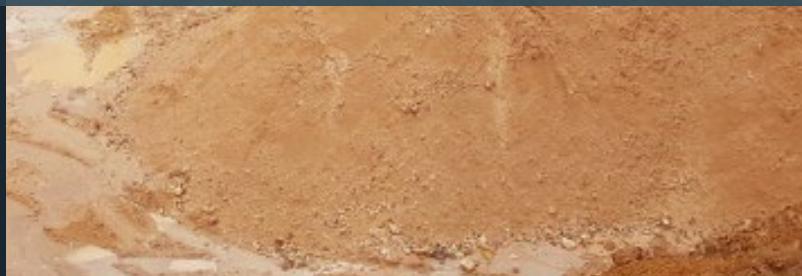


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June
2022

**Surface Water Management Plan
for
Roberts Road
Maroota Sand Quarry
DA 267-11-99**



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Roberts Road Maroota Sand Quarry

Surface Water Management Plan

Name of Mine	Roberts Road Maroota Sand Quarry
Name of Mine Operator (s)	Hodgson Quarries and Plant Pty Ltd
Name and Contact Details of the Mine Manager	Mr Martin Hodgson, 0408 251 393 hodgsonquarries@gmail.com
Name and Contact Details of the Environmental Representative	Mr Stuart Reed 0418 277 871 hodgsonquarries@gmail.com

Revision Table

Date	Version	Author	Reviewed	Approved
30/5/2016	2801_MA_EMP_SWMP_2016_R0	TO	LGT	TO
20/6/2016	2801_MA_EMP_SWMP_2016_R1	TO	LGT	TO
25/1/2017	2801_MA_EMP_SWMP_2016_R2	TO	LGT	TO
30/1/2017	2801_MA_EMP_SWMP_2016_R3	TO	LGT	TO
31/01/2017	2801_MA_EMP_SWMP_2016_F2	TO	LGT	TO
5/10/2017	2801_MA_EMP_SWMP_2016_R5	TO	LGT	TO
10/10/2017	2801_MA_EMP_SWMP_2016_F3	TO	LGT	TO
20/3/2018	5072_MA_EMP_SWMP_2016_F4	TO	LGT	TO
29/10/2020	9853_HMA_EMP_SWMP_2020_D0	TO	LGT	TO
25/02/2021	9853_HMA_EMP_SWMP_2020_F0	TO	MH/SR DPIE- Charissa Pillay (29/4/2022)	TO
18/05/2022	9853_HMA_EMP_SWMP_2020_D1	TO	LGT/MH/SR	TO
19/5/2022	9853_HMA_EMP_SWMP_2020_F1	TO	DPIE- Charissa Pillay (22/06/2022)	TO
23/06/2022	9853_HMA_EMP_SWMP_2022_F2	Tara O'Brien Approved as Expert 27/10/2020 Appendix A	LGT	TO Wayne Jones, Resource Assessments, 28/6/22

26/7/2023

Reviewed, no changes required

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1 Introduction

This document has been prepared to meet the consent requirements of DA 267-11-99 Mod 4 for a **Surface** Water Management Plan within the Maroota Quarry, located at Maroota. The Groundwater Management Plan is addressed in a separate document (available at www.vgt.com.au/hodgsons). This version of the Surface Water Management Plan was written in response to the Independent Audit undertaken in 2020, which noted that the SWMP was required to be updated annually, see section 1.8.

It should be noted that the Draft Consolidated Mod 4 Consent on which this version of the plan is based contains numbering errors such that the water management condition is referred to as Condition 44 rather than 42. This is also the case for the Process Dam conditions and the standard reporting conditions at the end of the consent.

1.1 SITE DESCRIPTION

Hodgson Quarries and Plant Pty Ltd.'s Roberts Road Maroota Sand Quarry is located on Roberts Road near Old Northern Road, Maroota. Maroota is approximately 50 kilometres North West of Sydney see *Figure One*. The site was formerly known as Sun-A-Rise Quarry, where construction of a water supply dam commenced around 1970. Consent was granted for extraction and processing of sand, clay and pebble material in 2000. Hodgson Quarries and Plant Pty Ltd took over operations on the site in 2004.

1.2 EXTRACTION TECHNIQUES

1.2.1 Quarry Staging and Methods

Site works involve the extraction of sand, clay and gravel material from approximately 28 hectares of the site to an average depth of 20-25 metres, depending on the underlying groundwater level. Maximum extraction depth will be approximately 35 metres, towards Old Northern Road. Extraction operations will continue as before with the sand and sandstone materials providing raw material to the processing plant. .

1.2.2 Materials Processing and Storage

The material is loaded into a belt feeder which introduces the sand into a mixing tank. An electric pump at the water storage dam and pumps water to the mixing tank via a pipeline. The sand slurry is drawn out of the mixing tank by a slurry pump and pumped to the processing plant.

The processing plant washes and screens material, using water primarily from the existing water supply dam adjacent to the northern boundary (the Process Dam).

After washing and screening, material is stockpiled adjacent to the plant area prior to transportation off-site by truck. Trucks are loaded using a front-end-loader.

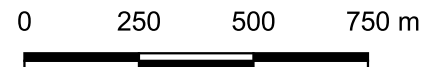
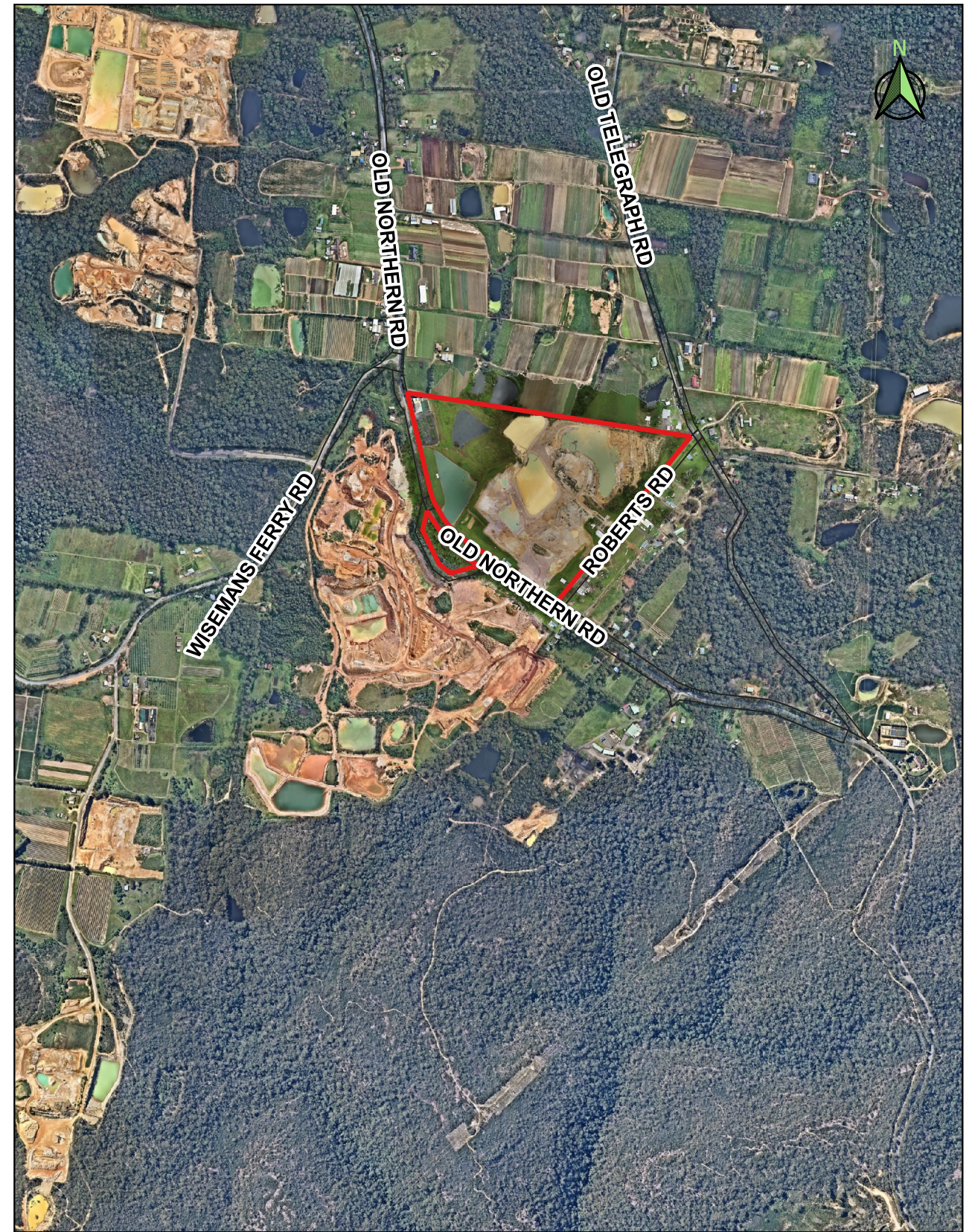
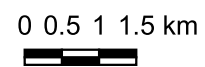
Washing and screening forms a residual clay/silt slurry which is piped to designated drying areas in a previously extracted cell where it will be spread in thin layers to dry. Liberated water will be drained to the water dam for re-use in the processing plant.

Figure One. Site Locality

Plan of:	Surface Water managemtn Plan 2022 for Roberts Road Maroota Sand Quarry - Site Location	Location:	Maroota Quarry, Roberts Road, Maroota, NSW	Source:	Google Maps & nearmap - Image Date 18/03/2020 Fyfe - Image Date 24/2/2022	Plan By:	TO
Figure:	ONE	Council:	Hills Shire Council	Survey:	Not Applicable	Project Manager:	LT
Version/Date:	18/05/2022	Tenure:	Not Applicable	Projection:	GDA2020/MGA Zone 56 EPSG:7856	Office:	Thornton
Our Ref:	9853_HMA_EMP_WMP_2022_Q001_V0_F1	Client:	Hodgson Quarries & Plant Pty Ltd	Contour Interval:	Not Applicable		



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Legend

Property Boundary

1.3 REPORTING HISTORY

A Soil and Water Management Plan was originally developed by Morse McVey and Associates Pty Ltd for the site in 1999 and was submitted with the EIS in the same year. Since that time there have been a number of revisions of the plan and consultation with authorities. The reporting history is summarised in *Table 1* below and relevant correspondence is reproduced in *Appendix D*.

A more recent Independent Audit was undertaken on the 4th June 2020. Recommendations from that audit are addressed in this plan.

Table 1. *Reporting and Revision History*

Date	Plan Version	Author	Approval Authority	Approval Date	Review	Comments
August 1999	Soil and Water Management Plan	Morse McVey and Associates	Department of Urban Affairs and Planning	2000	-	Plan submitted with EIS and development application.
2000	DA 267-11-99	Consent granted by Department of Urban Affairs and Planning				
29/11/2000	DA 267-11-99 Mod 1	Consent granted by Department of Urban Affairs and Planning				
18/08/2015	DA 267-11-99 Mod 2	Consent granted by Department of Urban Affairs and Planning				
July 2016	2801_MA_EMP_SWMP_2016_R1	VGT Environmental Compliance Solutions Pty Ltd	Department of Planning	-	DPE DPI-Water	SWMP submitted was an interim report and a new version was requested by DPI-Water by the 31 st of December 2016. An extension for submission of the Water Management Plan (both the GWMP and SWMP) was requested of the DPE and granted in November 2016.
31st January 2017	2801_MA_EMP_SWMP_2016_F2	VGT Environmental Compliance Solutions Pty Ltd	Department of Planning	-	DPE DPI-Water	Correspondence from DPI-Water was received in a letter dated the 4 th of April 2017
22/5/2017	Independent Audit	Independent audit by Newport Technical was conducted and reported in August 2017. DPE commented on the Independent Audit.				
10/10/2017	2801_MA_EMP_SWMP_2016_F3	VGT Environmental Compliance Solutions Pty Ltd	Department of Planning	-	DPE DPI-Water	Submitted to DPE and Department of Industry- Water who provided recommendations and requested the plan be revised.

Date	Plan Version	Author	Approval Authority	Approval Date	Review	Comments
20/3/2018	2801_MA_EMP_SWMP_2016_F4	VGT Environmental Compliance Solutions Pty Ltd	Department of Planning and Environment	22/8/2018	-	Submitted to Planning NSW on 20/3/2018 and incorporated comments from Audit and DPE comments on the audit. Plan approved by DPE in correspondence dated 22/8/2018.
4/6/2020	Independent Audit	Independent audit by RPS Australian East Pty Ltd was conducted and reported in August 2020. DPE provided comments.				
November 2020	9853_HMA_EMP_SWMP_2020_F0	VGT Environmental Compliance Solutions Pty Ltd	Department of Planning and Environment	TBA	-	Revised plan incorporates recommendations from Independent Audit and DPE review.
May 2022	9853_HMA_EMP_SWMP_2020_F1	VGT Environmental Compliance Solutions Pty Ltd	Department of Planning and Environment	TBA	DPE	Revised plan due to request for additional information received from DPE after review of 9853_HMA_EMP_SWMP_2020_F0.

1.4 SCOPE

This report is intended to satisfy the conditions of the consent as amended (NSW Department of Planning, Industry and Environment, August 2021):

Table 2. *Relevant Consent Conditions*

Consent Condition	Where Addressed
<p>SOIL AND WATER</p> <p>Note: the applicant is required to obtain the necessary water licences for the development under the Water Act 1912 and/or Water Management Act 2000.</p>	Section 1.6.2
<p>Water Management Plan</p> <p>44. The Applicant shall prepare a Water Management Plan for the development to the satisfaction of the Secretary. This plan must be prepared in consultation with the DPIE-Water by suitably qualified and experienced person/s whose appointment has been approved by the Secretary, and be submitted to the Secretary for approval by 31 December 2016. The plan must be updated on an annual basis in consultation with DPIE-Water for three years from the date of the approval of Modification 2 and thereafter as agreed with by the Secretary.</p>	This Report, Appendix D, Section 1.9
<p>42. Continued....</p> <p>In addition to the standard requirements for management plans (see condition 65), this plan must include a:</p> <p>a) Site Water Balance that:</p> <ul style="list-style-type: none"> • Includes details of: <ul style="list-style-type: none"> ○ Sources and security of water supply, including contingency planning; ○ Water use on the site; ○ Water management on site, including groundwater inflows to the quarry voids and site discharges; and ○ Audit and reporting procedures, including comparisons of the site water balance each calendar year; and ○ Describes the measures that would be implemented to minimise clean water use on site and maximise recycling opportunities; 	Section 3.9
<p>b) Surface Water Management Plan that:</p> <ul style="list-style-type: none"> • A detailed description of the surface water management system of the site, including the: <ul style="list-style-type: none"> ○ Clean water diversion systems; ○ Erosion and sediment controls; ○ Effluent irrigation system; ○ Water transfers from the extraction areas; ○ Water storages; and ○ Discharge points; 	Section 4

Consent Condition	Where Addressed
<ul style="list-style-type: none"> • Design objectives and performance criteria for proposed: <ul style="list-style-type: none"> ○ Erosion and sediment control structures; ○ Water storages, including quarry voids; ○ Site discharges; and ○ Control of water pollution from rehabilitated areas of the site; 	Section 4.2 Section 4.3 Section 4.6 Section 4.7 Section 4.8
<ul style="list-style-type: none"> • Performance criteria, including trigger levels for investigating any potentially adverse impacts for surface water quality. 	Section 4.8
<ul style="list-style-type: none"> • A program to monitor: <ul style="list-style-type: none"> ○ The effectiveness of the water management system; ○ Site discharge water quality; and ○ Surface water level and quality in the Process Water Dam, including the quantification of rainfall inflow, groundwater inflow and evaporation; 	Section 4.9
<ul style="list-style-type: none"> • 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 4.8 Section 4.11
<ul style="list-style-type: none"> • Long term water quality management objectives and the measures to achieve these objectives; 	Section 4.12, Section 4.3 Section 4.8
<ul style="list-style-type: none"> • A plan that ensures surface stormwater runoff from the disturbed areas is directed to the sedimentation dam(s); 	Section 4.2 Section 4.3 Section 4.8
<ul style="list-style-type: none"> • A plan that ensures tailgate drainage does not discharge into or onto any adjoining public or Crown road, or other persons land, any Crown land, any rover creek or watercourse, any groundwater aquifer, any native vegetation as described under the native <i>Vegetation Conservation Act 1997</i> and any wetlands of environmental significance; 	Section 4.13
<ul style="list-style-type: none"> • A detailed description of design and construction criteria for the Process Water Dam based on a feasibility study of: <ul style="list-style-type: none"> ○ Capacity to construct multiple cells within the overall dam footprint (i.e. a two stage or three stage dam); ○ Whether the dam floor and walls are able to be effectively lined with compacted clay (especially for multiple cells); ○ Whether effective hydraulic separation can be achieved between such cells; ○ Rehabilitating such cells to create a single dam within the final landform; and ○ The appropriateness of diverting runoff received from off-site around the dam; 	Section 3.2 Section 4.14
<ul style="list-style-type: none"> • A strategy for the decommissioning of water management structures, including storage, sedimentation and leachate dams once extraction is complete; and 	Section 1.7 & 4.15
<ul style="list-style-type: none"> • Audit and reporting procedures, including comparisons of the monitoring results each calendar year and quarterly reporting of surface water monitoring results; 	Section 4.18
<p>Process Water Dam Design and Construction</p> <p>47. The applicant must ensure that the Process Water Dam is designed and constructed in a manner that satisfies the design and construction criteria for the Process Water Dam as developed under the Surface Water management plan (see condition 42b) above).</p>	Section 4.14 Error! Reference source not found.

1.5 OBJECTIVES

The principle objectives of the SWMP are set out below.

- As far as possible ensure the segregation of 'dirty' water from 'clean' water and maximise the retention of time of 'dirty' water such that any discharge from the project site meets the relevant water-quality limits, including limits contained in the relevant guidelines and any limits imposed by specific project approvals. 'Dirty' water is defined as surface runoff from disturbed catchments. 'Clean' water is defined as surface runoff from catchments that are undisturbed or rehabilitated catchments.
- To ensure water used in the processing of materials (sand) is contained within the closed system on the site.
- To monitor the effectiveness of surface water and sediment controls and to ensure all relevant surface water quality criteria are met.

1.6 LICENCING

1.6.1 EPA Licence

Environmental Protection Licence 6535 has been issued under the *Protection of the Environmental Operations Act, 1997* for Crushing, Grinding or Separating Works and Dredging Works. It is renewed annually on the 12th of March.

There are no specific monitoring requirements in the licence.

The site is not currently licenced to discharge and the water balance suggests that it will not be necessary to release water from the site.

1.6.2 NSW Water

The site holds a number of licences issued under the *Water Management Act 2000*, for the operation of groundwater bores as well as dams. Location of these bores and licences are discussed in the Groundwater Management Plan. Location of the dams can be found in *Figure Four*.

Dams 3 and 4 are licenced for irrigation purposes each with an approval for a pump under WAL26163 for 264 ML under Water Supply Works and Water Use approval 10CA104888. The water source is defined as the Hawksbury and Lower Nepean Rivers Water Source. The Licences held for Dams 3 and 4 are in the name of the landowner and the proponent does not access, monitor or use these dams for the quarrying operations.

The Process Dam and the Drying Pond were not licenced as they were considered exempt from the Water Management Act as their primary purpose is to prevent sediment laden water from exiting the property. Process Dam also receives clean water from the property next door which is combined with the dirty surface water collected in the Process Dam used to feed the processing plant. NSW Water has indicated that as a portion of 'clean' water is used for 'works' that the Process Dam would require licencing under the Act.

It is therefore intended to investigate, with Water NSW, the transfer of the required allocation of the current water licence on Lot 2 DP228308 for 'irrigation' held by Mr Leonard Martin (the landowner) to Lot 1 DP228308 (where the Process Dam is located) for 'works' where Mr Martin is also the landowner. In essence there will be no need to purchase a water allocation from the open market within the Greater Metropolitan Region Unregulated River Water Source and the site has more than sufficient allocation to licence the Process Dam.

1.7 FINAL LANDFORM

The final landform according to the SoEE (2019) (see *Figure Two* and *Figure Three*) is to slope gently from the native trees screens along Old Northern Road and from the planted bunds along Roberts Road to the base of the void at RL 190m in the north east. The landform will be free-draining to the natural drainage line in the north.

Under the Water Management Act (2000) if the landowner chooses to retain a dam, a Water Access Licence (WAL) may be required if it will be of a volume greater than the harvestable rights for the site. The landowner already holds a WAL for the two nursery dams (Dams 3 and 4) on the site which will be transferred to the dam in the final landform.

Figure Two. Proposed Final Landform- 1,200,000m³ Fill (from SoEE 2019)

Plan of: Surface Water Management Plan 2022 for Roberts Road Maroota Sand Quarry - Proposed Final Landform 1,200,000m3 Fill

Figure: TWO

Version/Date: V0 15/03/2022

Our Ref: 9853_HMA_EMP_SWMP_Q002_V0_F2

Location: Maroota Quarry, Roberts Road, Maroota, NSW

Council: Hills Shire Council

Tenure: Not Applicable

Client: Hodgson Quarries & Plant Pty Ltd

Source: Umwelt- Rpbert Road Quarry modification, SoEE Final December 2019 Figure 4.2


Survey: Not Applicable

Projection: Not Applicable

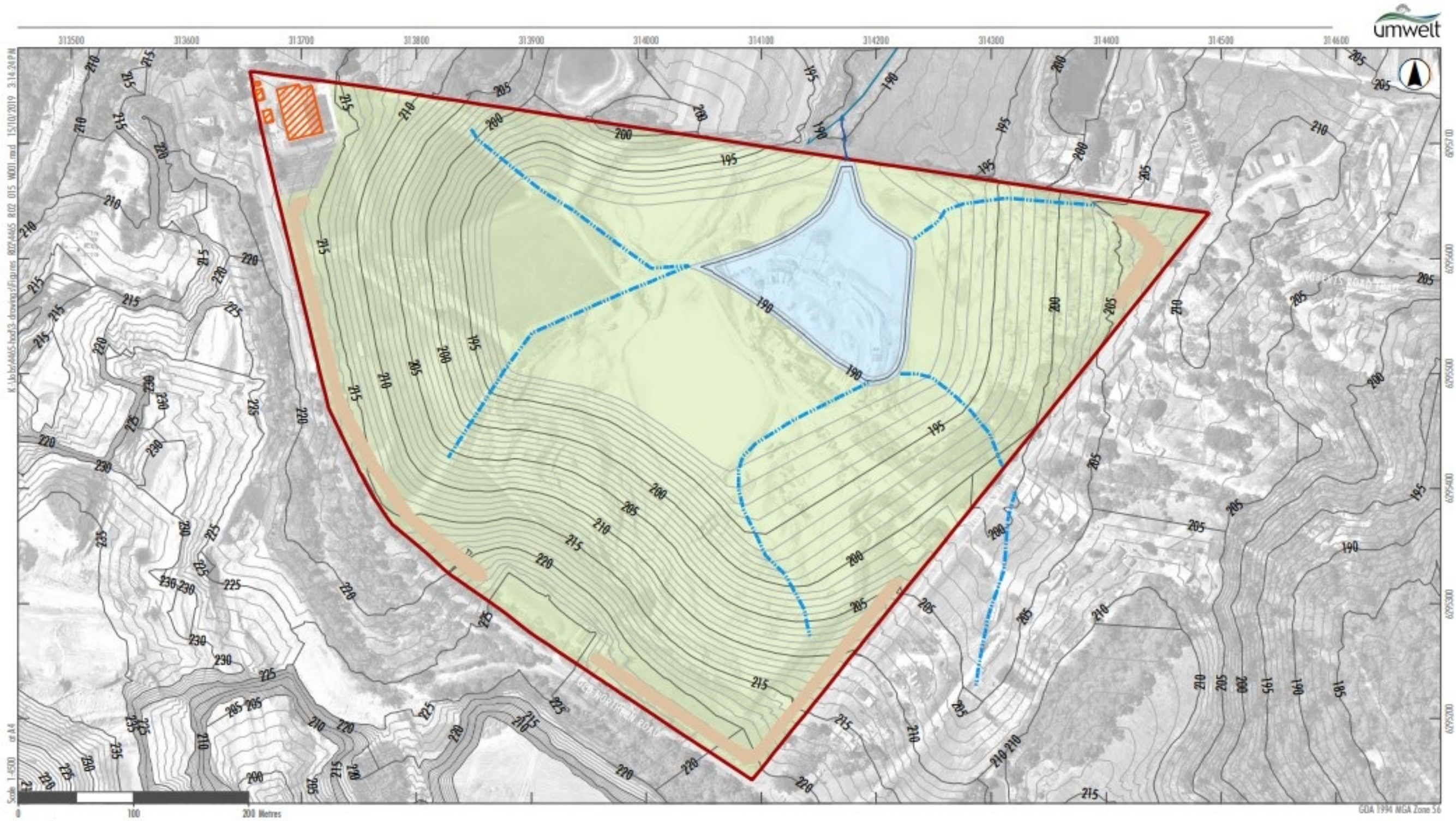
Contour Interval: Not Applicable

Plan By: TO

Project Manager: LT



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- Legend**
- Quarry Site
 - Sediment Dam 1 Discharge Drain
 - Existing Watercourse
 - Retained Nursery Infrastructure
 - Bundwall (indicative)
 - Internal Drainage Lines (indicative)
 - Final Landform / landuse
 - Revegetated Area
 - Option 1 - Final Landform
 - Major Countours (5m)
 - Minor Countours (1m)

