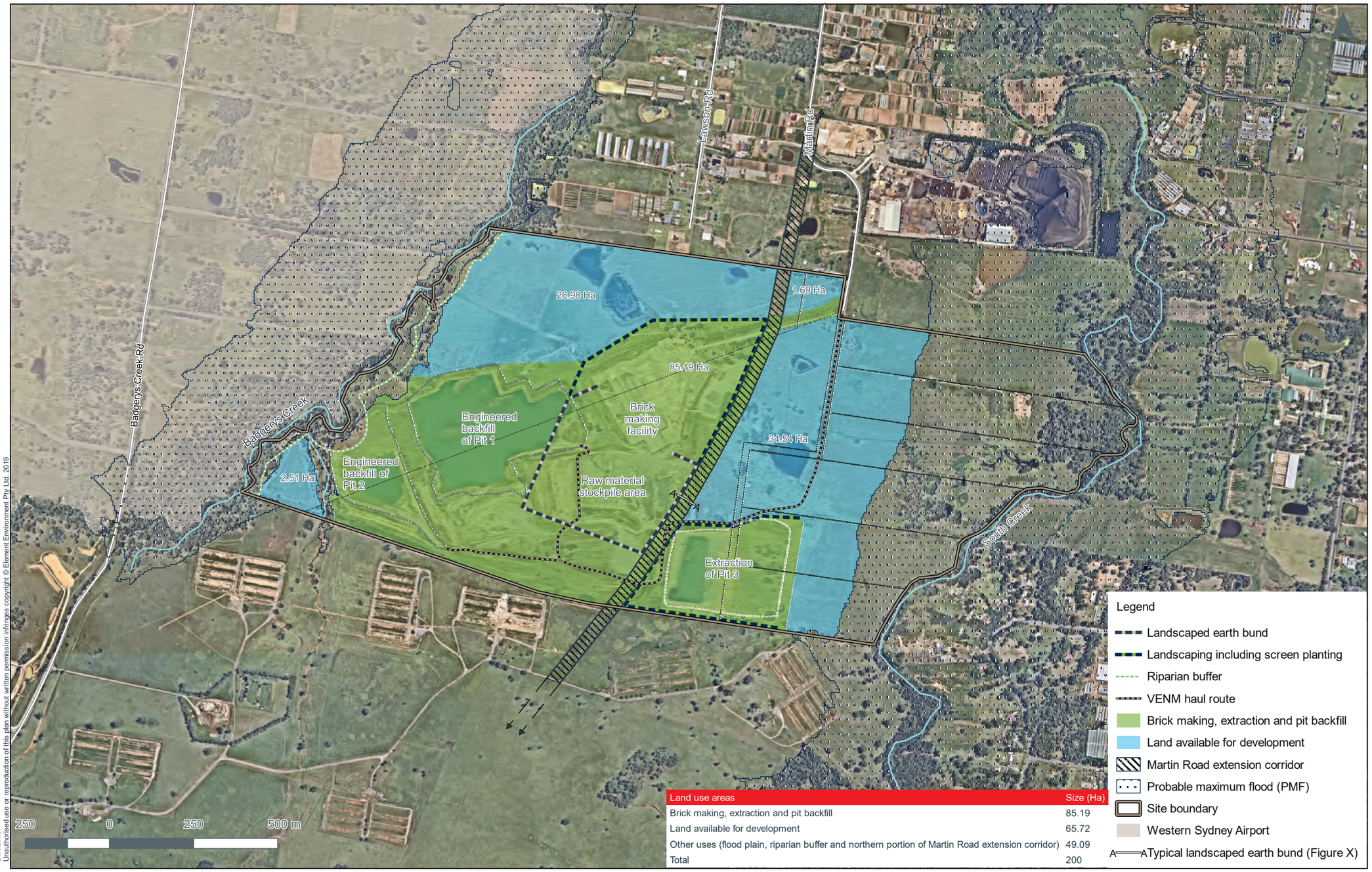
Figure 2.2
Preferred Project: Phase 1 - Years 1 to 6 (End 2019 to end 2025)

CSR ADVANCED MANUFACTURING HUB
Response to Submissions Report



Land use areas	Size (Ha)
Brick making, extraction and pit backfill	85.19
Land available for development	65.72
Other uses (flood plain, riparian buffer and northern portion of Martin Road extension corridor)	49.09
Total	200

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Plan of:	Water Management Plan for Badgerys Creek Brick Manufacture & Quarry Operations 2020 - Preferred Project Phase 2 - Years 7 to 10	***Location:***	235 Martin Road, Badgerys Creek, NSW	***Source:***	CSR Advanced Manufacturing Hub Response to Submissions Report 2019 Figure 2.3	***Our Ref:***	9060_BB_WMP2020_C005_V0_F5.cdr
Figure:	FIVE	***Council:***	Liverpool City Council	***Survey:***	N/A	***Plan By:***	SK/JD
Sheet:	1 of 1	***Tenures:***	ML1771 *(Act 1992)*	***Projection:***	N/A	***Project Manager:***	TO
Version/Date:	V0 07/07/2020	***Client:***	PGH Bricks & Pavers Pty Ltd	***Contour Interval:***	N/A	***Office:***	Thornton

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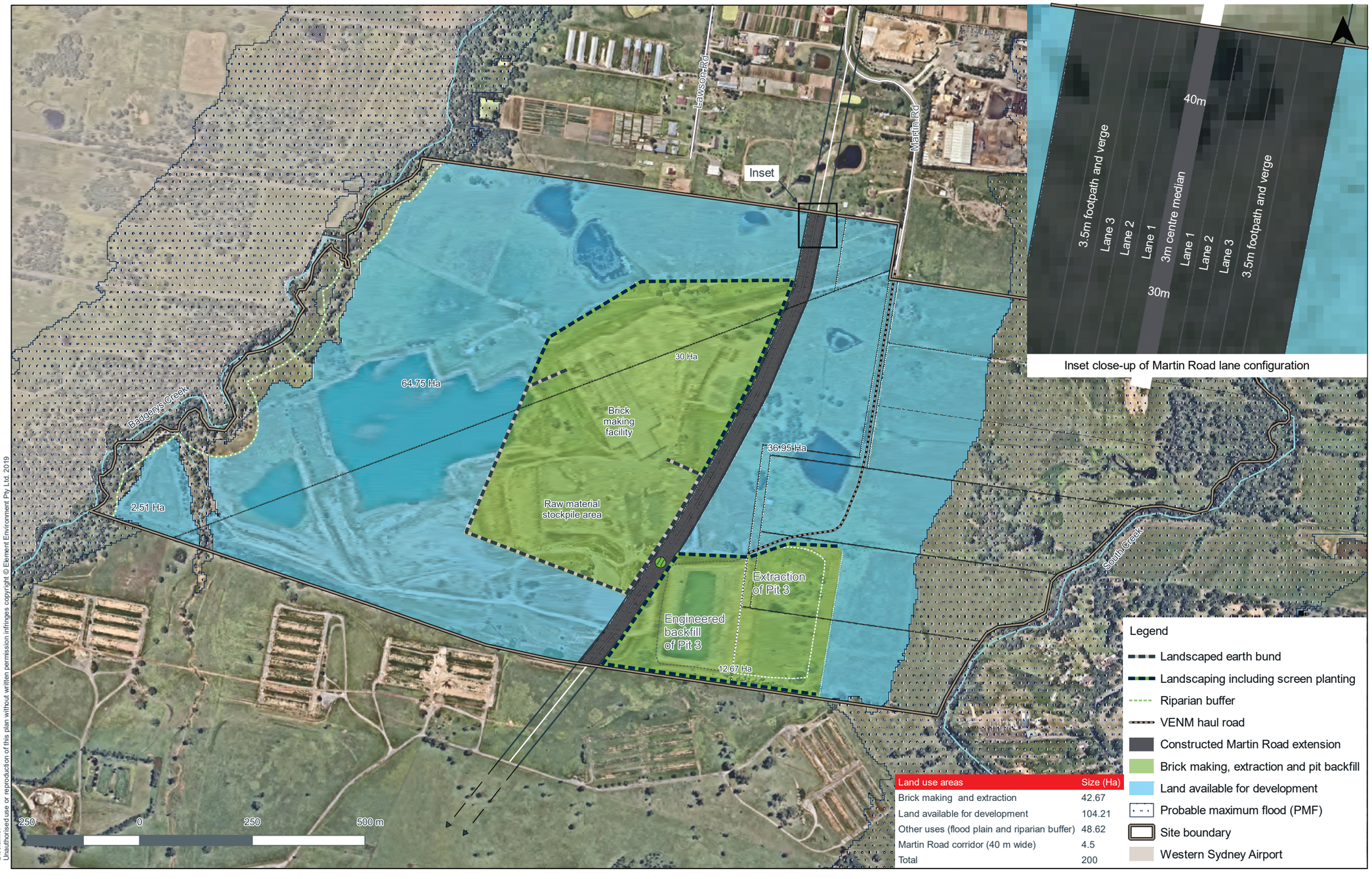
Figure 2.3
Preferred Project: Phase 2 Year 7 to 10 (end of 2025 to end of 2029)

CSR ADVANCED MANUFACTURING HUB
Response to Submissions Report



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Plan of:	Water Management Plan for Badgerys Creek Brick Manufacture & Quarry Operations 2020 - Preferred Project Phase 3 - Years 11 to 13	***Location:***	235 Martin Road, Badgerys Creek, NSW	***Source:***	CSR Advanced Manufacturing Hub Response to Submissions Report 2019 Figure 2.4	***Our Ref:***	9060_BB_WMP2020_C006_V0_F6.cdr
Figure:	SIX	***Council:***	Liverpool City Council	***Survey:***	N/A	***Plan By:***	SK/JD
Sheet:	1 of 1	***Tenures:***	ML1771 *(Act 1992)*	***Projection:***	N/A	***Project Manager:***	TO
Version/Date:	V0 07/07/2020	***Client:***	PGH Bricks & Pavers Pty Ltd	***Contour Interval:***	N/A	***Office:***	Thornton

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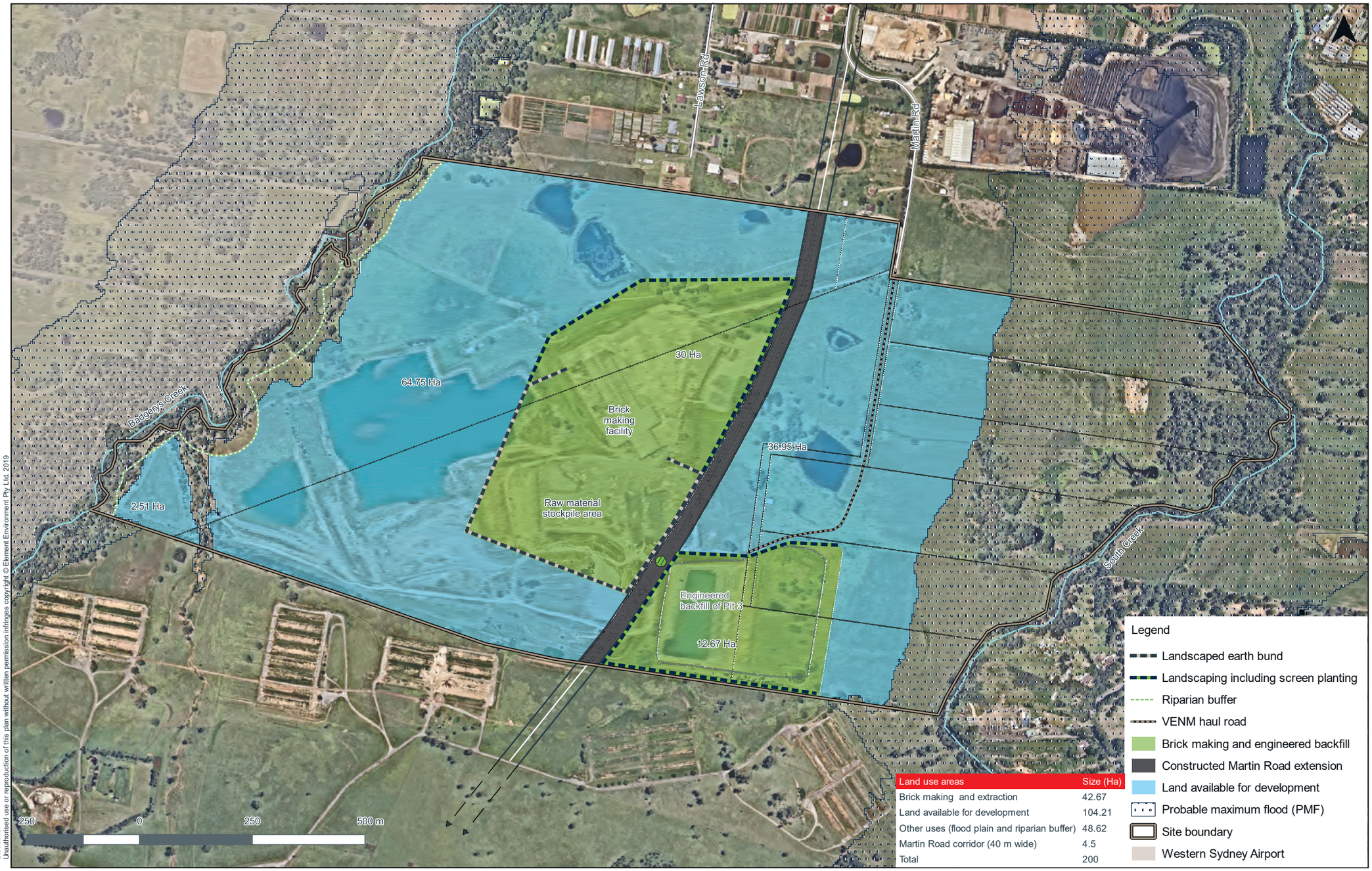
Figure 2.4
Preferred Project: Phase 3 - Year 11 to 13 (end of 2029 to end of 2032)

CSR ADVANCED MANUFACTURING HUB
Response to Submissions Report



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Plan of:	Water Management Plan for Badgerys Creek Brick Manufacture & Quarry Operations 2020 - Preferred Project Phase 4 - Years 14 Onwards	***Location:***	235 Martin Road, Badgerys Creek, NSW	***Source:***	CSR Advanced Manufacturing Hub Response to Submissions Report 2019 Figure 2.5	***Our Ref:***	9060_BB_WMP2020_C007_V0_F7.cdr
Figure:	SEVEN	***Council:***	Liverpool City Council	***Survey:***	N/A	***Plan By:***	SK/JD
Sheet:	1 of 1	***Tenures:***	ML1771 *(Act 1992)*	***Projection:***	N/A	***Project Manager:***	TO
Version/Date:	V0 07/07/2020	***Client:***	PGH Bricks & Pavers Pty Ltd	***Contour Interval:***	N/A	***Office:***	Thornton

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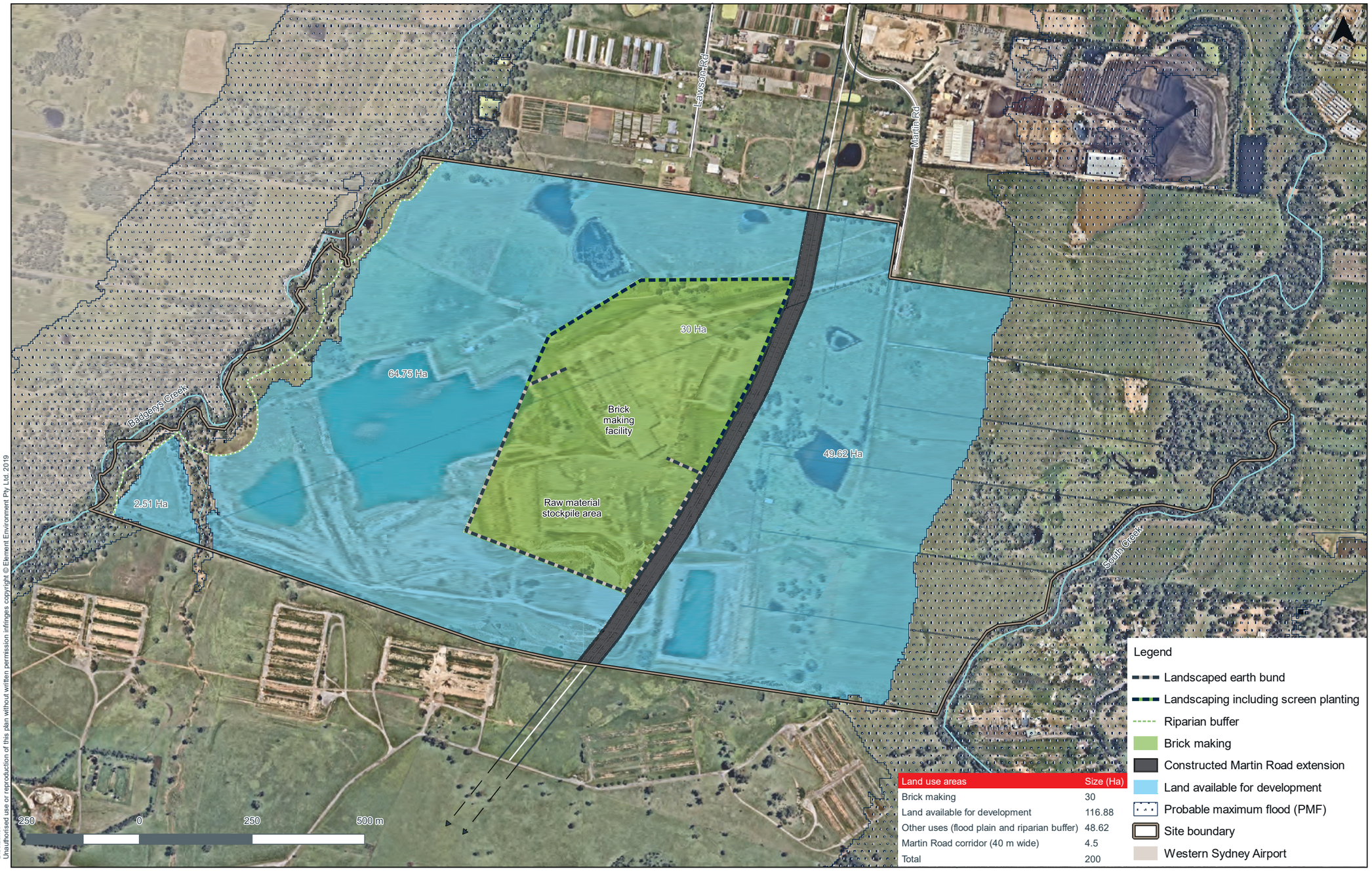
Figure 2.5
Preferred Project: Phase 4 - Year 14 onwards (approximately end of 2032 onwards)

CSR ADVANCED MANUFACTURING HUB
Response to Submissions Report



Land use areas	Size (Ha)
Brick making	30
Land available for development	116.88
Other uses (flood plain and riparian buffer)	48.62
Martin Road corridor (40 m wide)	4.5
Total	200

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Plan of:	Water Management Plan for Badgerys Creek Brick Manufacture & Quarry Operations 2020 - Proposed Surface Water Management	***Location:***	235 Martin Road, Badgerys Creek, NSW	***Source:***	Nearmap- Image Date 28/05/2020. High Definition Design Pty Ltd Project No.HD283 Dwg No.HD02 Revision 3 16/06/20	***Our Ref:***	9060_BB_WMP2020_C009_V3_F8.cdr
Figure:	EIGHT	***Council:***	Liverpool City Council	***Survey:***	N/A	***Plan By:***	TO
Sheet:	1 of 1	***Tenures:***	ML1771 *(Act 1992)*	***Projection:***	N/A	***Project Manager:***	TO
Version/Date:	V3 22/09/2020	***Client:***	PGH Bricks & Pavers Pty Ltd	***Contour Interval:***	N/A	***Office:***	Thornton

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291500 E 291750 E 292000 E 292250 E 292500 E 292750 E 293000 E 293250 E 293500 E 293750 E

6247750 N 6247500 N 6247250 N 6247000 N 6246750 N 6246500 N 6246250 N

MARTIN ROAD

SEDIMENTATION BASIN 1
SEDIMENTATION BASIN 2
OFFICE
WEIGHBRIDGE
GATE HOUSE
CARPARK
DAIRY
PROPOSED SEDIMENT BASIN B
BRICK PRODUCT STORAGE AREA
BRICK MAKING FACILITY
PIT 1 (Dam 1)
24.1Ha
REPAIRS TO BUND WALLS
SEDIMENTATION BASIN 3
PIT 2 (Dam 2)
7.9Ha
WESTERN SP
PROPOSED SEDIMENT BASIN A
RAW MATERIAL STOCKPILE
26.4Ha
EASTERN SP
CENTRAL SP
SOUTH EASTERN (WEST) SP
SOUTH EASTERN (EAST) SP
SOUTHERN SP
5.9Ha
PIT 3 (Dam 3)
Badgerys Creek
South Creek

LEGEND

Feature/Domain			
	Property Boundary		Drain (to be constructed)
	Approved Project Boundary		Dirty Water Flows
	Mine Lease Boundary *(ML1771)*		Clean Water Discharge
	60m Badgerys Creek Buffer		Conceptual Treatment Flows
	Surface Water Treatment System		Basin Treatment Outlet Pipe
	Sediment Dam (to be constructed)		
	Pit 1 (Dam 1) Catchment		Pit 3 (Dam 3) Catchment
	Pit 2 (Dam 2) Catchment		Basin A Catchment

Note: Catchment areas sourced from High Definition Design Pty Ltd Drawing Hd283 R3 Option 2 (HD01 R3)

Plan of:	Environmental Management Strategy for Badgerys Creek Brick Manufacture & Quarry Operations 2019 -Alluvium Extent	***Location:***	235 Martin Road, Badgerys Creek, NSW	***Source:***	nearmap - Image Date 29/12/2018, Client & Boral Badgerys Creek EIS AECOM Figure 7 November 2010, GES Technical Report- Groundwater Assessment Jan 2019	***Our Ref:***	9060_BB_WMP2020_C010_V0_F9.cdr
Figure:	NINE	***Council:***	Liverpool City Council	***Survey:***	Client Supplied	***Plan By:***	TO/JD
Sheet:	1 of 1	***Tenures:***	ML1771 *(Act 1992)*	***Projection:***	N/A	***Project Manager:***	TO
Version/Date:	V0 10/11/2020	***Client:***	PGH Bricks & Pavers Pty Ltd	***Contour Interval:***	N/A	***Office:***	Thornton

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N

0 50 100 150 200 250m

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SEDIMENTATION BASIN 2
SEDIMENTATION BASIN 1
OFFICE
WEIGHBRIDGE
GATE HOUSE
CARPARK
BRICK PRODUCT STORAGE AREA
BRICK MAKING FACILITY
MARTIN ROAD
Badgerys Creek
PIT 1 (Dam 1)
PIT 2 (Dam 2)
WESTERN SP
RAW MATERIAL STOCKPILE
EASTERN SP
Sediment Dam 3
CENTRAL SP
SOUTH EASTERN (WEST) SP
SOUTH EASTERN (EAST) SP
SOUTHERN SP
PIT 3 (Dam 3)
South Creek

LEGEND

Feature/Domain	
	Property Boundary
	Approved Project Boundary
	Mine Lease Boundary *(ML1771)*
	60m Badgerys Creek Buffer
	Badgerys Creek Alluvium Extent
	South Creek Alluvium Extent
	Quaternary Sediments

Appendix B: Erosion and Sediment Control Checklist

Erosion and Sediment Control Checklist

Date				Conducted by		
Start Time				Finish Time		
Inspections	Compliance with WMP Not Applicable		Yes	No	Comments	Action Date/ Corrective Action	Action Completion Date
Are quarrying, brickmaking and site access facilities confined to the minimum practicable area and are nearby waterways being protected?							
Is there any evidence of erosion onsite (e.g. gullies, landslips, rill erosion, sheet erosion, subsidence, stream bank instability) associated with project activities?							
Are there any areas around the site that require installation of erosion and sediment controls? (Check through flow chart, Appendix F, Blue Book Volume 2E).							
Are appropriate site control measures in place (barrier fencing, stormwater diversions etc.) and are they being properly maintained.							