Image Source: Nearmap (December 2018) Data source: Umwelt (2019); NSW LPI DT08/DC08 (2018)

FIGURE 4.2
Proposed Final Landform – 1,200,000 m3 Fill

Figure Three. Proposed Final Landform- 2,000,000m³ Fill (from SoEE 2019)

Plan of: Surface Water Management Plan 2022 for Roberts Road Maroota Sand Quarry - Proposed Final Landform 2,000,000m3 Fill

Figure: THREE

Version/Date: V0 15/03/2022

Our Ref: 9853_HMA_EMP_SWMP_Q003_V0_F3

Location: Maroota Quarry, Roberts Road, Maroota, NSW

Council: Hills Shire Council

Tenure: Not Applicable

Client: Hodgson Quarries & Plant Pty Ltd

Source: Umwelt- Rpbert Road Quarry modification, SoEE Final December 2019 Figure 4.2

Survey: Not Applicable

Projection: Not Applicable

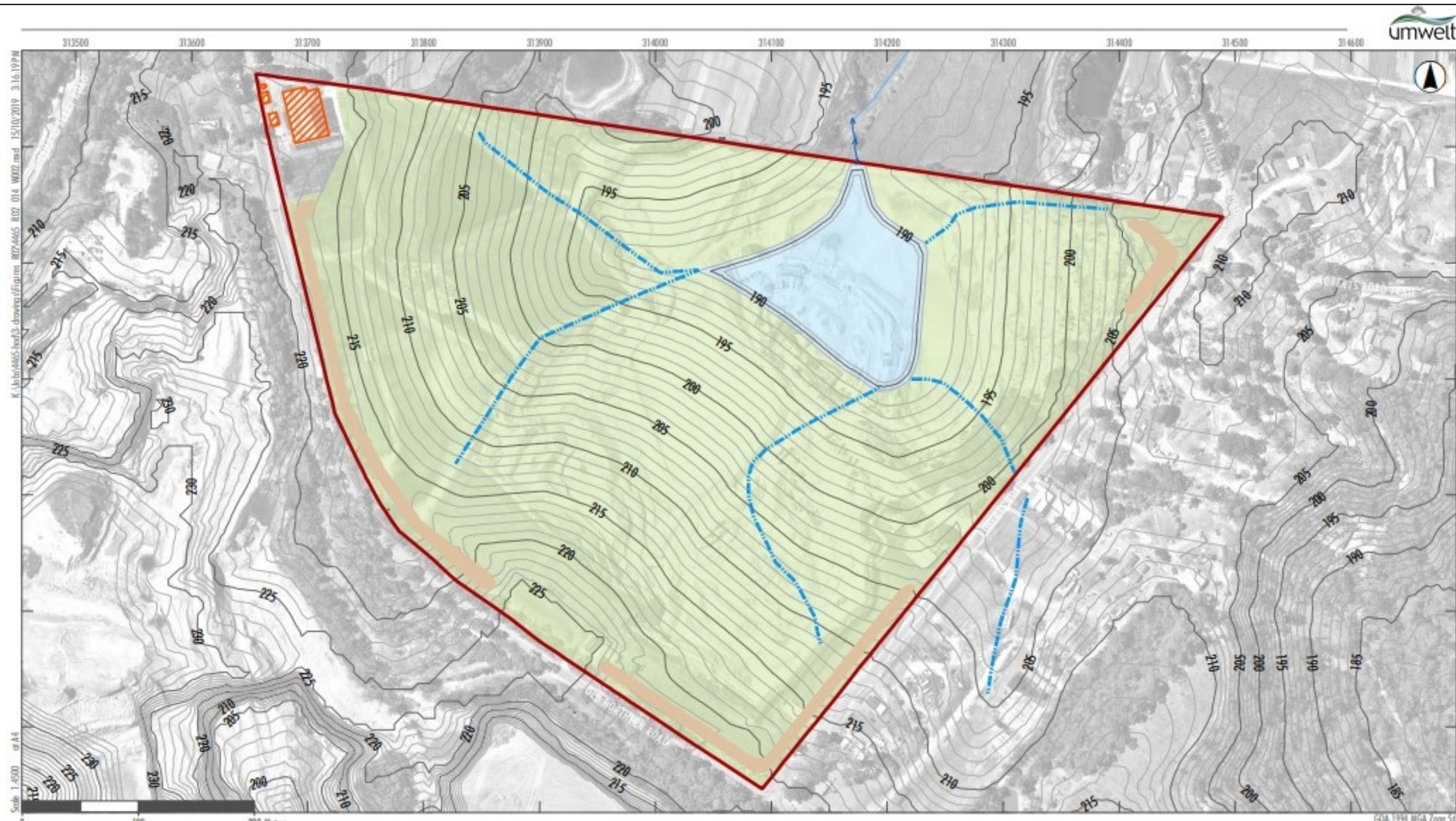
Contour Interval: Not Applicable

Plan By: TO

Project Manager: LT



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- Legend**
- Quarry Site
 - Sediment Dam 1 Discharge Drain
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 - Bundwall (indicative)
 - Internal Drainage Lines (indicative)
 - Final Landform / landuse: Revegetated Area
 - Final Landform / landuse: Final Dam
 - Final Landform / landuse: Major Countours (5m)
 - Final Landform / landuse: Minor Countours (1m)

Image Source: Nearmap (December 2018) Data source: Umwelt (2019); NSW LPI DTDB/DCDB (2018)

FIGURE 4.3
Proposed Final Landform – 2,000,000 m3 Fill

1.8 RESPONSE TO 2020 INDEPENDENT AUDIT

The response to DPIE addressed findings from the independent audit conducted by RPS Australian East Pty Ltd on 4th of June 2020 and reported in August 2020 that relate to the SWMP. Audits and the Response Reports are provided on the company website (www.vgt.com.au/hodgsons) in accordance with consent conditions.

Table 3. *Independent Audit Findings*

Section of Audit Report	Comment	Where Addressed in this Report
Table 7	<p>Condition 42</p> <p>The Water Management Plan has not been subject to annual review in consultation with DPIE-W for the three years from the date of approval of Mod 2. The current version is dated 20 March 2018. The Water Management Plan should be updated in consultation with DPIE-W in order to meet this requirement, and then subject to ongoing review as agreed by the Secretary.</p>	This Report
	<p>Condition 45</p> <p>Section 7.2 of the SWMP contains conflicting measures regarding consultation with the NSW Dams Safety Committee and the assessment of the dam construction by a suitably qualified engineer.</p> <p>It is recommended that the SWMP is reviewed to detail and explain why the Dam Safety Committee and engineering sign-off is no longer relevant to the development.</p>	Section 4.14.4

1.9 CONSULTATION

The report has been developed in consultation with the NSW Water, NRAR and DPIE (see *Appendix D*) as outlined in *Table 1*. The Secretary approved the appointment of Tara O'Brien of VGT Pty Ltd on 27th October 2020 (see *Appendix A*).

Further consultation will be undertaken with the DPIE with the submission of this Plan. Comments received by DPIE on review of version 9853_HMA_EMP_SWMP_F0 are attached with the company responses included can be found in Appendix F.

2 Existing Site Features

2.1 GEOLOGY

From the EIS (1999):

'The Maroota area is known for the production of sand, which represents a valuable resource to the building industry. The sand is obtained from two main sources, the Maroota Sand and the weathered profiles of the Hawkesbury Sandstone.

.....The Maroota Sand comprises a sequence of interbedded and poorly sorted sands, gravels, clayey gravels, gravelly sands, clayey/silty sands and clay which range from compacted to partly consolidated materials. The bulk of these sediments, however, consists of sand sized material. Ferricrete bands are common and occur at a number of levels within the Maroota Sand.....

.....The Hawkesbury Sandstone is a widespread formation occupying a large portion of the Sydney Basin. It comprises a thick sequence of sub-horizontal, massive, cemented quartz sandstone, with well-developed cross-bedding and intercalations of shale and siltstone beds. Grain size is generally in the range of fine to medium sand, but sorting is generally poor with some silt and pebble grains. Shale layers and bands and occasional carbonaceous beds are also common within the Hawkesbury Sandstone. Shale beds have been identified at various locations between the Maroota Sand and the underlying Hawkesbury Sandstone bedrock.'

2.2 SOIL TYPES

Important site physical characteristics are identified in the table below.

Table 4. *Constraints and Characteristics*

Constraint/Opportunity	Value
Rainfall Erosivity	Moderate (R-factor= 2,290)
Rainfall Zone	1
Slope Gradients	Variable (average up to 14%)
Potential Erosion Hazard	Generally high depending on the slopes
Soil Erodibility	Moderate to high
Calculated Soil Loss	Up to 2,400 tonnes/ha/yr depending on particular quarry slopes.
Soil Loss Class	1 to 7
Soil Texture Group	Type F
Soil Hydrological Group	B
Percent Dispersible (subsoil)	Significant
Runoff Coefficient	0.57 low to moderate (Soil Hydrological Group B)
Disturbed Site Area	28 ha approximately

The Soil Hydrological Group for the soil materials is assumed to be B, low to moderate run-off potential. Water moves into and through these soils at a moderate rate when thoroughly wetted. They shed run-off only infrequently.

Sediment retention basins are designed using the Type F 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.

2.3 TOPOGRAPHY

The area's landscape is formed on a Hawkesbury Sandstone plateau surrounded by steep valleys and massive cliff faces. The relief ranges from 170m AHD, south of the project area to 240.7m AHD at the Maroota Trig Station. Within the site elevations range from approximately 226m at the south-western end along Old Northern Road to approximately 192m AHD on the northern boundary.

The original drainage pattern of the area was in a northerly direction to eventually join a tributary of Coopers Creek approximately 2km to the north; however, runoff along this line is captured by a number of dams, two of which are located inside the property boundaries. Those dams provide a water supply to the existing nursery operations on the site. The rest of the site is internally draining, with all runoff directed towards the central dam construction operation.

2.4 DRAINAGE PATTERNS

The quarry forms a bowl-like structure capturing surface water and directing it to a number of dams located within the site as shown in *Figure Four*. The portions of the site adjacent to Old Northern Road comprise mainly of clean water catchments whilst the disturbed areas extend from the central area to the north and east. The lowest point of the site is the Process Dam with the highest adjacent to Old Northern Road. Surface water collected over properties to the east of Roberts Road enters the site via a road culvert just north of the site entrance. This catchment comprising of approximately 10 Ha is considered clean, and is diverted into the Process Dam. It has not been physically possible to divert this water around the site due to the topography. NSW Water has indicated that this dam will require licencing (see Section 1.6.2).

The original creek line runs north of the property from the Process Dam.

The site is above the 1 in 100-year flood level and quarrying at the site will have no adverse impact on flooding in the area.

2.5 WATER QUALITY

Water monitoring results indicate the pH is naturally low in the groundwater, and since the surface water has such low buffering capacity, the water from the bore water used in the processing plant (PB1) has a high influence on the pH of the Process Dam and Dam 2. Dams 3 and 4 show little similarity to the groundwater, with pH closer to neutral. Dams 3 and 4 are influenced by surface inflows. The purpose of the monitoring was to determine if there was any interaction between the process dam and groundwater. Due to the mixing of the bore water with the surface water during processing this was determine to not be a reliable method of determining the extent of any interaction and there is very little purpose to continued quarterly monitoring. For this reason water quality monitoring will be conducted annually.

2.6 INFRASTRUCTURE

There are a number of site features:

- An office building, car shed/workshop and amenities building are located at the entrance of the site. The offices consist of a permanent building whilst the sheds are of corrugated iron and colour bond construction.
- Adjacent to the office is the weighbridge.
- A processing plant is located centrally in the quarry is also of colour bond construction. Smaller office buildings and general storage are located in this area.
- Mobile plant is located within the quarry. Internal haul roads link the quarry to the weighbridge and the access road to the quarry.

- The site surface is covered in dams, material stockpiles, grass and vegetation. The road is sealed between the access via Roberts Road and the weighbridge. All other roads are constructed of gravel.

2.7 CONTAMINATED SITES REGISTRY/ DANGEROUS GOODS

A search of the NSW EPA Contaminated Land Register shows that the site has not been notified. The proponent advises that there are no dangerous goods held on site.

2.8 SITE HISTORY SUMMARY AND CONTAMINANTS OF POTENTIAL CONCERN

Based on a review of the available historical information, the site began operations in 1990's when construction of a water supply dam began. Previous land uses were agricultural. The proponents took over operations on the site in 2004 as an established quarry.

Table 5. *Site Use Summary and Associated Potential Contaminants*

Site Use/ Contaminate Source	Potential Contaminants
Weed and pest spraying	Herbicides
Fuel Storage	Total Petroleum Hydrocarbons (TPH), Benzene, Toluene, Ethyl benzene, Xylene (BTEX), Polycyclic Aromatic Hydrocarbons (PAHs)
Emplacement of mulch for rehabilitation	Alkalinity, ammonia, calcium, chloride, magnesium, nitrate, potassium, sodium, sulphate, total organic carbon and BOD

3 Water Balance

3.1 OVERVIEW

The objective of the water balance modelling in the EIS was to assess the ability of the project site to provide on-site water detention and to understand the water demands of the processing operations. It is essential that there is sufficient capacity in the dams onsite to provide this processing water. The model investigated whether the following requirements were satisfied:

- Ensure that the discharge of water flowing from the disturbed part of the site is limited to 1 to 2 times during the year for a critical historical 10 year period.
- Demonstrate that there is sufficient water security for the site operations over the term of a critical historical 10 year period.
- The water balance over an average rainfall year, a wet year and a dry year.

The EIS water balance, based on historical weather data concluded that:

- During an 'average' rainfall year the site would not overtop and there is sufficient water to supply the processing plant.
- During a 'wet' rainfall year the site would not overtop and there is sufficient water to supply the processing plant.
- During a 'dry' rainfall year the site is not expected to overtop and there is just sufficient water to supply the processing plant. If the dry conditions continued the plant would risk insufficient water moving into the following year.

Modelling performed for a critical 10-year period (1979-1988) was undertaken in the EIS to determine the frequency of overflows within the nominated period. This ten-year period was selected as it approximated the wettest and driest years in any consecutive 10 year period on record. The average annual rainfall over the period however was 941mm which is comparable with the BOM annual average of 932mm. The model predicted that the void would not overtop. However, there may have been periods where there would not have been sufficient water stored on site to conduct the processing operations.

Water level loggers were installed in the site dams in late 2017 as well as a study of the depth of the Process Dam. Combined with site weather data this data has enabled a more detailed review of the site water balance in recent years, which is discussed in the following sections.

The water balance is required to be compared each calendar year under Consent Condition 42 a).

3.2 SOURCES AND SECURITY OF WATER SUPPLY

It is difficult to predict long term changes in rainfall patterns and this presents an ongoing difficulty for the operation's water security.

The primary source of water on the site for processing is from incident rainfall collected into the Process Dam (see *Figure Four*). A number of farm dams also known as the nursery dams are also located on the site (Dam 3 and 4) which are licenced for irrigation only and are not included in the water usage balance.

The Drying Pond is used as the holding pond for the slurry resulting from the processing, and water from the Drying Pond releases into the Process Dam overnight.

Bore PTPB1, located near the processing plant is licenced as a production bore for use in the processing plant as required. The bore is licenced for 45ML per annum of groundwater to be extracted for production purposes until 14th June 2025 and may be renewed after that time. Extraction from the bore is licenced for a maximum rate of 3L per second, or 10.8 cubic metres per hour. The bore alone is unable to supply the full water usage requirements for the site.

As sand extraction progresses Dams 3 and 4 will be incorporated into the pit and captured rainfall will then be directed to either the Process Dam or the Drying Pond, providing additional water through the increasing catchment area. When this occurs, the water balance will be updated.

Water security is contingent on capturing and reusing nearly all rainfall and surface water flows onto the site. If insufficient water is available on site for processing, operations will cease.

3.3 WATER USE ON SITE

The extraction of sand on the site relies on an adequate supply of water for washing and screening of material. After processing, residual clay/silt is delivered to the designated drying areas and liberated water is drained into a the Drying Pond to settle sediment entrained in the process. Water from the holding dam is then released back into the process dam for re-use. Release from the Drying Pond to the Process Dam is through a riser pipe that can be manually adjusted to maximise the water draining to the Process Dam. During processing the Drying Pond fills with sediment as well as water. The overall effect is that whilst a nominal small volume is held in the Drying Pond, virtually all processing water makes its way back to the Process Dam overnight.

The plant requires 160L per second to process the sand which equates to approximately 4,600 cubic metres per day assuming an 8 hour day.

Water is also used on site for dust suppression and rehabilitation works when required and is generally sourced from the process dam.

The office and weighbridge area are supplied by town water for drinking and amenities.

3.4 GROUNDWATER INFLOWS

Groundwater inflows are discussed in detail in the Ground Water Management Plan (GWMP). As stated in the GWMP:

'Regular inspections across the pit faces and quarry floor has not identified any notable groundwater seepages in the quarry. As noted in the Groundwater Study Report (Dundon Consulting, 2017) water levels in the 5 site ponds (Process Dam 1, tailings dams Dam 2 and unnamed dam, and water supply Dams 3 and 4) are higher than groundwater levels in nearby bores within the quarry site, indicating that there is a potential for water to flow from the ponds to the groundwater, but not from the groundwater to the ponds. There is no evidence of any groundwater inflow occurring at the current extraction depth.'

The one exception to the above observation is a persistent seepage zone that has been observed in the active quarry about 120m east of Dam 4, at the location marked "Seepage" on Figure 2. This seepage is observed at an elevation of approximately 195 mAHD, ie about 18m lower than the Dam 4 water level and several metres below the water level in the nearby tailings dam (Dam 2). It is shown also on the cross-section EE' which is presented in Figure C5 in Appendix C. The seepage has been observed to dry up whenever water is pumped for an extended period from Dam 4 causing the water level in Dam 4 to be lowered, indicating a clear connection between the dam and the seepage.'

As such this seepage is not considered a true 'groundwater inflow'. The seepage is very low in volume and does not contribute in a measurable way to the quantity of water held in the Drying Pond to where it flows. Any excessive seepage would be contained in the Drying Pond which is released back into the Process Dam each day. It should be noted that the quarry void has more than sufficient capacity to hold the complete volume of Dam 4. As Dam 4 will be ultimately destroyed as the quarry expands, this seepage point will cease to exist.

3.5 DISCHARGE

The site does not discharge water off site. There is no licenced discharge point on the EPA licence at present. As the final landform is developed, a sediment dam will be constructed in order to retain sediment laden water until revegetation has established. During this period an EPL discharge point will be sought to permit the discharge of surface water, once EPL criteria are met, to a drainage line to the north. The final landform will be free-draining and the sediment dam removed as shown in *Figure Two* and *Figure Three*.

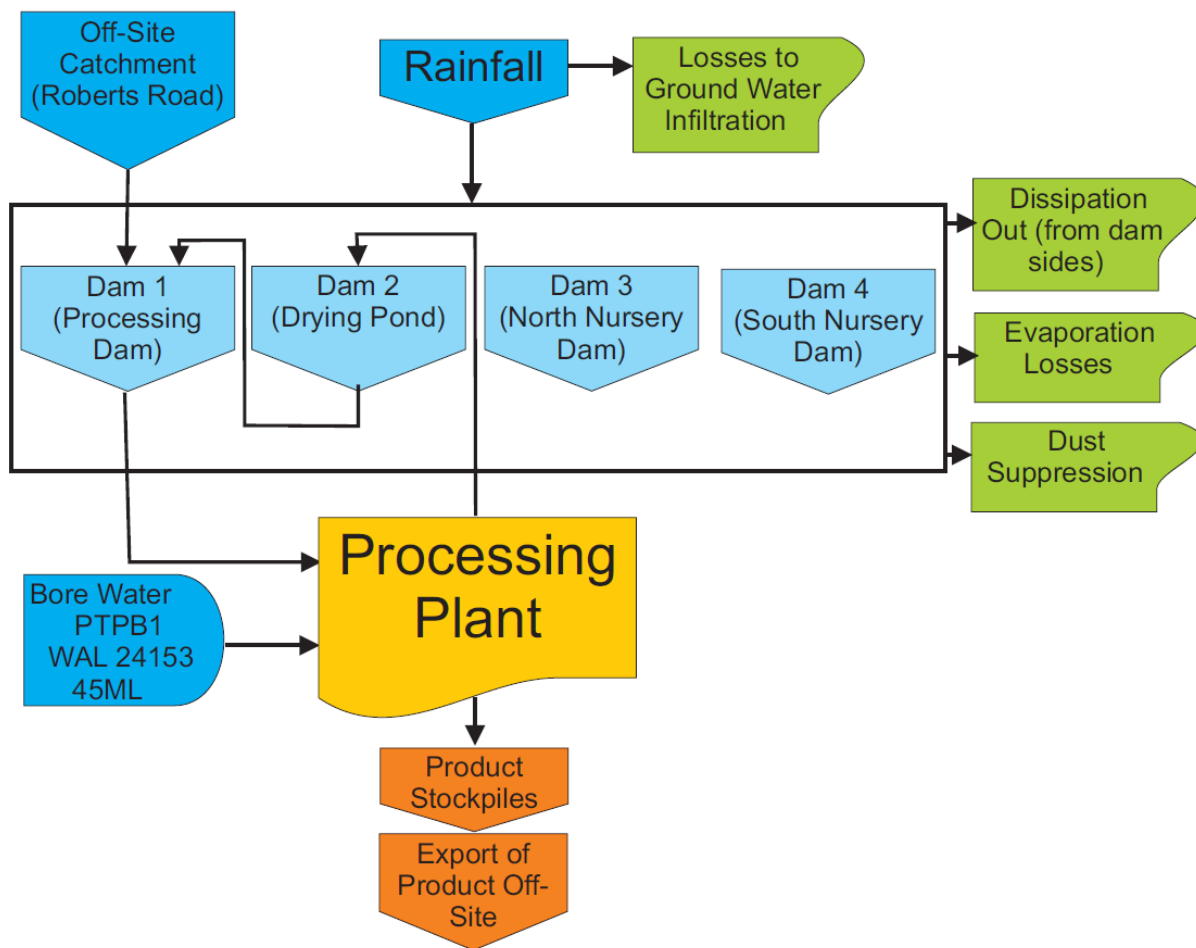
3.6 AUDIT AND REPORTING PROCEDURES

The audit and reporting requirements of the Water Balance are discussed in *Section 4.18*.

3.7 RECYCLING OF WATER

The quarry currently endeavours to recycle as much water on site as possible and indeed is reliant on the recycling of water on the site. Water collected in the on-site dams (see *Table 16* for descriptions and capacities) is used for dust suppression, rehabilitation works and for processing operations as described in *Section 1.2*. These practices will be continued and thus there is no requirement to discharge. A flow chart representing the water usage on the site is shown below.

Graph 1. Water Usage Flow Diagram



3.8 MODELLING ASSUMPTIONS

The following assumptions and inputs were applied during the development of the water balance model:

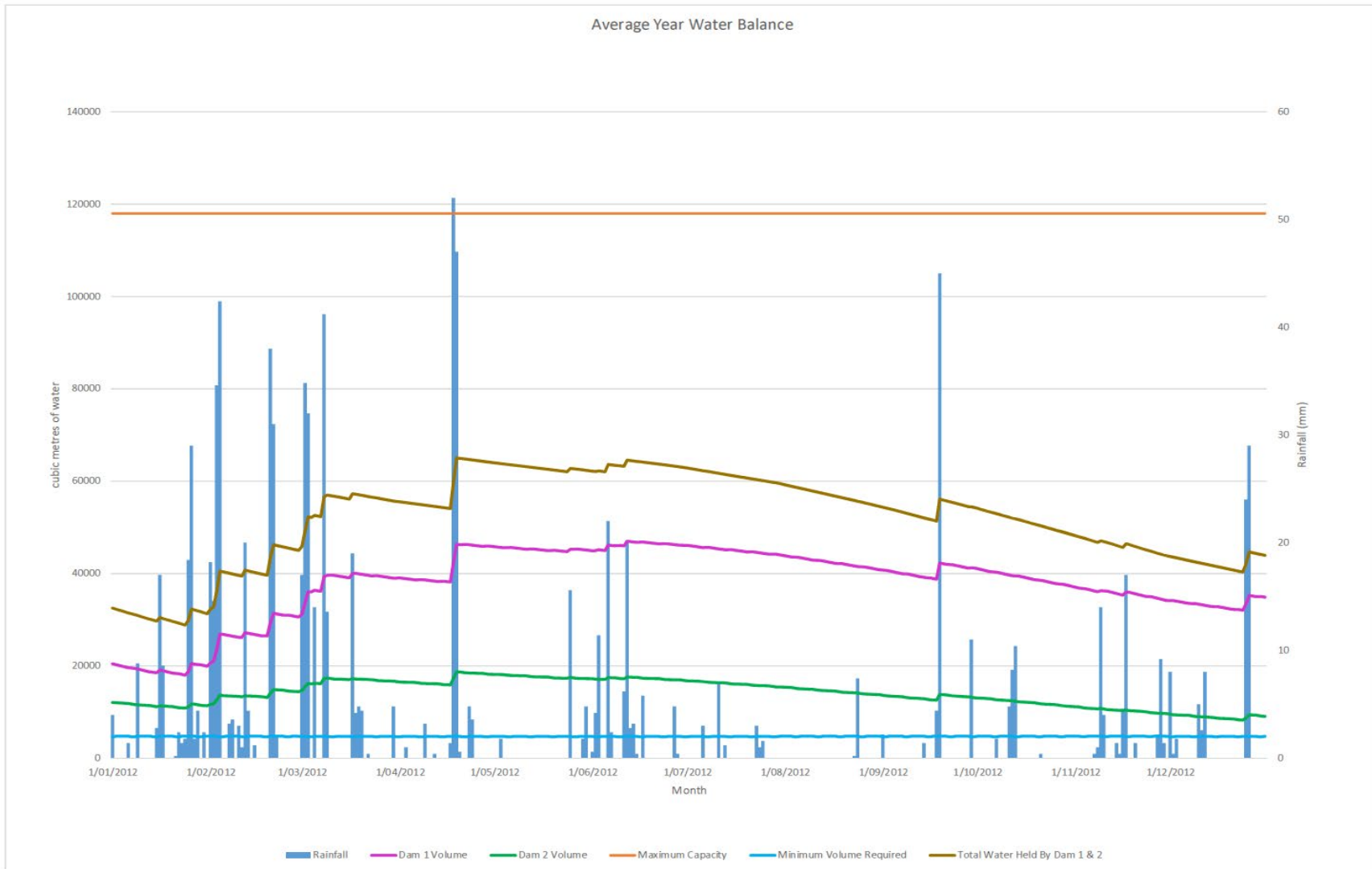
- The 10-year, average, wet and dry year water balance models have been run using the void (as of March 2018) as the water storage area as the worst case scenario. As the extraction progresses the void available for water storage will increase and reduce the risk of overflows. The 2018 estimated dam volume has been used as the initial dam volume for the model.
- The catchment area (39Ha) for surface water includes not only the project site but also the adjoining property to the east of Roberts Road. Water captured over this catchment is directed to the Process Dam via a culvert under the road. This represents a worst case scenario as being equivalent to the full extent of extraction on the site and accounts for the difficulty in separating the neighbouring catchment due to the topography.
- Catchment areas have not changed from 2017 to 2020. Should the catchment footprints change, the model catchment areas will be updated.
- To ensure a conservative and realistic assessment is being carried out, 10mm of rainfall will be applied prior to the expected runoff commencing. It is industry standard practice to provide wetting of the catchment and allows the dams to retain some water, as in practice the dams generally have carryover of water from previous flood events .i.e. they are rarely dry.
- To understand how the system operates under both wet and dry conditions, the existing site scenarios were modelled for average rainfall years, a wet year and a dry year and also with application of a daily time step for a 10 year period, 1979 to 1988.
- Historical rainfall data from the Maroota- Old Telegraph Road site (BOM Station 67014) has been used for the years 1979 to 1988 as this included years approximating the driest and wettest years over a consecutive 10 year data period.
- The 'average' annual rainfall is 932mm according to BOM and the year 2012 where 984mm of rainfall was received has been selected as representative of an average year.
- The 'wettest' year and 'driest' years were 1950 (1,774mm) and 1953 (354mm) respectively.
- Rainfall data for 2017-2020 collected from onsite monitoring and interpolated dam volumes based on the dam depth loggers has been compared to the predicted water balance.
- A runoff coefficient of 0.47 has been used. This differs slightly from the blue book estimation of 0.57 for similar soils used in previous estimations. It appears through the modelling, that the soil over the disturbed area allows for a slightly higher rate of infiltration.
- Maximum dam volumes before overtopping have been calculated from survey data and estimated dam depths.
- The effective area of evaporation has been assumed to be the current dams 1 & 2 surface area. The actual area will vary according to the dam volume but for this calculation vertical dam walls are assumed for ease of calculation.
- A pan evaporation factor of 0.75 for the water storage (to convert recorded pan evaporation to pond surface evaporation).
- Groundwater seepage into the Process Dam and the Drying Pond is assumed to be negligible as the dams are perched above the groundwater level as discussed in the GWMP.
- Dissipation from the dams is assumed to be negligible.
- The processing plant runs 5 days a week for 8 hours each day.
- The production bore (PTPB1) that is licenced for 45ML per annum is used to provide clean water to the processing plant. It is assumed that water is pumped from the bore at a rate of 1.0L per second for 40 hours a week i.e. 86 cubic metres per day. This is recycled through the plant several times and released back to the drying pond at the end of the day. This water is assumed to be returned to the Process Dam at the end of the day. Where actual daily pumping volumes are available (from January 2018), they have been incorporated into the calculation.
- The plant requires 160L per second to process the sand which equates to approximately 4,600 cubic metres per day. It is assumed that all of this water is returned to the process dam at the end of each working day. This rate provides the critical volume for the water required on the site for the plant to operate.
- On average 5 cubic metres per day is used for dust suppression.

- An average of 8 trucks are loaded per day (from truck movement data) with material estimated to be at 3% moisture. Assuming each truck is 30 tonnes that equates to approximately 8 cubic metres of water leaving the site per working day.
- Stockpiled sand and clay material have approximately 10% moisture content (by mass) respectively. Assuming production rate of 1675 tonnes of material per day of which approximately 70% is sand and 30% is clay material the monthly water losses have been calculated to be approximately 50 cubic metres and 120 cubic metres per working day respectively.
- Evaporation rates were obtained from the nearest available comparative site which was the Peats Ridge (Waratah Road) (BOM site 61351).
- Surface areas for the Process Dam and the Drying Pond have been estimated from survey data and are approximately 20,500 square metres and 12,200 square metres respectively.
- Vertical perimeter embankment walls.

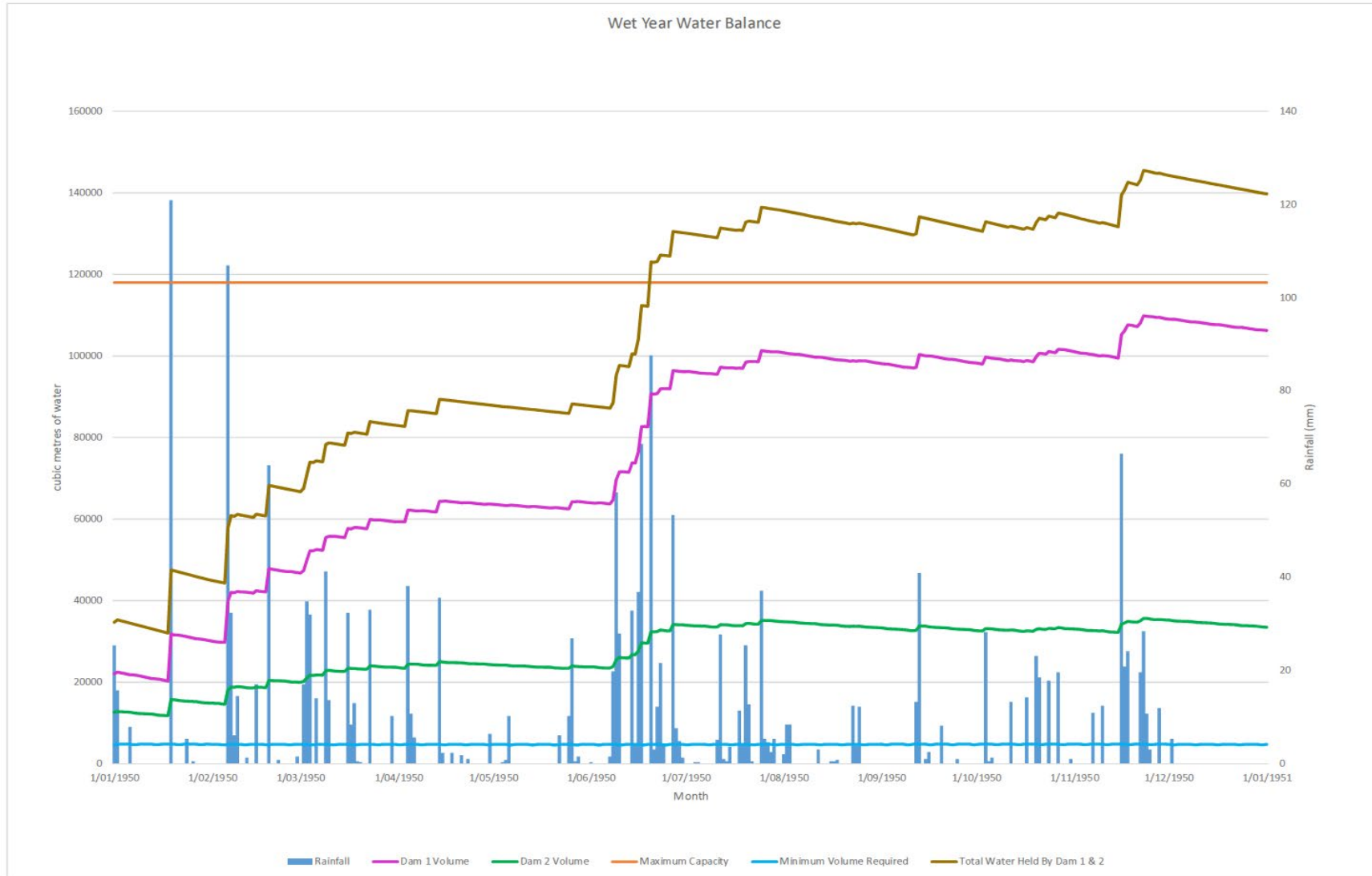
3.9 WATER BALANCE CALCULATION

Using the above data the water balance is shown graphically below.

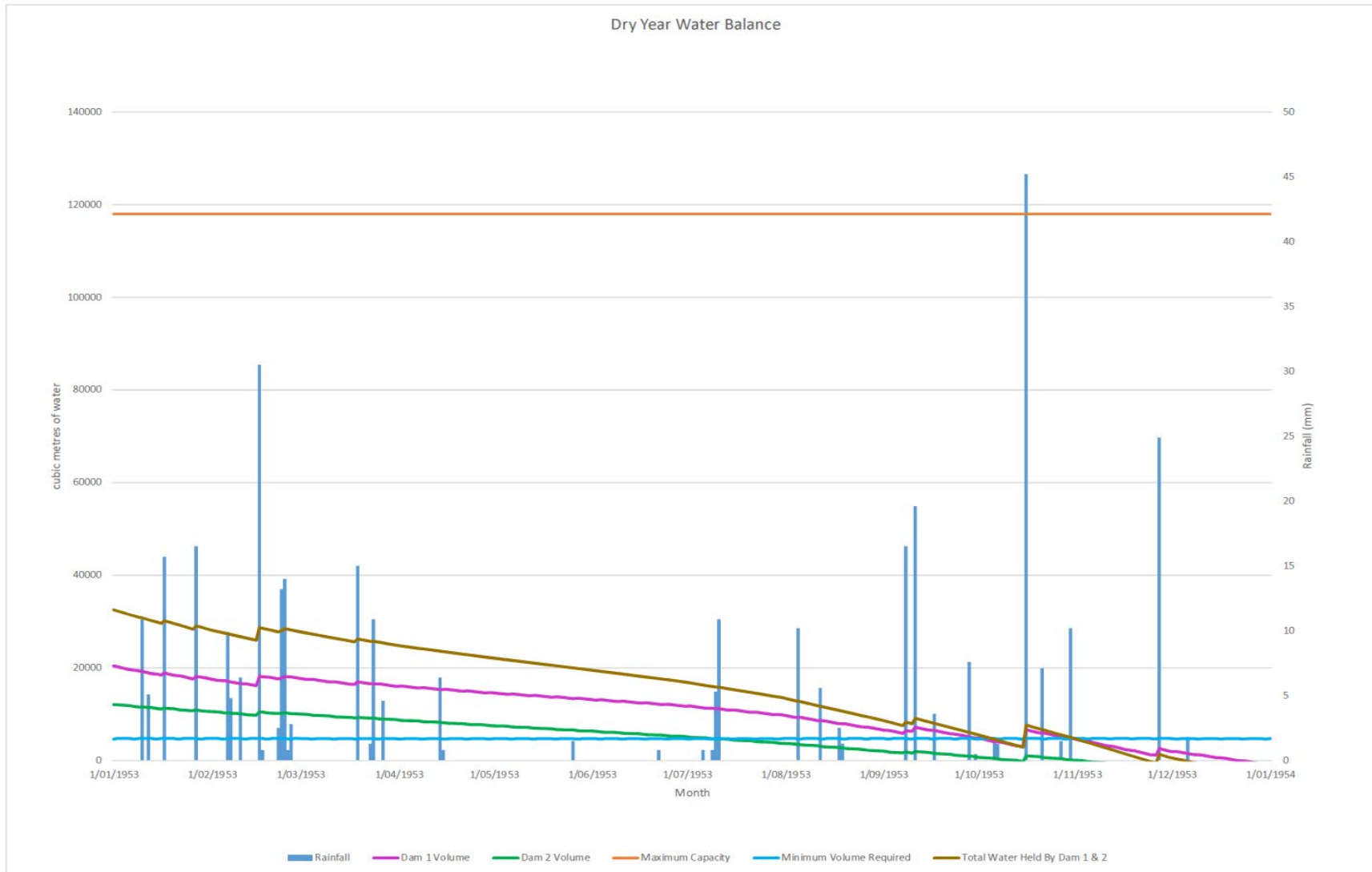
Graph 2. Average Year Water Balance



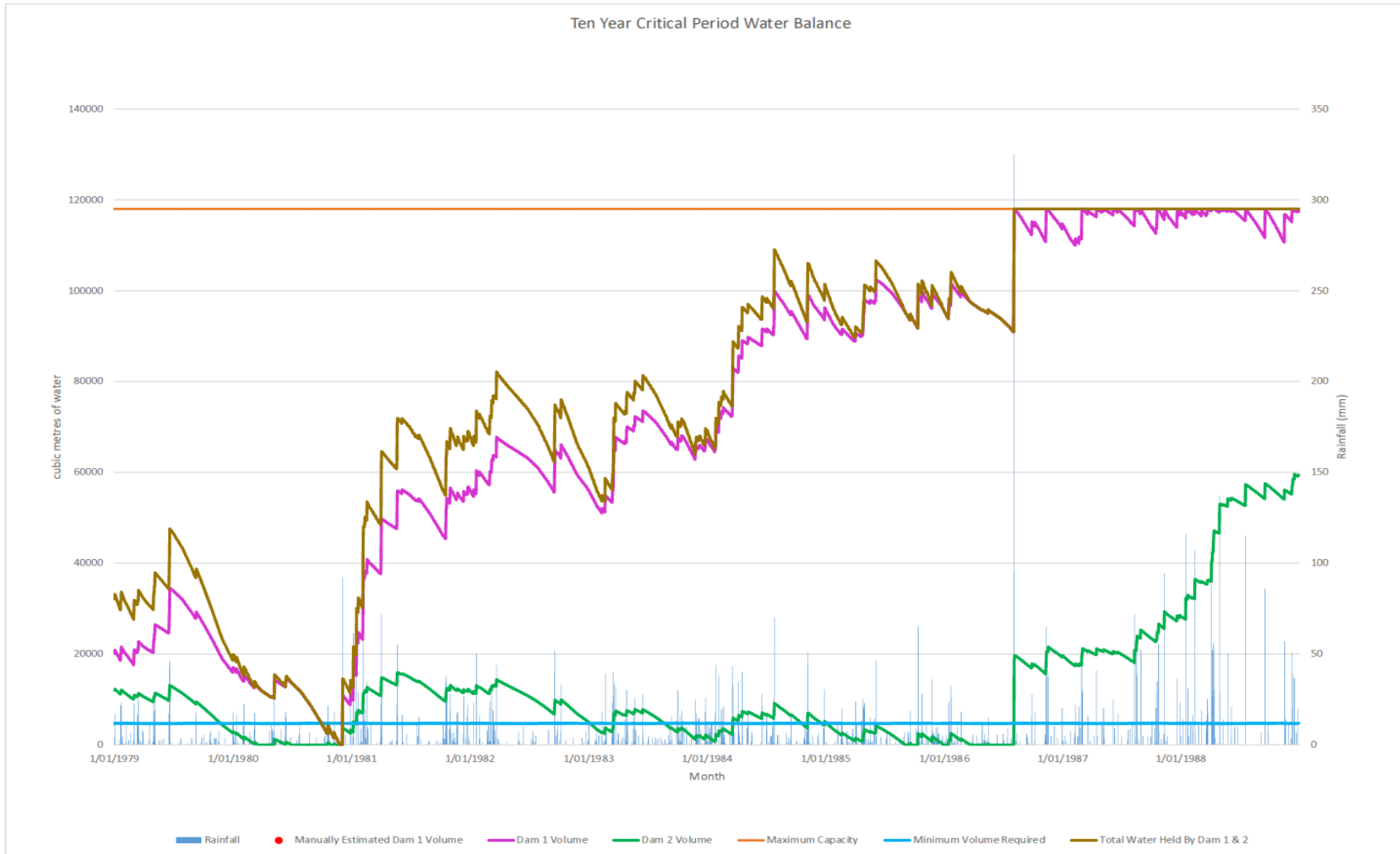
Graph 3. Wet Year Water Balance



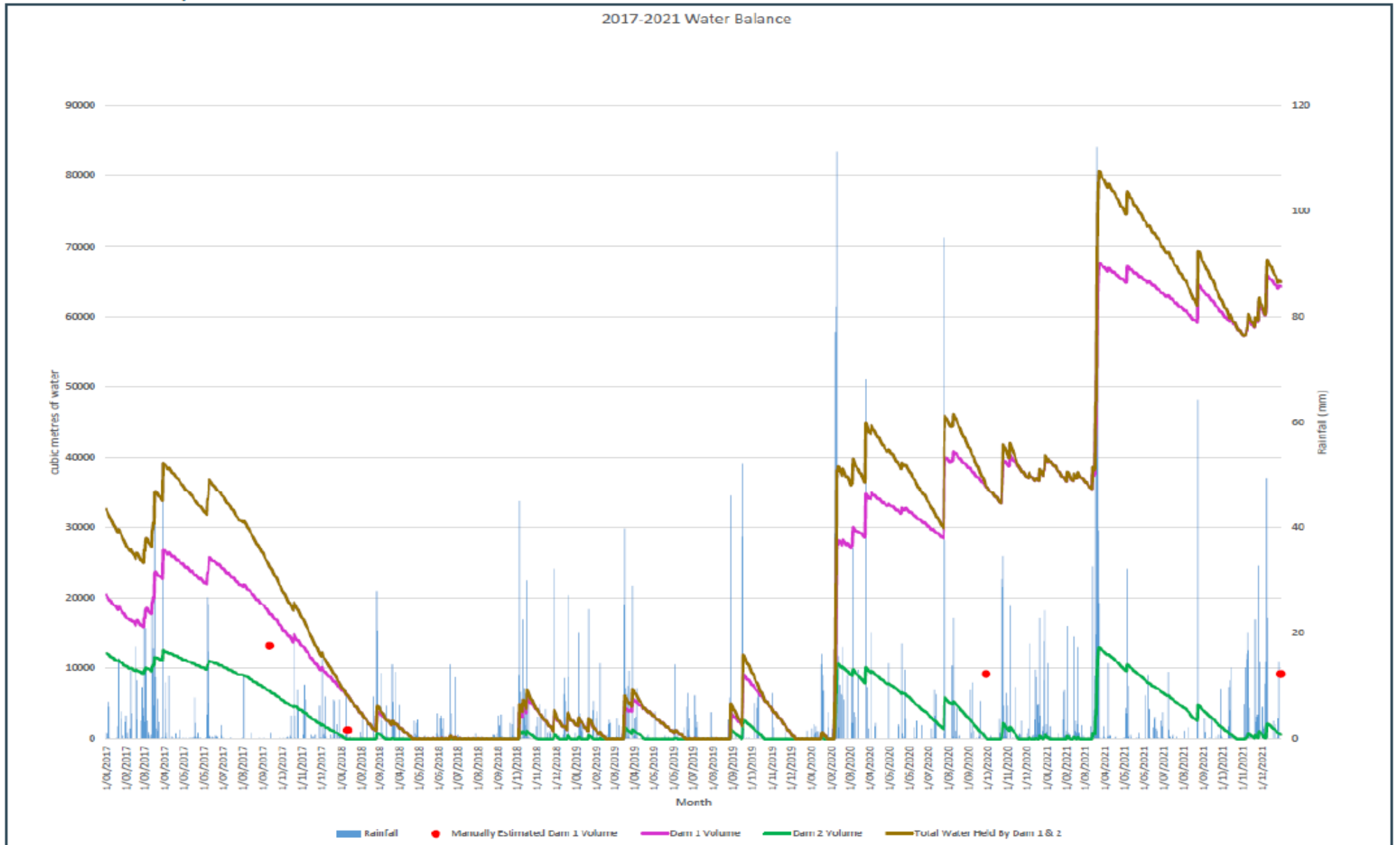
Graph 4. Dry Year Water Balance



Graph 5. Ten Year Critical Period Water Balance



Graph 6. 2017 to 2021 Water Balance



3.9.1 2017 to 2020 Water Balance Discussion

The water balance has focused on the currently disturbed catchments and Dams 1 and 2. Dams 3 and 4 are not controlled by the operator and usage/pumping rates are unknown. At present they play no part in the site operations and therefore are not included in the water balance. Rainfall from data obtained onsite over the period 2017 to 2020 was used to correlate site observations and measured dam water levels.

The assumptions made in the EIS modelling have been further refined as described in *Section 3.8* above and in the following.

A level logger was installed in the Process Dam in late September 2017 and at the time the logger was installed, the RL of the water in the Process Dam was recorded. Measurements were taken over the area of the dam to determine the depth of water to the base of the silt. The dam was found to be only up to 0.5m deep over the vast majority of its extent with the exception of a deeper hole (up to 3m deep) around the pump intake. This data was used to project an approximate contour model of the base of the dam. From the model, the volume of the water within the dam was estimated at the time of the installation of the logger. The volume was also estimated in January 2018 when it was noted that the dam was virtually dry with only the immediate pump uptake area submerged. At this time the level logger in the Process Dam was below the now dry silt level but was still recording. It is assumed that the levels it has recorded relate to the water held within the silt layer in a similar manner to groundwater bores.

A slightly lower runoff coefficient has been used as it appears that the rainfall infiltration rate is higher than the initial Blue Book assumption made. Water usage on the site due to the processing losses, dust suppression and 'out the gate' losses from the product have been reduced as it was apparent that the EIS model would have the site run out of water completely mid to late 2017 and this was contrary to site observations.

No dissipation from the dams has been accounted for in the amended assumptions due to work undertaken in the Ground Water Study that confirmed that the hydraulic conductivity at the base of the dams was very low.

From the plot of the predicted water balance, based on actual rainfall data, it can be seen that the plant was likely to run out of water early 2018 if further rainfall is not received. The low water levels have been confirmed by site inspections and photographic evidence. Further periods of low water levels were predicted during 2019 and 2020 which is consistent with site observations during the drought period. The most recent calculation of the Process Dam volume using the measured RL of the water (from the logger) and 12D modelling indicates that the water balance prediction of the Process Dam volume is very close to the calculated volume (see *Table 16* and *Graph 6*).

During the periods where the dam volumes are low, the site has shut down the processing plant for a number of hours and permitted the water in the Drying Pond to flow back into the Process Dam. Once there is sufficient volume within the Process Dam the processing plant recommenced operations. The staggering of the processing allowed the site to continue to produce material during the drought periods.

3.9.2 Projected Future Water Usage

The water balance is affected primarily by the rainfall and the production losses suffered through the processing of the sand. In order to maintain the currency of the water balance the following items will be recorded and /or reviewed if the production rates or rainfall received alter significantly from the expected rates. The water balance would be recalculated using the most current data.

- Rainfall data is currently collected on the site using the meteorological station and is reported monthly along with other meteorological data. Site data will be used in the water balance calculation when updated in the annual review.
- Spot moisture checks would be conducted annually on stockpiles to determine losses.
- Volumes of water used through the plant will be estimated and/or recorded if there is a change in process or equipment. Data will be used to recalculate the water balance as required.
- Water levels within the Process Dam will be recorded using a continuous logger. Any change in the level will be measured and the volume of water gained or lost from the dam will be calculated and recorded in the water balance.

Should any significant changes to the water balance be apparent, the water management system will be reviewed and changed if required.

4 Surface Water Management Plan

4.1 CLEAN WATER MANAGEMENT

The current water management strategy is to divert clean water as appropriate but retaining as much surface water as possible to meet the needs of the processing plant.

Clean water is diverted around the site via a series of earthen bunds where possible or utilising the natural ridgeline topography and bunds (see *Figure Four*) However, clean water enters the site from the east of Roberts Road via a culvert. Due to the topography of the site this clean water is unable to be directed around the site and is collected in the Process Dam. Surface water captured over the disturbed areas must be collected to prevent dirty water from leaving the site and to maintain an adequate supply of water from the processing works.

Dams 3 and 4 (the Nursery Dams) collect the majority of clean water from the west of the site and are licenced with Water NSW for irrigation use.

This system has been shown to be satisfactory and no changes are proposed.