Erosion and Sediment Control Checklist

Date				Conducted by		
Start Time				Finish Time		
Inspections	Compliance with WMP Not Applicable		Yes	No	Comments	Action Date/ Corrective Action	Action Completion Date
Are clean water diversion structures in place prior to land disturbance and are they successfully minimising dirty runoff?							
Is there evidence of erosion on haul roads, quarry slopes or road side drainage networks?							
Is there an accumulation of sediment within onsite drainage networks or within water storage areas?							
Are sediment dams and water storage areas working within capacity? Does sediment need to be actively removed from these areas?							
Is there evidence of increased turbidity to Badgerys Creek tributary or any other watercourses downstream of the works attributable to project activities?							

Erosion and Sediment Control Checklist

Date				Conducted by		
Start Time				Finish Time		
Inspections	Compliance with WMP Not Applicable		Yes	No	Comments	Action Date/ Corrective Action	Action Completion Date
Is topsoil being managed correctly, through progressive stripping when moist and not double handled?						
Is the noise attenuation bund being progressively stabilised in accordance with topsoil excavation?						
Is there any evidence of erosion or contamination around the Western stockpile area?						
Are there any signs of erosion at overburden stockpiles?						
Are weekly inspections being undertaken and after all rainfall events exceed 15mm in a 24 hour period?						

Appendix C: Consultant Approval

Planning, Industry & Environment

Planning and Assessment
Energy and Resource Assessments
Contact: Jack Murphy
Phone: 8217 2016
Email: jack.murphy@planning.nsw.gov.au

Mr Rich Mason
National Environmental Manager
PGH Bricks and Pavers TM
Locked Bag 1345
North Ryde BC NSW 1670

Email: rmason@pghbricks.com.au

Dear Mr Mason,

Badgerys Creek Quarry and Brick Making Project (MP 10_0014)
Appointment of a Suitably Qualified and Experienced Person

I refer to your letter dated 14 August 2019 requesting the Secretary's endorsement of a suitably qualified and experienced person to prepare the Soil and Water Management Plan for Badgerys Creek Quarry and Brick Making Project (MP 10_0014).

The Department has reviewed the credentials of Ms Tara O'Brien of VGT Environmental Compliance Solutions Pty Ltd and agrees she is a suitably qualified person. In accordance with condition 23 of Schedule 3 of MP 10_0014, the Secretary endorses Ms Tara O'Brien to prepare the above document.

Should you have any enquiries in relation to this matter, please contact Jack Murphy.

Yours sincerely,

Howard Reed 15.8.19
Howard Reed
Director Resource Assessments
as the Secretary's nominee

Appendix D: Blue Book Calculations

1. Erosion Hazard and Sediment Basins

Site Name: Badgerys Creek

Site Location:

Precinct/Stage:

Other Details: wallacia rainfall

Site area	Sub-catchment or Name of Structure						Notes
	Pit 1	Pit 2	Pit 3	BasinA	BasinB	Total D	
Total catchment area (ha)	24.1	7.9	5.9	26.4	0.9	64.3	
Disturbed catchment area (ha)	24.1	7.9	5.9	26.4	0.9	64.3	

Soil analysis (enter sediment type if known, or laboratory particle size data)

Sediment Type (C, F or D) if known:	D	D	D	D	D	D	From Appendix C (if known)
% sand (fraction 0.02 to 2.00 mm)							Enter the percentage of each soil fraction. E.g. enter 10 for 10%
% silt (fraction 0.002 to 0.02 mm)							
% clay (fraction finer than 0.002 mm)							
Dispersion percentage							E.g. enter 10 for dispersion of 10%
% of whole soil dispersible							See Section 6.3.3(e). Auto-calculated
Soil Texture Group	D	D	D	D	D	D	Automatic calculation from above

Rainfall data

Design rainfall depth (no of days)	5	5	5	5	5	5	See Section 6.3.4 and, particularly, Table 6.3 on pages 6-24 and 6-25.
Design rainfall depth (percentile)	90	90	90	90	90	90	
x-day, y-percentile rainfall event (mm)	48.8	48.8	48.8	48.8	48.8	48.8	
Rainfall R-factor (if known)							Only need to enter one or the other here
IFD: 2-year, 6-hour storm (if known)	8.02	8.02	8.02	8.02	8.02	8.02	

RUSLE Factors

Rainfall erosivity (*R*-factor)	1540	1540	1540	1540	1540	1540	Auto-filled from above
Soil erodibility (*K*-factor)	0.05	0.05	0.05	0.05	0.05	0.05	RUSLE LS factor calculated for a high rill/interrill ratio.
Slope length (m)	300	300	300	300	300	300	
Slope gradient (%)	5	5	5	5	5	5	
Length/gradient (*LS*-factor)	2.53	2.53	2.53	2.53	2.53	2.53	
Erosion control practice (*P*-factor)	1.3	1.3	1.3	1.3	1.3	1.3	
Ground cover (*C*-factor)	1	1	1	1	1	1	

Sediment Basin Design Criteria (for Type D/F basins only. Leave blank for Type C basins)

Storage (soil) zone design (no of months)	2	2	2	2	2	2	Minimum is generally 2 months
Cv (Volumetric runoff coefficient)	0.69	0.69	0.69	0.69	0.69	0.69	See Table F2, page F-4 in Appendix F

Calculations and Type D/F Sediment Basin Volumes

Soil loss (t/ha/yr)	253	253	253	253	253	253	
Soil Loss Class	3	3	3	3	3	3	See Table 4.2, page 4-13
Soil loss (m^3/ha/yr)	195	195	195	195	195	195	Conversion to cubic metres
Sediment basin storage (soil) volume (m^3)	782	256	192	857	29	2087	See Sections 6.3.4(i) for calculations
Sediment basin settling (water) volume (m^3)	8115	2660	1987	8889	303	21651	See Sections 6.3.4(i) for calculations
Sediment basin total volume (m^3)	8897	2916	2179	9746	332	23738	

NB for sizing of Type C (coarse) sediment basins, see Worksheet 3 (if required).

Appendix E: DPIE-Water Correspondence

Contact: Ellie Randall
Email: ellie.randall@nrar.nsw.gov.au

Our ref: OUT20/12740

Lisa Thomson
Environmental Chemist
VGT Environmental Compliance Solutions Pty Ltd

email: Lisa@vgt.com.au

Dear Lisa,

19 October 2020

PGH Bricks Badgerys Creek Quarry and Brickworks – Environmental Management Plans

Thank you for giving the Department of Planning, Industry and Environment – Water (DPIE-Water) the opportunity to review the Environmental Management Plans for PGH Bricks Badgerys Creek Quarry and Brickworks. DPIE-Water has reviewed the assessment and has the further comments:

The following updates be included in the next revision of each plan (no later than December 2020) and that the revised plans be submitted to the department for approval.

Soil and Water Management Plan (SWMP)

The proponent shall update the management plan to align with the conditions of the most recent modification and include the following:

1. Include written evidence that the approved suitably qualified person, Ms O'Brien, either prepared or reviewed and approved the Soil and Water Management Plan.
2. Include written evidence that Liverpool City Council have had the opportunity to comment and/or give feedback on the SWMP.
3. Include additional measures/details to satisfy the following conditions:
    a. all existing Water Access Licences and potential Water Access Licences, including information on the relevant Water Sharing Plan and Water Sources; and
    b. any off-site water transfers, including those described in condition 23A of Schedule 3 (Note: condition 23A refers to dewatering).
4. Detail all measures that will be implemented to minimise clean water use on site.
5. Badgerys Creek downstream monitoring location is to be relocated further downstream to more accurately capture potential impacts of the project activities.
6. Surface water monitoring locations and baseline water quality testing of South Creek are to be implemented, as has been done for Badgerys Creek.
7. Include the depths of all water storages.

8 Baseline data for riparian vegetation and channel morphology are to be collected as soon as practicable and appropriately detailed response actions are determined.

Groundwater Management Plan (GWMP)

The proponent shall update the management plan to align with the conditions of the most recent modifications and include the following:

1 Detail groundwater inflow volumes and the methodology used to calculate them for all current and proposed pits and how the proponent will ensure that the approved water access licence shares are adequate for all pits.

2 Detail groundwater quality baseline data and associated trigger levels.

3 Ensure that groundwater sampling and reporting includes the same suite of analytes (more is also acceptable) as the surface water program.

Rehabilitation Management Plan (RMP)

The proponent shall update the management plan to align with the conditions of the most recent modifications and include the following:

1 Include written evidence that BCD, TfNSW, WSA authorities and Liverpool City Council have had the opportunity to comment and/or give feedback on the RMP.

2 Align Table 14 in Section 4.3 of the RMP to the Conditions of Approval for Mod 3 and 4 (dated August 2020) in relation to the rehabilitation objectives and strategy (Schedule 3, Condition 36 (b)).

3 Address the strategic planning associated with the draft Western Sydney Aerotropolis Plan (or subsequently adopted NSW Government strategic plans) and how this may impact the future use of the project site.

4 Include details of the planting of replacement trees in riparian areas consistent with the Statement of Commitments and with vegetation requirements for WSA to minimise wildlife impacts.

5 Align the RMP to the requirements of Schedule 3, Condition 34, 35A, 35B and 36F of the Project Approval conditions in relation to the approved rehabilitation of the pit voids.

Should you have any further queries in relation to this submission please do not hesitate to contact the Natural Resources Access Regulator's Service Support Team at nrar.servicedesk@dpie.nsw.gov.au.

Yours sincerely

Alison Collaros
Licensing and Approvals Manager (East)
Natural Resources Access Regulator
Department of Planning, Industry and Environment

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Environmental Management Strategy – MP 10_0014 – condition 1, Schedule 5	**Satisfactory (Yes/No)**	**Comment**	**Action Required**
The Proponent must prepare an Environmental Management Strategy for the project to the satisfaction of the Secretary. This strategy must:			
(a) be submitted to the Secretary for approval within 6 months of the determination of Modification 2, unless otherwise agreed by the Secretary;	-	-	-
(b) provide the strategic framework for environmental management of the project;	Yes	Satisfied – See Section 2.	-
(c) identify the statutory approvals that apply to the project;	Yes	See Section 4 – Please ensure the most up to date legislation, planning instruments, codes, standards and guidelines are referenced in the document. Not satisfied – Please include the Biodiversity Conservation Act 2016, etc. See http://www.planningportal.nsw.gov.au/major-projects/assessment/policies-and-guidelines/key-guidance for details on policies and guidelines. Satisfied.	-
(d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;	Yes	Satisfied – Section 5, Section 6 and Section 7.	-
(e) describe the procedures to be implemented to: • keep the local community and relevant agencies informed about the operation and environmental performance of the project; • receive, record, handle and respond to complaints; • resolve any disputes that may arise during the course of the project; • respond to any non-compliance; and • respond to emergencies; and	Partial	• Please include the details of or alternatively append/provide a hyper link to the Community and Stakeholder Consultation Plan (CCP). Not satisfied. Satisfied. • Please include the details of or alternatively append/provide a hyper link to the CCP. Not satisfied. Not satisfied – No complaints management procedure. • Please include the details of or alternatively append/provide a hyper link to the CCP. Not satisfied. Not satisfied – No dispute resolution procedure. • See Section 9.2 – Please ensure any incident or non-compliance is reported in accordance with condition 9 and condition 10 of Schedule 5. Satisfied. • Please include the details of or alternatively append/provide a hyperlink to the Emergency	Note the comments and amend the plan accordingly

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		Management Response plan. Not satisfied. Not satisfied.	
(f) include: • references to any strategies, plans and programs approved under the conditions of this approval; and • a clear plan depicting all the monitoring to be carried out under the conditions of this approval.	Yes	• Satisfied – See Section 1.3. • Satisfied – See Figure 3 and Section 7.	-
Other Comments			
• Please hyperlink the "13 environmental management sub-plans". So that the EMS may be read as a standalone document. Not satisfied. Satisfied. • Where appropriate please remove references to the word "should", "possible", "practicable" and "may" and replace with "will" etc. The Department is seeking clear commitments on what management measures will be implemented.			
Air Quality Management Plan – MP 10_0014 – condition 13, Schedule 3	**Satisfactory (Yes/No)**	**Comment**	**Action Required**
The Proponent must prepare an Air Quality Management Plan for the project to the satisfaction of the Secretary. This plan must:			
(a) be prepared in consultation with the EPA;	Yes	Satisfied – Appendix B.	-
(b) be submitted to the Secretary for approval prior to commencing quarrying operations under Modification 2, unless otherwise agreed by the Secretary;	-	-	-
(c) describe the proposed air quality management system;	Partial	See Section 6 – Please include the details of or alternatively append/provide a hyper link to the *Community and Stakeholder Consultation Procedure*. Not satisfied – No complaints management procedure.	Note the comments and amend the plan accordingly.
(d) describe the measures to be implemented to ensure: • compliance with the air quality criteria and operating conditions of this approval; • best practice management is being employed; and • the air quality impacts of the project are minimised during adverse meteorological conditions and extraordinary events;	Partial	• See Section 6.1 – Ensure mitigation measures are in line with those outlined in section 8.4 of the EA. Partial – Please explain the use of HVAS as an alternative to TEOM. • Satisfied – Section 8. • See Section 6.2 – haul roads should continue to be watered during adverse meteorological conditions. Satisfied.	Note the comments and amend the plan accordingly.
(e) describe measures to ensure that all the commitments in the EA in relation to air quality are implemented;	Partial	See Section 6.1 – Ensure mitigation measures are in line with those outlined in section 8.4 of the EA. Partial – Please explain the use of HVAS as an alternative to TEOM.	Note the comments and amend the plan accordingly.
(f) include a program to ensure surface disturbance associated with quarrying operations is minimised;	Partial	See Section 6.2 – Please include further details of progressive rehabilitation or alternatively append/provide a hyper link to the Rehabilitation	Note the comments and amend the plan accordingly.

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		Management Plan. Partial – Proposed levels of revegetation insufficient.	
(g) include an air quality monitoring program that: • uses a combination of real-time monitors, high volume samplers and dust deposition gauges, to evaluate the performance of the project at potential receivers and on-site; • is capable of evaluating the performance of the project and informing day to day operational decisions; • includes a protocol for determining any exceedances of the relevant conditions of this approval; and • effectively supports the air quality management system; and	Partial	• Satisfied – Section 7.2. • See Section 7.2 – Please ensure correct table references are made. Satisfied. • See Section 7 – Further details for determining any exceedance required. Not satisfied • Satisfied – Section 7.	Note the comments and amend the plan accordingly.
(h) include a program to: • notify affected landowners of the potential health-related impacts associated with dust; and • respond effectively to enquiries or complaints.	Partial	• See Section 9.2 – Please ensure any incident or non-compliance is reported in accordance with condition 9 and condition 10 of Schedule 5. Not satisfied. • See Section 9.2 – Please provide details of how enquires or complaints will be responded to. Not satisfied.	Note the comments and amend the plan accordingly.
Other Comments			
• Incorrect table references throughout the document please amend. Satisfied. • Please hyperlink any referenced documents so that the AQMP may be read as a standalone document. Satisfied. • Where appropriate please remove references to the word "should", "possible", "practicable" and "may" and replace with "will" etc. The Department is seeking clear commitments on what management measures will be implemented.			
Soil and Water Management Plan – MP 10_0014 – condition 23, Schedule 3	**Satisfactory (Yes/No)**	**Comment**	**Action Required**
(a) be prepared by a suitably qualified and experienced person/s approved by the Secretary;	No	Append evidence of approval.	Note the comments and amend the plan accordingly.
(b) be prepared in consultation with the EPA and DoI Water;	Partial	Further consultation required.	Note the comments and amend the plan accordingly.
(c) be submitted to the Secretary for approval prior to commencing quarrying operations under Modification 2, unless otherwise agreed by the Secretary; and	Yes	-	-
(i) Site Water Balance that includes:			
• details of: o sources and security of water supply; o water use and management on site;	Partial	o See Table 5 – Please include the volumes of inflows and out flows of each source presented per annum and the total balance of inflows and outflows per annum. o Satisfied – Section 3 and Section 4.	Note the comments and amend the plan accordingly.

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o adequacy of water storage facilities to contain all surface water runoff; o any off-site water transfers;		o See Section 3.2, Figure 3 and Section 5.2.3 – The Department notes the SWMP indicates there will be environmental discharges without an EPL which allows for this. The Department requests PGH consult with the EPA about this matter. Furthermore, surface water monitoring will be required at any locations were discharges are proposed, therefore current surface water monitoring locations are inadequate. o See above.	
• measures to be implemented to minimise clean water use on site;	Yes	Satisfied – Section 4.3.	-
(ii) Surface Water Management Plan, that includes:			
• a program for obtaining detailed baseline data on surface water flows and quality in water bodies that could potentially be affected by the project;	Partial	See Figure 4 – It appears water will be discharged downstream of the current monitoring points for Badgerys Creek. It also appears the site will discharge to an unnamed creek to the West of the project. As such current baseline data and proposed surface water monitoring is inadequate.	Note the comments and amend the plan accordingly.
• a detailed description of the surface water management system on site including the: o clean water diversion system; o erosion and sediment controls; o dirty water management system; and o water storages, including the area, depth and capacity of any in-pit sumps;	Partial	Discussions with EPA and DPIE - Water to determine the controlled discharge program need to be finalised.	Note the comments and amend the plan accordingly.
• detailed plans, including design objectives and performance criteria, for: o reinstatement of drainage lines on the rehabilitated areas of the site; and o control of any potential water pollution from rehabilitated areas of the site;	Partial	o See Section 5.3 – Please consult with the EPA to finalise the EPL. o Satisfied – Section 5.3.	Note the comments and amend the plan accordingly.
• performance criteria for the following, including trigger levels for investigating any potentially adverse impacts on: o the water management system; o surface water quality in creeks and other water bodies that could potentially affected by the project (including Badgerys Creek and Badgerys Creek tributary); and o the stream health, vegetation health and channel stability of water bodies that could potentially affected by the project;	Partial	o See Section 5.4 – Finalise the industrial process water and EPL criteria. o See Section 5.4 – Further monitoring needs to be undertaken to establish the baseline health of Badgerys creek. o See Section 5.4 – The proposed monitoring locations for stream health are inadequate as	Note the comments and amend the plan accordingly.

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		Figure 4 indicates discharges will occur beyond the proposed downstream monitoring location.	
• a program to monitor and report on: o any surface water discharges; o the effectiveness of the water management system; o the quality of water discharged from the site to the environment; o surface water flows and quality in local watercourses; and o the stream health, riparian vegetation health and channel stability of creeks and other water bodies that could potentially be affected by the project; and		o See Section 5.5 – Any discharges including those from Sediment Dam 3 must be monitored. o See Section 5.5.2 – The proposed monitoring locations are inadequate as Figure 4 indicates discharges will occur beyond the proposed downstream monitoring location. o See Section 5.5.2 – Liaise with EPA regarding EPL requirements. o See Section 5.5.2 – See above regarding monitoring locations. o See Section 5.5.2 – See above regarding monitoring locations.	
• a plan to respond to any exceedances of the performance criteria, and mitigate and/or offset any adverse surface water impacts of the project; and	No	See Section 5.5.3 – Please include a plan to respond to any exceedances of the performance criteria, and mitigate and/or offset any adverse surface water impacts of the project.	Note the comments and amend the plan accordingly.
(iii) Groundwater Management Plan that includes:			
• measures to ensure that the maximum extraction depth is not exceeded (see condition 19 of Schedule 2);	Yes	Satisfied – Section 5.3.	-
• a protocol to obtain appropriate water licence(s) to cover the volume of any unforeseen groundwater inflows into the quarry from the quarry face or floor;	Yes	Satisfied – Section 8.3.	-
• groundwater assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts; and	No	Not Satisfied – Please provide Groundwater Assessment Criteria. Not Satisfied	Note the comments and amend the plan accordingly.
• a monitoring program to manage potential impacts, if any, on any alluvium and associated surface water source near the proposed extraction area that includes: o monitoring of groundwater inflows into the quarry from the quarry face or floor, or into any in-pit sumps; o monitoring the impacts of the project on baseflows to Badgerys and South Creeks and their tributaries; o identification of a methodology for determining exceedances of the assessment criteria;	Partial	o Satisfied – Section 6.2. o Satisfied – Section 8.4. o See Sections 6 to 9 – Further details of the proposed monitoring program required. The Department recommends a greater frequency of monitoring then annually. Not Satisfied o Satisfied – Section 8.1.	Note the comments and amend the plan accordingly.

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o a plan to respond to any exceedances of the performance criteria; and o a program to regularly report on monitoring.		o Satisfied – Section 8.	
Other Comments			
• Please hyperlink any referenced documents so that the SWMP may be read as a standalone document. Not Satisfied. • Please append consultation with the EPA and DoI Water. Not satisfied further consultation required. • Please update table of contents.			
Noise Management Plan – MP 10_0014 – condition 8, Schedule 3	**Satisfactory (Yes/No)**	**Comment**	**Action Required**
The Proponent must prepare a Noise Management Plan for the project to the satisfaction of the Secretary. This plan must:			
(a) be prepared in consultation with the EPA;	No	Not Satisfied – Please append consultation with the EPA. Not Satisfied.	Note the comments and amend the plan accordingly.
(b) be submitted to the Secretary for approval prior to commencing quarrying operations under Modification 2, unless otherwise agreed by the Secretary;	-	-	-
(c) describe the measures to be implemented to ensure: • compliance with the noise criteria and operating conditions of this approval; • best practice management is being employed; and • the noise impacts of the project are minimised during meteorological conditions under which the noise criteria in this approval do not apply (see Appendix 8);	Partial	• Satisfied – See Section 3 and Section 5.1. • Satisfied – See Section 4. • See Section 4.4 – Please provide further details of how impacts will be minimised during times the conditions do not apply e.g. ceasing or modifying operations. Not Satisfied.	Note the comments and amend the plan accordingly.
(d) describe measures to ensure that all the commitments in the EA in relation to noise are implemented;	Partial	See Section 4.5 – Please include the details of these commitments within the NMP. Not Satisfied.	Note the comments and amend the plan accordingly.
(e) include a consultation plan detailing: • procedures for notifying and consulting nearby residents prior to the commencement of the construction of the noise bunds and during quarrying and brick making operations; • details of a telephone complaints line (all hours) and relevant site persons responsible for following up complaints; • procedures for handling and monitoring all complaints received; and • contingency measures that would be implemented where complaints are received;	Partial	• See Section 5.2 – Please include a clear commitment to undertake the required notification and consultation prior to the commencement of operations. Not Satisfied. • See Section 5.2 – Please include the complaints line number and note that it will be all hours. Not Satisfied. • Satisfied – Section 5.2. • Satisfied – Section 5.2.	Note the comments and amend the plan accordingly.
(f) describe the proposed noise management system; and	Yes	Satisfied – Section 4 and Section 5.	-
(g) include a noise monitoring program that: • is capable of evaluating the performance of the project;	Partial	• See Section 5.1 – Further details of how the monitoring will evaluate the performance of the project (i.e. how often will campaign periods	Note the comments and amend the plan accordingly.