4.2 SEDIMENT CONTROL

All surface water captured over the disturbed areas of the quarry contains sediment and is considered dirty and is collected in on site dams. No water is discharged off site.

4.2.1 Catchments

The site is divided into 4 major catchments consisting of clean and dirty water catchments. The estimated volume of water retained from the design storm for each catchment, existing and final stage of the extraction are presented below.

4.2.1.1 Catchment 1

Catchment 1 is the largest catchment on the site and comprises both clean and dirty water sub-catchments. The Process Dam, used as a source of processing water, is located centrally in this catchment at the lowest point. As the quarry progresses the size of the catchments will alter and thus the required capacity of the dam will change in order to meet the design storm event criteria.

The total catchment area is approximately 26 Hectares however it has been divided into sub-catchments for ease of calculation when designing sediment basins and drains based on slopes and slope lengths.

Catchment 1A comprises the Process Dam in the north east of the site. It is approximately 2.0Ha in area with zero slopes. The size of this catchment will not change appreciably over the extraction stages until the final phase where it will evolve into the full site catchment.

Catchment 1B comprises the east and west flanks of the Process Dam and is approximately 5.0Ha in area with slopes averaging 8%. The size of this catchment will not change appreciably over the extraction stages.

Catchment 1C comprises the western portion of Catchment 1 and is approximately 1.2Ha in area with slopes averaging 5%. The size of this catchment will not change appreciably over the extraction stages.

Catchment 1D is considered clean water and comprises the south eastern portion and the eastern boundary of Catchment 1. It is approximately 1.9Ha in area with slopes averaging 9%. The catchment will reduce with each stage as water is diverted into Catchment 2.

Catchment 1E is also considered clean water and comprises the properties to the east of Roberts Road. It is approximately 11Ha in area with slopes averaging 9%. The size of this catchment will not change over the extraction stages.

Catchment 1F comprises the Drying Pond and a grassed area to the west of the pond and is approximately 2.5 Ha in area with average slopes of approximately 14%. The size of this catchment will change over the extraction stages.

The following table summarises the Catchment 1 volumes required by the Blue Book calculations in *Appendix A*.

Table 6. *Existing Catchment 1 Volumes*

Catchment	Catchment Area (Ha)	Sediment Basin Storage (soil) volume (m ³)	Sediment Basin Storage (water) volume (m ³)	Dam Volume Required for 95 th percentile, 5 day rainfall event (m ³)
1A	2.0	0	791	791
1B	5.0	653	1,980	2,630
1C	1.2	72	475	547
1D	1.9	-	752	752
1E	11.0	-	4,350	4,350
1F	2.5	460	989	1,450
Total	23.6	1,185	9,340	10,500

Note: volumes and areas have been calculated using Nearmaps spatial data and QGIS.

The following table outlines the current estimated volume held in the Process Dam. It also shows the potential volume of water that could be held in this catchment before it would overtop at the lowest point of the quarry wall (calculated using survey data).

Table 7. *The Process Dam Volume*

Dam Identification/ Catchment	Dam Area (m ²)	Estimated Depth (m)	Current Estimated Volume (m ³)	Potential Volume that could be held (m ³)
Process Dam	-	Ranging from 0.5m to 3m*	1,240	119,000

*Areas have been calculated using 12D software and depths were taken from field measurements on the 12/09/2017.

As can be seen from the tables above, the volume of water that could be held by the **Process Dam is more than sufficient to capture the design storm event over all stages of the development.**

4.2.1.2 Catchment 2

Catchment 2 is the area of current extraction and surrounding slopes and comprises of dirty water sub-catchments. It is approximately 7.5 Ha in area with slopes averaging 8%. As the quarry progresses the size of the catchments will alter and thus the required capacity of the dams will change in order to meet the design storm event criteria. The catchment does not include the Drying Pond which flows to the Process Dam. Surface water is collected on the floor of the extraction area in informal sumps, the main one lying in the western portion of the pit. Surface water collected within the main sump can be pumped to either the Drying Pond or Process Dam if required.

The following table summarises the Catchment 2 volumes required by the Blue Book calculations in *Appendix A*.

Table 8. *Existing Catchment 2 Volumes*

Catchment	Catchment Area (Ha)	Sediment Basin Storage (soil) volume (m ³)	Sediment Basin Storage (water) volume (m ³)	Dam Volume Required for 95 th percentile, 5 day rainfall event (m ³)
2	7.5	2,197	2,967	5,164

Note: volumes and areas have been calculated using Nearmaps spatial data and QGIS.

The volume of surface water that potentially could be held by the Catchment 2 extraction area sump to 200m RL (top of adjacent Drying Pond) has been estimated to be approximately 282,000 m³ using survey data and QGIS calculations. This is more than sufficient volume to contain the design storm. Should the water level exceed 200m RL the catchment will overtop into the Drying Pond and thence the Process Dam.

4.2.1.3 Catchment 3

Catchment 3 is in the North West corner of the site and comprises of clean water. Dam 3 is located centrally in this catchment at the lowest point. As the quarry progresses the size of the catchment will reduce and thus the required capacity of the dam will change in order to meet the design storm event criteria. Eventually the dam will be de-watered by pumping to either the Process Dam or the Drying Pond and excavated. The surface water captured over this catchment will be treated as dirty water as extraction progresses.

Catchment 3 comprises Dam 3 and is approximately 3.9 Ha in area with average slopes of approximately 5%. The size of this catchment will reduce over the extraction stages as dirty water is directed to catchment 2.

The following table summarises the Catchment 3 volumes required by the Blue Book calculations in *Appendix A*.

Table 9. *Existing Catchment 3 Volumes*

Catchment	Catchment Area (Ha)	Sediment Basin Storage (soil) volume (m ³)	Sediment Basin Storage (water) volume (m ³)	Dam Volume Required for 95 th percentile, 5 day rainfall event (m ³)
3	3.9	-	1,540	1,540

Note: volumes and areas have been calculated using Nearmaps spatial data and QGIS.

The following table outlines the current estimated volume held in Dam 3 and its potential capacity assuming a freeboard of approximately 1m.

Table 10. *Dam 3 Volume*

Dam Identification/ Catchment	Dam Area (m ²)	Estimated Depth (m)	Estimated Volume (m ³)	Potential Volume that could be held (m ³)
Dam 3	7,494	2	14,988	22,482

Note: volumes and areas have been calculated using SURPAC software.

As can be seen from the tables above, the volume of water that could be held by the Dam 3 is more than sufficient to capture the design storm event. At this stage the dam is passively managed by the landowner.

4.2.1.4 Catchment 4

Catchment 4 is in the North West corner of the site and comprises of clean water. The Dam is located to the north of this catchment at the lowest point. As the quarry progresses the size of the catchment will reduce and thus the required capacity of the dam will change in order to meet the design storm event criteria. Eventually the dam will be de-watered by pumping to the Drying Pond and excavated. The surface water captured over this catchment will be treated as dirty water as extraction progresses.

Catchment 4 comprises Dam 4 and is approximately 3.8 Ha in area with average slopes of approximately 5%. The size of this catchment will reduce over the extraction stages as dirty water is directed to Catchment 2.

The following table summarises the Catchment 4 volumes required by the Blue Book calculations in *Appendix A*.

Table 11. *Existing Catchment 4 Volumes*

Catchment	Catchment Area (Ha)	Sediment Basin Storage (soil) volume (m ³)	Sediment Basin Storage (water) volume (m ³)	Dam Volume Required for 95 th percentile, 5 day rainfall event (m ³)
4	3.8	-	1,500	1,500

Note: volumes and areas have been calculated using Google Earth data.

The following table outlines the current estimated volume held in Dam 4 and its potential capacity assuming a freeboard of approximately 1m.

Table 12. *Dam 4 Volume*

Dam Identification/ Catchment	Dam Area (m ²)	Estimated Depth (m)	Estimated Volume (m ³)	Potential Volume that could be held (m ³)
Dam 4	14,500	2	29,000	43,500

Note: volumes and areas have been calculated using SURPAC software.

As can be seen from the tables above, the volume of water that could be held by the Dam 4 is more than sufficient to capture the design storm event. At this stage the dam is passively managed.

4.2.2 Final Stage Catchment

The final landform will be a free draining structure with a base of 190m RL, subject to the landowner maintaining sufficient surface water licence entitlement. However, until groundcover is established in the final landform, a Sediment Dam will be established to retain surface water as a sediment control structure, as shown in Figure 4.1 & 4.2 of the EIS (Umwelt Dec 2019) (see . It will be managed in accordance with the Blue Book for a 95th percentile, 5-day design storm. The final catchment will be approximately 38Ha, including the rural/residential catchment east of Roberts Road.

Site Catchment is approximately 27 Ha in area with average slopes of approximately 9%. It has been assumed that the entire site has not been rehabilitated in this calculation and a sediment dam is required to retain dirty water until vegetation establishes.

Rural/Residential Catchment to the east is approximately 11 Ha with average slopes of 9%.

The following table summarises the sediment dam volume required by the Blue Book calculations in *Appendix A*.

Table 13. *Final Stage Sediment Dam Volume Required*

Catchment	Catchment Area (Ha)	Sediment Basin Storage (soil) volume (m ³)	Sediment Basin Storage (water) volume (m ³)	Dam Volume Required for 95 th percentile, 5 day rainfall event (m ³)
Site Catchment	27	10,500	10,600	21,100
Rural/Residential Catchment	11	-	4,300	4,300
Total	38	10,500	14,900	25,400

Note: areas have been calculated using SURPAC software.

4.2.3 Diversion Drains

If new diversion drains are required, they will be designed with a sufficient capacity to convey runoff from a 1 in 10-year storm. They will be trapezoidal in shape and have side batters of 1 in 3 to enable maintenance of the structures (see *Appendix C*).

Where steep grades are required which result in flow velocities that may cause scour, the drains shall be lined with appropriate scour protection, e.g. rock, jute mesh, rip rap etc.

Figure Four. Existing Catchments

Plan of: Surface Water Management Plan 2022 for Roberts Road Maroota Sand Quarry - Existing Catchments

Figure: FOUR

Version/Date: V0 15/03/2022

Our Ref: 9853_HMA_EMP_SWMP_Q004_V0_F4

Location: Maroota Quarry, Roberts Road, Maroota, NSW

Council: Hills Shire Council

Tenure: Not Applicable

Client: Hodgson Quarries & Plant Pty Ltd

Source: Fyfe Quarry Photo - Image Date 24/02/2022
Nearmap surrounding photo - Image Date 18/03/2020 Zone MGA 56


Survey: Not Applicable

Projection: GDA2020/MGA Zone 56 EPSG:7856

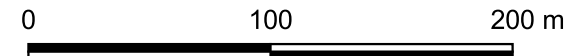
Contour Interval: Not Applicable

Plan By: TO

Project Manager: LT



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.



Legend	
Catchment 1	Catchment 1B
Catchment 1A	Catchment 1C
Catchment 1D	Catchment 1E
Catchment 1F	Catchment 2
Catchment 3	Property Boundary
Catchment 4	RoadCorridor

Note: Phases and Years are indicative only, and are dependent on market demand and product mixing requirements.

4.3 SOIL AND EROSION MANAGEMENT

4.3.1 General Instructions

The control of erosion and sedimentation at the site focusses on source reduction measures. In general, these measures include:

- Reading the SWMP and any other plans or written instructions issued in relation to development at the subject site.
- Ensure contractors undertake all soil and water management works as instructed in this specification and constructed following the guidelines stated in *Managing Urban Stormwater- Soils and Construction Volume 2E- Mines and Quarries (2008)* (the "Blue Book").
- Informing all subcontractors of their responsibilities in minimising the potential for soil erosion and pollution to downslope areas.

4.3.2 Works Sequence

- Topsoil will be stripped and stockpiled in the rehabilitated previous active cell or a convenient location which is, both out the way of daily activity, however, easily accessed for re-use in the creation of bunds and for preparation of rehabilitation areas as necessary.
- Construct earth banks (Stormwater Collection Drains) to divert as much clean water as possible and capture the dirty water.
- Rehabilitate lands previously used to stockpile topsoil with clay residue materials and previously stockpiled topsoil.
- Install barrier fencing to limit access to rehabilitated areas.
- Ensure management practices are carried out to minimise areas being affected by wind and water erosion.

4.3.3 Erosion Control

- The soil erosion hazard on the site will be kept as low as practicable by minimising disturbance. Some ways of doing this are outlined in *Table 14*.
- Extraction will take place within a defined work area and materials will be transported only within the site for processing.
- Entry to land not involved directly in the extraction process will be prohibited and will be managed according to the Landscape and Rehabilitation Plan (LRP). Maintenance activities, as described in the LRP may include but not restricted to weed control, pest control, fencing to prevent access by livestock and vehicles, watering and replacement planting where required.
- Limit vehicular access to the site to that essential for construction work.

Table 14. *Limitations to Access*

Landuse	Access Limitations	Comments
Extraction	Land disturbances beyond five (preferably two) metres from the edge of the operations are prohibited.	All site workers should clearly recognise these areas and they should be clearly marked — suitable materials include barrier mesh, sediment fencing, etc. The project manager will determine their actual location on site. They can vary in position to conserve existing vegetation best while being considerate of the needs of efficient works activities.
Access Roads	Roads and tracks are limited to a width that are the minimum necessary to allow safe operation of heavy equipment	
Remaining Lands	Land disturbances are prohibited except for essential management works.	

Here, rehabilitation means achieving a C-factor (Revised Universal Soil Loss Equation) of less than 0.1 and set in motion a program that should ensure it will drop permanently, by reducing the risk of erosion by vegetation, paving, armouring, etc. as soon as practicable after extraction activities cease.

NOTE: The cover factor, C, is the ratio of soil loss from land under specified crop or mulch conditions to the corresponding loss from continuously tilled, bare soil. A C-factor of 1.0 corresponds to that of bare soil.

While C-factors are likely to rise to 1.0 during the work's program, they should not exceed those given in Table 15 within the specified times.

Table 15. *Maximum acceptable C-factors at nominated times during works*

Lands	Maximum C-Factor	Remarks
Waterways and other areas subjected to concentrated flows, post construction.	0.05	Applies after ten working days from completion of formation and before they are allowed to carry any concentrated flows. Flows are limited to those indicated in "Blue Book". Foot and vehicular traffic are prohibited in these areas.
Stockpiles, post clearance	0.1	Applies after ten working days from completion of formation.
All lands, including waterways and stockpiles during construction	0.15	Applies after 20 working days of inactivity, even though works might continue later.

Note: *working days* does not include public holidays, weekends or days when work is not possible due to wet weather.

The required C factors can be achieved in the short term (temporary protection for up to six months) with either:

- a suitable soil binder in areas of sheet flow, e.g. topsoil stockpiles
- anionic bitumen emulsion sprayed over hessian cloth (at 0.5 L/m²) in areas of concentrated flow, e.g. diversion banks and waterways
- a temporary vegetative cover. i.e. replace stripped turf.

Application of any soil binders employed should follow the manufacturer's instructions.

See the EIS and Rehabilitation and Landscape Plan for a plant list for vegetation cover.

- While ever the C-factor is higher than 0.1, maintain the lands in a condition that resists removal by wind. This can be achieved by:

- keeping moist (not wet) by sprinkling with water
- where practicable, leaving the surface in a cloddy state.
- Notwithstanding the above, schedule works so that the duration from the conclusion of land shaping to completion of final stabilisation is less than:
 - 10 days on slopes steeper than 30 per cent
 - 20 days on slopes less steep than 30 per cent.
- Lands planted recently with grass species or re-turfed will be watered regularly until an effective cover has properly established and plants are growing vigorously. Follow-up seed and fertiliser will be applied as necessary in areas of minor soil erosion and/or inadequate vegetative protection.
- Where practicable, keep foot and vehicular traffic away from all recently stabilised areas.
- Stockpiles of topsoil to be located at least five metres from areas of likely concentrated or high velocity flows, especially drainage lines and access roads. If necessary, earth banks or drains will be constructed to divert localised run-on.
- Replace soil materials in the same order they are removed from the ground. It is particularly important that all subsoils are buried and topsoils remain on the surface at the completion of works.
- Earth batters will be laid back to lower grades before the rehabilitation program starts. Final batter gradients should not exceed 3:1.
- All waterways, drains, spillways and outlets will be constructed to be stable in accordance with the "Blue Book" for soils with high erodibilities.
- Topsoil stockpiles are not to exceed 3m in height with a minimum crest width of 3m and if not immediately re-turfed, are to be seeded with a temporary vegetation cover if stockpiles are to remain longer than 14 days
- Topsoil is to be stripped in a moist condition to avoid pulverisation and dust.

4.4 EFFLUENT IRRIGATION SYSTEM

There is no effluent irrigation system on the site.

4.5 WATER TRANSFERS FROM THE EXTRACTIVE AREA

The extraction of sand on the site relies on an adequate supply of water for washing and screening of material. After processing, residue clay/silt is delivered to designated drying areas and liberated water is drained into a Drying Pond to settle sediment entrained in the process. Water from the holding dam is then pumped back into the Process Dam for re-use.

4.6 WATER STORAGEES

Current dam volumes have been estimated using the area of the dams (obtained from 12D modelling using survey data and images) and the depth of the majority of dams from personal observations from Mr Martin Hodgson. All the site dams were installed with level loggers in 2017. This was in order to comply with Condition 42 b) dot point 4, which states that the surface level of the Process Water Dam must be monitored. The loggers were also envisaged to assist in the estimation of dam water volumes held on site, which would in turn inform the water balance (see *Section 3.9*).

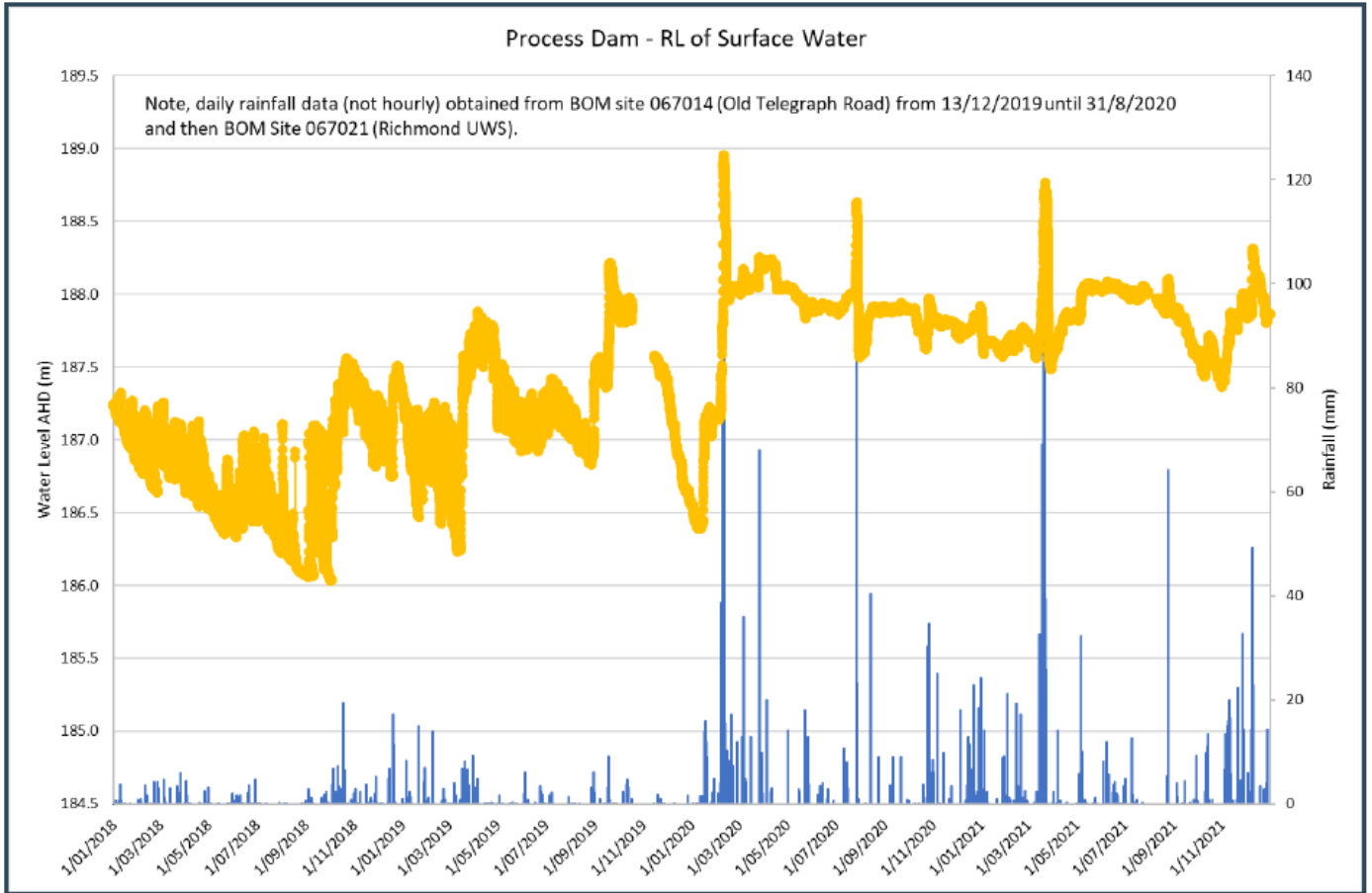
4.6.1 Process Dam Volume

The Process Dam volume was initially obtained from survey and field measurements (see *Table 7*) whereby depths to the top of the silt layer were taken over various points within the dam. The data was then modelled in 12D software to approximate the contours on the bottom of the dam. A data logger was installed and surveyed into the dam and has provided the RL of the water level (RL187.68m on the date of the survey) which has been used to estimate the volume of the dam from the 12D modelling software.

It was hoped that the level loggers would assist in the estimation of the dam volumes however, due to the very low rainfall received in the years following installation, correlations have been difficult to establish. The water level indicated by the Process Dam logger was consistently below the silt level of the dam until mid-2020.

Volume verification with the water balance model required more data including periods of rainfall and periods when the water is above the silt level, which has only occurred recently. The following graphs show the dam water levels to date.

Graph 7. Process Dam Level Logger Data



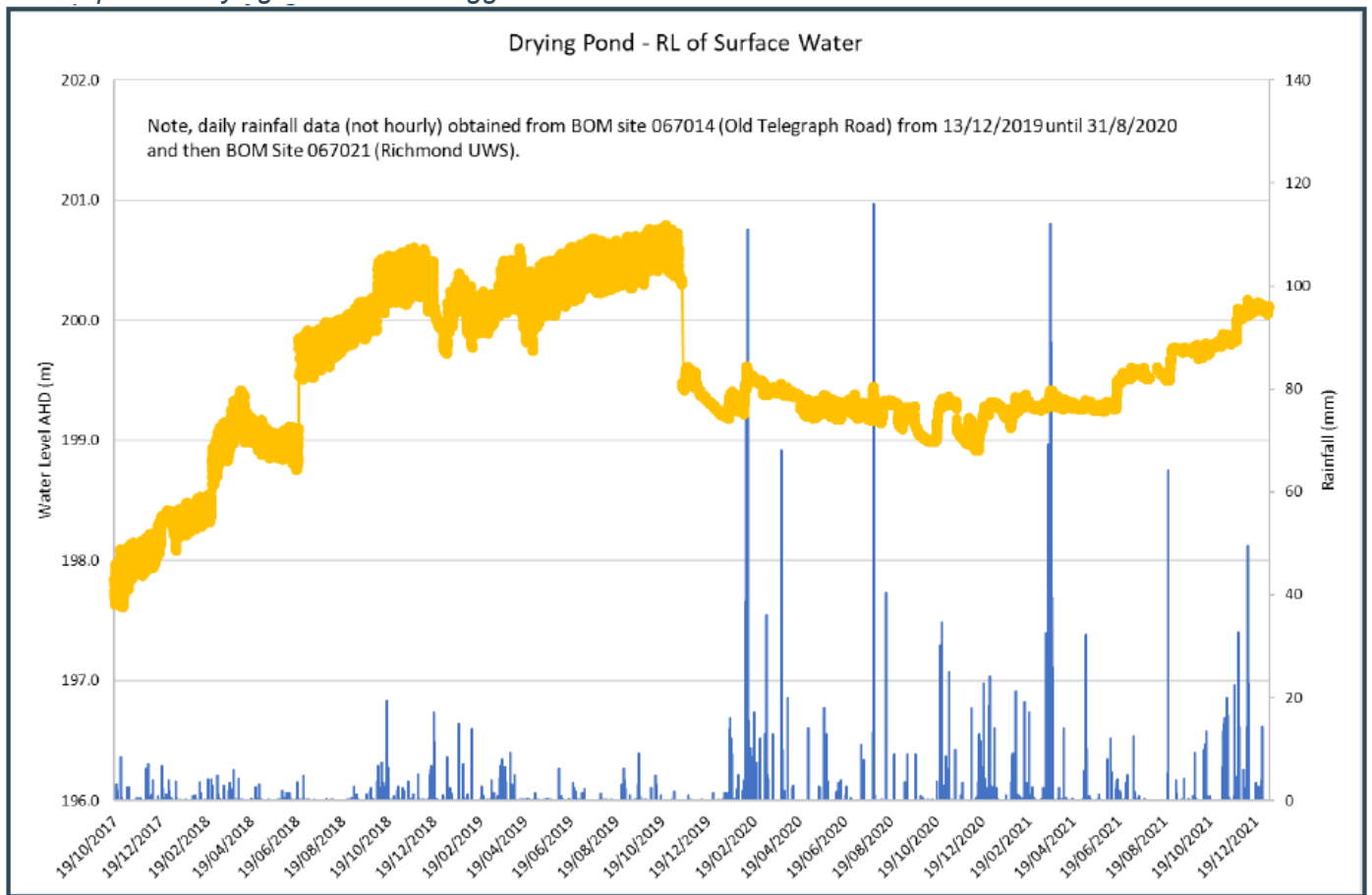
4.6.2 Drying Pond

Water, as a by-product of the processing, is received in the Drying Pond and is returned to the Process Dam at the end of each day. As the base of the Drying Pond is ever evolving due to the deposition of silt, it is difficult to estimate the actual volume of the dam at any given time. The graph indicates the daily variations in the water level in the dam and the rise in the floor level of the dam as the silt volume increases.