• includes a protocol for determining any exceedances of the relevant conditions of this approval; and • effectively supports the noise management system		occur and how were the chosen noise monitoring locations determined). Not Satisfied. • See Section 5.1. – Please ensure any incident or non-compliance is reported in accordance with condition 9 and condition 10 of Schedule 5. Not Satisfied. • See Section 5.1 – As above. Not Satisfied.	
Other Comments			
• Please hyperlink any referenced documents so that the NMP may be read as a standalone document. Satisfied. • Please append consultation with the EPA. Not Satisfied. • The plans should provide clear commitments, and avoid ambiguous or hypothetical language. For example, words such as 'would' or 'should' are to be avoided. Not Satisfied.			
Rehabilitation Management Plan – MP 10_0014 – condition 36, Schedule 3	**Satisfactory (Yes/No)**	**Comment**	**Action Required**
The Proponent must prepare a Rehabilitation Management Plan for the project to the satisfaction of DRG. This plan must:			
(a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Secretary;	Yes	Satisfied – Appendix B	-
(b) be prepared in consultation with the Department, DoI Water, OEH and Council;	Partial	Update Appendix A following consultation. Not Satisfied.	To note the comments and amend the plan accordingly
(c) be submitted to DRG within 12 months of the determination of Modification 2;	-	-	-
(d) be prepared in accordance with any relevant DRG Guideline;	Yes	Satisfied – Section 1.	-
(e) build upon the Rehabilitation Objectives in Table 6 and the proposed rehabilitation strategy described in the EA and shown in Appendix 4;	Yes	Satisfied – Section 4.3 and Section 6.	-
(f) investigate options for the future use of disturbed areas (including voids) following the completion of quarrying operations;	Yes	Satisfied – Section 4 and Section 11.	-
(g) describe and justify the proposed rehabilitation strategy for the site, including post-operations landform and use;	Partial	See Section 4 and Section 5 – Please include a clear justification for the proposed rehabilitation strategy. Not Satisfied. See Section 2.3.5 – RMP indicates the site would be rehabilitated to as close as possible to natural ground level. Please update to natural ground level.	To note the comments and amend the plan accordingly
(h) describe and justify the proposed rehabilitation strategy for the site in the event that quarrying and brick making operations do not recommence following the shutdown period;	Partial	See Section 7.2 – Please include further details regarding the event that quarrying and brick making operations do not recommence following the shutdown period. Not Satisfied.	To note the comments and amend the plan accordingly

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(i)	describe how the rehabilitation of the site would achieve the objectives identified in Table 6;	Partial	See Table 17 – Please include completion metrics where appropriate. Not Satisfied.	To note the comments and amend the plan accordingly
(j)	include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, and for triggering remedial action (if necessary);	Partial	See Table 17 – Please include completion metrics where appropriate. Not Satisfied.	To note the comments and amend the plan accordingly
(k)	describe the measures to be implemented to ensure compliance with the relevant conditions of this approval, and address all aspects of rehabilitation including mine closure, final landform (including final voids) and final land use/s;	Yes	Satisfied – Section 7.	-
(l)	include procedures for the use of interim stabilisation and temporary vegetation strategies, where reasonable to minimise the area exposed for dust generation;	Yes	Satisfied – Section 2.	-
(m)	include a program to monitor, independently audit and report on the effectiveness of the measures in paragraph (k) above, and progress against the detailed performance and completion criteria in paragraph (j) above;	Partial	See Table 17 – Please include completion metrics where appropriate. Not Satisfied.	To note the comments and amend the plan accordingly
(n)	to the maximum extent practicable, build on and integrate with the other management plans required under this consent; and	Yes	Satisfied – Section 3.	-
(o)	include detailed scheduling for progressive rehabilitation to be initiated, undertaken and/or completed over the next three years (see condition 35 of this Schedule).	Partial	See Section 2 – Please include a table which clearly outlines rehabilitation to be completed. Not Satisfied.	To note the comments and amend the plan accordingly
Other Comments				
•	Please hyperlink any referenced documents e.g. the NMP. So that the RMP may be read as a standalone document. Satisfied.			
•	Please remove references to the word “should” or “may” and replace with “will”. The Department is seeking clear commitments on what management measures will be implemented. Where appropriate please remove references to the word “should”, “possible”, “practicable” and “may” and replace with “will” etc. The Department is seeking clear commitments on what management measures will be implemented.			

Appendix F: Liverpool Council Correspondence

[redacted]

[redacted]

[redacted]

Wastewater Management

2. Section 2.2.1 of the SWMP refers to requirements applicable to the operation of wastewater treatment and effluent irrigation systems at the site. VGT Environmental Compliance Solutions Pty Ltd indicated that approval requirements for any upgrades to the wastewater treatment system will be investigated during the detailed design of the wastewater treatment system. Whilst approval requirements for the operation of the onsite sewage management system were outlined, consideration was not given to the installation requirements for the systems.

   Under Section 68 of the *Local Government Act 1993,* approval is required to install, construct or alter a waste treatment device and operate a system of sewage management at the premises.

   "Operate a system of sewage management" means hold or process, or re-use or discharge, sewage or by-products of sewage (whether or not the sewage is generated on the premises on which the system of sewage management is operated). In accordance with the Liverpool Development Control Plan 2008, a new system must be installed where the existing system does not have adequate treatment capacity for all potential flows. It should be noted that sewage pump-out facilities are not supported by Council.

   The Application must be supported by a wastewater report prepared by a suitably qualified and experienced environmental or wastewater consultant to identify the site area available for development and determine if on-site effluent disposal is feasible when considering potential risks to public health and the environment. The detailed wastewater report shall be prepared by an Environmental Scientist or Engineer with a minimum of a bachelor's degree qualification and extensive industry experience within an on-site sewage management context. Note: There is currently no certification body for this field. The Applicant is encouraged to contact Council to discuss these requirements in further detail.

Referral to NSW EPA for Review and Comment

3. The proposed development is a scheduled activity under the *Protection of the Environment Operations Act 1997* and subject to an existing EPL issued by the NSW EPA. It is requested that the NSW EPA reviews the SWMP to determine that the proposed development is capable of being operated in an environmentally satisfactory manner consistent with the current EPL.

   Sampling and analysis methods must comply with the NSW EPA Approved Methods for the Sampling and Analysis of Water Pollutants in NSW dated 2004. The proposed discharge criteria for the sedimentation basins include a pH between 6.5 and 8.0 and turbidity less than 150 NTU. It is strongly recommended that water quality criteria are based on the document titled 'Managing Urban Stormwater: Soils & Construction' published by LandCom dated 2004.

   In this regard, the water quality discharge criteria for turbidity NTU must equal less than 50 mg/L Total Suspended Solids (TSS). If NTU is to be used in place of TSS, a statistical correlation which identifies the relationship between NTU and TSS must be established to the satisfaction of the NSW EPA.

If you have any questions please do not hesitate to contact me.

Kind regards,

Boris Santana
Principal Planner

LIVERPOOL CITY COUNCIL

02 8711 7683 | 0439 562 915 | SantanaB@liverpool.nsw.gov.au
Customer Service: 1300 36 2170 | 33 Moore Street Liverpool, NSW 2170, Australia
www.liverpool.nsw.gov.au

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From: Arancibia, Nelma <NARANCIBIA@csr.com.au>
Sent: Thursday, 1 October 2020 2:06 PM
To: LCC <LCC@liverpool.nsw.gov.au>
Subject: State Significate Development MP 10_0014 MOD 4 - Surface Water Management Plan

Attention George Nehme
Badgerys Creek Quarry and Brick Making Project (MP10_0014)
Soil and Water Management Plan – Consultation request

Background

10 August 2020 the NSW Department of Planning, Industry and environment approved our Modification application to reignite and expand the old Brick Manufacturing plant, continue mining on the site as well as commence the Rehabilitation works within the site which involves Dewatering a 1 Billion Litres of Water that is currently held within the old Quarry Pits and then fill them with VENM imported material to bring them back to natural surface level.
On 3 June 2020 PGH Pavers & Bricks Pty Limited (PGH) entered into an Enforceable Undertaking (EU) with the Natural Resources Access Regulator (NRAR)
In Summary the EU outlines:

1. The Basis of an agreement with Western Sydney Airport Corporation (WSA) to supply it with stored water from the Badgerys Creek PGH site, thus preventing further extraction of water that would otherwise be required to facilitate development works by WSA
2. A requirement that PGH purchase the water, at twice its value, that was unlawfully taken under s60G of the Water Management Act 2000.
3. The obligation to undertake works b y 2 December 2020 to prevent the capture of surface water in the form of rainfall runoff.

To comply with the requirements of the EU we proposed to undertake the works outlined in the attached plan, which in summary will include:

- Construction of a new Sediment Basin (Basin A) to capture surface water
- Construction of bund wall extensions to prevent water entering the Pits
- Construction of pipeline & treatment infrastructure to enable water from Basin A to be pumped to a new Sediment Basin (Basin B) prior to testing (to ensure compliance with water quality requirements) and discharge to Badgerys Creek.

As part of this works a variation is being sought to EPL 684 to permit discharge off site.

Request

Our current approval (link below) under Schedule 3 – Condition 23 **'Soil and Water Management Plan'**
Notes that we are to prepare a Soil and Water Management Plan for the project *(a) be prepared in consultation with Council and DPIE-Water.*
APPROVAL Link http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=9122
As such we are submitting our **Soil and Water Management Plan** and request any feedback or comments by no later than **29th October 2020.**
Link to SWMP
https://csrltd-my.sharepoint.com/:b:/r/personal/narancibia_csr_com_au/Documents/Share%20External/SWMP%20Doc%20BRK-BAD-3.10.7-P09_V2_F0%20reduced%20(1).pdf?csf=1&web=1&e=zvaclf
If you have any questions please do not hesitate to contact Andrew O'Neill or myself (Nelma).

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Appendix G: Dewatering Infrastructure Plan

Appendix H: Dewatering Management Plan

Appendix I: Technical Report- Groundwater Assessment

TECHNICAL REPORT
GROUNDWATER ASSESSMENT
CSR Advanced Manufacturing Hub

Draft Report

For CSR Building Products Limited (CSR).

Andrew Fulton
BSc (Geol), MSc (Hydrogeol)

Groundwater Exploration Services

January, 2019

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1 INTRODUCTION

1.1 Background

The CSR Advanced Manufacturing Hub is in the suburb of Badgerys Creek within the Liverpool LGA. Badgerys Creek is approximately 15 km south east of Penrith and 20 km north of Campbelltown.

The Project Site covers an area of approximately 230 ha and has previously been used for quarrying of the local claystone for brick production which ceased in March 2012. Existing features of the Project Site include two completed quarry pits (known as Pits 1 and 2), an active quarry pit (known as Pit 3), three large sediment basins in the eastern and northern portions of the Project Site, two smaller dams in the eastern and northern parts of the Project Site, a brick making facility, various administration buildings, a bricks finished goods storage yard, car parks and internal road network. The majority of the Project Site is currently being used for stock agistment and grazing. The Project location is shown in **Figure 1.-1.**

In October 2016, CSR Building Products Limited (CSR) acquired Boral Bricks Pty Limited (Boral) brick business along the eastern seaboard of Australia and with it, the Badgerys Creek. It is the intention of CSR to reestablish brick making activities and associated quarrying from the project site which requires modifications to the existing Project Approval.

This document provides supporting information for current modification approval with regards to the localised groundwater resource and anticipate impacts from the project activities.

1.2 Project Approval

There are existing approvals in place for operation of the site for which modifications are currently being progressed. Environmental performance conditions associated with original approval documentation are still applicable and form the basic framework for this investigation. The relevant condition (Schedule 3 Condition 20) states as follows:

20. The Proponent shall prepare and implement an Alluvial Aquifer Assessment for the project to the satisfaction of the Director-General. This plan must:
(a) be prepared in consultation with NOW by suitably qualified and experienced persons whose appointment has been approved by the Director-General;
(b) be submitted to the Director-General for approval within 12 months of recommencing quarrying operations; and
(c) include:

- *a program to monitor groundwater from boreholes to be constructed in the alluvial sediments adjacent to Badgerys and South Creeks and in the Bringelly Shale bedrock aquifer; •*
- *alluvial mapping to delineate the presence and extent of alluvial sediments and alluvial aquifers between Badgerys Creek and the proposed Pit 5 extraction area (refer to Appendix 3);*
- *mitigation and management measures to ensure alluvial sediments and alluvial aquifers are not impacted by the project, including: - appropriate buffer setback distances between the alluvial sediments and the Pit 5 extraction area; and - any resulting adjustments to the Pit 5 extraction area.*

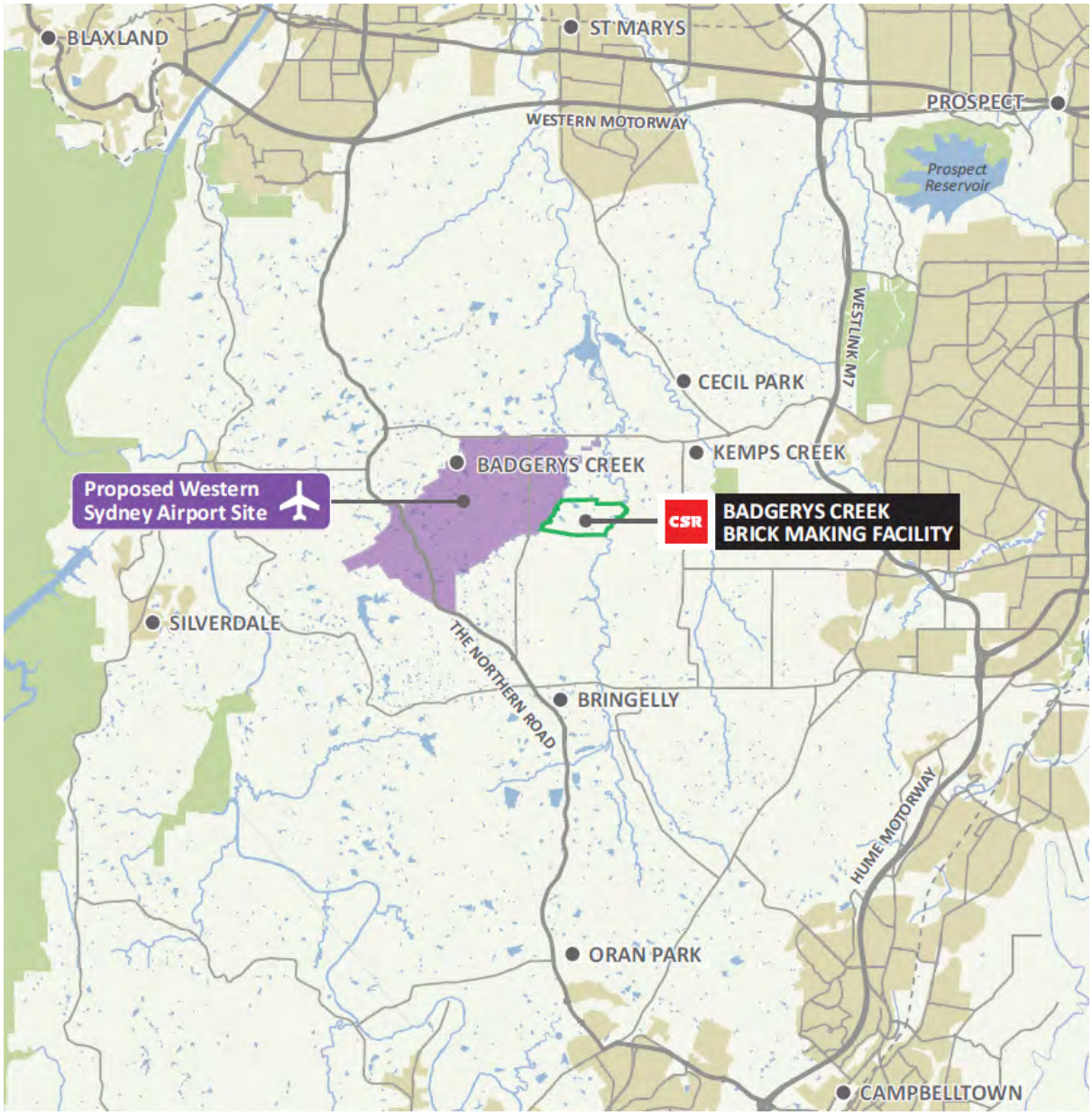

Figure 1-1: Location Diagram

1.3 Secretary's Environmental Assessment Requirements (SEARs)

To ensure the sustainable and integrated management of groundwater sources, this EIS supporting study needs to include adequate details to assess the impact of the project on all groundwater sources. The following table outlines the

.

Table 1-1: Secretary's Environmental Assessment Requirements

Groundwater Assessment Potential Impacts	Section Addressed
Works likely to intercept, connect with or infiltrate the groundwater sources.	3
Any proposed groundwater extraction, including purpose, location and construction details of all proposed bores and expected annual extraction volumes	3
Bore construction information is to be supplied to DPI Water by submitting a "Form A" template. DPI Water will supply "GW" registration numbers (and	3

Groundwater Assessment Potential Impacts	Section Addressed
license/approval numbers if required) which must be used as consistent and unique bore identifiers for all future reporting.	
A description of the water table and groundwater pressure configuration, flow directions and rates and physical and chemical characteristics of the groundwater source (including connectivity with other groundwater and surface water sources).	3.4
Sufficient baseline monitoring for groundwater quantity and quality for all aquifers and Groundwater Dependent Ecosystems to establish a baseline incorporating typical temporal and spatial variations.	3.4
The predicted impacts of any final landform on the groundwater regime.	4.14
The existing groundwater users within the area (including the environment), any potential impacts on these users and safeguard measures to mitigate impacts	4.18
An assessment of groundwater quality, its beneficial use classification and prediction of any impacts on groundwater quality.	3.6

Where potential impact/s are identified, the assessment will need to identify limits to the level of impact and contingency measures that would remediate, reduce or manage potential impacts to the existing groundwater resource and any dependent groundwater environment or water users. Table 1-2 outline contingency measures.

1.4 Objective

In line with the DoP requirements, the overall objective of this report is to address specific approval environmental performance conditions listed above and to additionally address the issue of groundwater supply and performance against existing groundwater allocation licenses.

To achieve this, a program was developed to update the existing groundwater monitoring network, gain an understanding of the groundwater regime specific to the project site and develop a groundwater model that can examine synergistic impacts from the quarrying and across the site, and allow for an understanding of long term steady state impacts from the site activities on the local groundwater resource.

1.5 Groundwater licenses

A water access license (WAL) issued under the Water Management Act 2000 is current. WAL24346 which has an annual allocation of 25 ML to take from the Sydney Basin Central Groundwater Source.

2 GEOLOGY AND GEOMORPHOLOGY

2.1 Regional Geology

The 1:100 000 Geological Series Sheet for Penrith shows that the geology in the vicinity of the Project Site comprises the Wianamatta Group of Triassic age, which is made up of shale and quarternary sediments along the adjacent creeks. The shale is a carbonaceous claystone, laminate, fine to medium grained lithic sandstone, rare coal and tuff that is separated into three principal geological units, namely the Bringelly Shale, Minchinbury Sandstone and Ashfield Shale.

The Wianamatta Group extends to a depth of up to 110 m within the southern Sydney Basin and is underlain by the Hawkesbury Sandstone which comprises a medium to coarse grained quartz rich sandstone.

The regional geology is dominated by the north-south trending Lapstone Monocline and Nepean Fault west of the Site, the Luddenham Dyke System, and a series of anticlinal and synclinal structures (Aecom, 2011).

2.2 Geomorphology

The Project Site rises within the central (65 m AHD) and southern (80 m AHD) site portions, and falls towards South Creek to the east (45 m AHD) and towards Badgerys Creek (50 m AHD) to the west. The Site is bounded on the eastern and western margins by South Creek and Badgerys Creek respectively.

The underlying topography of the site is relatively flat, however historical quarrying activities on the site have substantially altered the natural landform with various voids and elevated stockpiles present in the western part of the site. The most prominent of these landforms is a rehabilitated stockpile in the far west of the site, known as the 'Western Stockpile'. This stockpile of unusable material is approximately 200m x 125m, with an average height of 10m and has been revegetated with native grasses and trees. Other significant landforms on the site include the raw material stockpile in the centre of the site, as well as unusable materials stockpiles in the south and centre of the site.

Existing voids on the site comprise Pits 1, 2 and 3. The largest of these, Pit 1, is located in the west of the site and is used as the main water storage for the site. Pit 2, adjacent to Pit 1 is also complete and was previously partially backfilled. Pit 3 is an active pit where quarry campaigns were focused, prior to the site being mothballed. Three large sediment basins are located in the north and east of the site, along with two smaller dams in the vicinity of these basins.

Remaining land at the site is vacant, of which areas to the north and east of the brick making facility are leased for livestock grazing. The site is generally cleared of vegetation apart from the creek lines and some isolated stands of trees scattered across the site.

Badgerys Creek is an ephemeral drainage pathway and is regularly devoid of surface water, except for small isolated ponds. South Creek, containing stagnant water during the site inspection and fieldwork, is shown on the Perith geologicial map to be flanked by surficial Quaternary fluvial deposits comprising medium grained sands, clays and silts (Element Environmental, 2017).

The Project Site straddles a localised topographical high within the central north south trending subdued ridge (65 m AHD) with the land form dipping to the east towards South Creek east (45 m AHD) and towards Badgerys Creek (50 m AHD) to the west.

South Creek flows into the Hawkesbury River east of Windsor, and forms the eastern property boundary of the Project. South Creek is an intermittent surficial creek containing sediments of brown, silty sand and clay. Along the boundary with the Project site, the creek has a very gentle slope in the northern margin and steep incised edge on the southern extent. There is frequent erosion along the river edge. The creek is used to water cattle which graze on the eastern side of the Project Site.

Badgerys Creek is also located within the South Creek catchment and forms the western property boundary of the Project Site. Badgerys Creek is ephemeral with a thin veneer of fine grained, orange-brown sandy silt overlying claystone.

An overview map of the local topography is shown in Figure 2.1.

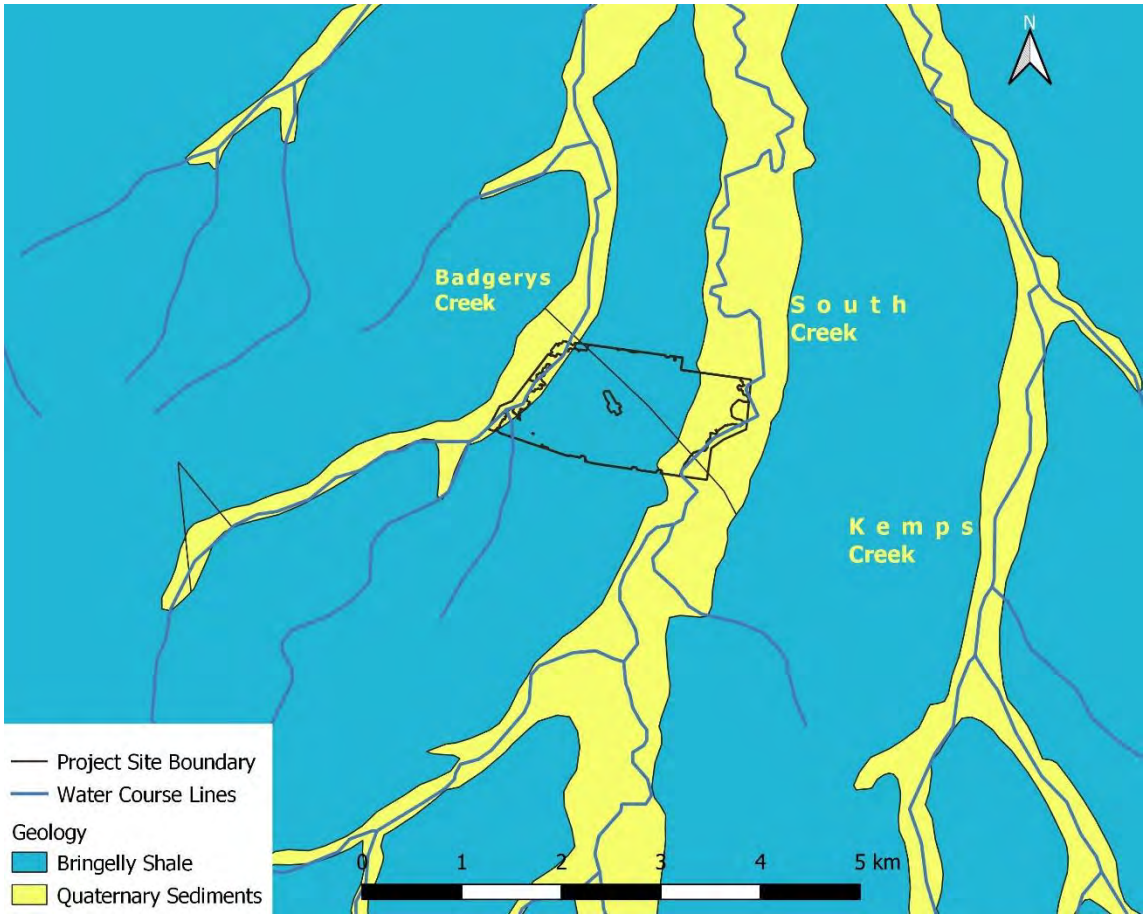

Figure 2-1: Local Geological Map

2.3 Geology

The geology in the vicinity of the Project Site comprises the Mid-Triassic Wianamatta Group. The sequence which is exposed at surface over most of the western and central Sydney Basin, west of Sydney. The Wianamatta Group is primarily comprised of shale, carbonaceous claystone, laminate and fine to medium grained lithic sandstone. Coal is found but is rare. Three distinct formations have been recognized within the Wianamatta Group and these include:

- Ashfield Shale: the upper most unit consisting of claystone, carbonaceous claystone, siltstone, laminite. sandstone and tuff. The unit has a maximum thickness within the Sydney Basin of 300m.
- Minchinbury Sandstone: a quartz rich lithic fine to medium grained sandstone which separates the underlying Ashfield from the Bringelly Shale.
- Bringelly Shale: the basal dark gray to black siltstone.