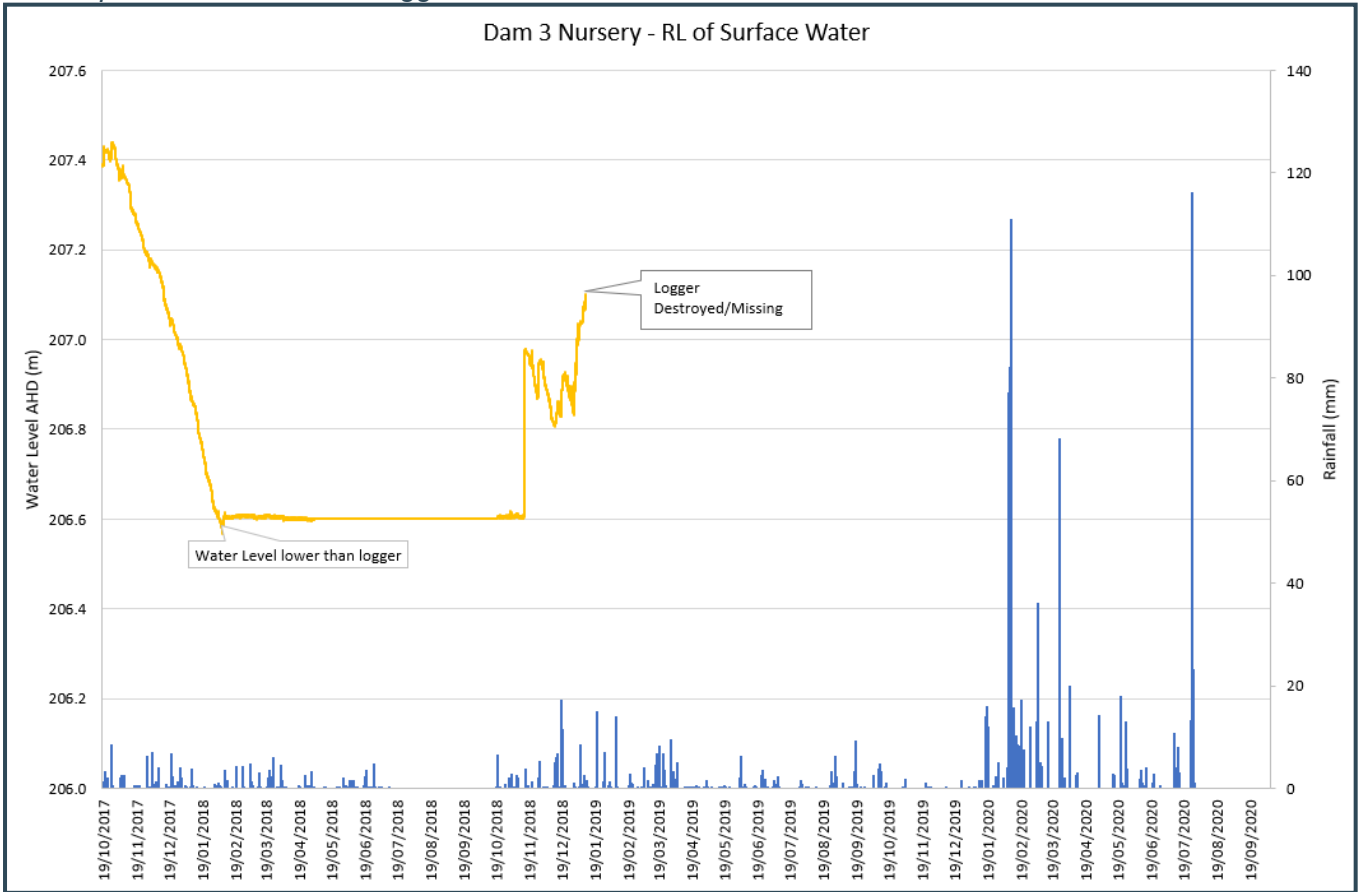
The value of the level logger in the Drying Pond for assessing the water volume is questionable. It is effective only in measuring the daily rise and fall of water within the dam due to processing water. This does not add insight to the calculation of the water held on site, which is best estimated from the volume of water held in the Process Dam (the combination of the Process Dam and the Drying Pond).

The Process Dam logger now resides in the silt bed which further hinders the accurate reading of water levels.

Graph 8. Drying Pond Level Logger Data

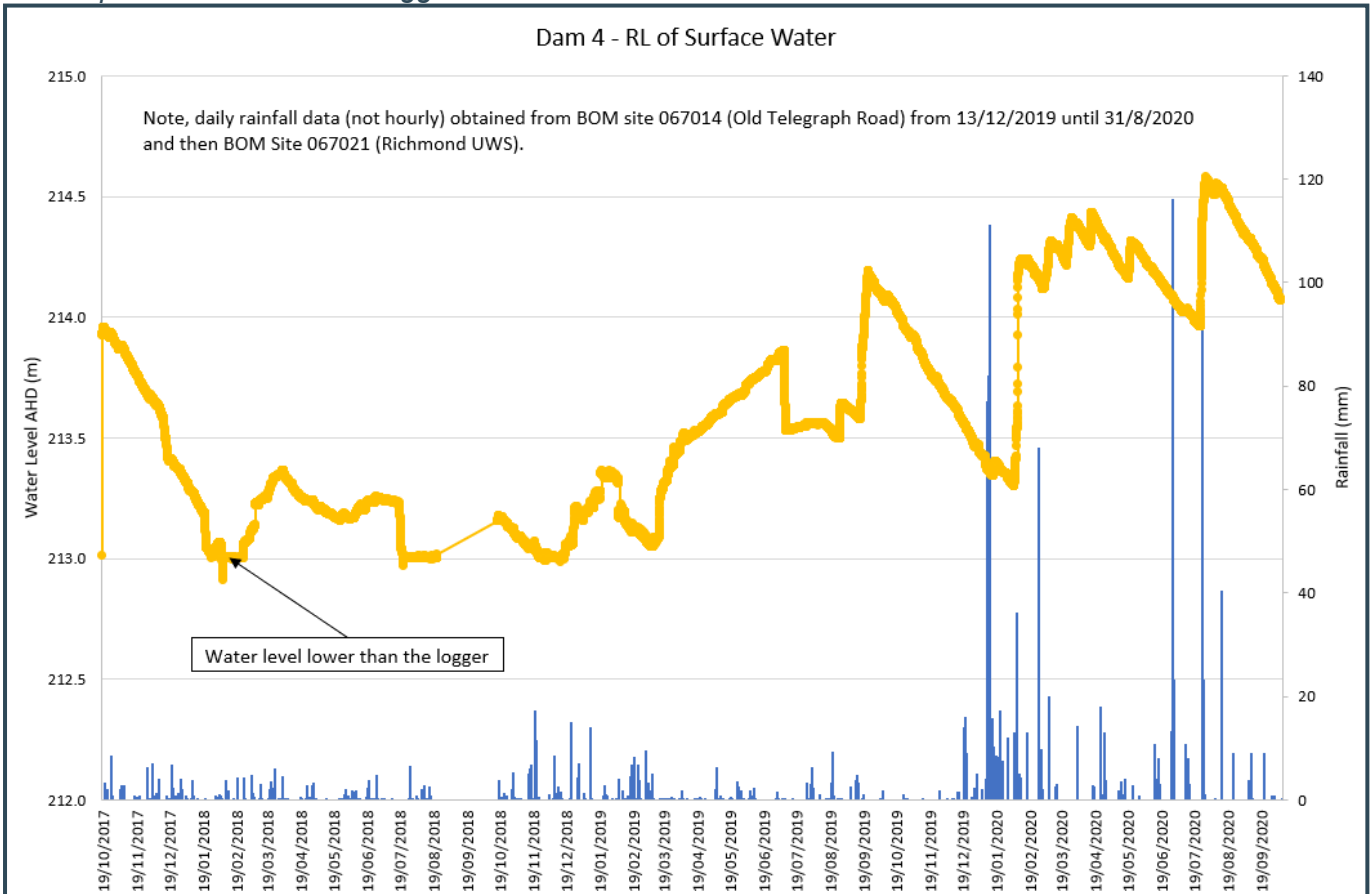


Graph 9. Dam 3 Level Logger Data



The logger for Dam 3 has been removed after it was damaged by cattle.

Graph 10. Dam 4 Level Logger Data



The volumes of water held in the dams (as of October 2020) on the site are summarised in the table below.

Table 16. *Dam Volumes of Water Held October 2020*

Dam Identification/ Catchment	Dam Area (m ²)	Estimated Average Depth (m)	Estimated Volume (m ³)	Estimated Volume from the Water Balance (m ³)
Process Dam	-	Ranging from 0.1m to 3m*	9,160*	8,000
Drying Pond	12,200	0.25 (at the start of the day)	3,050	1,500
Dam 3 (Northern Nursery Dam)	7,500	2	15,000	-
Dam 4 (Southern Nursery Dam)	14,500	2	29,000	-
Total Volume held			56,210	-

*Volume calculated from 12D software to RL188m from modelled contours.

Note: areas have been calculated using 12D software except for the Process Dam as discussed above.

As discussed in *Section 4.6.4*, there is little value in retaining the depth loggers for the purpose of determining the interaction of the site dams with groundwater. In addition, Dam 3 and Dam 4 are not used in the site operations and are therefore not included in the water balance calculation. Monitoring of the water levels in these dams serves no purpose and the loggers will be removed from these dams.

The logger in the Drying Pond will also be removed as it is also of little value in determining the volume of water held on the site for processing as discussed above. The Process Dam water level is required by the consent conditions to be monitored and the logger will be retained in this dam.

4.6.3 Total Water Storage Capacity of the Site

The approximate water storage capacity of the excavation in 2018 was estimated using 12D software and the lowest point of the Process Dam wall in the north at RL192m. It was determined to be approximately 119,000 metres cubed, well above the design event of a 1% AEP storm event (of approximately 11,000 metres cubed) based on the 'Blue Book'. The excavation has increased in size since the time of this estimation and the capacity has also increased.

4.6.4 Dams and Interaction with Groundwater

NSW Water advised in its submission of 31 October 2016 reviewing the SWMP, that it required continuous water logger to be placed on each of the dams at the site to determine if the water in the dams is originating from the Maroota sands aquifer. Loggers were therefore installed in all the site dams in 2017.

The findings of the Groundwater Study ^{Ref 2} (Dundon Consulting Pty Ltd- 2018) determined that there was clear evidence that the dams on the site are above the groundwater level and are not interacting with the Maroota Sands aquifer. There is therefore no purpose in retaining the loggers in the dams for this purpose as the interaction with the Maroota Sands aquifer has been determined in the detailed study as negligible.

4.7 DISCHARGE

As discussed in Section 3.5, the site does not discharge.

4.8 DESIGN OBJECTIVES AND PERFORMANCE CRITERIA AND RESPONSE PLAN

Table 17. Performance Criteria and Trigger Action Response Plan

Objective	Performance Criteria	Potential Adverse Outcome	Trigger Level	Actions to be Implemented	Response to Exceedance of Performance Criteria	Responsibility	Evidence/ Reference
Sediment to be contained on site	On-site dams are sized according to the 'Blue Book' Criteria for a 5 day 90th percentile storm event with 5 day management period.	Sediment is not contained within the on-site dams and is observed as uncontrolled discharge exiting the site due to incorrect dam sizing.	Annual review of SWMP finds on-site dams are found to be a reduced in capacity than that indicated in <i>Section 4.2</i> , as reviewed by aerial survey and/or on-site measurements.	Dam sizes are to be verified against current catchments. Dams are to be enlarged to meet the required capacity.	The PIRMP is to be activated including notification of authorities and stakeholders. Sediment dam water to be tested to determine if the water quality is likely to cause material harm to the downstream environment.	Site Manager Suitably qualified consultant.	Annual review report/ Managing Urban Stormwater- Soils and Construction- Volume 2E Mines and Quarries & SWMP
	Sediment Dam capacity is maintained at a level sufficient for the design 5 day 90th percentile storm event.	Sediment is not contained within the on-site dams and is observed exiting the site as uncontrolled discharge due to dams having diminished capacity as requiring desilting or dam not emptied from previous storm event.	Maximum volume of sediment before desilting of each dam is required is listed in <i>Section 4.2</i> .	On-site dams will be pegged with markers (or similar) indicating the maximum sediment level. Once this level has been reached the dams will be desilted.	Flocculants to be applied to the dam water if discharge cannot prevented to minimise sediment in the downstream environment. Investigation will be undertaken into the extent of any uncontrolled discharged water and any remediation measure required. In addition to the above, a suitable qualified specialist will be consulted to identify where improvements may be made.	Site Manager Suitably qualified consultant.	Annual review report & photographic evidence/ Managing Urban Stormwater- Soils and Construction- Volume 2E Mines and Quarries & SWMP
	All surface water received over exposed surfaces prone to sediment entrainment is directed to the dirty water management system.	Surface water received over exposed surfaces prone to sediment entrainment egresses off site as no sediment dam or drains provided for disturbed catchments.	Expansion of the quarry or changes to the mining sequence that may impact the current water management system.	Review of site and SWMP to determine water management requirements. No work will commence in new areas or changes to the mining sequence until the SWMP is reviewed and appropriate water management structures are constructed.	Sediment dam/drains to be constructed in accordance with Blue Book guidelines or surface water to be directed to existing dam. Exposed surfaces to be stabilised via as soon as practicable e.g. mulch, spray emulsions or similar. Investigation will be undertaken into the extent of any uncontrolled discharged water and any remediation measure required In addition to the above, a suitable qualified specialist will be consulted to identify where improvements may be made.	Site Manager Suitably qualified consultant. Rehabilitation contractor	Environmental Management Report/ Managing Urban Stormwater- Soils and Construction- Volume 2E Mines and Quarries & SWMP

Objective	Performance Criteria	Potential Adverse Outcome	Trigger Level	Actions to be Implemented	Response to Exceedance of Performance Criteria	Responsibility	Evidence/ Reference
	Constructed drains direct sediment laden water to the on-site dams and clean water around the site.	<p>Sediment leaves the site due to the failure to construct suitable drains to contain the design storm event to direct dirty water to the on-site dams.</p> <p>Clean water (surplus to requirements) is diverted onto the site and on-site dam capacity for dirty water is impacted causing overtopping of dams</p>	<p>Clean or dirty water drains observed to be blocked or damaged.</p> <p>Inspection during rainfall events shows dirty water egressing the site via drain overflow.</p> <p>Inspection during rainfall events shows additional drains required to redirect dirty water to on-site dams.</p> <p>Inspection during rainfall events shows additional drains required to redirect clean water around the site.</p>	<p>Blocked or damaged drains are to be repaired.</p> <p>Drains sizes are to be checked by on-site measurements to ensure compliance with Blue Book calculations i.e. all drains will be designed for the 1 in 10 year design storm event.</p> <p>Install additional drains as required.</p>	<p>Sediment dam water to be tested to determine if the water quality is likely to cause material harm to the downstream environment.</p> <p>Flocculants to be applied to the dam water if discharge cannot prevented to minimise sediment in the downstream environment.</p> <p>Investigation will be undertaken into the extent of any uncontrolled discharged water and any remediation measure required.</p> <p>Drains to be constructed in accordance with Blue Book guidelines or surface water to be directed to existing dam.</p> <p>In addition to the above, a suitable qualified specialist will be consulted to identify where improvements may be made.</p>	<p>Site Manager</p> <p>Suitably qualified consultant.</p> <p>Rehabilitation contractor</p>	<p>Annual review report & photographic evidence/</p> <p>Managing Urban Stormwater- Soils and Construction- Volume 2E Mines and Quarries & SWMP</p>
	On-site dams and earth embankments are vegetated and stable for the design storm event.	<p>Sediment leaves the site due to the dam wall due to not being designed for the design storm flows.</p> <p>Sediment leaves the site due to the erosion of the dam wall.</p>	<p>Inspection during a 5 day rainfall event of <69.4mm shows overtopping of the on-site dams.</p> <p>Erosion or tunnelling on the dam walls observed.</p> <p>Inspections shows dam walls (earth embankments) are not adequately vegetated.</p>	<p>Dam walls and batters to be measured to ensure they are not too steep i.e.>3H:1V</p> <p>Replace vegetation on eroded surfaces if required.</p> <p>Repair dams as required</p>	<p>Sediment dam water to be tested to determine if the water quality is likely to cause material harm to the downstream environment.</p> <p>Flocculants to be applied to the dam water if discharge cannot prevented to minimise sediment in the downstream environment.</p> <p>Investigation will be undertaken into the extent of any uncontrolled discharged water and any remediation measure required.</p> <p>Dam wall to be repaired/constructed in accordance with Blue Book guidelines.</p> <p>In addition to the above, a suitable qualified specialist will be consulted to identify where improvements may be made.</p>	<p>Site Manager</p> <p>Suitably qualified consultant.</p> <p>Rehabilitation contractor</p>	<p>Annual review report & photographic evidence/</p> <p>Managing Urban Stormwater- Soils and Construction- Volume 2E Mines and Quarries & SWMP</p>

Objective	Performance Criteria	Potential Adverse Outcome	Trigger Level	Actions to be Implemented	Response to Exceedance of Performance Criteria	Responsibility	Evidence/ Reference
Erosion is minimised	Rehabilitation slopes are designed to minimise the effects of erosion according to the Blue Book	Excessive sediment build up in on-site dams. Re-vegetation unable to establish. Loss of topsoil for rehabilitation.	Slopes in rehabilitated areas observed to be greater than 3 horizontal to 1 vertical. Slope lengths in rehabilitated areas shall not exceed 20m for a 3H: 1V batter. Slope lengths in rehabilitated areas shall not exceed 30m for a 4H: 1V batter. Slope lengths in rehabilitated areas shall not exceed 40m for batters >4H: 1V. Visual inspection shows evidence of excessive rilling or gullyng on rehabilitation slopes. Visual inspection shows established rehabilitated areas lose vegetation coverage or are unable to establish adequate vegetation coverage i.e. <70% coverage. Visual inspection shows spread topsoil on areas awaiting revegetation is eroding.	Install catch drains or earth banks on slopes where slope lengths exceed recommendations. Review rehabilitation areas to determine where slopes and catch drains need maintenance or repair or reworking. Reseeding/replant areas that require increased vegetation cover. Replace/ rework topsoil as required	Consult with suitably qualified specialist to implement described actions in accordance with Blue Book guidelines. Monitor repairs to ensure they are successfully implemented.	Site Manager Suitably qualified consultant. Rehabilitation contractor	Annual review report & photographic evidence/ Managing Urban Stormwater- Soils and Construction- Volume 2E Mines and Quarries & SWMP
	Revegetation whether temporary or permanent is undertaken as soon as practicable to reduce the exposed surface area.	Excessive sediment build up in on-site dams. Re-vegetation unable to establish. Loss of topsoil.	A C-factor (Revised Universal Soil Loss Equation) of less than 0.1 is not achieved on rehabilitated surfaces i.e. equivalent of 70% coverage by vegetation.	Review rehabilitation areas to determine where revegetation requires maintenance or repair.		Site Manager Suitably qualified consultant.	Annual review report & photographic evidence/ Managing Urban Stormwater- Soils and Construction- Volume 2E Mines and Quarries & SWMP
	Long term topsoil stockpiles and overburden stockpiles are protected from erosion within 10 days of formation.	Excessive sediment builds up in on-site dams. Loss of topsoil for rehabilitation.	A C-factor (Revised Universal Soil Loss Equation) of less than 0.1 is not achieved on rehabilitated surfaces i.e. equivalent of 70% coverage by vegetation.	Review topsoil and overburden stockpiles to determine where maintenance or repair is required.		Site Manager Suitably qualified consultant.	Annual review report & photographic evidence/ Managing Urban Stormwater- Soils and Construction- Volume 2E Mines and Quarries & SWMP
	Access to rehabilitated areas and works areas are limited to necessary vehicles and personnel	Erosion of rehabilitation areas due to tracks by vehicles. Disturbance and erosion of areas outside the quarry extraction footprint.	Monthly visual inspections show evidence of vehicle tracks or earthworks outside of approved works areas or within rehabilitation areas.	Repair damage to rehabilitation areas or areas outside the quarry extraction footprint. Ensure adequate signage and/or barrier fencing is erected to limit traffic access to sensitive areas Review staff training to ensure personnel are aware of 'no go' areas.		Site Manager Suitably qualified consultant.	Monthly inspection reports & photographic evidence/ Managing Urban Stormwater- Soils and Construction- Volume 2E Mines and Quarries & SWMP

Objective	Performance Criteria	Potential Adverse Outcome	Trigger Level	Actions to be Implemented	Response to Exceedance of Performance Criteria	Responsibility	Evidence/ Reference
	Tracks suitable for private access or pedestrian usage will not be subject to excessive erosion	Excessive sediment build up in on-site dams.	Visual inspection indicates excessive road erosion and deterioration.	Slopes of major tracks <10° or have cross drains/banks installed. Where unsuitable soils are present, tracks to be stabilised with crushed bricks, concrete, gravel or similar.		Site Manager Suitably qualified consultant. Rehabilitation contractor	Monthly inspection reports & photographic evidence/ Managing Urban Stormwater- Soils and Construction- Volume 2E Mines and Quarries & SWMP
Water overtopping from the final landform is consistent with the baseline ecological and geomorphic conditions of the surrounding environment	Water quality monitoring results show that the discharge is non-polluting prior to full capacity and overtopping occurring. Note: it is very unlikely that the final water body will overtop.	Significant changes to quality of water discharged harms ecological communities downstream.	Water Quality does not meet the objective of the ANZECC Guidelines for 90% protection of freshwater ecosystems at cessation of rehabilitation.	Final Dam is to be treated as appropriate to ensure the water meets the criteria.	Determine if discharged water is of a quality that will materially harm the downstream environment. Investigation by suitably qualified specialist into the causes of discharged water from the final landform not meeting the ANZECC guideline. Implement measures identified by specialist.	Site Manager Suitably qualified consultant.	Annual review report & photographic evidence/ Managing Urban Stormwater- Soils and Construction- Volume 2E Mines and Quarries & SWMP
	Fuel and oil storage has been removed from the site in final rehabilitation prior to full capacity and overtopping occurring. No spills of hydrocarbons occur.	Releases of hydrocarbons changes quality of water discharged and harms ecological communities downstream.	Hydrocarbon spill occurs that has not been contained and contaminants observed to enter the water management system. Water Quality does not meet the objective of the ANZECC Guidelines for 90% protection of freshwater ecosystems at cessation of rehabilitation	Final Dam are to be treated as appropriate to ensure the water to be discharged meets the criteria All hydrocarbon spills are to be cleaned up. Procedures for handling hydrocarbons to be revised and updated if required. Staff and contractors to be re-trained in the handling of hydrocarbons.		Site Manager Suitably qualified consultant.	Annual review report & photographic evidence/ Managing Urban Stormwater- Soils and Construction- Volume 2E Mines and Quarries & SWMP
Water filled quarry voids remaining are consistent with the proposed final landform and fit for purpose i.e. irrigation and visual purposes.	The final void area to be inundated is of a size and location consistent with the proposed final landform.	The final landform becomes inundated to the extent where the rehabilitation vegetation on the 3H:1V batter is impacted.	The water level in the final water body exceeds the floor area. Note: it is unlikely that the water body will cover more than half the floor area according to the water balance.	Investigate increasing irrigation over the site or other measures to reduce the water level.	Consult with suitably qualified specialist to determine if harm to inundated vegetation is significant and/or permanent and if any remediation measures are practical or required.	Site Manager Suitably qualified consultant. Rehabilitation contractor	Annual review report & photographic evidence/ SWMP, EIS & EIS Rehabilitation Report
	The water filled void in the final landform will have safe access area for pumps for irrigation.	Irrigation pumps are difficult or unsafe to access.	There are no slopes of approximately 3H:1V to access the water body for pumping.	Review site to ascertain if slopes require reworking and/or Where unsuitable soils are present, tracks to be stabilised with crushed bricks, concrete, gravel or similar.	Cease all pumping until the pump can be safely accessed. Consult with suitably qualified specialist to implement described actions. Monitor repairs to ensure they are successfully implemented.	Site Manager Suitably qualified consultant. Rehabilitation contractor	Annual review report & photographic evidence/ SWMP, EIS & EIS Rehabilitation Report