The Bringelly Shale is mined within the Project Site. The Wianamatta Group extends to a depth of up to 110 m within the southern Sydney Basin and is underlain by the Hawkesbury Sandstone which comprises a medium to coarse grained quartz rich sandstone with claystone, siltstone, minor shale and shale lenses and is known to contain significant amounts of groundwater in some parts of the Sydney Basin.

Quaternary sediments, primarily alluvial deposits of unconsolidated clays and silts with minor sand are present associated with Badgerys Creek to the east and South Creek to the west of the Project Site. These have been maooed on the Penrith 1:100,000 Geology map sheet to encroach 400m inside the Project Site boundary in the east associated with South Creek, and up to 150m in the west assocated with badgerys Creek. A review of the extent of alluvium is cinductuce late in th report.

Groundwater flow within the alluvial sediments is expected to follow topography and flow towards the creeks and it is likely that the alluvial aquifer is hydraulically connected to the creeks.

2.4 Structure

Previous investigations (Resource Planning, 1994) have indicated the presence of faulting which became apparent in early drilling programs and were revealed during excavation of Pit 1. Other structural defects such as large fractures can currently be observed in Pit 1. Some of which have calcite deposition resulting from precipitation from groundwater seepage.

3 HYDROGEOLOGY

3.1 Climate

The nearest long-term meteorological station is located at Prospect Reservoir around 5km to the northeast of the assessment area. Long term rainfall data for that station are provided in **Table 2.1**.

Table 3-1: Rainfall Data for Prospect Station 067019

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean (mm)	95.3	96.5	97.7	76.1	69.4	77.2	55.7	50.4	46	58.1	72.8	75.9	895.0
Mean Rain days	7.9	7.8	7.7	7.7	6.7	7.5	6.6	6.2	6.2	7.4	6.5	6.4	84.6

The annual rainfall at the Prospect site exhibits a moderate seasonal pattern with the highest mean rainfall occurring during the December to June period and lower rainfall between July and November. Evaporation data for the Prospect station are given in **Table 2.2**.

Table 3-2: Pan Evaporation Data for Prospect Station

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Total (mm)	199	123	118	77	51	31	44	75	112	111	163	180	1284

Although actual evaporation is generally only around 85% of the pan data, the above tables show that there is a clear annual rainfall deficit and potential evaporation exceeds rainfall for most months of the year, except during the May to July period.

3.2 Hydrogeological Investigation Programme

As the project site was an active quarry before being mothballed in 2011, there are geological records from previous drilling campaigns which provides considerable insight into the local geology and hydrogeology. Several groundwater monitoring bores were also previously installed, however there are no records of construction details nor is there any temporal data for groundwater levels or geochemistry. Groundwater levels are relativity close to surface and will be intersected during mining activities associated with the project.

This investigation program has been designed to gain an understanding of the geometry of the sub surface water table and to the physical hydraulic properties of the host rock formation, primarily hydraulic conductivity.

The drilling program was designed to target shallow weathered shales / colluvium / alluvium adjacent to South Creek. and Badgerys Creek and also shales at levels comparable to basal excavation design depths. To achieve this, paired standpipe piezometers were installed at 4 locations with screens installed to depths of approximately 6m and 33m respectively.

The aim being to investigate any presence of alluvium and associated groundwater with South Creek or Badgerys Creek and, to test connectivity between any shallow groundwater resource and a deeper system within the shale.

3.3 Drilling and Piezometers Installation

A total of 8 new standpipe piezometers have been installed to augment monitoring installations in place from previous programs. Drilling was undertaken by Highland Drilling using a track mounted multi-purpose rig set up with 110mm auger flighted drill rods and air core rods utilising a 110mm air hammer with an auxillary compressor. Monitoring instalation are 50mm Class 18 tubular PVC with screened intervals. The locations of the standpipe piezometers are shown in **Figure 3.1**.

Paired standpipes (**Figure 3-1**) were installed at multiple locations which aimed to investigate separation of groundwater or the existence of perched water tables between the shallow regolith and the base levels of the proposed excavations (near to the base of the Bringelly Shale). The program also aimed at investigating the presence of alluvium that may be associated with either South Creek or Badgerys Creek.

Lithology encountered in recent drilling included claystone and shales consistent with the Bringelly sub group. In BW4 adjacent to South Creek on the northern eastern boundary a weathered fine grain sandstone was encountered at 3m depth.

Lithologies intersected included claystone, siltstone, sandstone and carbonaceous claystone. It is noted that laminate, tuff and minor thin coaly bands have been encountered in previous core drilling programs. The Cobbitty Claystone which marks the base of the Bringelly Shale has also been encountered in previous programs is a thin light brown to white, waxy weathered tuff which is typically found within 3 metres of the top of the Minchinbury Sandstone and is regarded as a significant time marker horizon. Drilling in this most recent program was limited to 33m depth and this unit was not encountered (**Table 3-3**).

Figure 3-1: Location of Groundwater Monitoring Bores

Table 3-3: Installed Groundwater Monitoring Bores

Site	Easting	Northing	Depth Installed (m)	Screen Interval (m)	Surface Elevation (mAHD)	SWL*** (mbtoc)	SWL*** (m AHD)
BW1a	291741	6247174	8	5-8	56.06	6.11	50.67
MW4*	291750	6247169	28	22-28**	56.43	6.85	49.85
BW2a	291911	6247442	8	5-8	56.29	3.58	53.36
BW2b	291914	6247440	33	27-33	56.40	11.25	45.82
BW3	292585	6247552	33	27-33	64.10	12.13	52.63
BW4a	293602	6247294	6	3-6	49.04	3.89	45.86
BW4b	293602	6247295	33	27-33	49.06	2.43	47.41
BW5a	293098	6246559	7	4-7	45.56	4.09	43.18
BW5b	293098	6246561	33	27-33	46.51	2.64	44.57
MW1*	292250	6246990	31	25-31**	63.99	14.83	49.94

* Pre-existing bore
SWL – Standing Water Level
(mbtoc) – meters below top of casing
**No records of bore construction available. Screen length assumed at 6m
*** Water levels as of 25/9/18

3.4 Groundwater Levels

Recorded groundwater levels in the updated monitoring network have a limited temporal span. However, with little changing stresses in the past decade, the static water levels show the existence of steady state conditions.

Figure 3.2 shows static groundwater levels for recently installed and previously existing monitoring bores which have been incorporated into the updated groundwater monitoring network. Newly installed monitoring bores are designated BC and previously installed are designated MW.

BC1, adjacent to MW4 is located in close proximity to the south-east corner of Pit 1. It lies within 30m of the top of the batters and approximately 60m from stored water level. Groundwater levels are similar at 6.11m and 6.85m below ground level (bgl) respectively. These levels are close to the base level of Badgerys Creek and significantly above ponded water levels within Pit 1. This indicates a very steep drawdown cone occurring towards the excavation which has been open since the project was mothballed in 2008.

BC2a and BC2b is a paired standpipe piezometer site, located adjacent to Badgerys Creek, but set back from an Aboriginal Heritage site identified for protection. Here we see the largest separation between screened intervals, with a shallow water table over 7m above the base of shale. Note, the recovery time for BC2b (in excess of 1 week) following initial sampling which indicates the inherent very low hydraulic conductivity of the shale unit.

BC3 is located on the northern boundary of the Project Site. Static groundwater levels are approximately 12m below ground level.

Two paired sites installed adjacent to South Creek (GW4a, b and GW5a, b), show groundwater pressures at depth are higher than the shallow surficial water table indicating a disconnection and an upward pressure gradient. This indicates that the groundwater at the base of the shale is not in connection with either the shallow water table or South Creek.

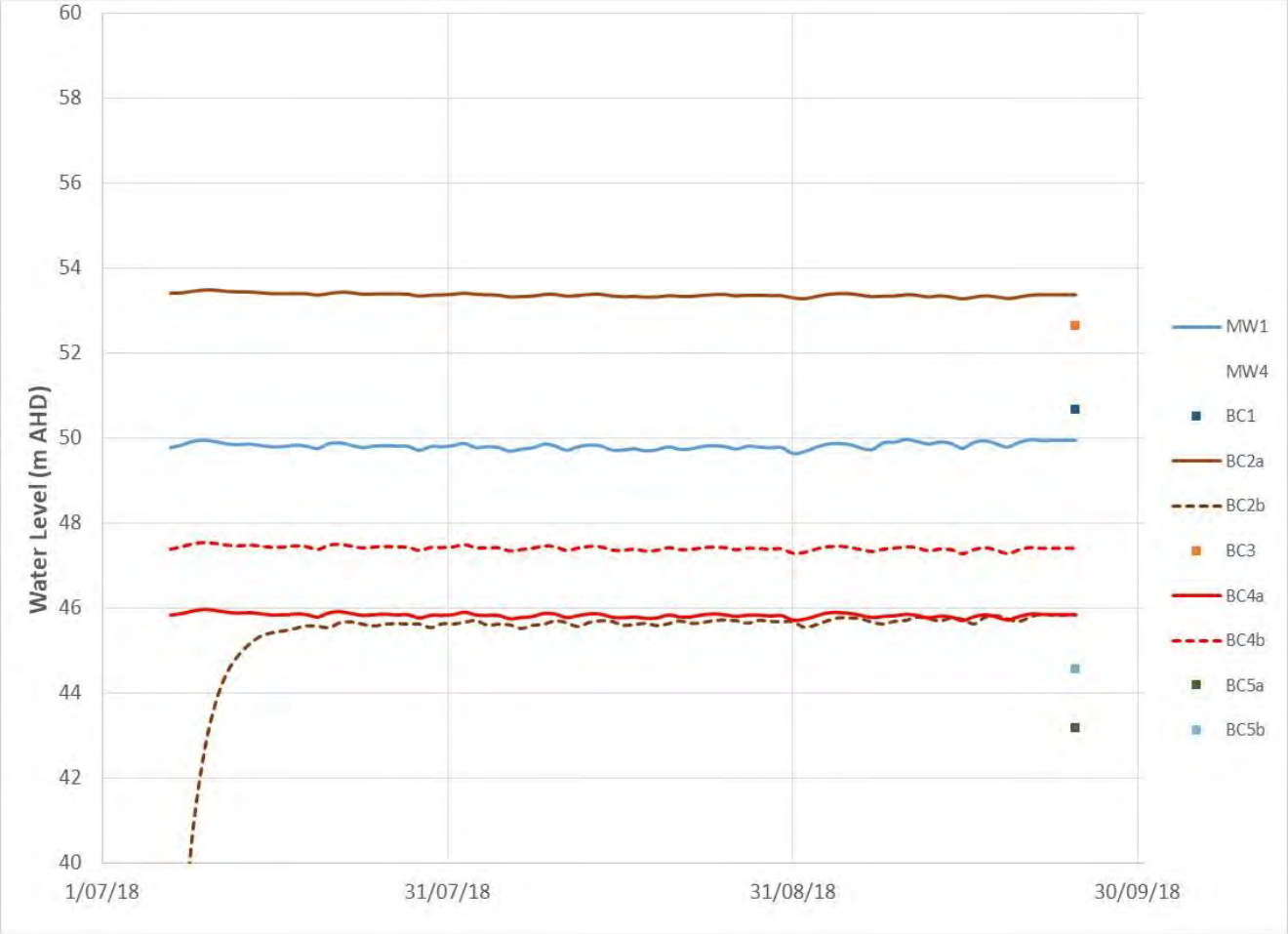

Figure 3-2: Groundwater Levels

3.5 Groundwater Loggers

Groundwater level loggers have been installed in five monitoring bores to allow baseline trends to be collected and as a management tool for future operational requirements. These have been installed in BW2a, BW2b, BW4a, BW4b and BW6. These have been set to log water levels on a daily frequency. GES provided the logging equipment and provided training to PGH's Environmental Manager. Future monitoring will be undertaken by PGH personnel in accordance with the Water Management Plan.

3.6 Groundwater Quality

Water quality data obtained from newly installed piezometers is summarised in **Table 3.4**. Water samples were collected for field analysis of pH and electrical conductivity (EC), and for laboratory testing of the following comprehensive suite of analytes:

- pH, EC and total dissolved solids (TDS);
- Major cations and anions; and
- Dissolved metals (Aluminum, Arsenic, Chromium, Copper, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Zinc, Boron, Iron).

The laboratory analysis was undertaken by ALS Environmental, a NATA-accredited laboratory based in Sydney. All groundwater tested for inorganic analytes reported below applicable

criteria, with the exception of iron in BC3 and BC4b, and manganese in BC1 and BC4a (highlighted red in Table 3-4).

Assessments of groundwater and surface water quality can be useful in understanding conceptual hydrogeology, particularly in relation to EC and Piper diagram plots. Different strata horizons can demonstrate differing amounts of salinity, which tend to be low in areas of high recharge or connectivity with surface waters. Piper plots provide an assessment of the recharge-discharge processes, and also allow a comparison of water samples derived from different environments within the hydrological cycle. Recently-recharged water tends to plot closer to the left-hand apex of the diamond field in the Piper diagram, and waters further from the source of recharge closer to the right-hand side.

Figure 2.8 shows a composite Piper plot of the groundwater samples from the project area. The plot shows that all samples are grouped close to the right-hand side of the diagram indicative of a sodium chloride type groundwater.

The piper diagram shows results of sampling divided into shallow and deeper installations which have little in variability between them.

Table 3-4: Analytical Groundwater Chemistry Results

	BC1	MW4	BC2a	BC2b	BC3	BC4a	BC4b	BC5b	MW1
pH	6.97	7.3	6.92	7.12	7.1	7.68	7.05	7.14	7.12
Electrical Conductivity µS/cm	28800	24900	31600	21700	23100	20000	20700	21100	10200
Total Dissolved Solids	17200	18200	24700	13300	13700	13800	13000	14200	5130
Hydroxide ($CaCO_3$)	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate ($CaCO_3$)	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	256	675	224	815	637	526	799	646	469
Total $CaCO_3$	256	675	224	815	637	526	799	646	469
Sulfate as $SO4^-$	1320	1050	816	341	53	210	<1	<1	398
Chloride	10400	8600	11500	7490	8290	6940	7290	7540	3120
Calcium	112	254	103	429	486	232	483	671	110
Magnesium	1170	912	1340	388	411	453	311	328	291
Sodium	5070	4300	5570	4020	4110	3550	3770	3670	1600
Potassium	10	15	3	55	71	11	65	71	23
Aluminum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	<0.001	0.001	<0.001	0.044	0.005	<0.001	0.009	0.003	<0.001
Chromium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	0.008	0.002	0.082	<0.001	<0.001	0.001	<0.001	0.364	0.017
Lead	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	4.02	0.436	0.662	0.742	0.541	1.92	0.2	0.252	0.265
Molybdenum	0.002	<0.001	<0.001	0.001	0.002	0.001	<0.001	0.002	0.004
Nickel	0.106	0.004	0.024	0.003	0.002	0.061	0.003	0.082	0.042
Selenium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silver	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	0.141	0.015	0.027	<0.005	<0.005	0.207	0.03	0.081	0.015
Boron	<0.05	0.06	<0.05	0.19	0.15	0.14	0.07	0.06	0.08
Iron	<0.05	<0.05	<0.05	0.08	0.66	<0.05	0.78	<0.05	<0.05

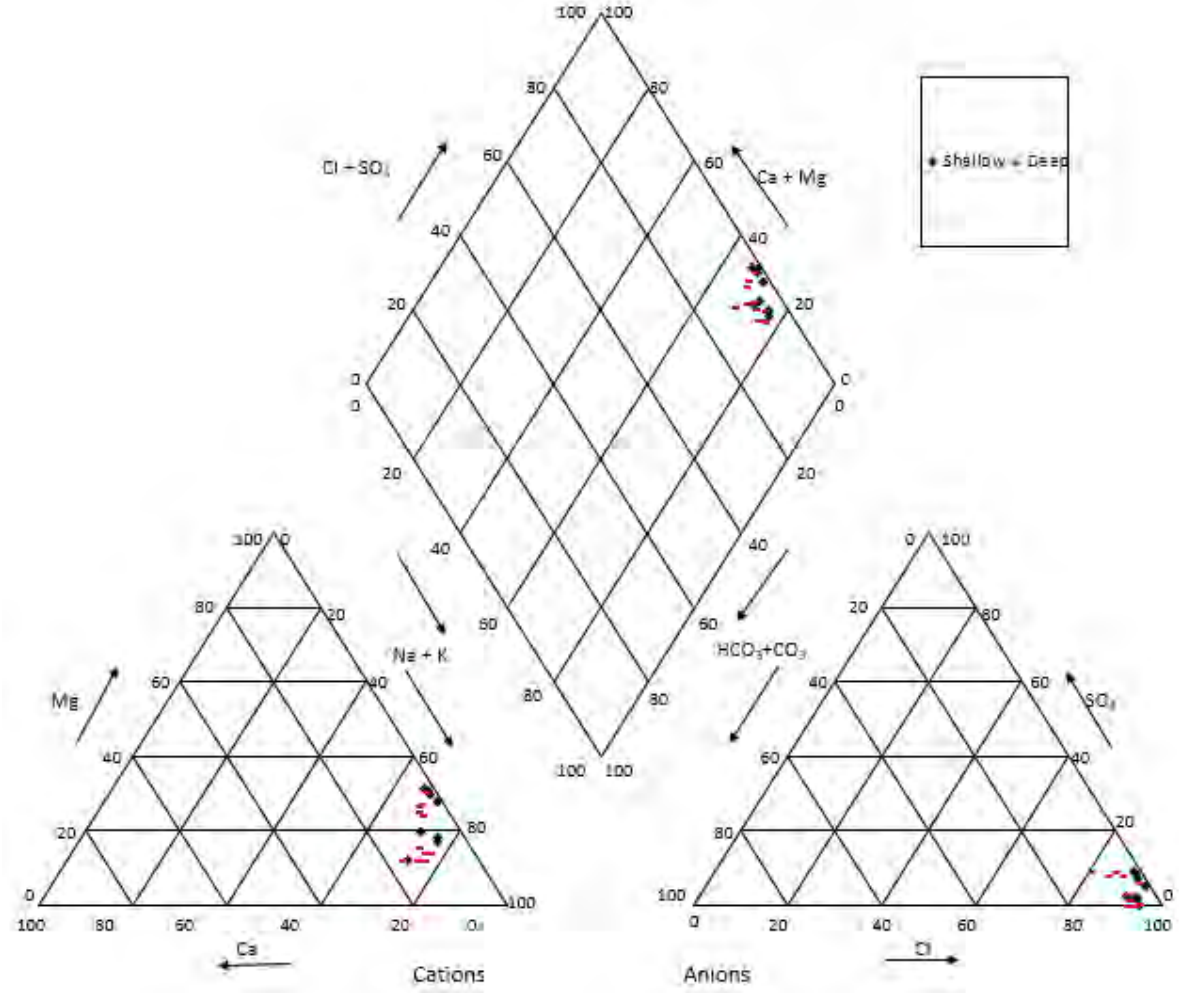

Figure 3-3: Piper Diagram

3.7 Hydraulic Testing

Falling head or conversely rising head slug tests are common testing methods used to determine the permeability of fine to medium grained sediments such as clays, silts and fine to medium grained sands. A slug or fixed object such as a solid tube of smaller diameter than the bore casing is lowered, displacing a volume of water, or a slug of water is removed or pumped out of the borehole. As water levels recover, the resultant recover curve can be subjected to a number of empirical methods to establish an estimate of permeability (hydraulic conductivity). Hydraulic conductivity being the potential rate of transmission of groundwater through the subsurface and is measured by units of distance and time.

Software has been used to aid this process. AQTESOLV software used for the analysis of aquifer tests (pumping tests, constant-head tests and slug tests) employs curve matching techniques. The results of these are locate in Appendix B

Slug test provide estimates only because the method only tests the host soils in close proximity to a borehole. Slug tests were used along with short term low flow constant head pump tests (CRT) where permeability and yield were higher in relative terms.

Slug were undertaken on the new standpipe piezometers following installation to obtain estimates of hydraulic conductivity. The data was analysed using the Bouwer-Rice method (Bouwer and Rice, 1976) for the tests on shallower installations (weather shale / colluvium), and the Hvorslev Method (Hvorslev, 1951) for tests on confined aquifers. For bores where higher yields were encountered, A fractured Moench Model was used to gain curve matching in the case of BC5b.

A summary of the derived hydraulic conductivity values is presented in **Table 2.2**. Curve matching results of falling head tests are presented in Appendix A.

Table 3-5: Slug Test Results

Bore	Test Method	Hydraulic Conductivity K (m/d)*
BW1a		N/A
BW2a	Slug	6.5×10^{-3}
BW2b	Slug	2.9×10^{-3}
BW3	Slug	6.5×10^{-3}
BW4a	Slug	4.2×10^{-3}
BW4b	Slug	9.5×10^{-3}
BC5a	Slug	4.3×10^{-3}
BC5b	CRT	1.3

* m/d - meters per day

Aquifer testing shows that hydraulic conductivities within the Bringelly shale are relatively consistent with the exception of the result in BC5b. This is indicative of hydraulic conductivity for the shale being in the order of 5.5×10^{-3} m/d. The result in BC5b was analysed by curve matching using a Moench fractured aquifer model which suggests that the drilling intersected a fracture network with the result not being indicative of the shale.

3.8 Alluvial Mapping

Figure 2.1 shows local surface geology as expressed in the 1:100 000 Geological Series Sheet for Penrith. This has the extent of quaternary sediment (alluvium) extending a footprint onto the Project site which is significant adjacent to south Creek where alluvium is mapped 400m from South Creek within the Project Site boundary. The footprint is less associated with Badgerys Creek, although this area is important cosidering the proposed location of Pit 5 (adjacent to Badgerys Creek) and a required off set from alluvium associated with the creek.

Although detailed drilling investigations to delineate the boundary of alluvium associated with South Creek and Badgerys Creek has not been undertaken, the recent drilling to expand the groundwater monitoring network and field observations has been informative. In all new drill holes, no alluvium has been encountered apart from potentially the upper 0.5m at BC4 which appeared as a silty topsoil overlying a weathered sandstone. At all other locations, a weathered siltstone / shale was encountered at depths of less than 2m overlain by a weathered regolith.

Along South Creek, there are a number of terraced levels before the landforms rise to the west. However, shale is encountered immediately below the surface at BC5 and can also be

observed in the steep banks of South Creek adjacent to BC5, this shows that in the southern portion of the South Creek boundary, the creek is incised into the Triassic shale unit.

Similarly, to the north at monitoring site BC4, a clay and clean weathered fine sandstone at shallow depth provides little evidence of quaternary sediments which would be in connection with South Creek and absolutely no evidence of saturated alluvium. There are low lying areas adjacent to South Creek which will likely have saturated alluvium and the is an embayment mid-way along the eastern Project boundary that is low lying, has swampy peaty soils and likely does contained sediment associated with South Creek that is partially saturated. **Figure 3.4** shows an updated assessment of the extent of alluvium associated with South Creek.

Alluvium has also been mapped at Badgerys Creek in the 1:100 000 Geological Series Sheet. Drilling adjacent to the Creek was not possible due to a herritage buffer zone. However, similar to what wasobserved near South Creek, drilling in this area revealed weathered shale just beneath a shallow cover of top soil. There is little doubt that this also applies to the area adjacent to Badgerys Creek and Pit 5. The banks of Badgerys Creek are not as incised as that seen on South Creek near BC5. However, weathered clays do appear in the banks and deposited alluvium is limited to the base of the creek. **Figure 3-5** shows the base of the creek and alluvial sediments.

In both Badgerys and South Creeks bordering the project Site, there is little evidence of an alluvium footprint encroaching beyond the extent of the creek itself. Any flood related deposition appears to be limited to the upper meter of the soil profile and is not saturated or in connection with either creek system.

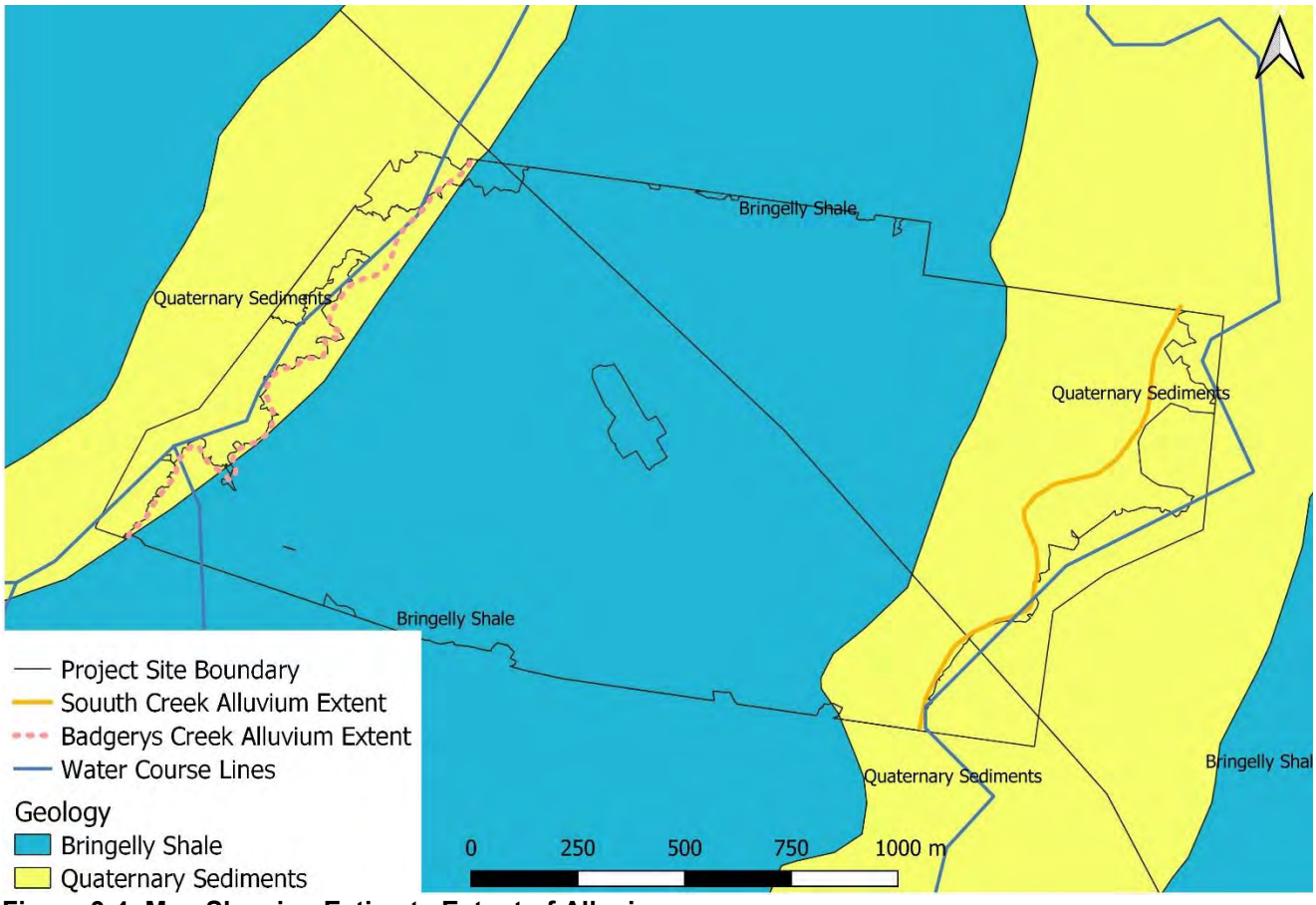

Figure 3-4: Map Showing Estimate Extent of Alluvium

Figure 3-5: Badgerys Creek Channel

4 GROUNDWATER MODEL

4.1 Objective

The key objective of the model is to simulate the local hydrogeological environment and quantify the impacts on the groundwater resource from groundwater seepage in to the various excavation voids associated with the project and any baseflow impacts on either Badgerys Creek or South Creek,

4.2 Model Code and Complexity

Numerical modelling to date has been undertaken using the Groundwater Vistas software interface (Environmental Simulations) in conjunction with MODFLOW-SURFACT (Hydrogeologic). MODFLOW-SURFACT is an advanced version of the MODFLOW code.

The groundwater model is Low Complexity (under the MDBC Guidelines) with a Class 1 Confidence Level (under the NWC guidelines). It provides an assessment of the existing groundwater system status and predicts the potential effects of shale excavation in the conceptual excavation plan.

4.3 Model Domain and Discretisation

The model domain is discretised into 302,400 cells comprising 180 rows, 240 columns and 7 layers. The dimensions of the model cells are 25 m in both lateral directions. The model extent is approximately 4.5 km from west to east and 6 km from south to north, covering an area of approximately 27 km^2. **Figure 4-1** shows the extent of the groundwater model domain.

Figure 4-1: Current Model Domain

4.4 Model Layers and Geometry

Seven model layers represent a reasonably uniform stratigraphic profile. Layer thickness includes:

- Layer 1 at 5m.
- Layer 2 at 2 m.
- Layer 3 variable thickness
- Layer 4 at 1m.
- Layer 5 at 15m.
- Layer 6 at 23m.
- Layer 7 at 10m.

4.5 Topography

Topography for the model domain utilised Project Site survey data (1m contours) which was spliced into the Space Shuttle Radar Topography Mission (SRTM99) data outside the Project Site boundary. The resolution for the SRTM data is one arc second (30 m). This was then interpolated to the 25m grid.

4.6 Boundary Conditions

Model boundaries should be placed at such a distant that they do not interfere with applied stresses and visa-versa. As noted above, the boundaries are relatively close in this model which has the benefit of limiting model extent, but they must still contain enough distance to not affect the results.

The model extent is a factor of conceptualization where the very low hydraulic conductivity of localised geology limits the areal extent of any stresses.

The geomorphology of the Project Site is bounded by South Creek in the east and Badgerys Creek in the west and to these creeks conceptually are discharge pathways for local shallow geology. The two creek systems drain towards the Hawkesbury River, located approximately 10kms to the north and it is likely that flow directions are influenced by the shallow gradient of this system.

The local groundwater table surface is a subdued reflection of surface topography and is likely to be the largest influence on local flow directions. Not considered, and which could be influential, is a boundary condition causing upward vertical pressure gradients which potentially exist given the results obtained from the paired standpipes adjacent to South Creek.

The boundary conditions of the model consist of:

- General head boundaries representing the assumed sub regional drainage inflow and outflow areas north and south of the Project Site and offset by 2kms;
- Stream boundaries representing the Badgerys Creek and South Creek with stream stage set 1m below surface.

4.7 Recharge and Evapotranspiration

Recharge in the preliminary model was set at 2% of rainfall from BoM data for Prospect across most the model domain which equates to 4.9×10^{-5}m/d. Evapotranspiration was applied uniformly to the model with rate of 5.4×10^{3}m/d m/d and a shallow extinction depth of 4m.

4.8 Hydraulic Properties, Specific Yield and Porosity

The most influential physical property affecting flows within the model is hydraulic conductivity and the basis for values used were estimates from testing of hydraulic conductivity undertaken on recently installed monitoring bores.

Other physical properties of the model such as Specific Yield (Sy) / Specific Storage (Ss) or porosity are based assumptions from typical general ranges for the similar lithologies.

There is good supporting information from monitoring data adjacent to Pit 1, showing a steep drawdown in the surrounding rea, supporting the low average values of hydraulic conductivity (K) that were found. So, there is a high level of confidence on the aquifer test results. These values were used as the basis for calibration model runs for layers within excavation depths range. Some variation occurring while manipulating K during calibration

No other testing was undertaken that allowed assessment of specific yield (Sy) or porosity. However, it is well understood that variability of K is going to cause the most sensitivity to inflow rates to excavations and connectivity with boundaries such as the creek systems.

4.9 Model Calibration

Steady state (or baseline 'long term') calibration was achieved using spot groundwater elevations form the updated groundwater monitoring network.

Calibration is the process where the reliability or accuracy of the model is tested by assessing how well it is able to reproduce or match historically observed groundwater records. One measure of calibration performance is to use statistical methods such as SRMS (Scaled Root Mean Square). A target 5% SRMS or less suggested in the MDBC flow model guidelines (MDBC, 2001). The more recent Australian Groundwater Modelling Guidelines suggest a more qualitative approach is more useful rather than strictly relying on the quantitative measures. However, the statistical calibration results are still very useful for making comparisons between the various sensitivity / uncertainty approaches.

Calibration accuracy was limited by the sparse groundwater data available. However, calibration was carried out against 10 targets, using manual modification of zones and model parameters. Steady state calibration performance achieved a 3.0% Scaled Root Mean Square (SRMS), which is below the target 5% SRMS suggested in the MDBC flow model guidelines (MDBC, 2001). However, it is also notable that as Pit I has been an open excavation for an extended period, there is a qualitative aspect as we know there is a very tight drawdown cone around Pit o1 from the monitoring bore water levels.

The scatter diagram of measured versus modeled groundwater level targets is plotted in Figure 4-2. The model is reasonably well balanced against the measured targets (i.e. there is no systematic under or over prediction).
Table 4-1 summarises the final calibrated hydraulic conductivities.

Mass balances were generally good, at less than 4% imbalance for the base case steady state run. The model was generally stable and relatively insensitive to most model parameters.
Some of the parameters did have a large potential influence, but the values selected were realistic and represented the best fit for the model calibration.

The groundwater table contours for the base case model is shown in **Figure 4-2**. Water levels show subdued reflection of topography with a steep drawdown cone surrounding Pit 1 which

can be observed in groundwater levels within active monitoring point GW1 and MW4, MW1 and the out of service MW2.

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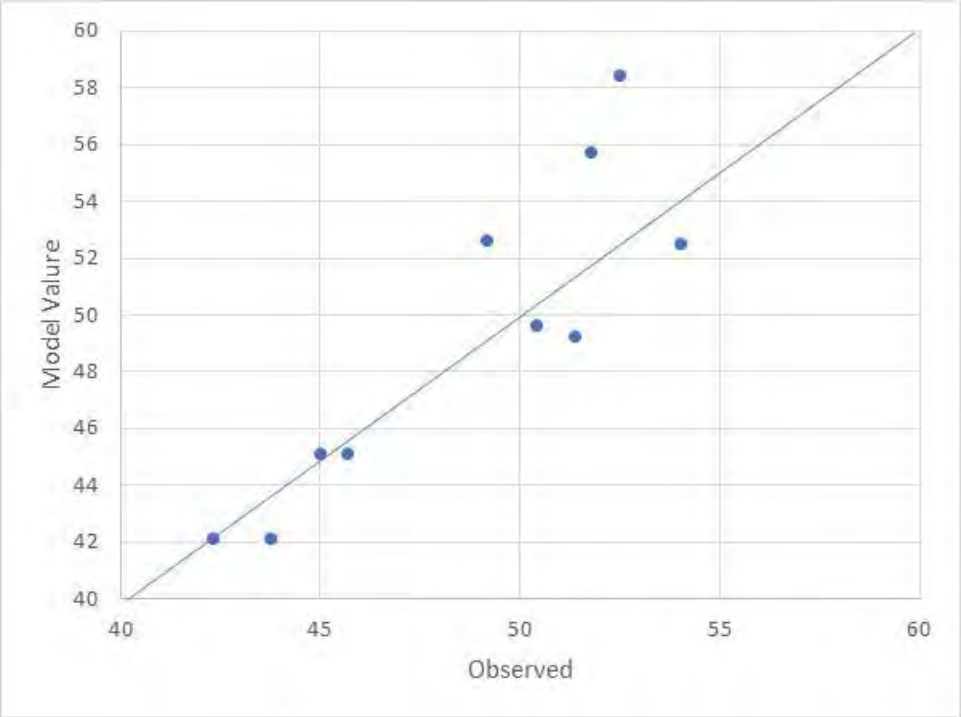

Figure 4-2: Calibration Performance

Table 4-1: Calibrated Hydraulic Conductivities [(m/day)

Layer	Lithology	Zone	Horizontal Hydraulic Conductivity (Kx)	Vertical Hydraulic Conductivity (Kz)
1	Alluvium	8	1	5.0×10^{-1}
1	Colluvium / Regolith	1	1×10^{-1}	5.0×10^{-2}
2	Bringelly Shale	2	8×10^{-3}	1.0×10^{-3}
3	Bringelly Shale	3	5×10^{-3}	1×10^{-3}
4	Bringelly Shale		3.0×10^{-3}	1.0×10^{-3}
5	Bringelly Shale	4	1×10^{-5}	1×10^{-5}
6	Bringelly Shale	6	1×10^{-2}	1×10^{-3}
7	Cobbity Sandstone	7	5×10^{-3}	1×10^{-4}

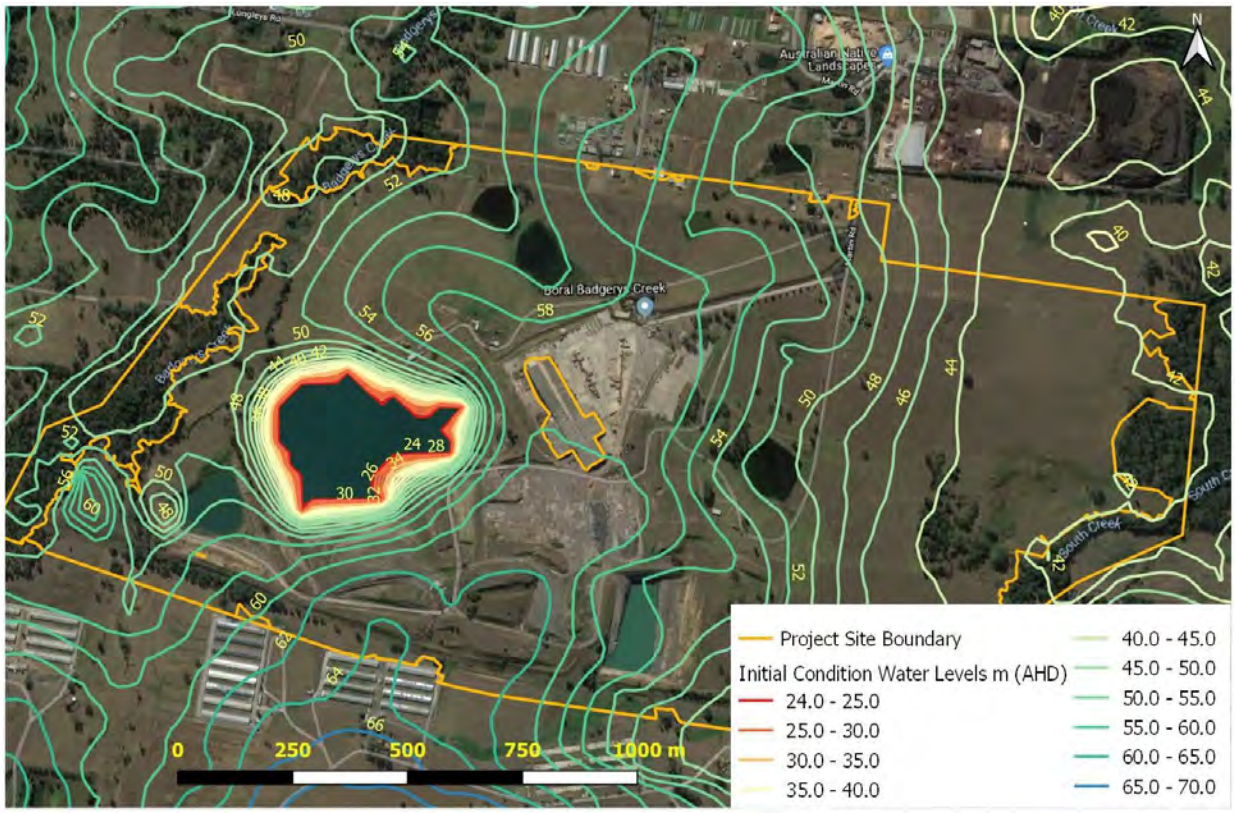

Figure 4-3: Calibrated Water Levels

4.10 Steady State Calibration Model Water Balance

There are multiple opportunities for groundwater to discharge from and recharge to the groundwater system and groundwater model. Those implemented in the model will include:

- Storage
- Drains (Seepage / Inflow)
- Recharge (Direct Rainfall)
- Et (Evapotranspiration)
- Stream flow (Leakage/Baseflow)
- Head Dependent Boundary (GHB)

Given the modelling approach is focused on long term static effects of post extraction voids, in steady state conditions, storage is not included in the water balance accounting. **Table 4-2** provides principal components of the model water balance for the base case calibration model. Current inflow to Pit 1 at 17 m^3/d is a very small component of the overall balance.

Table 4-2: Calibration Model Simulated Water Balance

Component	Inflow (m^3/d)	Outflow (m^3/d)
Drains (Pit Inflow)	-	14
Recharge (Direct Rainfall)	1323	0
ET(Evapotranspiration)	-	1311
River (Leakage/Baseflow)	106	106

Component	Inflow (m^3/d)	Outflow (m^3/d)
Head Dependent Boundary	74	88
Total	1503	1539
Discrepancy	-2.66%	

4.11 Pseudo Steady State

The model was converted to a pseudo steady state whereby runs are in a transient format but with no changes in stresses applied. That being steady state conditions using the steady state model results as initial conditions. This allows additional parameters such as storage and specific yield, for which there is no information, to be tested for sensitivity and test any variability to seepage rates under transient mode.

Component	Inflow (m^3/d)	Outflow (m^3/d)
Storage	0	0
Drains (Pit Inflow)	-	20
Recharge (Direct Rainfall)	1323	0
ET(Evapotranspiration)	-	1310
River (Leakage/Baseflow)	88	118
Head Dependent Boundary	74	88
Total	1485	1537
Discrepancy	-3.43%	

4.12 Sensitivity Analysis

Sensitivity analysis is the process of identifying the model parameters that have the most effect on model calibration or on model predictions. Within the Groundwater Vistas software, there is the ability to undertake an automated sensitivity. The automatic sensitivity analysis procedure is a very useful calibration tool aid.

Auto sensitivity analysis was carried out in order to examine the sensitivity of the model calibration to variations in Kh, Kv, SS, Sy and recharge in each of the model zones. Summary graphs of the auto-sensitivity results for the final steady state model are provided in Figure 4-4 and Figure 4-5. Model runs were undertaken with multipliers of the various model parameters chosen. For in Kh, Kv, SS, Sy, multipliers of 0.1, 0.5, 1, 5, and 10. Intis way, a selected model parameter is varied by plus and minus 1 order of magnitude. Recharge multipliers included 0.5, 1, 2, 5, 10. This equates to a range of 50% to 20% of total rainfall from the Prospect Reservoir meteorology station.

The graphs show multipliers vs calibration statistics. In this case using an average residual from the base case calibration water levels. The multiplier 1, represents the base case. If a multiplier causes a residual value falls below the base case, there is an argument for updating the calibrated values. Above the base case, and the analysis demonstrates that the appropriate parameter value has been used.

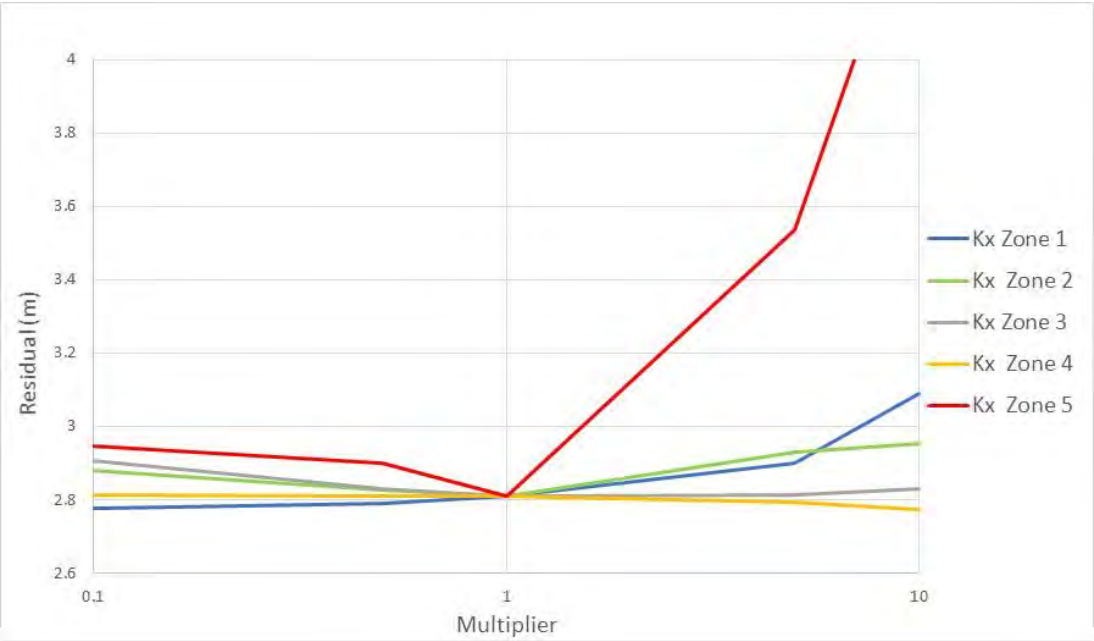

Figure 4-4: Horizontal Conductivity Sensitivity

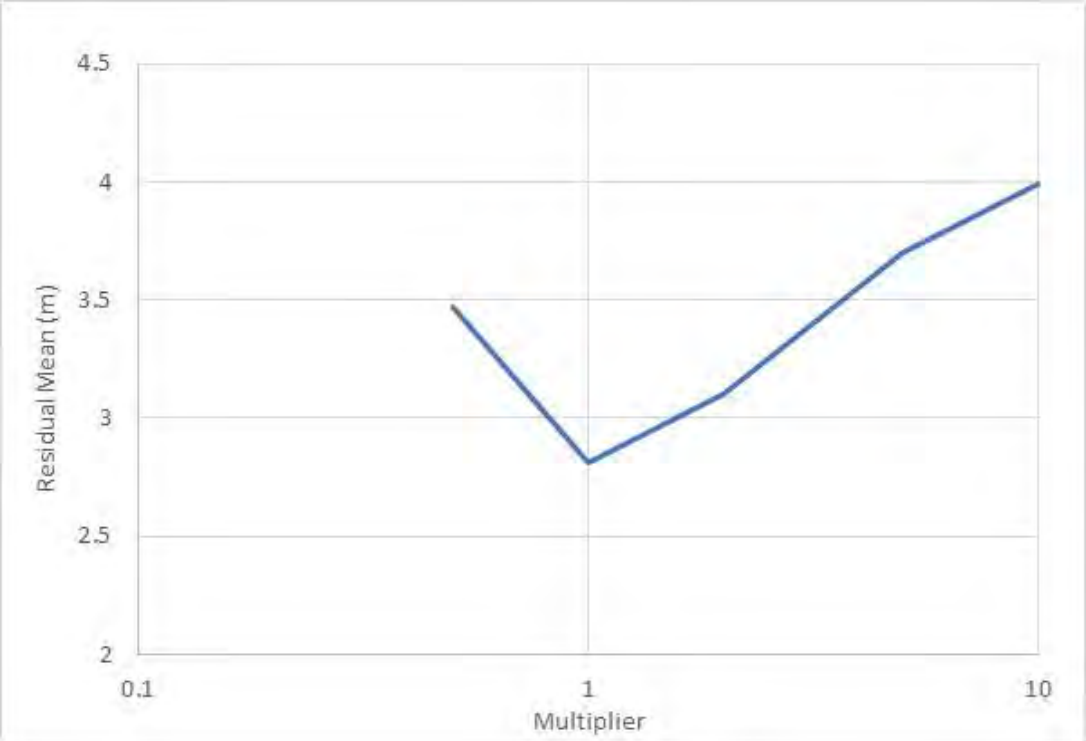

Figure 4-5: Recharge Sensitivity

Horizontal conductivity (Kh) was generally not a sensitive parameter, although there was some sensitivity to the assumed horizontal permeability. The graph clearly shows that optimum values were selected for each zone within the model. Kz was most sensitive to Zone 5 (Layer 5), which represents the lowest level of shale to be excavated. The model was also sensitive to Zone 1 (Layer 1), which surficial colluvium / weathered shale.