Objective	Performance Criteria	Potential Adverse Outcome	Trigger Level	Actions to be Implemented	Response to Exceedance of Performance Criteria	Responsibility	Evidence/ Reference
	Water quality of the final void dam is suitable for irrigation	Water is unsuitable for use in irrigation	Water Quality does not meet the objective of the ANZECC Guidelines for Irrigation.	All irrigation is to cease.	Investigations to be undertaken by qualified person/s to determine appropriate treatment or other actions.	Site Manager Suitably qualified consultant.	Annual review report & photographic evidence/ SWMP, EIS & EIS Rehabilitation Report
Vegetated quarry voids are consistent with the Rehabilitation and Landscaping Plan	Pit floor areas are to be vegetated with a hydro mulched native seed mix as per Detail 10 Dwg No LPDA 15 -94/3 of the EIS Rehabilitation Report.	Lack of vegetation causes excessive sediment builds up in the final water filled void. Lack of vegetation causes loss of topsoil.	Visual inspection shows evidence of excessive rilling or gullyng on rehabilitation areas. Visual inspection shows established rehabilitated areas lose vegetation coverage or are unable to establish adequate vegetation coverage i.e. <70% coverage.	Review rehabilitation areas to determine where revegetation requires maintenance or repair. Initiate repairs and maintenance as required including reshaping, replacing soils and revegetating.	Consult with suitably qualified specialist to implement described actions in accordance with Blue Book guidelines. Monitor repairs to ensure they are successfully implemented.	Site Manager Suitably qualified consultant. Rehabilitation contractor	Annual review report & photographic evidence/ Managing Urban Stormwater- Soils and Construction- Volume 2E Mines and Quarries & SWMP, EIS & EIS Rehabilitation Report
	1V:3H areas are to be mass planted with endemic species as per Detail 07 & 08 of Dwg No LPDA 15 -94/3 of the EIS Rehabilitation Report.	Lack of vegetation causes excessive sediment builds up in the final water filled void. Lack of vegetation causes loss of topsoil.	Visual inspection shows evidence of excessive rilling or gullyng on rehabilitation areas. Visual inspection shows established rehabilitated areas lose vegetation coverage or are unable to establish adequate vegetation coverage i.e. <70% coverage.	Review rehabilitation areas to determine where revegetation requires maintenance or repair. Initiate repairs and maintenance as required including reshaping, replacing soils and revegetating.		Site Manager Suitably qualified consultant. Rehabilitation contractor	Annual review report & photographic evidence/ Managing Urban Stormwater- Soils and Construction- Volume 2E Mines and Quarries & SWMP, EIS & EIS Rehabilitation Report
	Embankments with final slopes steeper than 1V:3H are to be stabilised by jute matting and pocket planted with endemic species as per Detail 07 & 11 of Dwg No LPDA 15 -94/3 of the EIS Rehabilitation Report.	Lack of vegetation causes excessive sediment builds up in the final water filled void. Lack of vegetation causes loss of topsoil.	Visual inspection shows evidence of excessive rilling or gullyng on rehabilitation areas. Visual inspection shows established rehabilitated areas lose vegetation coverage or are unable to establish adequate vegetation coverage i.e. <70% coverage.	Review rehabilitation areas to determine where revegetation requires maintenance or repair. Initiate repairs and maintenance as required including reshaping, replacing soils and revegetating.		Site Manager Suitably qualified consultant. Rehabilitation contractor	Annual review report & photographic evidence/ Managing Urban Stormwater- Soils and Construction- Volume 2E Mines and Quarries & SWMP, EIS & EIS Rehabilitation Report
	Endemic screen planting within perimeter bund setbacks will be planted as per Detail 07 & 08 of Dwg No LPDA 15 -94/3 of the EIS Rehabilitation Report.	Lack of vegetation causes excessive sediment builds up in the final water filled void. Lack of vegetation causes loss of topsoil.	Visual inspection shows evidence of excessive rilling or gullyng on rehabilitation areas. Visual inspection shows established rehabilitated areas lose vegetation coverage or are unable to establish adequate vegetation coverage i.e. <70% coverage.	Review rehabilitation areas to determine where revegetation requires maintenance or repair. Initiate repairs and maintenance as required including reshaping, replacing soils and revegetating.		Site Manager Suitably qualified consultant. Rehabilitation contractor	Annual review report & photographic evidence/ Managing Urban Stormwater- Soils and Construction- Volume 2E Mines and Quarries & SWMP, EIS & EIS Rehabilitation Report

4.9 MONITORING OF WATER MANAGEMENT SYSTEM EFFECTIVENESS

4.9.1 Erosion and Sediment Monitoring

Monitoring of the soil erosion, sediment and water is undertaken regularly and within 24 hours of expected rainfall and within 18 hours of a rainfall event of sufficient intensity and duration to cause runoff (approximately 70mm of rainfall over 5 days). It may include but is not limited to the following.

- Topsoil stripping to be visually monitored to check moisture content of soil and depth of stripping.
- Stockpiles to be visually assessed at time of forming to check they do not exceed three metres high.
- Visual check of stability and operation of all banks, ponds, channels and spillways to be undertaken monthly. Effecting any necessary repairs.
- Removal of spilled sand or other materials from hazard areas, including lands closer than five metres from areas of likely concentrated or high velocity flows, especially waterways and access roads.
- Removal of trapped sediment whenever less than design capacity remains for the sediment basins.
- Ensuring rehabilitated lands have effectively reduced the erosion hazard and initiate upgrading or repair as appropriate.
- Constructing additional erosion and/or sediment control works as might become necessary to ensure the desired water control is achieved.

4.9.2 Surface Water Monitoring

There are no quality parameters for water testing within the consent conditions or the EPL.

Surface water monitoring will be undertaken as outlined below and results will be reported and discussed in the Annual Review.

4.9.3 Monitoring Program

Table 18. *Sediment, Erosion and Surface Water Monitoring Program*

Monitoring Aspect	Parameter	Responsibility	Frequency
Erosion and Sediment	Topsoil stripping to be visually monitored to check moisture content of soil and depth of stripping.	Site Manager	Monthly; and Within 24 hours of expected rainfall and within 18 hours of a rainfall event of sufficient intensity and duration to cause runoff.
	Stockpiles to be visually assessed at time of forming to check they do not exceed three metres high.	Site Manager	During and after construction.
	Visual check of stability and operation of all banks, ponds, channels and spillways to be undertaken monthly. Effecting any necessary repairs.	Site Manager	Monthly; and Within 24 hours of expected rainfall and within 18 hours of a rainfall event of sufficient intensity and duration to cause runoff.
	Removal of spilled sand or other materials from hazard areas, including lands closer than five metres from areas of likely concentrated or high velocity flows, especially waterways and access roads.	Site Manager	Monthly.
	Removal of trapped sediment whenever less than design capacity remains for the sediment basins.	Site Manager	As required.
	Ensuring rehabilitated lands have effectively reduced the erosion hazard and initiate upgrading or repair as appropriate	Site Manager	Monthly; and Within 24 hours of expected rainfall and within 18 hours of a rainfall event of sufficient intensity and duration to cause runoff.
	Visual inspection for evidence of tailgate discharge and/or sediment build-up at exit to site.	Site Manager	Weekly
	Constructing additional erosion and/or sediment control works as might become necessary to ensure the desired water control is achieved.	Site Manager	As required.

Monitoring Aspect	Parameter	Responsibility	Frequency
Process Dam Depth	Automatic data loggers to monitor the dam levels to assist in the water balance modelling.	Site Manager and suitably qualified sampler/consultant.	Monthly checks on automatic data loggers. Prior to discharge if EPL approved.
Weather	Weather data is obtained from the on-site weather station and reported in the Annual Review. Data is also used to calculate the water balance.	Site Manager and suitably qualified sampler/consultant.	Monthly
Water Balance	The water balance will be reviewed annually using rainfall, evaporation data, water usage on the site and any other relevant inputs.	Site Manager and suitably qualified consultant.	Annually
Surface Water Quality	All on-site dams to be sampled and water quality tested on a annually basis to determine if there is a relationship to the groundwater and to ascertain the water quality. Parameters include but no limited to: pH, Conductivity, Total Dissolved Solids, Chloride, Sulphate, Calcium, Magnesium, Sodium, Potassium, Nitrate, oil and Grease.	Site Manager and suitably qualified sampler/consultant.	Annually
Long Term Water Quality	Water quality in Sediment Basin 1, as shown in the Final Landform, will be within EPL criteria prior to discharge (once a variation to permit discharge has been approved).	Site Manager and suitably qualified sampler/consultant	Once-off at post rehabilitation completion. As required in accordance with EPL.

4.9.4 Complaints and Non-Compliances

The site has signposted an emergency phone number on the front gate that can be contacted for emergencies or complaints. Complaints are logged in a complaints register and actioned as required.

Regular site and system audits are undertaken by independent auditors and reports prepared outlining the performance of the site.

Any non-compliances or complaints noted will require a review of the relevant site procedures and Environmental Management Plan.

Within seven days of becoming aware of a non-compliance, Hodgson Quarries and Plant Pty Ltd will notify the DPIE of the non-compliance. The notification will be in writing via the Major Projects Website and identify the development (including the development application number and name), set out the condition of this consent that the development is non-compliant with, 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.

4.10 INCIDENTS

Hodgson Quarries and Plant Pty Ltd will immediately notify the Department and any other relevant agencies immediately after it becomes aware of an incident. The notification will be in writing via the Major Projects Website and identify the development (including the development application number and name) and set out the location and nature of the incident.

4.11 EXCEEDANCES OF PERFORMANCE CRITERIA

The plan to respond to any exceedances of the performance criteria, and mitigate and/or offset any adverse surface water impacts of the project is included in Section 4.8.

4.12 LONG TERM WATER QUALITY MANAGEMENT OBJECTIVES

The permanent dam to be retained in the final landform is envisaged to provide stock water or use in aquaculture. At this final stage of the development, the objective is that the water quality within the dam will meet the ANZECC Guidelines for a 90% protection level for freshwater ecosystems. This is expected to be achieved once the site has been fully rehabilitated and groundcover is sufficient to minimise erosion. Testing of the dam water will confirm that it meets this criteria.

The measures to achieve these objectives are integrated with the rehabilitation of the site, particularly groundcover to minimise erosion. These measures are discussed in Section 4.3 and Section 4.8,

4.13 TAILGATE DISCHARGE

Material loaded onto trucks to be exported from the site is very low in moisture (typically 3%) which does not contribute to tailgate discharge. In the unlikely event that discharge was to occur from the trucks as they exit from the site, over the weighbridge, it is directed to the Process Dam via the drainage system. There is no evidence that tailgate drainage occurs offsite. Daily visual inspections of the exit area will be undertaken by the Site Manager or delegate and, if required, a street sweeper may be employed to remove any sediment or sand noted on Roberts Road.

4.14 PROCESS DAM DESIGN AND CONSTRUCTION

4.14.1 Background

Key questions around the Process Dam have centred around whether there is any interaction between the dam water and the groundwater table, more specifically, does the base of the Process Dam intersect the groundwater level. As such the previous consent conditions have required the SWMP to address design and construction criteria to prevent interaction with the groundwater should there be intersection. Studies undertaken on the depth of the Process Dam and the Groundwater Study have shown that the Process Dam is not only sealed effectively but is above the wet weather high groundwater level, therefore staged lining of the Process Dam as proposed in the EIS is not required. This includes the construction of multiple cells in the Process Dam, as described in Condition 44 b) (mod 4), which was to permit access to the base of the dam in order to clay line and therefore seal the base of the dam. The following describes more detail of the studies and the conclusions drawn.

4.14.2 Process Dam Depth and Wet Weather High Groundwater Level

The depth of the floor of the Process Dam had not been confirmed until recently and no extraction activities have been undertaken in the deepest area of the dam for more than 10 years.

VGT representatives visited the site on 12th September, 2017 for the purpose of determining the depth of the Process Dam. A technician proceeded around the dam using a boat in an approximate grid pattern taking readings using a hand-held Garmin GPS ($\pm 4\text{m}$) and a marked, weighted disposable groundwater bailer. A depth from the base of the dam (as defined by when the bailer would descend no further under its own weight and contained sediment when lifted out) to the top of the water was measured at each location. These points were then plotted using 3D modelling software (12d).

The recently installed data logger was also surveyed at the top of the casing at 189.551m AHD and a manual measurement was taken to the surface of the water (1.91m). It was then determined that the surface of the water was at 187.64m AHD.

Dam levels have now been tracked by the logger, installed in September 2017, and data obtained will be used to correlate rainfall data and dam volumes for the purposes of refining the water balance. The contours and cross-sections are presented in *Figure Five* and *Figure Six*.

The deepest point of the dam was found to be 2.9 metres from the surface of the water, or 185 m AHD in the vicinity of the pump. The remainder of the points measured averaged 0.4 metres from the surface of the water to the top of the sediment, or an average of 187 m AHD.

Consent condition number 40 (Mod 4) states:

38. The Applicant shall not extract:

(a) below a depth of 182 m AHD in the footprint of the Process Water Dam, if not already extracted as at the date of Modification 2

(b) below a depth of 186.1 m AHD in all other areas of the site;

unless in accordance with Condition 17, and following written notification to the Secretary and DPIE-Water.

Consent Condition number 17 (Mod 4) states:

The applicant shall ensure that extraction does not take place below a level 2 metres above the wet weather high groundwater level of the regional aquifer, as measured and mapped on the site.

The investigation and survey conducted on the 12th September 2017 shows that the site is not in breach of consent condition 40 (Mod 4). The lowest point in the Process Water Dam is 185 m AHD.

4.14.3 Process Dam and Groundwater Interaction

The dam has filled with clay fines and investigations undertaken in the Groundwater Study ^{Ref 2} indicate that the **Process Dam sits well above the regional groundwater table and is hydraulically separated**. The wet weather high groundwater level is discussed in the Ground Water Management Plan and is reviewed periodically.

It is therefore concluded that the staged lining of the Process Dam as proposed in the EIS is not required, as discussed in the extract from the Rehabilitation Plan below.

'The original 1999 EIS described a Process Dam extracted to a depth of 178m RL or firm base, with a temporary internal wall approximately 10m high. Figure Eight in the LRMP shows the original cross sections along with the current extraction depth limit. As can be seen, these dam construction works are no longer required at the new extraction limit of RL 187m, which is the current water level of the process dam, rather than the original 178m.

There will therefore be no further construction within the Process Dam footprint.'

Figure Five. Process Dam Contours

Plan of:	Surface Water Management Plan 2022 for Roberts Road Maroota Sand Quarry - Processing Dam Contours
Figure:	FIVE
Version/Date:	V0 19/05/2022
Our Ref:	9853_HMA_EMP_SWMP_Q005_V0_F5

Location:	Maroota Quarry, Roberts Road, Maroota, NSW
Council:	Hills Shire Council
Tenure:	Not Applicable
Client:	Hodgson Quarries & Plant Pty Ltd

Source:	Umwelt- Rpbert Road Quarry modification, SoEE Final December 2019 Figure 4.2
Survey:	Not Applicable
Projection:	Not Applicable
Contour Interval:	Not Applicable

Plan By:	TO
Project Manager:	LT



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.



Figure Six. Process Dam Cross Sections

Plan of:	Surface Water Management Plan 2022 for Roberts Road Maroota Sand Quarry - Process Dam Cross Sections
Figure:	SIX
Version/Date:	V0 19/05/2022
Our Ref:	9853_HMA_EMP_SWMP_Q006_V0_F6

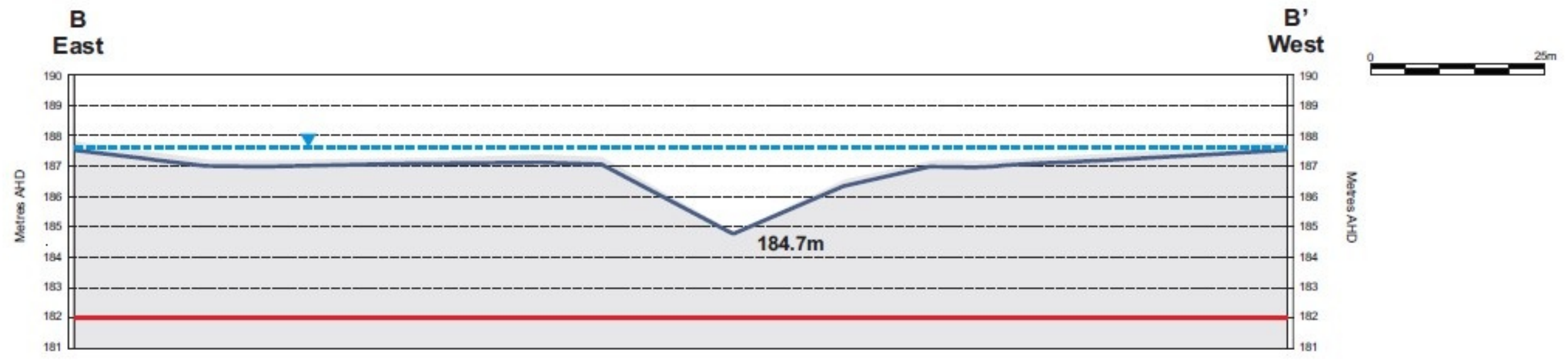
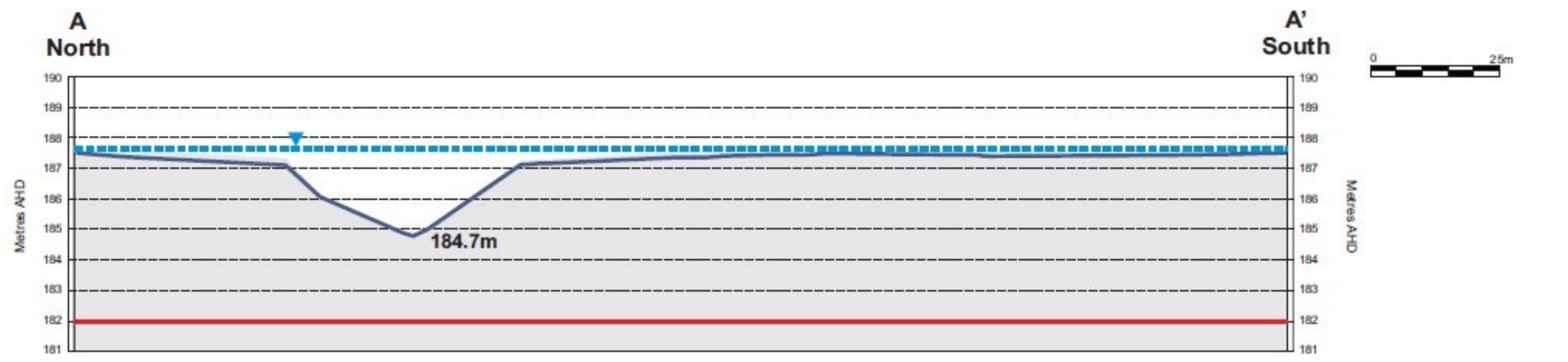
Location:	Maroota Quarry, Roberts Road, Maroota, NSW
Council:	Hills Shire Council
Tenure:	Not Applicable
Client:	Hodgson Quarries & Plant Pty Ltd

Source:	Umwelt- Rpbert Road Quarry modification, SoEE Final December 2019 Figure 4.2
Survey:	Not Applicable
Projection:	Not Applicable
Contour Interval:	Not Applicable

Plan By:	TO
Project Manager:	LT



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.



- Legend**
- Extrapolated Dam Profile
 - Water Level (187.6m)
 - Consented Depth in Process Dam (182m)

4.14.4 Dam Safety

The Resources Regulator conducted an onsite inspection and required a risk assessment and Principle Hazard Management Plan be prepared regarding the risk of in-rush for the Drying Pond (see *Appendix E*). Controls have been implemented to reduce the risk of in-rush and the Resources Regulator was satisfied that the controls were sufficient. The dam is not a Declared Dam and therefore the dam is not regulated by the Dam Safety NSW.

The Process Dam has no dam wall construction and therefore no engineering is required. This dam does not meet the level of risk required for assessment by Dam Safety Committee. Similarly, in the final landform water body, there will be no dam wall construction– therefore no engineering required. The dam will not meet the level of risk required for assessment by Dam Safety Committee.

4.14.5 Diversion of Clean Water around the Process Dam

There is little opportunity to divert clean water around the Process Dam as discussed in Section 4.1.

4.15 DECOMMISSIONING OF WATER MANAGEMENT STRUCTURES

Water management structures, including storage and sedimentation dams are to be decommissioned after use. There are no leachate dams on site as the site doesn't not generate leachate. Temporary sediment traps, ponds and channels are to be removed and graded towards the active extraction area. Fines remaining within the sediment device will be removed by front end loader and placed within cells to be rehabilitated. Temporary sediment controls such as filter fencing and diversion banks will be used until the area has stabilised as part of site rehabilitation.

4.16 WET WEATHER OPERATIONS

The operation of the plant is not affected by wet weather conditions. Water will still be drawn from the process dam and recycled back to it via the holding dam. The dams have more than sufficient capacity to contain the design storm event and the processing plant is located well above the water levels.

Surface water drainage and storage is sufficient for the design storm event and as discussed in *Section 4.2* it is not possible for the dams to overtop and release uncontrolled discharge from the site for the design storm event. Access to the processing plant is not limited by wet weather.

4.17 CONTAMINATED WATER

One of the main sources of potential water contamination, aside from sediment from the quarry, is hydrocarbons from fuels and oils used by the plant on the site. The risk of hydrocarbons entering the water system is minimised by restricting all plant and vehicle repair and maintenance to the designated workshop area. All contractors are required to carry a spill kit and to notify the Site Manager immediately a spill occurs.

Waste and contaminated material is removed off site by a licenced waste contractor.

4.18 AUDIT AND REPORTING PROCEDURES

Annual update of this plan is to be provided to DPI- Water as required by consent conditions. Compliance report annually for first three years to DPIE. Further reports will be submitted as required by the Secretary.

The effectiveness of the water management system will be assessed in the annual reviews and audits as required by consent conditions.

These reviews will also report on the progress of the performance criteria as outlined in *Table 17*. Where an action response has been implemented, details of the action and any results obtained will be included in the review. The reviews will be submitted to the Secretary until the consent relinquished at the completion of rehabilitation.

As part of the measurement of the effectiveness of the water management system the following will be assessed.

- Water imported, water use, volumes stored and any discharges from the site and report results or changes to the balance. Comparisons of the site water balance each calendar year will also be submitted to DPIE and DPI- Water.
- Water quality results for compliance and trends.
- Identifying non-compliances and actions taken to ensure compliance.
- Discrepancies between the predicted and actual impacts of the development.
- Measures that may be undertaken to improve the environmental performance of the development.
- Any complaints received during the reporting period and actions taken.
- Any incidents that may have occurred during the reporting period and actions taken.

Every 3 years from the date of this consent and at the completion of works under this consent, unless the Secretary directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:

- (a) be 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;

(c) assess the environmental performance of the development and assess whether it is complying with the requirements in this Consent and any relevant EPL (including any assessment, plan or program required under these approvals);

(d) review the adequacy of strategies, plans or programs required under the abovementioned approvals; and

(e) recommend appropriate measures or actions to improve the environmental performance of the development, and/or any assessment, plan or program required under the abovementioned approvals. Note: This audit team must be led by a suitably qualified auditor and include experts in any field specified by the Secretary.

All documents required by the consent are provided on the company website (www.vgt.com.au/hodgsons) in accordance with consent conditions.

4.18.1 Surface Water Monitoring

There are no surface monitoring requirements in the EPA licence or consent conditions and no discharge off-site has occurred. Notwithstanding this, surface water quality is monitored annually as discussed in *Section 4.9.3* and reviewed by an independent consultant and reported in the Annual Review report. Monthly checks on automatic data loggers in the Process Dam are also undertaken and presented in the Annual Review and are reported on the Company website.

4.18.2 Responsibility

- Plant Manager - for implementing sedimentation control measures and monitoring as required
- All staff - for identifying where sediment controls required and for implementing procedures.

4.19 REVISION OF PLAN

This plan will be revised as follows in accordance with Condition 67 of the Mod 4 consent;

Within 3 months of the submission of:

- (a) an annual review;
- (b) an incident report;
- (c) an audit report; or
- (d) any modification to the conditions of Consent (unless the conditions require otherwise).

Where this review leads to revisions, then within 4 weeks of the review, unless the Secretary agrees otherwise, the revised document must be submitted to the Secretary for approval. Reviews are the responsibility of the Site Manager in consultation with an independent consultant.

The operator shall implement the approved management plan as approved from time to time from the Secretary.

5 References

- Ref 1 ANZMEC and Minerals Council of Australia (2000) *Strategic Framework for Mine Closure*
- Ref 2 Dundon Consulting Pty Ltd (April 2018) Robert Road Maroota Sand Quarry Groundwater Study Report
- Ref 3 Managing Urban Stormwater Soils and Construction Volume 2E Mines and Quarries (DECC, 2008)
- Ref 4 New South Wales Coal Association (February 1995) – *Mine Rehabilitation*
- Ref 5 Pers. Com. Martin Hodgson- *Quarry Manager*.
- Ref 6 Nexus (1999)- Environmental Impact Statement
- Ref 7 Nexus (2015)- Environmental Assessment
- Ref 8 Sean Harris, Morse McVey and Associates Pty Ltd (1999)- *Soil and Water Management Plan*
- Ref 9 Umwelt (Dec 2019)- *Roberts Road Quarry Modification 4 Statement of Environmental Effects*

Appendix A

Approval of Expert



Mr Greg Thompson
Principal Geologist
VGT Pty Ltd

27/10/2020

Dear Mr Thompson

**Roberts Road Quarry (DA 267-11-99)
Approval of Expert – Water Management Plan**

I refer to your request (DA 267-11-99-PA-9) for the Planning Secretary's approval of suitably qualified persons to prepare the Water Management Plan for the Roberts Road Quarry, as per condition 42 of DA 267-11-99.