The model was sensitive to recharge which is clear form **Figure 4-5**.

4.13 Project Excavation Proposal

Mining / quarrying activities at CSR Advanced Manufacturing Hub is expected to have a duration or 30 years. A proposed excavation plan footprint is showing in Figure 4-6. Excavation activities associated the brick making facilities is expected to be re-initiated in 2018 (Mine year 1) with progression of excavation as follows:

- Potential additional quarrying in Pit 1 if suitable material is present. Pit 1 has been an open void since previous quarry activates ceased. This assessment has included this additional excavation. Backfilling of Pit 1 is anticipated to be at 40% levels by Year 10 and complete by approximately Year 15.
- Continued quarrying of Pit 3 (existing partially excavated pit) including the lateral progression of the pit towards the east as shown in Figure 4-6 starting in Year 1 and complete by Year 7.
- Establishment of proposed Pit 4 would commence in approximately 2014. It is anticipated that extraction from Pit 4 which would start in Year 8 and continue until approximately Year 16 – 18. This excavation will remain as an open void at the completion of Project Sit activities.
- Establishment of proposed Pit 5 would commence in approximately Year 18. It is anticipated that extraction from the Pit 5 would continue until approximately Year 29. Backfilling would begin at approximately Year 25.
- Pit 2 has been excavated as part previous site activities and partially backfilled. Completion of backfilling

Figure 4-6: CSR Advanced Manufacturing Hub Excavation Layout Plan

4.14 Predictive Modelling

Proposed operations will involve continued extraction of raw materials from Pit 3 to an approximate depth of 35m and the establishment of two additional excavations. Pit 4 (approximately 14 ha) and Pit 5 (Approximately 20 ha) with depth of approximately 35 m.

Figure 4-7 shows extraction area relative to the Project Site boundary. Notes also that there is the possibility of extracting additional material in pit 1 and extract material to 35m if appropriate clay is available. This elevation has been included in the predictive model.

Drain cells were used in all layers within the excavation footprints with drain levels in set to the design levels in lowest layer, and to 01.m above layer base in overlying layers.

Initial conditions which is the result of calibration is shown in **Figure 4-3**. Figure 4-7 shows water table groundwater levels at Tear 5. Levels have recovered over Pit 2. Excavation has started (recommenced) in Pit 3.

Figure 4-8 shows Year 7 with progression of Pit 3 in an easterly direction. Figure 4-9 shows Year 10. Pit 3 is complete, and excavation has started in Pit 4 although design depths have not been reached.

Figure 4-10 shows water levels at Tear 15. Pit 1 has been partially backfilled and there is recovery of water levels associated. Pit 4 is progressing in a northerly direction.

Figure 4-11 shows levels at Year 20. Pit 4 is complete, and excavation has been initiated in Pit 5.

Figure 4-12 shows conditions at Year 25. Pit 5 is progression in a westerly direction. Pit 3 has been backfilled and rehabbed with water levels near full recovery. Pit 1 backfilling continues with recovery of water levels closely following behind.

Figure 4-13 shows conditions at the completion of operational activities at Year 30. Pit 5 has been back filled with partial recovery. Water levels in the footprint of Pit 1 near full recovery. Pit 4 remains an open void.

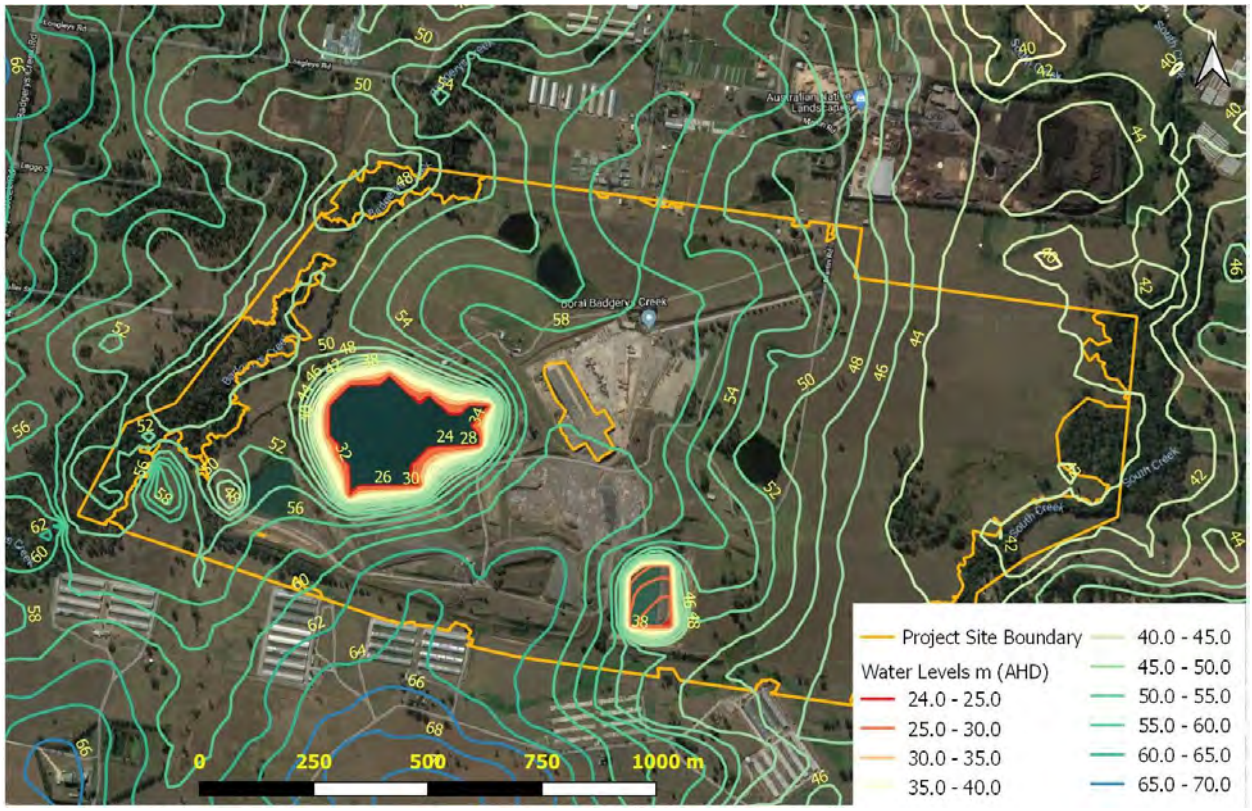

Figure 4-7: Groundwater Levels Year 5

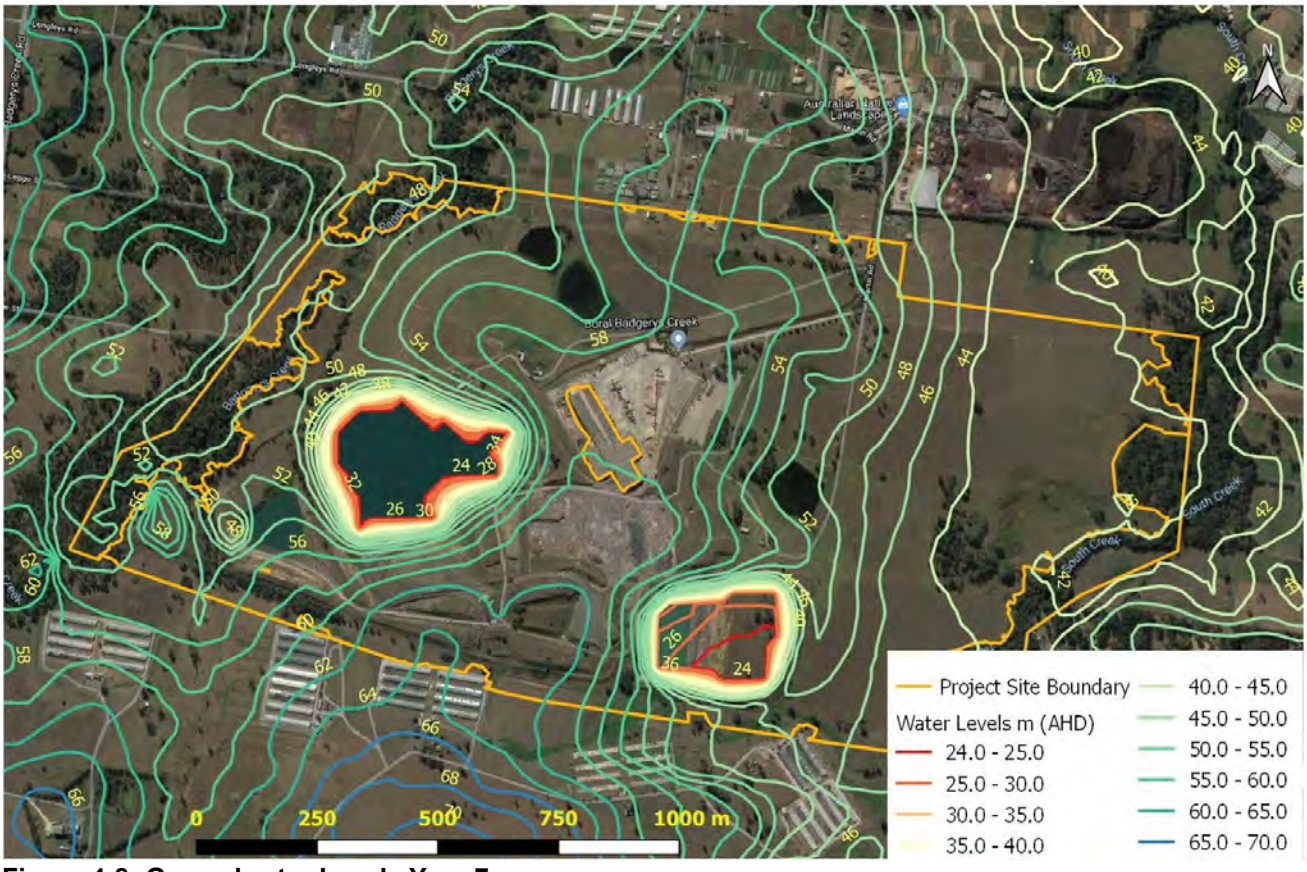

Figure 4-8: Groundwater Levels Year 7

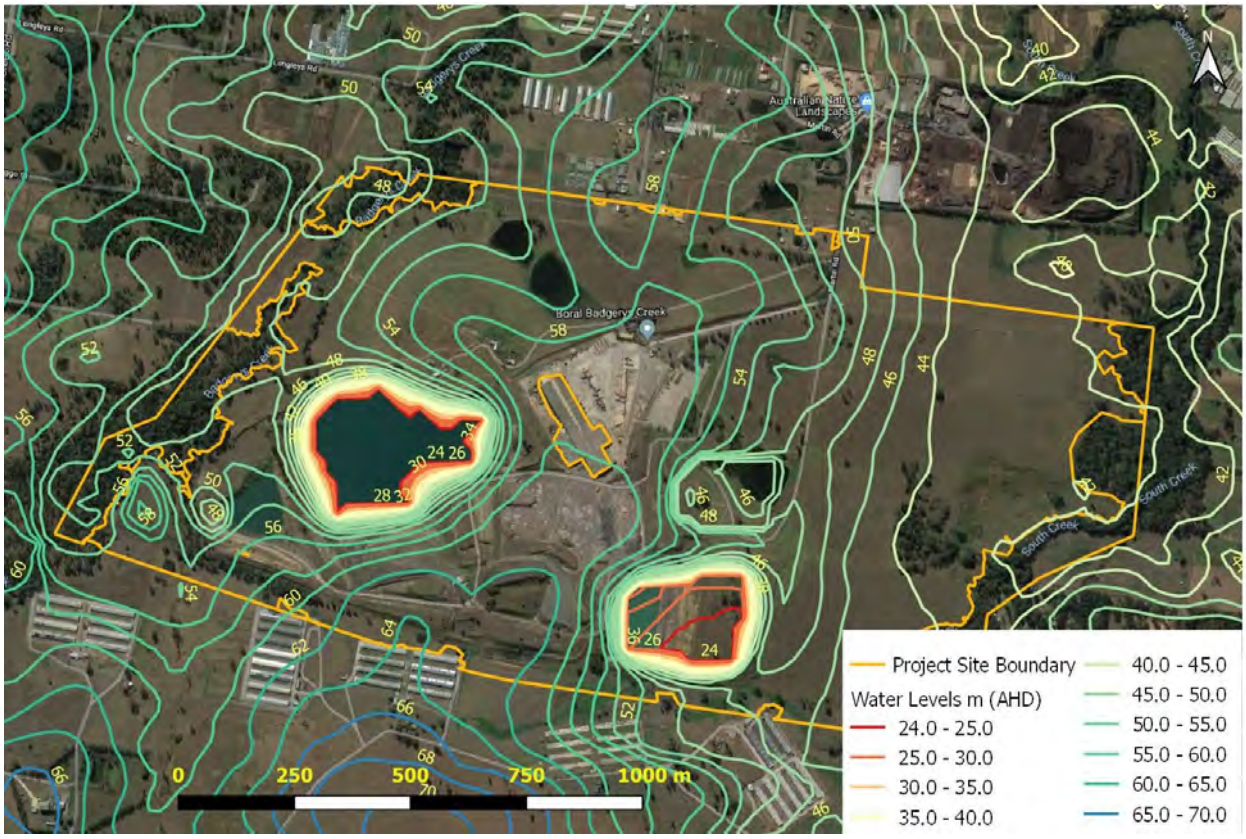

Figure 4-9: Groundwater Levels Year 10

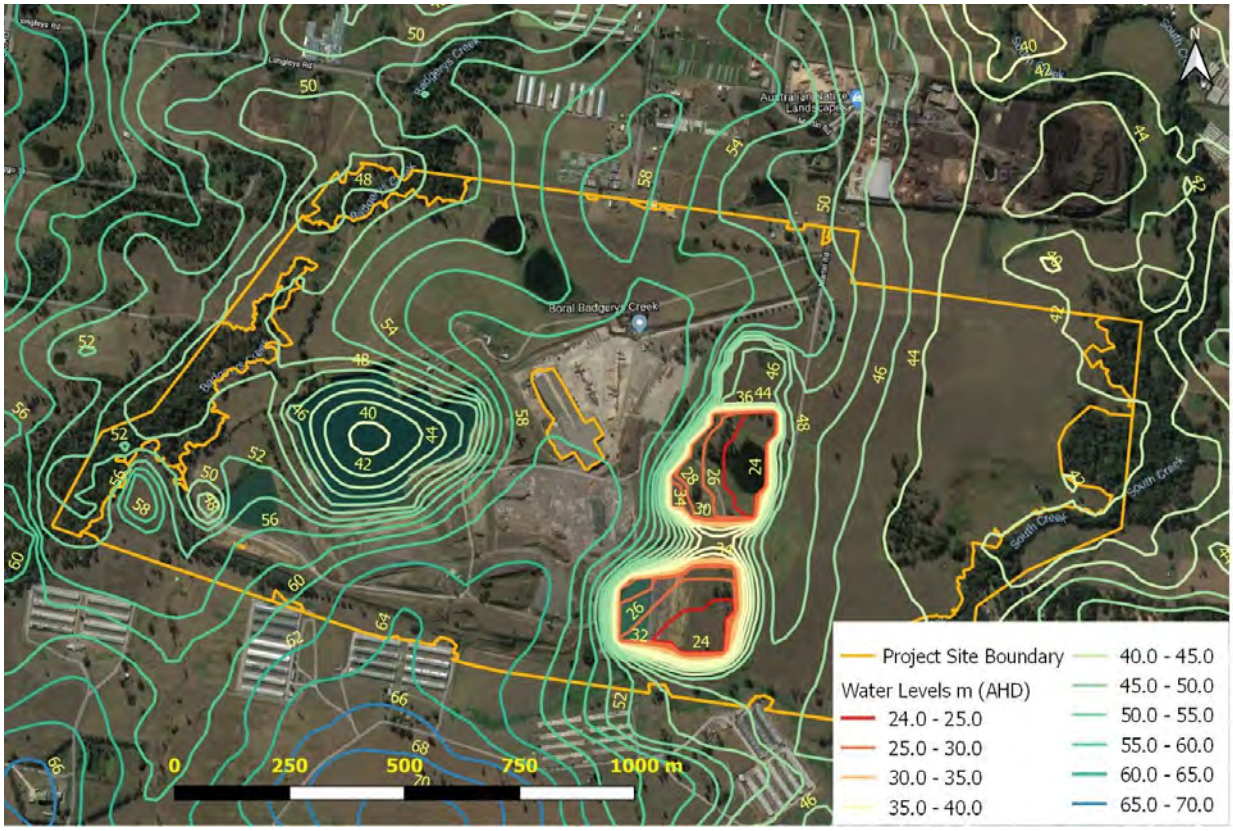

Figure 4-10: Groundwater Levels Year 15

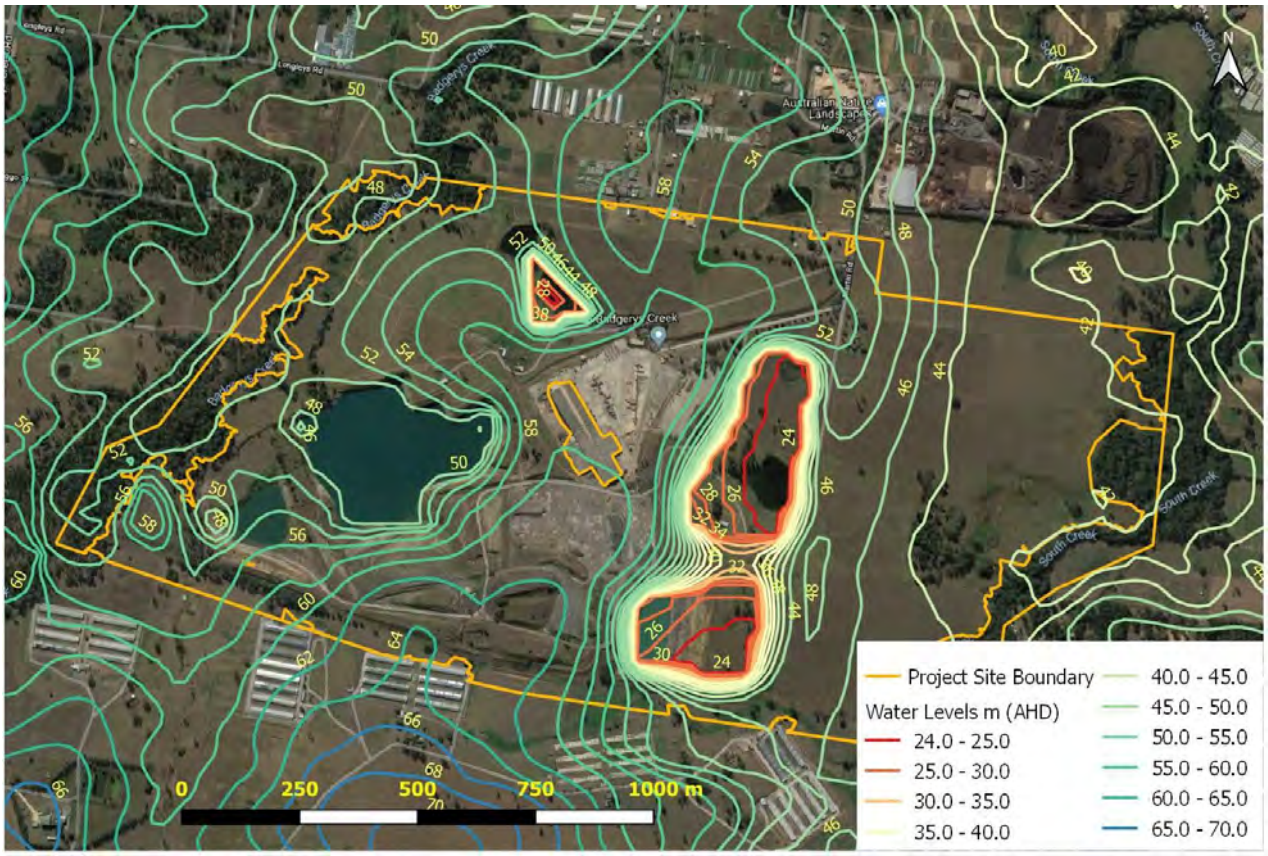

Figure 4-11: Groundwater Levels Year 20

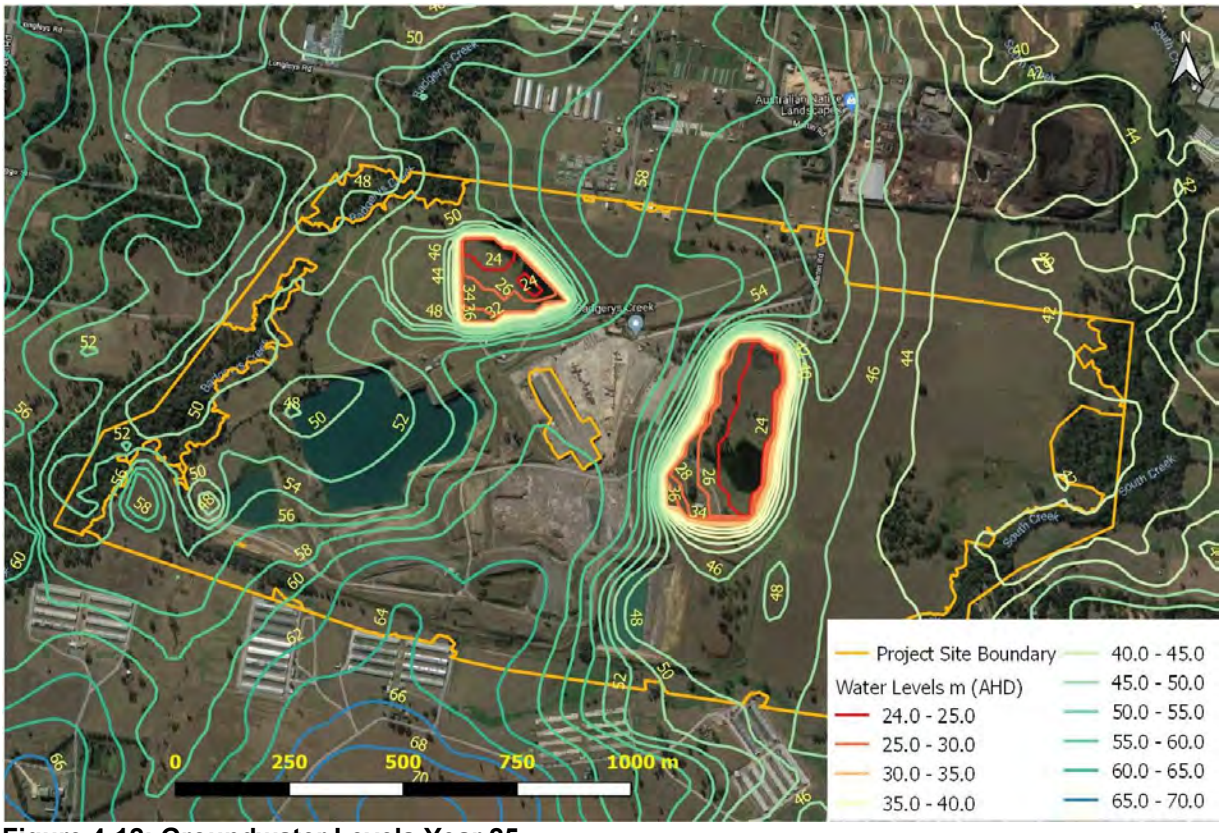

Figure 4-12: Groundwater Levels Year 25

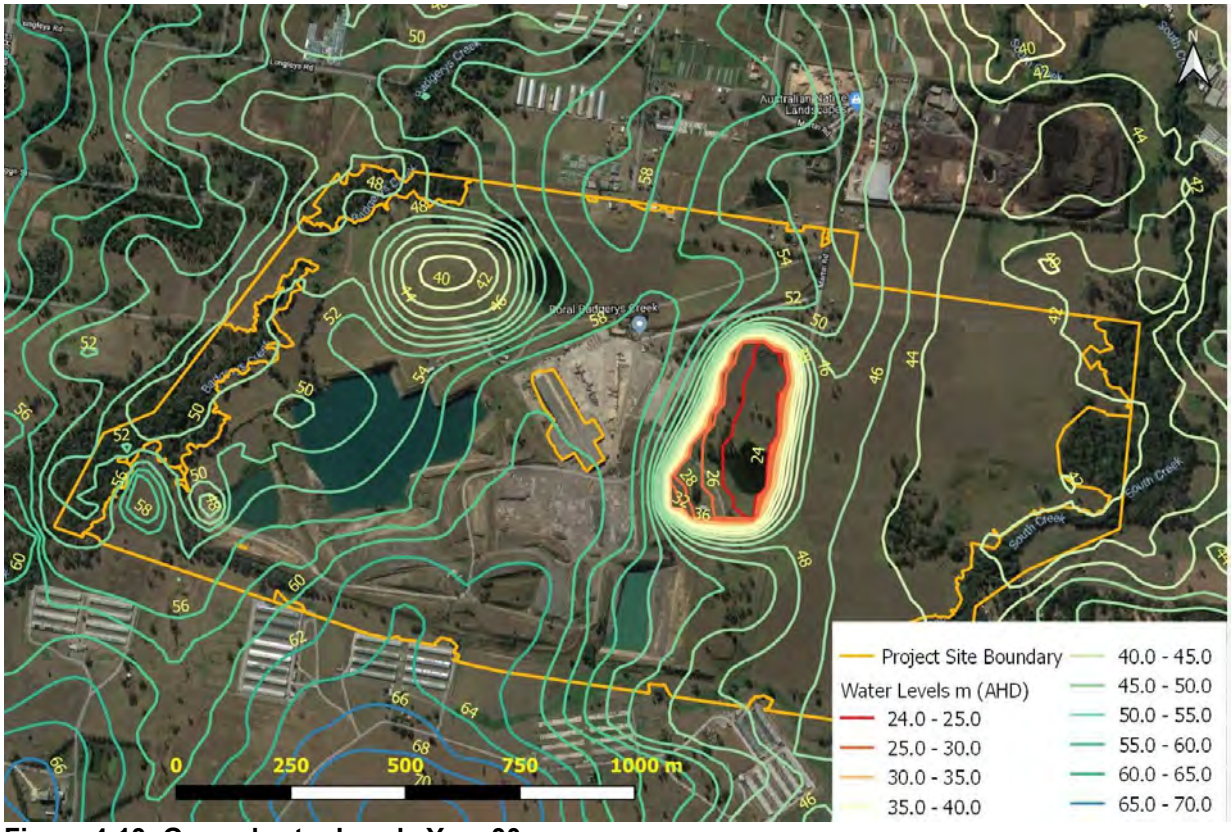

Figure 4-13: Groundwater Levels Year 30

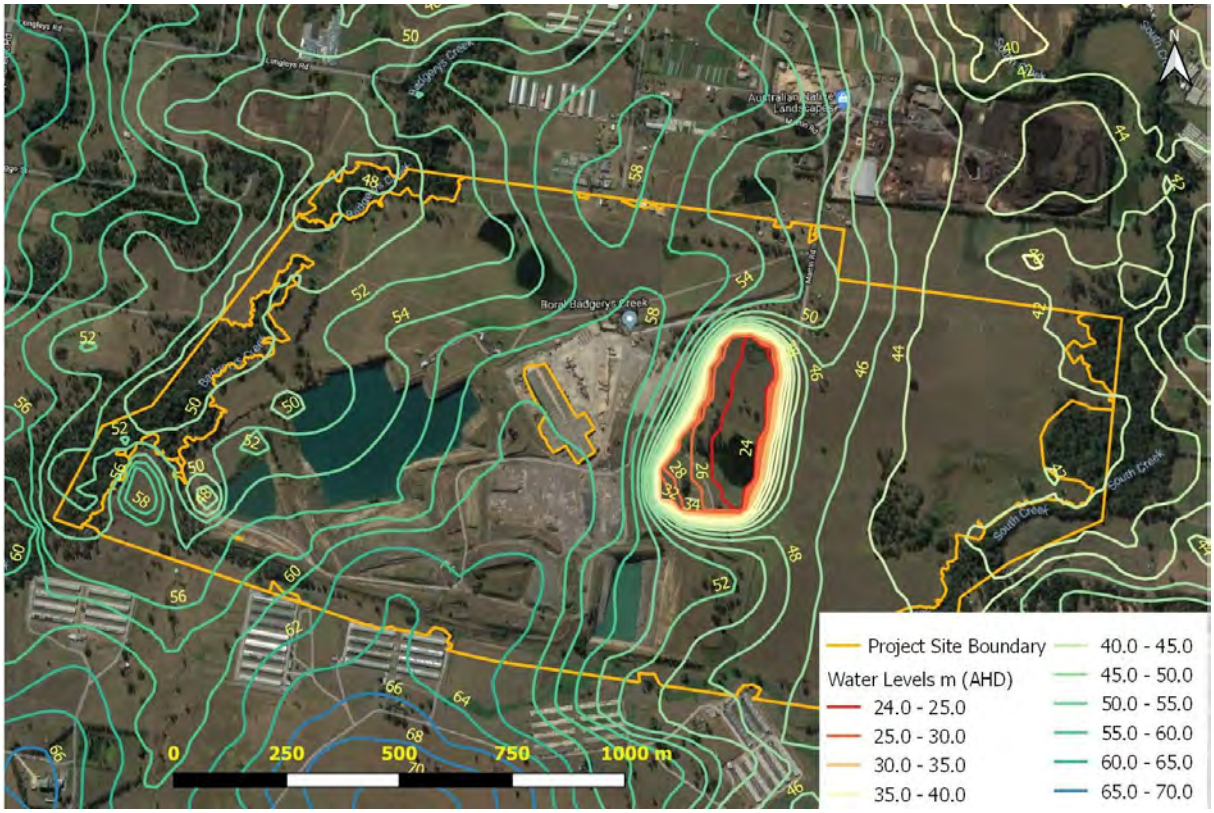

Figure 4-14: Groundwater Levels Year 30

4.15 Pit Inflows / Seepage

Combined temporal seepage into the various separate pit excavations from the prediction model are shown in **Figure 4-15**. The punctuated nature of increases in seepage rates is partly a function of the drain implementation and the time stepping used within the model. However, it is anticipated that short term increases in seepage rates would occur as new excavation areas are opened. Predicted rates indicate the inflows increase slightly from current static inflow rates into Pit 1 and peaking at approximately 31 ML/yr in Year 16 as multiple excavations are open. A gradual decline following Year 16 to approximately 9 ML/year at the completion of mining activities on site. The decline reflects the progressive backfilling of completed pits and the associated recovery that occurs. Inflows continue to decline following project completion until static conditions prevail at approximately 7 ML/yr similar to the current modeled conditions associated with Pit 1.

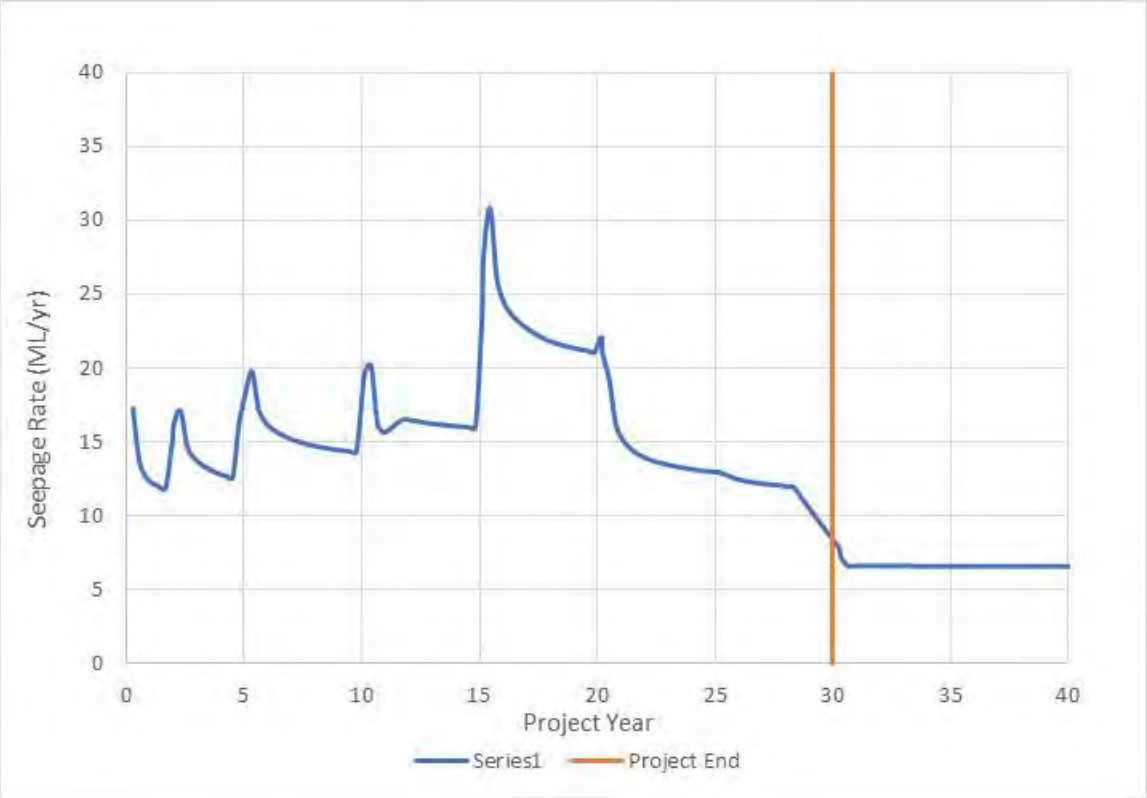

Figure 4-15: Predicted Inflows

4.16 Baseflow Impacts

Overall, the proposal is predicted to have very limited impact on baseflow to local creeks. This is primarily due to limited impact on surficial soils and the influence of low hydraulic conductivities on the groundwater system.

Figure 4-17 shows change of baseflow flux for a combined South Creek and Badgerys Creek and shows the differential between a model with the proposal and a comparison to a pseudo steady state model running in transient mode with current conditions persisting. Positive values represent an impact on the creek system (water removal from the creeks) and a negative value or recession trend signifies a return to the creeks.

The small recession trending the initial 5 years reflects a recovery in the Pit 2 area. The punctuated increase in impact with a peak in approximately Year 10 reflects a period where the larges excavation footprint is established. The recession following this peak reflects the

recovery from infilling and rehabilitation in Pit 1. there is a small increase and final recession associated with Pit 5.

It should be noted that Badgerys Creek is simulated using the stream package. Given that Badgerys Creek is an ephemeral drainage pathway, it could be argued that the drain package may have been a more effective method for simulation. The stream packages has arbitrarily left a small amount of water in the creek bed effectively leading to an over prediction of impacts. Given the low flux changes predicted, this is not seen to be an issue that would change the overall presentation of potential impacts.

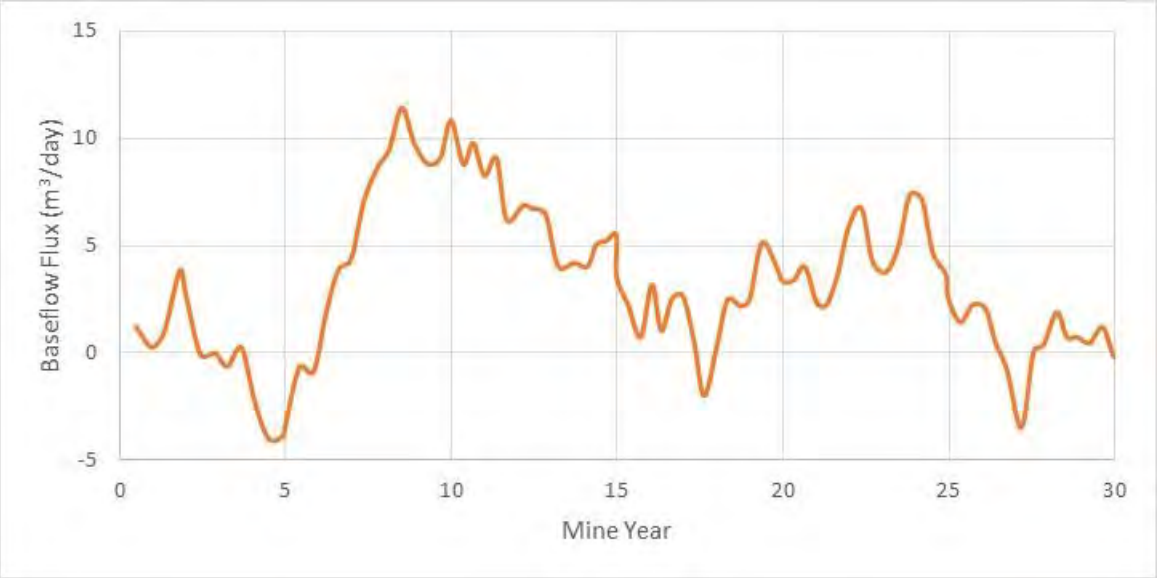

Figure 4-16: Change in Baseflow Flux

4.17 Uncertainty

Uncertainty analysis is the process by which the impacts of variations in critical parameters (identified as being “sensitive” during the sensitivity analysis) on model predictions and model reliability is assessed. The sensitivity analysis for the steady state model was presented in Section 4.12. In order to assess the impact from uncertainty of these parameters and to what extent these could impact on project inflows the model was run focusing on the sensitivity issue raised which was limited to hydraulic conductivity. Note the additional sensitivity to recharge, however since this will limited influence on inflows, was not considered for uncertainty model runs.

To test this sensitivity, additional runs were undertaken where the base case hydraulic conductivity in all zones was increased by a factor of 5. In increase by an order of magnitude (K x 10) was not stable however, early results indicate that the increase in K is near linear with a 100% increase in inflow rate with and order of magnitude increase in hydraulic conductivity. **Figure 4-16** shows inflow / seepage rates for the additional with hydraulic conductivity increase by a factor of 5.

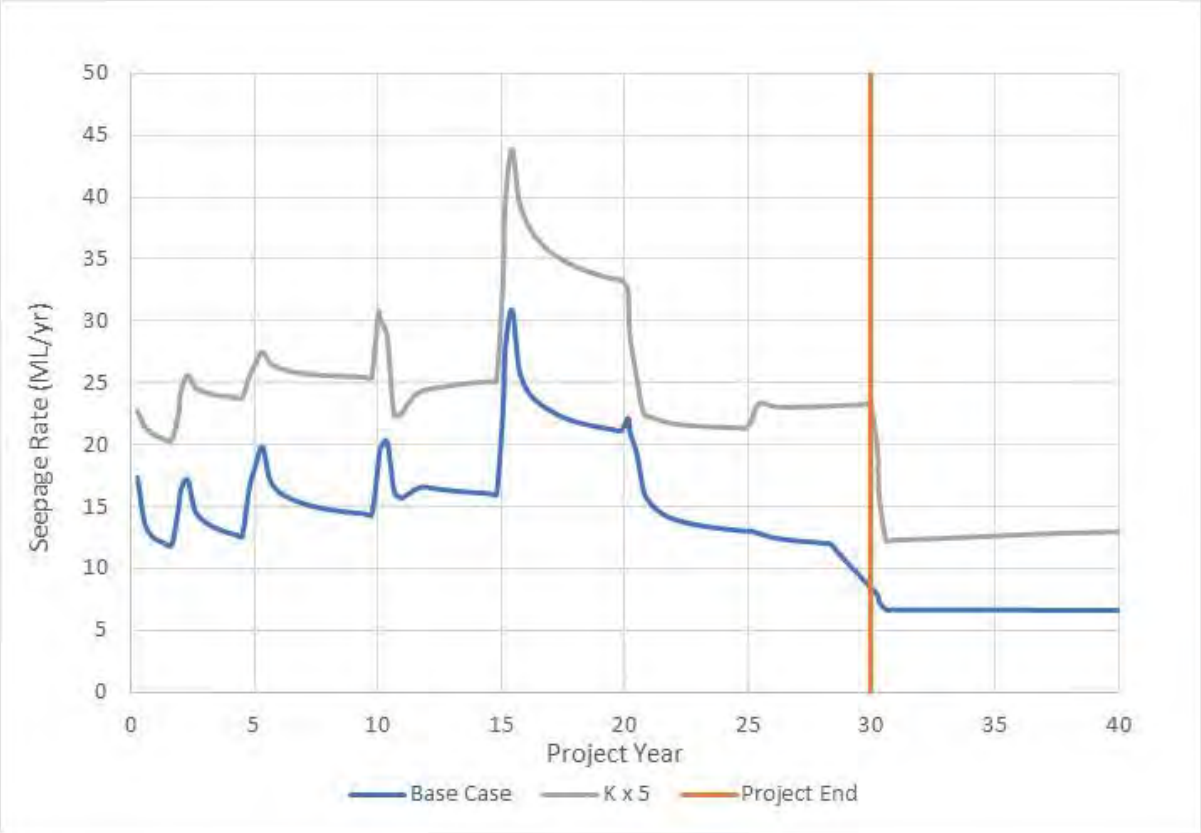

Figure 4-17: Inflow / Seepage – Uncertainty Runs

4.18 Existing Groundwater Users

The closest registered bore not associated with the Project Site is located more than 1km to the north. As predicted impacts are predicted to largely be contained with the project boundaries, no impact to other users is anticipated.

5 AQUIFER INTERFERANCE POLICY

Given that the Project is an extractive industry where the groundwater table is intersected and a groundwater license allocation (25ML/a) is current. The NSW Aquifer Interference Policy (AIP) states:

> *All water taken by aquifer interference activities, regardless of its quality, needs to be accounted for within these extraction limits. This is to protect environmental water and the lawful taking of water from groundwater and surface water sources by other users. The processes for obtaining licenses under the Water Management Act 2000, the license type and the entitlement volumes are all relevant for ensuring that the aquifer interference activity has adequate water in its water account to cover the take of water by that activity*

During excavation and with the subsequent resulting long-term voids, groundwater is taken from the Sydney Basin Central Groundwater Source. The AIP indicates that the volume of water taken from a water source, as a result of an activity, needs to be predicted prior to project approval and then measured and reported in Annual Returns or Environmental Management Reports.

The Wianamatta group Shales are not regarded as a regional aquifer given the low inherent hydraulic conductivities, inflow rates in perpetuity are relatively low as indicated in previous sections. Predicted perpetual inflow rates from the final Project Site voids is predicted to be 21 ML/a due to very low permeability of the Project Sites shales. This is supported from the observed water levels adjacent to Pit 1 and groundwater modelling. There is however some uncertainty given the low level of groundwater modelling undertaken for the project.

Given any uncertainty in the base case results, the basic sensitivity analysis of increased hydraulic conductivity (1 order of magnitude) shows that inflows increase beyond that of the water allocation license but there is no indication that any trigger in the AIP would be activated with impacts restricted to the area within the Project Site boundaries.

The groundwater inflows / seepage can be assigned to Sydney Basin Central Groundwater Source in its entirety. The current water access license (WAL24346) is appropriate given the base case results from this modelling assessment. The perpetual water inflow / seepage is likely to be consistent through time although higher rates can be expected for short period following initial excavation. However, given the uncertainty that is inherent with the confidence levels of this model, and the sensitivity shown to inflow / seepage, an increase in the WAL would be recommended.

It is also recommended that the Groundwater Monitoring Plan enables record to be kept of any short-lived visible inflows and reported the annual environmental performance review. Should the predictions made in this report be found to be inaccurate and cross designated trigger levels (to be established) a review would be established.

Not considering closure plans, following completion of planned excavation at the Project Site, any voids are likely to result in conditions like which presently occur in Pit 1, where low groundwater flows and rainfall recharge cause static ponding at levels below existing local groundwater levels and is balanced by the high rates of evaporation.

6 SUMARY AND CONCLUSIONS

The hydrogeology of the Project Site is strongly influenced by the geology which comprises low permeability shales and clays. Quaternary alluvial deposits flanking the creeks are located to the east and west of the Project Site. Historical extraction within the Project Site has reported negligible groundwater inflow from the shale and overlying weathered material into the open pits.

Exploratory resource drilling across the Site intercepted groundwater associated with the shale units, although yields are very low. Recent drilling and installation of monitoring bores, in conjunction with existing monitoring bores on the Project site, provide the Project with a monitoring network which placates the conditional approval requirement for groundwater monitoring. These will be incorporated into an updated water management plan and provide an effective tool for water management through the life of the Project.

Current observations from newly installed and previously exiting groundwater bores show that groundwater quality is poor, consistent with the host shale and that drawdown cones in the vicinity of existing excavations are steep. This highlights the low inherent hydraulic conductivity of the Bringelly Shale. However, groundwater levels are close to surface and will be intersected during mining activities associated with this project.

The recent drilling and a review of historical drilling records has shown that the 1:100,000 Geological Map interpretation of alluvium associated with Badgerys Creek and South Creek is not as extensive as implied and that the corridor of alluvium is much narrower than previously mapped. The outcome of this finding being that as there is limited alluvium associated with either Badgerys Creek or South Creek, there is little chance of impacting on an associated alluvial groundwater resource.

Modelling has been undertaken and although it is acknowledged that this is a low-level Class 1 Confidence category under the Murray Basin Modelling Guidelines and Australian Modelling Guidelines. This is a definition based on the quantity of data available for the calibration process. An acceptable level of quantitative and qualitative calibration albeit with limited data.

The base case model provides indicative perpetual steady state inflow rates of 18m^3/d (approximately 6 ML/y). It also shows that the areal extent of impact on groundwater level has a very small footprint surrounding the open excavations with a steep drawdown cone surrounding each one. this is the result of the low hydraulic conductivity typical of a shale. This insulates potential impacts on either Badgerys Creek or South Creek, or any alluvium associated with either of these creek systems. From a historical perspective, the Project Site has previously operated as a quarry and although observational environmental records are sparse, there is no indication that groundwater seepages into quarry workings were an operational issue.

Higher than long term groundwater inflows can be expected during excavation, however these higher rates are anticipated to be short term and recede to steady state conditions relatively quickly.

A sensitivity analysis was undertaken, and this process found that the model is generally insensitive to changes in physical parameters except for hydraulic conductivity. This is because it is well understood that this parameter has the largest impact on potential inflows.

The results of this showed that with an increase in hydraulic conductivity by an order of magnitude, a resultant increase to inflows by approximately 100% occurred. However, this occurs with a deterioration in calibration statistics.

This sensitivity analysis was undertaken to address the uncertainty in hydraulic conductivity values given limited test work was undertaken.

7 RECOMMENDATIONS

7.1 Water Management Plan

A water management plan has previously been approved for the Project Site although this will need to be updated prior to the start of continued operations. There is no consideration for observations to be recorded regarding groundwater inflow during Pit excavation within the current Water Management Plan.