The Department has reviewed the nominations and information you have provided and is satisfied that Ms Tara O'Brian of VGT Pty Ltd is suitably qualified and experienced. Consequently, I can advise that the Planning Secretary approves the appointment of Ms Tara O'Brian to prepare the Water Management Plan.

If you wish to discuss the matter further, please contact Joel Herbert on (02) 8289 6614.

Yours sincerely

A handwritten signature in black ink, appearing to read 'M Sprott'.

Matthew Sprott
Director
Resource Assessments (Coal & Quarries)
as nominee of the Planning Secretary

Appendix B: Blue Book Calculations

1. Erosion Hazard and Sediment Basins

Site Name: Maroota Sand Quarry

Site Location: Maroota Sand Quarry

Precinct/Stage: Existing

Other Details:

Site area	Sub-catchment or Name of Structure						Notes
	1A	1B	1C	1D	1E	1F	
Total catchment area (ha)	2	5	1.2	1.9	11	2.5	
Disturbed catchment area (ha)		5	1.2			2.5	

Soil analysis (enter sediment type if known, or laboratory particle size data)

Sediment Type (C, F or D) if known:	F	F	F	F	F	F	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	F	F	F	F	F	F	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)	95	95	95	95	95	95	
x-day, y-percentile rainfall event (mm)	69.4	69.4	69.4	69.4	69.4	69.4	
Rainfall R-factor (if known)							Only need to enter one or the other here
IFD: 2-year, 6-hour storm (if known)	10.4	10.4	10.4	10.4	10.4	10.4	

RUSLE Factors

Rainfall erosivity (R -factor)	2370	2370	2370	2370	2370	2370	Auto-filled from above
Soil erodibility (K -factor)	0.086	0.086	0.086	0.086	0.086	0.086	RUSLE LS factor calculated for a high rill/interrill ratio.
Slope length (m)	200	210	160	300	300	100	
Slope gradient (%)	0.2	8	5	9	9	14	
Length/gradient (LS -factor)	0.06	3.84	1.77	5.72	5.72	5.42	
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)	0.57	0.57	0.57	0.57	0.57	0.57	See Table F2, page F-4 in Appendix F

Calculations and Type D/F Sediment Basin Volumes

Soil loss (t/ha/yr)	16	1018	468	1515	1515	1435	
Soil Loss Class	1	6	4	7	7	6	See Table 4.2, page 4-13
Soil loss (m ³ /ha/yr)	12	783	360	1166	1166	1104	Conversion to cubic metres
Sediment basin storage (soil) volume (m ³)		653	72			460	See Sections 6.3.4(i) for calculations
Sediment basin settling (water) volume (m ³)	791	1978	475	752	4351	989	See Sections 6.3.4(i) for calculations
Sediment basin total volume (m ³)		2631	547			1449	

NB for sizing of Type C (coarse) sediment basins, see Worksheet 3 (if required).

1. Erosion Hazard and Sediment Basins

Site Name: Maroota Sand Quarry

Site Location: Maroota Sand Quarry

Precinct/Stage: Existing

Other Details:

Site area	Sub-catchment or Name of Structure						Notes
	2		3	4			
Total catchment area (ha)	7.5		3.9	3.8			
Disturbed catchment area (ha)	7.5						

Soil analysis (enter sediment type if known, or laboratory particle size data)

Sediment Type (C, F or D) if known:	F	F	F	F	F	F	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	F	F	F	F	F	F	Automatic calculation from above

Rainfall data

Design rainfall depth (no of days)	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)	95	95	95	95			
x-day, y-percentile rainfall event (mm)	69.4	69.4	69.4	69.4			
Rainfall R-factor (if known)							Only need to enter one or the other here
IFD: 2-year, 6-hour storm (if known)	10.4	10.4	10.4	10.4			

RUSLE Factors

Rainfall erosivity (R -factor)	2370	2370	2370	2370			Auto-filled from above
Soil erodibility (K -factor)	0.086	0.086	0.086	0.086			RUSLE LS factor calculated for a high rill/interrill ratio.
Slope length (m)	190	70	160	150			
Slope gradient (%)	14	13	5	5			
Length/gradient (LS -factor)	8.62	3.78	1.77	1.70			
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			Minimum is generally 2 months
Cv (Volumetric runoff coefficient)	0.57	0.57	0.57	0.57			See Table F2, page F-4 in Appendix F

Calculations and Type D/F Sediment Basin Volumes

Soil loss (t/ha/yr)	2285	1000	468	451			
Soil Loss Class	7	6	4	4			See Table 4.2, page 4-13
Soil loss (m ³ /ha/yr)	1757	770	360	347			Conversion to cubic metres
Sediment basin storage (soil) volume (m ³)	2197						See Sections 6.3.4(i) for calculations
Sediment basin settling (water) volume (m ³)	2967		1543	1503			See Sections 6.3.4(i) for calculations
Sediment basin total volume (m ³)	5164						

NB for sizing of Type C (coarse) sediment basins, see Worksheet 3 (if required).

Appendix C: Blue Book Standard Drawings

MATERIALS

ROCK: 150 TO 300mm NOMINAL DIAMETER, HARD, EROSION RESISTANT ROCK. SMALLER ROCK MAY BE USED IF SUITABLE LARGE ROCK IS NOT AVAILABLE.

SANDBAGS: GEOTEXTILE BAGS (WOVEN SYNTHETIC, OR NON-WOVEN BIODEGRADABLE) FILLED WITH CLEAN COARSE SAND, CLEAN AGGREGATE, STRAW OR COMPOST.

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND INSTALLATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. PRIOR TO PLACEMENT OF THE CHECK DAMS, ENSURE THE TYPE AND SIZE OF EACH CHECK DAMS WILL NOT CAUSE A SAFETY HAZARD OR CAUSE WATER TO SPILL OUT OF THE DRAIN.

3. LOCATE THE FIRST CHECK DAM AT THE DOWNSTREAM END OF THE SECTION OF CHANNEL BEING PROTECTED. LOCATE EACH SUCCESSIVE CHECK DAM SUCH THAT THE CREST OF THE IMMEDIATE DOWNSTREAM DAM IS LEVEL WITH THE TOE OF THE CHECK DAM BEING INSTALLED.

4. ENSURE THE CHANNEL SLOPE IS NO STEEPER THAN 10:1 (H:V). OTHERWISE CONSIDER THE USE OF A SUITABLE CHANNEL LINER INSTEAD OF THE CHECK DAMS.

5. CONSTRUCT THE CHECK DAM TO THE DIMENSIONS AND PROFILE SHOWN WITHIN THE APPROVED PLAN.

6. WHERE SPECIFIED, THE CHECK DAMS SHALL BE CONSTRUCTED ON A SHEET OF GEOTEXTILE FABRIC USED AS A DOWNSTREAM SPLASH PAD.

7. EACH CHECK DAM SHALL BE EXTENDED UP THE CHANNEL BANK (WHERE PRACTICABLE) TO AN ELEVATION AT LEAST 150mm ABOVE THE CREST LEVEL OF THE DAM.

MAINTENANCE

1. INSPECT EACH CHECK DAM AND THE DRAINAGE CHANNEL AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING RAINFALL.

2. CORRECT ALL DAMAGE IMMEDIATELY. IF SIGNIFICANT EROSION OCCURS BETWEEN ANY OF THE CHECK DAMS, THEN CHECK THE SPACING OF DAMS AND WHERE NECESSARY INSTALL INTERMEDIATE CHECK DAMS OR A SUITABLE CHANNEL LINER.

3. CHECK FOR DISPLACEMENT OF THE CHECK DAMS

4. CHECK FOR SOIL SCOUR AROUND THE ENDS OF EACH CHECK DAM. IF SUCH EROSION IS OCCURRING, CONSIDER EXTENDING THE WIDTH OF THE CHECK DAM TO AVOID SUCH PROBLEMS.

5. IF SEVERE SOIL EROSION OCCURS EITHER UNDER OR AROUND THE CHECK DAMS, THEN SEEK EXPERT ADVICE ON AN ALTERNATIVE TREATMENT MEASURE.

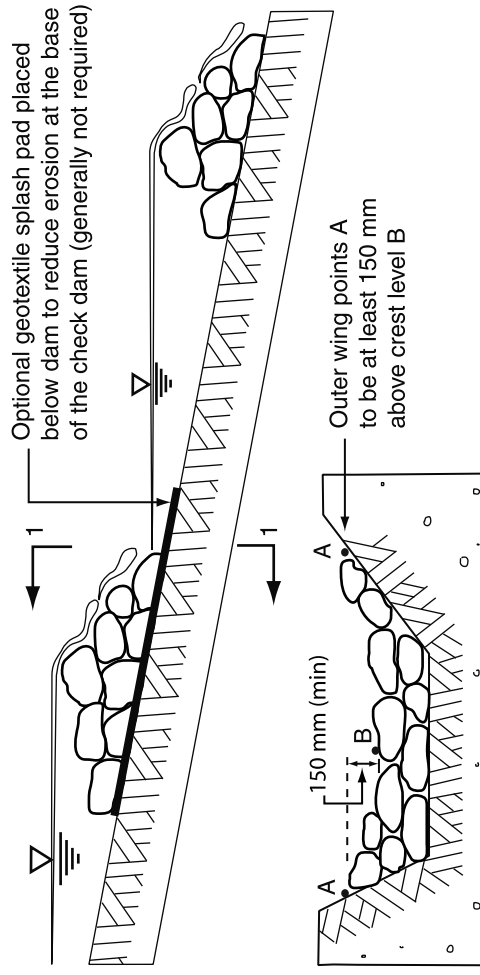
6. REMOVE ANY SEDIMENT ACCUMULATED BY THE CHECK DAMS, UNLESS IT IS INTENDED THAT THIS SEDIMENT WILL REMAIN WITHIN THE CHANNEL.

7. DISPOSE OF COLLECTED SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

REMOVAL

1. WHEN CONSTRUCTION WORK WITHIN THE DRAINAGE AREA ABOVE THE CHECK DAMS HAS BEEN COMPLETED, AND THE DISTURBED AREAS AND THE DRAINAGE CHANNEL ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, ALL TEMPORARY CHECK DAMS MUST BE REMOVED.

2. REMOVE THE CHECK DAMS AND ASSOCIATED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.



Section 1-1

Figure 1 - Layout and profile of check dams (rock check dams shown)

Drawn: **GMW**

Date:

Dec-09

Check Dams

RCD-01

MATERIALS

FABRIC: POLYPROPYLENE, POLYAMIDE, NYLON, POLYESTER, OR POLYETHYLENE WOVEN OR NON-WOVEN FABRIC, AT LEAST 700mm IN WIDTH AND A MINIMUM UNIT WEIGHT OF 140g/m². ALL FABRICS TO CONTAIN ULTRAVIOLET INHIBITORS AND STABILISERS TO PROVIDE A MINIMUM OF 6 MONTHS OF USEABLE CONSTRUCTION LIFE (ULTRAVIOLET STABILITY EXCEEDING 70%).

FABRIC REINFORCEMENT: WIRE OR STEEL MESH MINIMUM 14-GAUGE WITH A MAXIMUM MESH SPACING OF 200mm.

SUPPORT POSTS/STAKES: 1500mm² (MIN) HARDWOOD, 2500mm² (MIN) SOFTWOOD, OR 1.5kg/m (MIN) STEEL STAR PICKETS SUITABLE FOR ATTACHING FABRIC.

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND REQUIRED TYPE OF FABRIC (IF SPECIFIED). IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, FABRIC TYPE, OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. TO THE MAXIMUM DEGREE PRACTICAL, AND WHERE THE PLANS ALLOW, ENSURE THE FENCE IS LOCATED:

- (i) TOTALLY WITHIN THE PROPERTY BOUNDARIES;
- (ii) ALONG A LINE OF CONSTANT ELEVATION WHEREVER PRACTICAL;
- (iii) AT LEAST 2m FROM THE TOE OF ANY FILLING OPERATIONS THAT MAY RESULT IN SHIFTING SOIL/FILL DAMAGING THE FENCE.

3. INSTALL RETURNS WITHIN THE FENCE AT MAXIMUM 20m INTERVALS IF THE FENCE IS INSTALLED ALONG THE CONTOUR, OR 5 TO 10m MAXIMUM SPACING (DEPENDENT ON SLOPE) IF THE FENCE IS INSTALLED AT AN ANGLE TO THE CONTOUR. THE 'RETURNS' SHALL CONSIST OF EITHER:
(i) V-SHAPED SECTION EXTENDING AT LEAST 1.5m UP THE SLOPE; OR
(ii) SANDBAG OR ROCK/AGGREGATE CHECK

DAM A MINIMUM 1/3 AND MAXIMUM 1/2 FENCE HEIGHT, AND EXTENDING AT LEAST 1.5m UP THE SLOPE.

4. ENSURE THE EXTREME ENDS OF THE FENCE ARE TURNED UP THE SLOPE AT LEAST 1.5m, OR AS NECESSARY, TO MINIMISE WATER BYPASSING AROUND THE FENCE.

5. ENSURE THE SEDIMENT FENCE IS INSTALLED IN A MANNER THAT AVOIDS THE CONCENTRATION OF FLOW ALONG THE FENCE, AND THE UNDESIRABLE DISCHARGE OF WATER AROUND THE ENDS OF THE FENCE.

6. IF THE SEDIMENT FENCE IS TO BE INSTALLED ALONG THE EDGE OF EXISTING TREES, ENSURE CARE IS TAKEN TO PROTECT THE TREES AND THEIR ROOT SYSTEMS DURING INSTALLATION OF THE FENCE. DO NOT ATTACH THE FABRIC TO THE TREES.

7. UNLESS DIRECTED BY THE SITE SUPERVISOR OR THE APPROVED PLANS, EXCAVATE A 200mm WIDE BY 200mm DEEP TRENCH ALONG THE PROPOSED FENCE LINE, PLACING THE EXCAVATED MATERIAL ON THE UP-SLOPE SIDE OF THE TRENCH.

8. ALONG THE LOWER SIDE OF THE TRENCH, APPROPRIATELY SECURE THE STAKES INTO THE GROUND SPACED NO GREATER THAN 3m IF SUPPORTED BY A TOP SUPPORT WIRE OR WEIR MESH BACKING, OTHERWISE NO GREATER THAN 2m.

9. IF SPECIFIED, SECURELY ATTACH THE SUPPORT WIRE OR MESH TO THE UP-SLOPE SIDE OF THE STAKES WITH THE MESH EXTENDING AT LEAST 200mm INTO THE EXCAVATED TRENCH. ENSURE THE MESH AND FABRIC IS ATTACHED TO THE UP-SLOPE SIDE OF THE STAKES EVEN WHEN DIRECTING A FENCE AROUND A CORNER OR SHARP CHANGE OF DIRECTION.

10. WHEREVER POSSIBLE, CONSTRUCT THE SEDIMENT FENCE FROM A CONTINUOUS ROLL OF FABRIC. TO JOIN FABRIC EITHER:
(i) ATTACH EACH END TO TWO OVERLAPPING STAKES WITH THE FABRIC FOLDING AROUND THE ASSOCIATED STAKE ONE TURN, AND WITH

THE TWO STAKES TIED TOGETHER WITH WIRE; OR

(ii) OVERLAP THE FABRIC TO THE NEXT ADJACENT SUPPORT POST.

11. SECURELY ATTACH THE FABRIC TO THE SUPPORT POSTS USING 25 X 12.5mm STAPLES, OR TIE WIRE AT MAXIMUM 150mm SPACING.

12. SECURELY ATTACH THE FABRIC TO THE SUPPORT WIRE/MESH (IF ANY) AT A MAXIMUM SPACING OF 1m.

13. ENSURE THE COMPLETED SEDIMENT FENCE IS AT LEAST 450mm, BUT NOT MORE THAN 700mm HIGH. IF A SPILL-THROUGH WEIR IS INSTALLED, ENSURE THE CREST OF THE WEIR IS AT LEAST 300mm ABOVE GROUND LEVEL.

14. BACKFILL THE TRENCH AND TAMP THE FILL TO FIRMLY ANCHOR THE BOTTOM OF THE FABRIC AND MESH TO PREVENT WATER FROM FLOWING UNDER THE FENCE.

ADDITIONAL REQUIREMENTS FOR THE INSTALLATION OF A SPILL-THROUGH WEIR

1. LOCATE THE SPILL-THROUGH WEIR SUCH THAT THE WEIR CREST WILL BE LOWER THAN THE GROUND LEVEL AT EACH END OF THE FENCE.

2. ENSURE THE CREST OF THE SPILL-THROUGH WEIR IS AT LEAST 300mm THE GROUND ELEVATION.

3. SECURELY TIE A HORIZONTAL CROSS MEMBER (WEIR) TO THE SUPPORT POSTS/ STAKES EACH SIDE OF THE WEIR. CUT THE FABRIC DOWN THE SIDE OF EACH POST AND FOLD THE FABRIC OVER THE CROSS MEMBER AND APPROPRIATELY SECURE THE FABRIC.

4. INSTALL A SUITABLE SPLASH PAD AND/OR CHUTE IMMEDIATELY DOWN-SLOPE OF THE SPILL-THROUGH WEIR TO CONTROL SOIL EROSION AND APPROPRIATELY DISCHARGE THE CONCENTRATED FLOW PASSING OVER THE WEIR.

MAINTENANCE

1. INSPECT THE SEDIMENT FENCE AT LEAST WEEKLY AND AFTER ANY SIGNIFICANT RAIN. MAKE NECESSARY REPAIRS IMMEDIATELY.

2. REPAIR ANY TORN SECTIONS WITH A CONTINUOUS PIECE OF FABRIC FROM POST TO POST.

3. WHEN MAKING REPAIRS, ALWAYS RESTORE THE SYSTEM TO ITS ORIGINAL CONFIGURATION UNLESS AN AMENDED LAYOUT IS REQUIRED OR SPECIFIED.

4. IF THE FENCE IS SAGGING BETWEEN STAKES, INSTALL ADDITIONAL SUPPORT POSTS.

5. REMOVE ACCUMULATED SEDIMENT IF THE SEDIMENT DEPOSIT EXCEEDS A DEPTH OF 1/3 THE HEIGHT OF THE FENCE.

6. DISPOSE OF SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

7. REPLACE THE FABRIC IF THE SERVICE LIFE OF THE EXISTING FABRIC EXCEEDS 6-MONTHS.

REMOVAL

1. WHEN DISTURBED AREAS UP-SLOPE OF THE SEDIMENT FENCE ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, THE FENCE MUST BE REMOVED.

2. REMOVE MATERIALS AND COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

3. REHABILITATE/REVEGETATE THE DISTURBED GROUND AS NECESSARY TO MINIMISE THE EROSION HAZARD.

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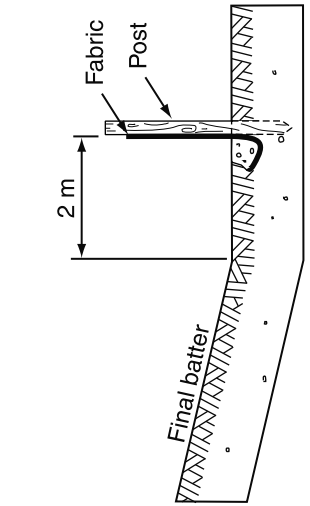
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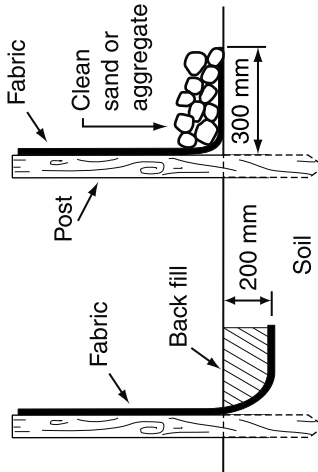
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Sediment Fence

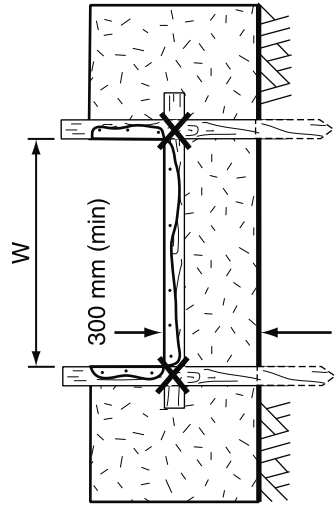
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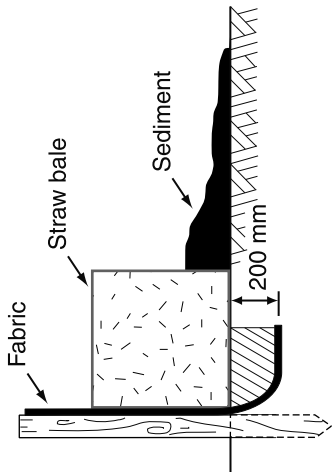
(a) Location of fence relative to base of slope



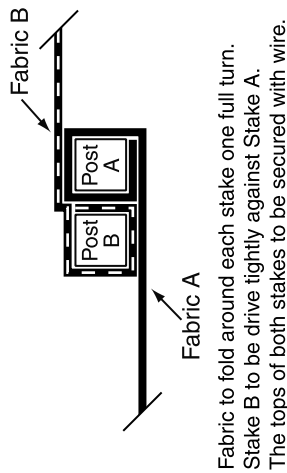
(b) Anchoring base of fabric



(e) Spill-through weir

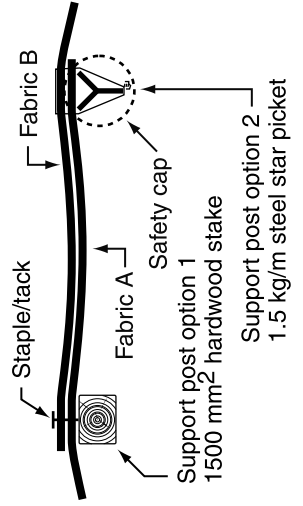


(f) Placement of up-slope straw bale

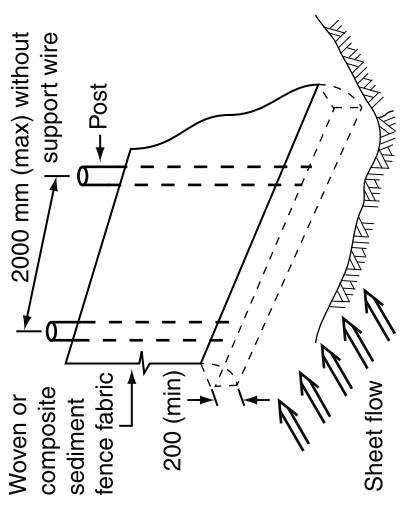


Fabric to fold around each stake one full turn. Stake B to be driven tightly against Stake A. The tops of both stakes to be secured with wire.

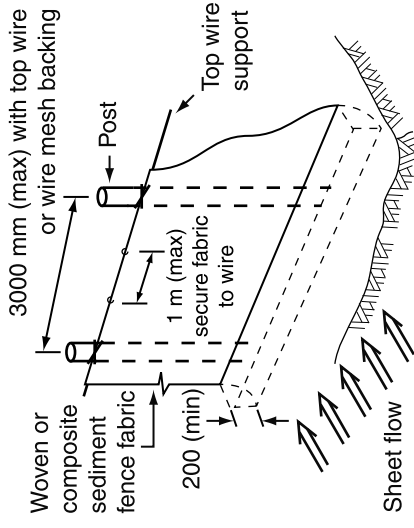
(c) Joining fabric - Method 1



(g) Joining fabric - Method 2



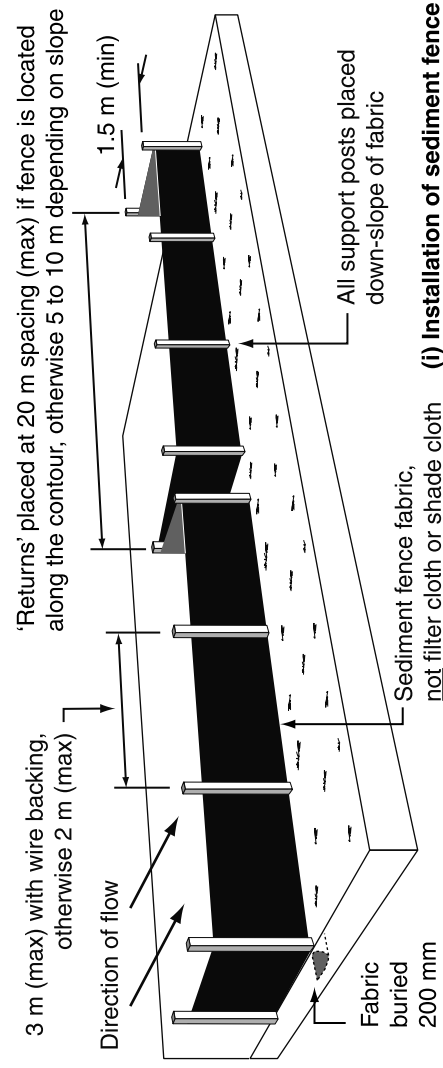
(d) Installation without backing support



(h) Installation with top wire support

Notes:

1. Sediment fence to be installed along a line of constant ground elevation wherever practical.
2. Both end of the sediment fence to extend up the slope at least 1m.
3. Support post to be spaced a maximum 2m unless the fence is supported by a top wire or wire mesh backing, in which case 3m maximum spacing.
4. Fence 'returns' shall be installed at maximum 20m spacing if fence is installed along the contour, otherwise 5 to 10m maximum spacing.
5. Minimum 4 staples or tie wires per stake.