Consideration should be given to recording any short-term flows, the duration and the field chemistry.

7.2 Water Access License

Water Access License which has an annual allocation of 25ML is adequate for anticipated mining activities. However, given the uncertainty of modeled physical parameters an increase in the WAL is recommended. Peak inflows occur at Year 16 where short term seepage rates exceed the WAL. However, over the life of project, average inflow rates remain well under the WAL predicted in the base case prediction model.

8 REFERENCES

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APPENDIX A
Bore Logs

Groundwater Exploration Services
1/156 Arden Street Coogee
NSW 2034
Australia

COMPOSITE WELL LOG

Well No: BW1a

Client: PGH **Project:** Badgerts Creek Brick Facility

Commenced:	7/6/18	**Method:**	Auger	**Area:**	Badgerys Creek
Completed:	7/6/18	**Fluid:**	NA	**East:**	291741
Drilled:	Hyland Drilling	**Bit Record:**	110	**North:**	6247174
Logged By:	A Fulton		110	**Collar (RL):**	0

Static Water Level: 4.6 **Date:** 5/6/18

Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion Diagram	Well Completion Notes
0			Topsoil: Light brown silty clay top soil			Casing Dia = 50mm
			Clay and Silt: Light brown			Bemtonite = 2-3m
			Shale/Claystone: Wheathered shale / clay			Gravel pack = 3-7m
			Shale: Light grey			Water Levle = 4.6m bgl
						Screen = 4-7m

Groundwater Exploration Services
1/156 Arden Street Coogee
NSW 2034
Australia

COMPOSITE WELL LOG

Well No: BW2a

Client: PGH **Project:** Badgerts Creek Brick Facility

Commenced:	6/6/18	**Method:**	Auger	**Area:**	Badgerys Creek
Completed:	6/6/18	**Fluid:**	NA	**East:**	291911
Drilled:	Hyland Drilling	**Bit Record:**	110	**North:**	6247442
Logged By:	A Fulton		110	**Collar (RL):**	0

Static Water Level: 4.6 **Date:** 5/7/18

Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion Diagram	Well Completion Notes
0			Topsoil: Light brown silty clay top soil			Casing Dia = 50mm
			Clay and Silt: Light brown			Bemtonite = 3-4m
			Clay: Mottled red brown clay			Gravel pack = 4-8m
			Shale: Weathered light grey			Water Levle = 4.6m bgl
						Screen = 5-8m
						Drillhole Dia = 110mm

COMPOSITE WELL LOG

Well No: BW2b

Groundwater Exploration Services
1/156 Arden Street Coogee
NSW 2034
Australia

Client: PGH
Project: Badgerts Creek Brick Facility

Commenced:	6/6/18	**Method:**	Hammer	**Area:**	Badgerys Creek
Completed:	6/7/18	**Fluid:**	NA	**East:**	291914
Drilled:	Hyland Drilling	**Bit Record:**	110	**North:**	6247440
Logged By:	A Fulton		110	**Collar (RL):**	0

Static Water Level: 7.795 **Date:** 5/6/18

Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion: Diagram	Well Completion: Notes
0			Topsoil: Light brown silty clay top soil			Casing Dia = 50mm
			Clay and Silt: Light brown			Drillhole Dia = 110mm
			Clay: Mottled red brown clay			
			Shale: Weathered light grey shale			Water Level = 7.795m bgl
10			Shale: Light grey shale			
20						Bemtonite = 23-25m
30						Screen = 27-33m
						Gravel pack = 25-33m

COMPOSITE WELL LOG

Well No: BW3

Groundwater Exploration Services
1/156 Arden Street Coogee
NSW 2034
Australia

Client: PGH
Project: Badgerys Creek Brick Facility

Commenced:	6/6/18	**Method:**	Hammer	**Area:**	Badgerys Creek
Completed:	6/6/18	**Fluid:**	NA	**East:**	292585
Drilled:	Hyland Drilling	**Bit Record:**	110	**North:**	6247552
Logged By:	A Fulton		110	**Collar (RL):**	0

Static Water Level: 11.5 **Date:** 5/7/18

Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion: Diagram	Well Completion: Notes
0			Topsoil: Light brown silty clay top soil			Casing Dia = 50mm
			Clay and Silt: Light brown			Drillhole Dia = 110mm
			Clay: Weathered light brown shale			
			Shale: Light grey shale			Water Level = 11.5m bgl
10						
20						Bemtonite = 23-25m
30						Screen = 27-33m
						Gravel pack = 25-33m

COMPOSITE WELL LOG

Well No: BW4a

Groundwater Exploration Services
1/156 Arden Street Coogee
NSW 2034
Australia

Client: PGH
Project: Badgerts Creek Brick Facility

Commenced:	6/6/18	**Method:**	Auger	**Area:**	Badgerys Creek
Completed:	6/6/18	**Fluid:**	NA	**East:**	293602
Drilled:	Hyland Drilling	**Bit Record:**	110	**North:**	6247294
Logged By:	A Fulton		110	**Collar (RL):**	0

Static Water Level: 4.6 **Date:** 5/7/18

Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion Diagram	Well Completion Notes
0			Topsoil: Light brown silty clay top soil			Casing Dia = 50mm
			Clay and Silt: Light brown			Water Levle = 3.77m bgl
			Clay: Mottled red brown clay			Bemtonite = 3-4m
						Gravel pack = 4-8m
			Shale: Weathered light grey			Screen = 5-8m
						Drillhole Dia = 110mm

COMPOSITE WELL LOG

Well No: BW4b

Groundwater Exploration Services
1/156 Arden Street Coogee
NSW 2034
Australia

Client: PGH
Project: Badgerts Creek Brick Facility

Commenced:	4/6/18	**Method:**	Hammer	**Area:**	Badgerys Creek
Completed:	4/6/18	**Fluid:**	NA	**East:**	293604
Drilled:	Hyland Drilling	**Bit Record:**	110	**North:**	6247297
Logged By:	A Fulton		110	**Collar (RL):**	0

Static Water Level: 1.71 **Date:** 5/7/18

Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion Diagram	Well Completion Notes
0			Topsoil: Light brown silty clay top soil			Water Level = 1.17m bgl
			Clay and Silt: Light brown / light grey mottled silty clay			Drillhole Dia = 110mm
			Sand and Silt: Light orange brown silty sand. Fine grained. Well sorted. Sun angular - sub rounded. Minor silt			Casing Dia = 50mm
10			Sand and Silt: Light brown / brown silty sand. Fine grained. Common iron banding			Bemtonite = 23-25m
			Clay: Grey brown clay			Screen = 27-33m
			Shale: Weathered light grey			Gravel pack = 25-33m
20			Shale: Grey Shale. Minor clay			
30						

Groundwater Exploration Services
1/156 Arden Street Coogee
NSW 2034
Australia

COMPOSITE WELL LOG

Well No: BW5a

Client: PGH **Project:** Badgerts Creek Brick Facility

Commenced:	7/6/18	**Method:**	Auger	**Area:**	Badgerys Creek
Completed:	6/6/18	**Fluid:**	NA	**East:**	293098
Drilled:	Hyland Drilling	**Bit Record:**	110	**North:**	62476559
Logged By:	A Fulton		110	**Collar (RL):**	0

Static Water Level: 3.98 **Date:** 5/7/18

Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion Diagram	Well Completion Notes
0			Topsoil: Light brown silty clay top soil			Casing Dia = 50mm
			Shale/Claystone: Weathered light grey brown shale / claystone			Water Levle = 3.17m bgl
			Clay: Weathered light brown clay			Bentonite Pack 3-4m
			Shale: Weathered light grey			Screen = 5-8m

Groundwater Exploration Services
1/156 Arden Street Coogee
NSW 2034
Australia

COMPOSITE WELL LOG

Well No: BW5b

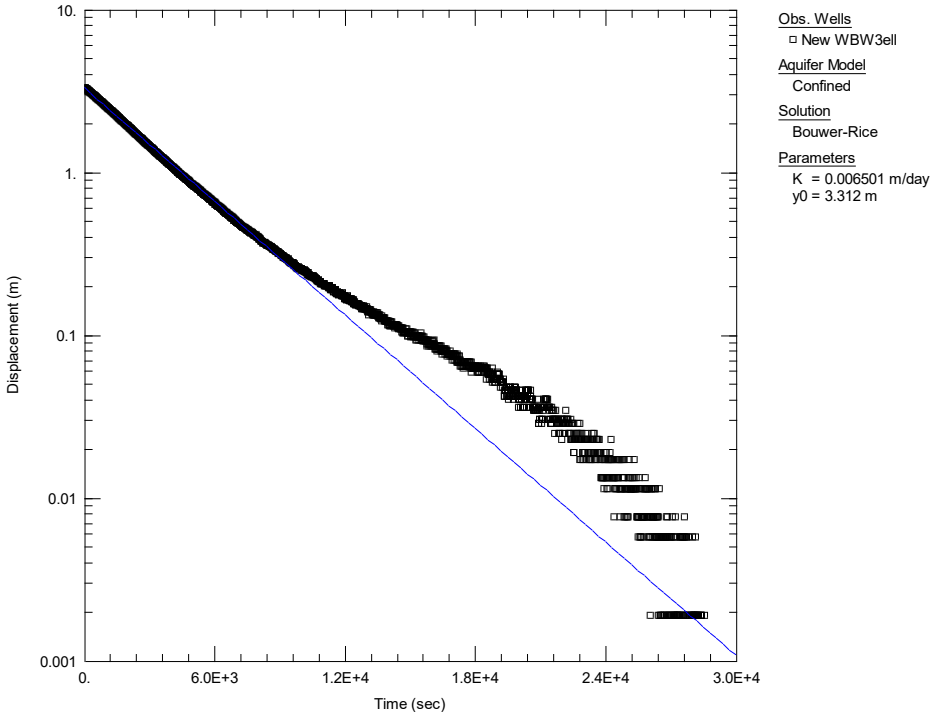
Client: PGH **Project:** Badgerts Creek Brick Facility

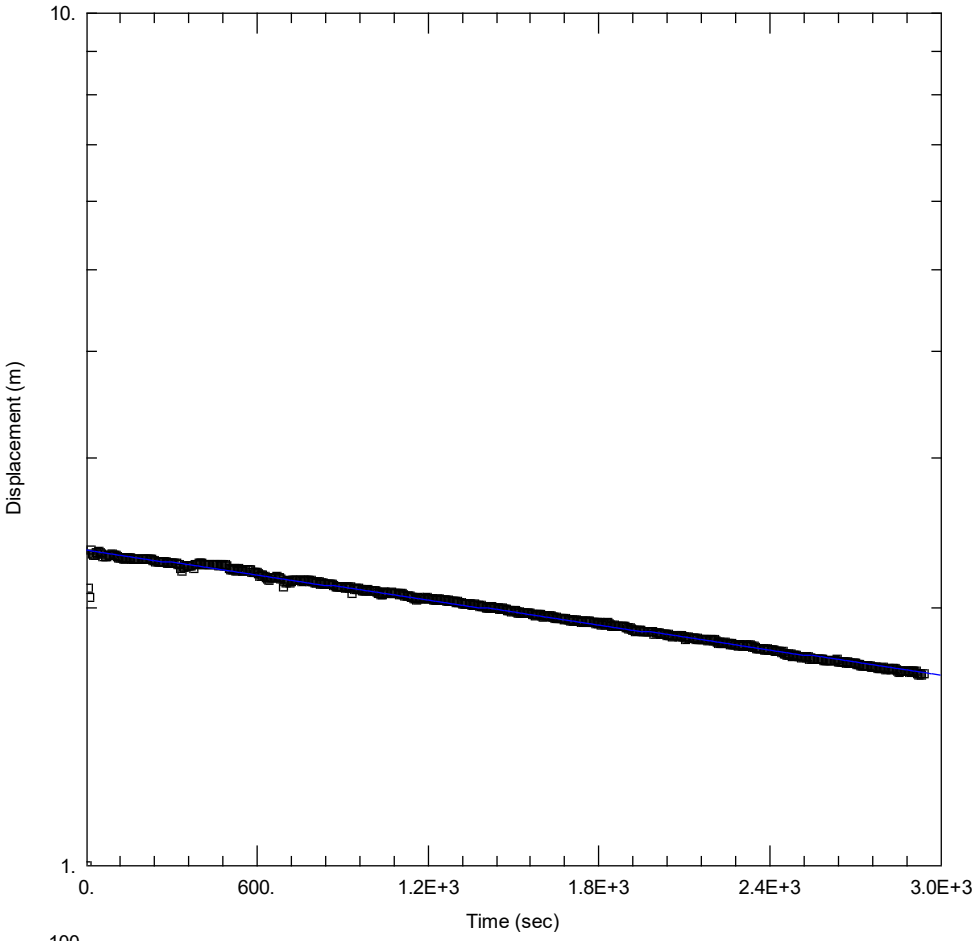
Commenced:	7/6/18	**Method:**	Hammer	**Area:**	Badgerys Creek
Completed:	6/6/18	**Fluid:**	NA	**East:**	293098
Drilled:	Hyland Drilling	**Bit Record:**	110	**North:**	6246561
Logged By:	A Fulton		110	**Collar (RL):**	0

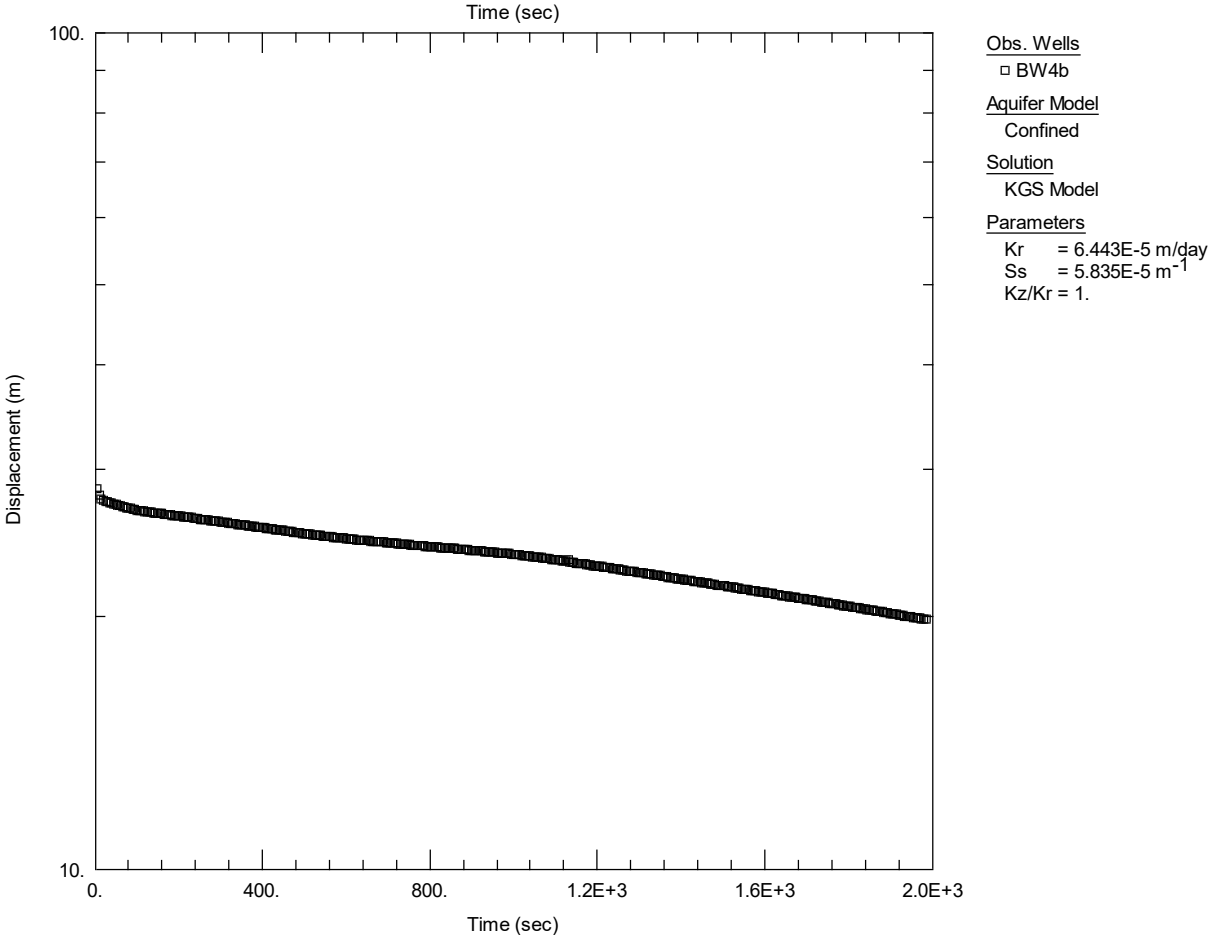
Static Water Level: 3.29 **Date:** 5/7/18

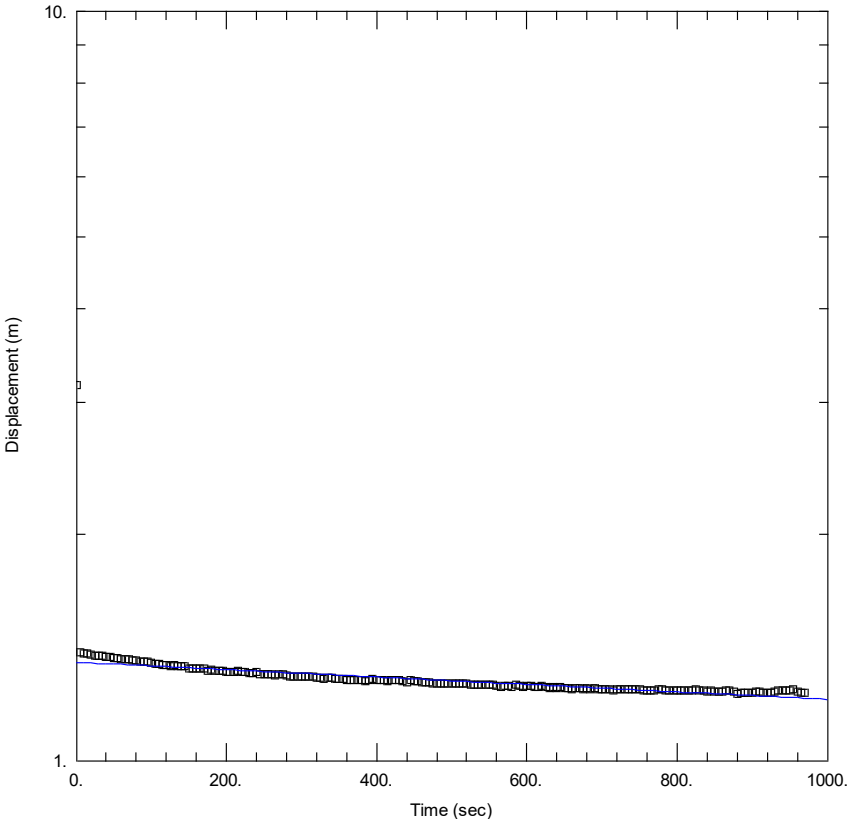
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion Diagram	Well Completion Notes
0			Topsoil: Light brown silty clay top soil			Casing Dia = 50mm
			Shale/Claystone: Weathered light grey brown shale / claystone			Water Level = 3.29m bgl
			Clay: Weathered light brown clay			Drillhole Dia = 110mm
10			Shale: Weathered light grey			
			Shale: Grwy / grey brwon shale			Bemtonite = 23-25m
20						Screen = 27-33m
30						Gravel pack = 25-33m

APPENDIX B
Aquifer Test Curve Matching

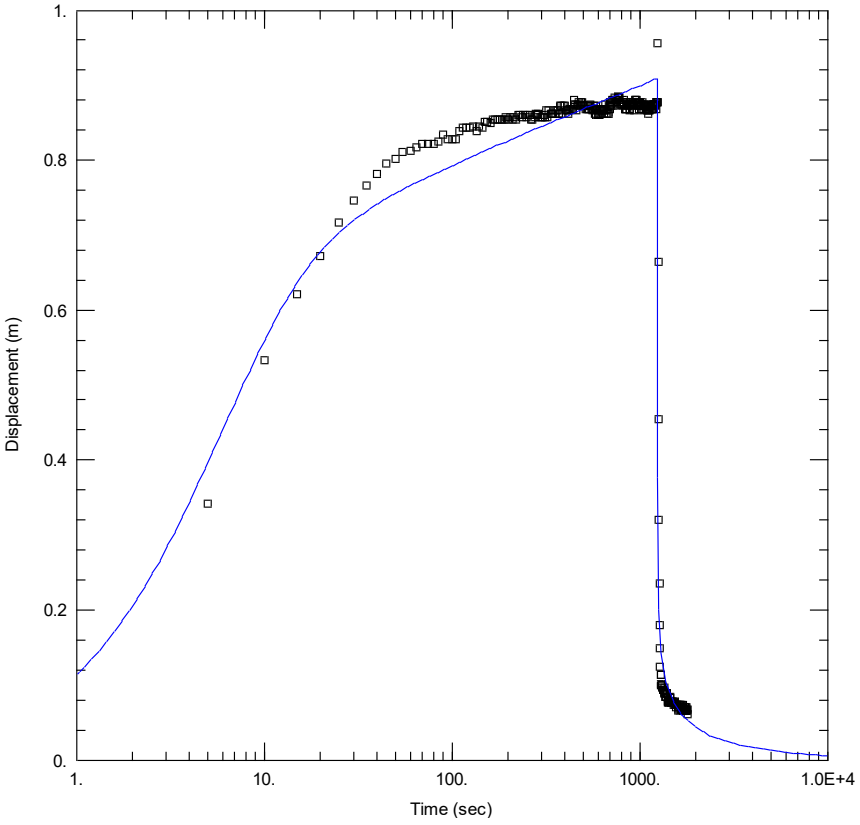



10.
1.
Displacement (m)
0.
600.
1.2E+3
1.8E+3
2.4E+3
3.0E+3
Time (sec)
Obs. Wells
BW4a
Aquifer Model
Unconfined
Solution
Bouwer-Rice
Parameters
K = 0.004173 m/day
y0 = 2.342 m


100.
10.
Displacement (m)
0.
400.
800.
1.2E+3
1.6E+3
2.0E+3
Time (sec)
Obs. Wells
BW4b
Aquifer Model
Confined
Solution
KGS Model
Parameters
Kr = 6.443E-5 m/day
Ss = 5.835E-5 m-1
Kz/Kr = 1.



Obs. Wells
□ BW5a
Aquifer Model
Unconfined
Solution
Bouwer-Rice
Parameters
K = 0.004332 m/day
y0 = 1.352 m



Obs. Wells
□ BW5b
Aquifer Model
Fractured
Solution
Moench w/slab blocks
Parameters
K = 1.25 m/day
Ss = 6.722E-8 m^{-1}
K' = 8.64E+4 m/day
Ss' = 1.267E-10 m^{-1}
Sw = 0.
Sf = 0.
r(w) = 0.025 m
r(c) = 0.025 m

APPENDIX I GROUNDWATER MANAGEMENT PLAN

included in Surface Water Management Plan

APPENDIX J TRAFFIC MANAGEMENT PLAN

APPENDIX K ABORIGINAL HERITAGE MANAGEMENT PLAN

APPENDIX L REHABILITATION MANAGEMENT PLAN

APPENDIX M WASTE MANAGEMENT PLAN

APPENDIX N COMMUNITY AND STAKEHOLDER CONSULTATION PLAN

APPENDIX O MINING OPERATIONS PLAN

APPENDIX P EMERGENCY MANAGEMENT RESPONSE PLAN

APPENDIX Q VISUAL IMPACT MANAGEMENT PLAN

APPENDIX R VENM MANAGEMENT PLAN

APPENDIX S DE-WATERING INFRASTRUCTURE PLAN

APPENDIX T DE-WATERING MANAGEMENT PLAN

APPENDIX U FAUNA RELOCATION MANAGEMENT PLAN

APPENDIX V EVACUATION PLAN

APPENDIX W **ENVIRONMENTAL RISK REGISTER**