(i) Installation of sediment fence

Drawn: GMW	Date: Dec-09	Sediment Fence	ESC-04
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CONSTRUCTION

1. THE SPILLWAY MUST BE EXCAVATED AS SHOWN ON THE PLANS, AND THE EXCAVATED MATERIAL IF CLASSIFIED AS SUITABLE, MUST BE USED IN THE EMBANKMENT, AND IF NOT SUITABLE IT MUST BE DISPOSED OF INTO SPOIL HEAPS.

2. ENSURE EXCAVATED DIMENSIONS ALLOW ADEQUATE BOXING-OUT SUCH THAT THE SPECIFIED ELEVATIONS, GRADES, CHUTE WIDTH, AND ENTRANCE AND EXIT SLOPES FOR THE EMERGENCY SPILLWAY WILL BE ACHIEVED AFTER PLACEMENT OF THE ROCK OR OTHER SCOUR PROTECTION MEASURES AS SPECIFIED IN THE PLANS.

3. PLACE SPECIFIED SCOUR PROTECTION MEASURES ON THE EMERGENCY SPILLWAY. ENSURE THE FINISHED GRADE BLENDS WITH THE SURROUNDING AREA TO ALLOW A SMOOTH FLOW TRANSITION FROM SPILLWAY TO DOWNSTREAM CHANNEL.

4. IF A SYNTHETIC FILTER FABRIC UNDERLAY IS SPECIFIED, PLACE THE FILTER FABRIC DIRECTLY ON THE PREPARED FOUNDATION. IF MORE THAN 1 SHEET OF FILTER FABRIC IS REQUIRED, OVERLAP THE EDGES BY AT LEAST 300mm AND PLACE ANCHOR PINS AT MINIMUM 1m SPACING ALONG THE OVERLAP. BURY THE UPSTREAM END OF THE FABRIC A MINIMUM 300mm BELOW GROUND AND WHERE NECESSARY, BURY THE LOWER END OF THE FABRIC OR OVERLAP A MINIMUM 300mm OVER THE NEXT DOWNSTREAM SECTION AS REQUIRED. ENSURE THE FILTER FABRIC EXTENDS AT LEAST 1000mm UPSTREAM OF THE SPILLWAY CREST.

5. TAKE CARE NOT TO DAMAGE THE FABRIC DURING OR AFTER PLACEMENT. IF DAMAGE OCCURS, REMOVE THE ROCK AND REPAIR THE SHEET BY ADDING ANOTHER LAYER OF FABRIC WITH A MINIMUM OVERLAP OF 300mm AROUND THE DAMAGED AREA. IF EXTENSIVE DAMAGE IS SUSPECTED, REMOVE AND REPLACE THE ENTIRE SHEET.

6. WHERE LARGE ROCK IS USED, OR MACHINE PLACEMENT IS DIFFICULT, A MINIMUM 100mm LAYER OF FINE GRAVEL, AGGREGATE, OR SAND MAY BE NEEDED TO PROTECT THE FABRIC.

7. PLACEMENT OF ROCK SHOULD FOLLOW IMMEDIATELY AFTER PLACEMENT OF THE FILTER FABRIC. PLACE ROCK SO THAT IT FORMS A DENSE, WELL-GRADED MASS OF ROCK WITH A MINIMUM OF VOIDS. THE DESIRED DISTRIBUTION OF ROCK THROUGHOUT THE MASS MAY BE OBTAINED BY SELECTIVE LOADING AT THE QUARRY AND CONTROLLED DUMPING DURING FINAL PLACEMENT.

8. THE FINISHED SLOPE SHOULD BE FREE OF POCKETS OF SMALL ROCK OR CLUSTERS OF LARGE ROCKS. HAND PLACING MAY BE NECESSARY TO ACHIEVE THE PROPER DISTRIBUTION OF ROCK SIZES TO PRODUCE A RELATIVELY SMOOTH, UNIFORM SURFACE. THE FINISHED GRADE OF THE ROCK SHOULD BLEND WITH THE SURROUNDING AREA. NO OVERFALL OR PROTRUSION OF ROCK SHOULD BE APPARENT.

9. ENSURE THAT THE FINAL ARRANGEMENT OF THE SPILLWAY CREST WILL NOT PROMOTE EXCESSIVE FLOW THROUGH THE ROCK SUCH THAT THE WATER CAN BE RETAINED WITHIN THE SETTLING BASIN AN ELEVATION NO LESS

THAN 50mm ABOVE OR BELOW THE NOMINATED SPILLWAY CREST ELEVATION.

MAINTENANCE

1. DURING THE CONSTRUCTION PERIOD, INSPECT THE SPILLWAY PRIOR TO FORECAST RAINFALL, DAILY DURING EXTENDED PERIODS OF RAINFALL, AFTER SIGNIFICANT RUNOFF PRODUCING STORM EVENTS, OR OTHERWISE ON A WEEKLY BASIS. MAKE REPAIRS AS NECESSARY.

2. CHECK FOR MOVEMENT OF, OR DAMAGE TO, THE SPILLWAY'S LINING, INCLUDING SURFACE CRACKING.

3. CHECK FOR SOIL SCOUR ADJACENT TO THE SPILLWAY. INVESTIGATE THE CAUSE OF ANY SCOUR, AND REPAIR AS NECESSARY.

REMOVAL

1. TEMPORARY SPILLWAYS SHOULD BE REMOVED WHEN AN ALTERNATIVE, STABLE, DRAINAGE SYSTEM IS AVAILABLE.

2. REMOVE ALL MATERIALS AND DEPOSITED SEDIMENT, AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

3. GRADE THE AREA IN PREPARATION FOR STABILISATION, THEN STABILISE THE AREA AS SPECIFIED IN THE APPROVED PLAN.

4. WHEN MAKING REPAIRS, ALWAYS RESTORE THE SPILLWAY TO ITS ORIGINAL CONFIGURATION UNLESS AN AMENDED LAYOUT IS REQUIRED.

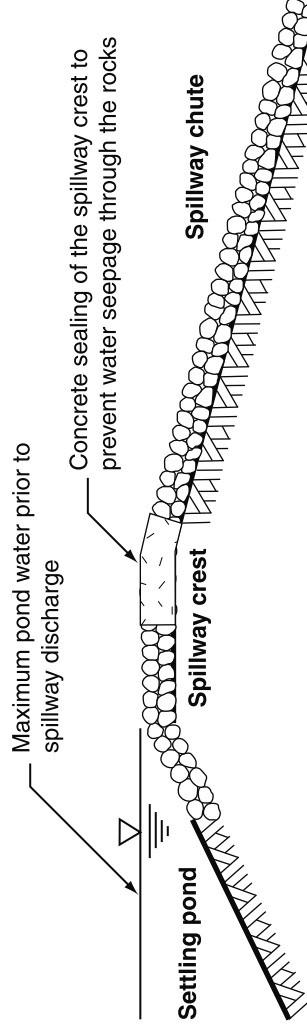


Figure 1 - Example of seepage control on the spillway crest

Drawn: **GMW**

Date: **Dec-09**

Emergency Spillways

ES-1

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. ENSURE ALL NECESSARY SOIL TESTING (e.g. SOIL pH, NUTRIENT LEVELS) AND ANALYSIS HAS BEEN COMPLETED, AND REQUIRED SOIL ADJUSTMENTS PERFORMED PRIOR TO PLANTING.

3. CLEAR THE LOCATION FOR THE CHANNEL, CLEARING ONLY WHAT IS NEEDED TO PROVIDE ACCESS FOR PERSONNEL AND CONSTRUCTION EQUIPMENT.

4. REMOVE ROOTS, STUMPS, AND OTHER DEBRIS AND DISPOSE OF THEM PROPERLY. DO NOT USE DEBRIS TO BUILD ANY ASSOCIATED EMBANKMENTS.

5. EXCAVATE THE DIVERSION CHANNEL TO THE SPECIFIED SHAPE, ELEVATION AND GRADIENT. THE SIDES OF THE CHANNEL SHOULD BE NO STEEPER THAN A 2:1 (H:V) IF CONSTRUCTED IN EARTH, UNLESS SPECIFICALLY DIRECTED WITHIN THE APPROVED PLANS.

6. STABILISE THE CHANNEL AND BANKS IMMEDIATELY UNLESS IT WILL OPERATE FOR LESS THAN 30 DAYS. IN EITHER CASE, TEMPORARY EROSION PROTECTION (MATTING, ROCK, ETC.) WILL BE REQUIRED AS SPECIFIED WITHIN THE APPROVED PLANS OR AS DIRECTED.

7. ENSURE THE CHANNEL DISCHARGES TO A STABLE AREA.

ADDITIONAL REQUIREMENTS FOR TURF PLACEMENT:

1. TURF SHOULD BE USED WITHIN 12 HOURS OF DELIVERY, OTHERWISE ENSURE THE TURF IS STORED IN CONDITIONS APPROPRIATE FOR THE WEATHER CONDITIONS (e.g. A SHADED AREA).

2. MOISTENING THE TURF AFTER IT IS UNROLLED WILL HELP MAINTAIN ITS VIABILITY.

3. TURF SHOULD BE LAID ON A MINIMUM 75mm BED OF ADEQUATELY FERTILISED TOPSOIL. RAKE THE SOIL SURFACE TO BREAK THE CRUST JUST BEFORE LAYING THE TURF.

4. DURING THE WARMER MONTHS, LIGHTLY IRRIGATE THE SOIL IMMEDIATELY BEFORE LAYING THE TURF.

5. ENSURE THE TURF IS NOT LAID ON GRAVEL, HEAVILY COMPACTED SOILS, OR SOILS THAT HAVE BEEN RECENTLY TREATED WITH HERBICIDES.

6. ENSURE THE TURF EXTENDS UP THE SIDES OF THE DRAIN AT LEAST 100mm ABOVE THE ELEVATION OF THE CHANNEL INVERT, OR AT LEAST TO A SUFFICIENT ELEVATION TO FULLY CONTAIN EXPECTED CHANNEL FLOW.

7. ON CHANNEL GRADIENTS OF 3:1 (H:V) OR STEEPER, OR IN SITUATIONS WHERE HIGH FLOW VELOCITIES (i.e. VELOCITY > 1.5m/s) ARE LIKELY WITHIN THE FIRST TWO WEEKS FOLLOWING PLACEMENT, SECURE THE INDIVIDUAL TURF STRIPS WITH WOODEN OR PLASTIC PEGS.

8. ENSURE THAT INTIMATE CONTACT IS ACHIEVED AND MAINTAINED BETWEEN

THE TURF AND THE SOIL SUCH THAT SEEPAGE FLOW BENEATH THE TURF IS AVOIDED.

9. WATER UNTIL THE SOIL IS WET 100mm BELOW THE TURF. THEREAFTER, WATERING SHOULD BE SUFFICIENT TO MAINTAIN AND PROMOTE HEALTHY GROWTH

MAINTENANCE

1. DURING THE SITE'S CONSTRUCTION PERIOD, INSPECT THE DIVERSION CHANNEL WEEKLY AND AFTER ANY INCREASE IN FLOWS WITHIN THE CHANNEL. REPAIR ANY SLUMPS, WHEEL TRACK DAMAGE OR LOSS OF FREEBOARD.

2. ENSURE FILL MATERIAL OR SEDIMENT IS NOT PARTIALLY BLOCKING THE CHANNEL. WHERE NECESSARY, REMOVE ANY DEPOSITED MATERIAL TO ALLOW FREE DRAINAGE.

3. DISPOSE OF ANY COLLECTED SEDIMENT OR FILL IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

REMOVAL

1. WHEN THE CONSTRUCTION WORK ABOVE A TEMPORARY DIVERSION CHANNEL IS FINISHED AND THE AREA IS STABILISED, THE AREA SHOULD BE APPROPRIATELY REHABILITATED.

2. DISPOSE OF ANY COLLECTED SEDIMENT OR FILL IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

3. GRADE THE AREA AND SMOOTH IT OUT IN PREPARATION FOR STABILISATION.

4. STABILISE THE AREA AS SPECIFIED IN THE APPROVED PLAN.

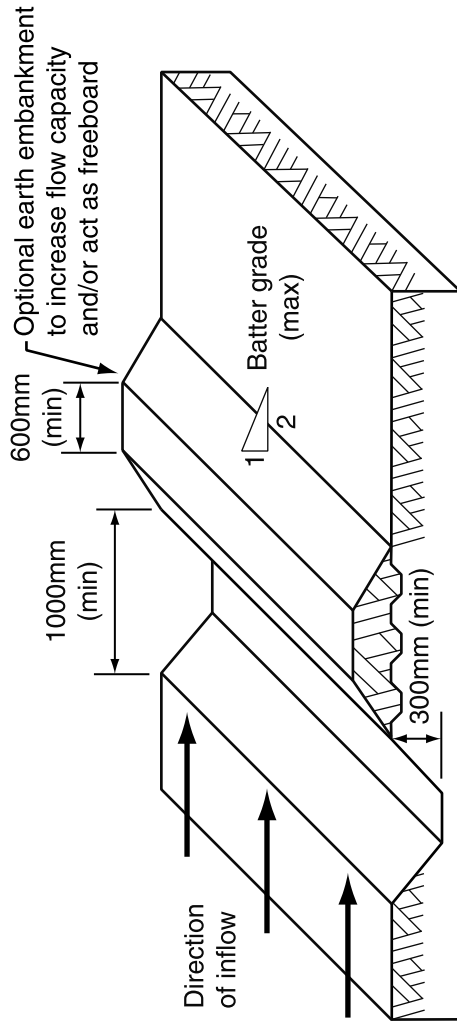


Figure 1 - Typical profile of diversion channel with bank

Drawn: GMW

Date:

Dec-09

Diversion Channels

DC-01

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. CLEAR THE LOCATION FOR THE BANK, CLEARING ONLY THE AREA THAT IS NEEDED TO PROVIDE ACCESS FOR PERSONNEL AND EQUIPMENT.

3. REMOVE ROOTS, STUMPS, AND OTHER DEBRIS AND DISPOSE OF THEM PROPERLY. DO NOT USE DEBRIS TO BUILD THE BANK.

4. FORM THE BANK FROM THE MATERIAL, AND TO THE DIMENSION SPECIFIED IN THE APPROVED PLANS.

5. IF EARTH IS USED, THEN ENSURE THE SIDES OF THE BANK ARE NO STEEPER THAN A 2:1 (H:V) SLOPE, AND THE COMPLETED BANK MUST BE AT LEAST 500mm HIGH.

6. IF FORMED FROM SANDBAGS, THEN ENSURE THE BAGS ARE TIGHTLY PACKED SUCH THAT WATER LEAKAGE THROUGH THE BAGS IS MINIMISED.

7. CHECK THE BANK ALIGNMENT TO ENSURE POSITIVE DRAINAGE IN THE DESIRED DIRECTION.

8. THE BANK SHOULD BE VEGETATED (TURFED, SEEDED AND MULCHED), OR OTHERWISE STABILISED IMMEDIATELY, UNLESS IT WILL OPERATE FOR LESS THAN 30 DAYS OR IF SIGNIFICANT RAINFALL IS NOT EXPECTED DURING THE LIFE OF THE BANK.

9. ENSURE THE EMBANKMENT DRAINS TO A STABLE OUTLET, AND DOES NOT DISCHARGE TO AN UNSTABLE FILL SLOPE.

MAINTENANCE

1. INSPECT FLOW DIVERSION BANKS AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING RAINFALL.

2. INSPECT THE BANK FOR ANY SLUMPS, WHEEL TRACK DAMAGE OR LOSS OF FREEBOARD. MAKE REPAIRS AS NECESSARY.

3. CHECK THAT FILL MATERIAL OR SEDIMENT HAS NOT PARTIALLY BLOCKED THE DRAINAGE PATH UP-SLOPE OF THE EMBANKMENT. WHERE NECESSARY, REMOVE ANY DEPOSITED MATERIAL TO ALLOW FREE DRAINAGE.

4. DISPOSE OF ANY COLLECTED SEDIMENT OR FILL IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

5. REPAIR ANY PLACES IN THE BANK THAT ARE WEAKENED OR IN RISK OF FAILURE.

REMOVAL

1. WHEN THE SOIL DISTURBANCE ABOVE THE BANK IS FINISHED AND THE AREA IS STABILISED, THE FLOW DIVERSION BANK SHOULD BE REMOVED, UNLESS IT IS TO REMAIN AS A PERMANENT DRAINAGE FEATURE.

2. DISPOSE OF ANY SEDIMENT OR EARTH IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

3. GRADE THE AREA AND SMOOTH IT OUT IN PREPARATION FOR STABILISATION.

4. STABILISE THE AREA BY GRASSING OR AS SPECIFIED IN THE APPROVED PLAN.

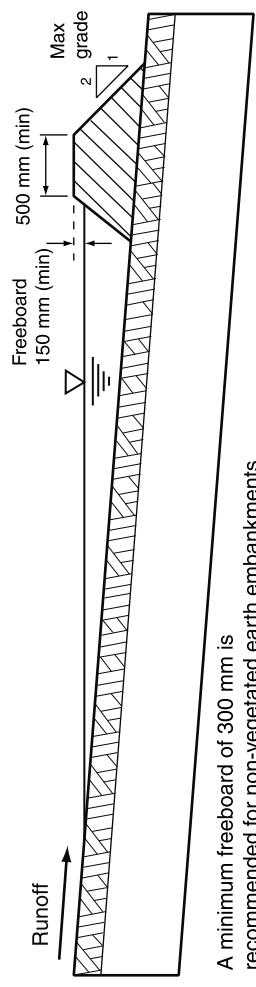


Figure 1 - Typical profile of flow diversion bank formed from earth

Table 1 - Recommended dimensions of flow diversion banks

Parameter	Earth banks	Vegetated banks	Compost berms	Sandbag berms
Height (min)	500 mm	500 mm	300 mm	N/A
Top width (min)	500 mm	500 mm	100 mm	N/A
Base width (min)	2500 mm	2500 mm	600 mm	N/A
Side slope (max)	2:1 (H:V)	2:1 (H:V)	1:1 (H:V)	N/A
Freeboard	300 mm	150 mm	100 mm	50 mm

Drawn: GMW	Date: Dec-09	Flow Diversion Banks	DB-01
-------------------	---------------------	-----------------------------	--------------

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. ENSURE ALL NECESSARY SOIL TESTING (e.g. SOIL pH, NUTRIENT LEVELS) AND ANALYSIS HAS BEEN COMPLETED, AND REQUIRED SOIL ADJUSTMENTS PERFORMED PRIOR TO PLANTING.

3. CLEAR THE LOCATION FOR THE CATCH DRAIN, CLEARING ONLY WHAT IS NEEDED TO PROVIDE ACCESS FOR PERSONNEL AND EQUIPMENT FOR INSTALLATION.

4. REMOVE ROOTS, STUMPS, AND OTHER DEBRIS AND DISPOSE OF THEM PROPERLY. DO NOT USE DEBRIS TO BUILD THE BANK.

5. GRADE THE DRAIN TO THE SPECIFIED SLOPE AND FORM THE ASSOCIATED EMBANKMENT WITH COMPACTED FILL. NOTE THAT THE DRAIN INVERT MUST FALL 10cm EVERY 10m FOR EACH 1% OF CHANNEL GRADIENT.

6. ENSURE THE SIDES OF THE CUT DRAIN ARE NO STEEPER THAN A 1.5:1 (H:V) SLOPE AND THE EMBANKMENT FILL SLOPES NO STEEPER THAN 2:1.

7. ENSURE THE COMPLETED DRAIN HAS SUFFICIENT DEEP (AS SPECIFIED FOR THE TYPE OF DRAIN) MEASURED FROM THE DRAIN INVERT TO THE TOP OF THE EMBANKMENT. WHERE NECESSARY, CUT THE DRAIN SLIGHTLY DEEPER THAN THAT SPECIFIED ON THE PLANS SUCH THAT

THE CORRECT CHANNEL DIMENSIONS ARE ACHIEVED FOLLOWING PLACEMENT OF THE TURF.

8. ENSURE THE DRAIN HAS A CONSTANT FALL IN THE DESIRED DIRECTION FREE OF OBSTRUCTIONS.

9. TURF SHOULD BE USED WITHIN 12-HOURS OF DELIVERY, OTHERWISE ENSURE THE TURF IS STORED IN CONDITIONS APPROPRIATE FOR THE WEATHER CONDITIONS (e.g. A SHADED AREA).

10. MOISTENING THE TURF AFTER IT IS UNROLLED WILL HELP MAINTAIN ITS VIABILITY.

11. TURF SHOULD BE LAID ON A MINIMUM 75mm BED OF ADEQUATELY FERTILISED TOPSOIL. RAKE THE SOIL SURFACE TO BREAK THE CRUST JUST BEFORE LAYING THE TURF.

12. DURING THE WARMER MONTHS, LIGHTLY IRRIGATE THE SOIL IMMEDIATELY BEFORE LAYING THE TURF.

13. ENSURE THE TURF IS NOT LAID ON GRAVEL, HEAVILY COMPACTED SOILS, OR SOILS THAT HAVE BEEN RECENTLY TREATED WITH HERBICIDES.

14. FOR WIDE DRAINS AND HIGH VELOCITY CHUTES, LAY THE FIRST ROW OF TURF IN A STRAIGHT LINE DIAGONAL TO THE DIRECTION OF FLOW. STAGGER SUBSEQUENT ROWS IN A BRICK-LIKE (STRETCHER BOND) PATTERN. THE TURF SHOULD NOT BE STRETCHED OR OVERLAPPED. USE A KNIFE OR SHARP SPADE TO TRIM AND FIT IRREGULARLY SHAPED AREAS.

15. FOR NARROW DRAINS, LAY THE TURF ALONG THE DIRECTION OF THE DRAIN, ENSURING, WHEREVER PRACTICABLE, THAT A LONGITUDINAL JOINT BETWEEN TWO STRIPS OF TURF IS NOT POSITIONED ALONG THE INVERT OF THE DRAIN.

16. ENSURE THE TURF EXTENDS UP THE SIDES OF THE DRAIN AT LEAST 100mm ABOVE THE ELEVATION OF THE CHANNEL INVERT, OR AT LEAST TO A SUFFICIENT ELEVATION TO FULLY CONTAIN EXPECTED CHANNEL FLOW.

17. ON CHANNEL GRADIENTS OF 3:1 (H:V) OR STEEPER, OR IN SITUATIONS WHERE HIGH FLOW VELOCITIES (i.e. VELOCITY >1.5m/s) ARE LIKELY WITHIN THE FIRST 2-WEEKS FOLLOWING PLACEMENT, SECURE THE INDIVIDUAL TURF STRIPS WITH WOODEN OR PLASTIC PEGS.

18. ENSURE THAT INTIMATE CONTACT IS ACHIEVED AND MAINTAINED BETWEEN THE TURF AND THE SOIL SUCH THAT SEEPAGE FLOW BENEATH THE TURF IS AVOIDED.

19. WATER UNTIL THE SOIL IS WET 100mm BELOW THE TURF. THEREAFTER, WATERING SHOULD BE SUFFICIENT TO MAINTAIN AND PROMOTE HEALTHY GROWTH.

20. ENSURE THE DRAIN DISCHARGES TO A STABLE OUTLET SUCH THAT DOWN-SLOPE SOIL EROSION WILL BE PREVENTED FROM OCCURRING. ENSURE THE DRAIN DOES NOT DISCHARGE TO AN UNSTABLE FILL SLOPE.

MAINTENANCE

1. INSPECT ALL CATCH DRAINS AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING STORM EVENTS AND REPAIR ANY SLUMPS, BANK DAMAGE, OR LOSS OF FREEBOARD.

2. ENSURE FILL MATERIAL OR SEDIMENT IS NOT PARTIALLY BLOCKING THE DRAIN. WHERE NECESSARY, REMOVE ANY DEPOSITED MATERIAL TO ALLOW FREE DRAINAGE.

3. DISPOSE OF ANY SEDIMENT OR FILL IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

REMOVAL

1. WHEN THE SOIL DISTURBANCE ABOVE THE CATCH DRAIN IS FINISHED AND THE AREA IS STABILISED, THE DRAIN AND ANY ASSOCIATED BANKS SHOULD BE REMOVED, UNLESS IT IS TO REMAIN AS A PERMANENT DRAINAGE FEATURE.

2. DISPOSE OF ANY SEDIMENT OR EARTH IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

3. GRADE THE AREA AND SMOOTH IT OUT IN PREPARATION FOR STABILISATION.

4. STABILISE THE AREA BY GRASSING OR AS SPECIFIED WITHIN THE APPROVED PLAN.

Drawn:

GMW

Date:

Dec-09

Catch Drains - Grass Lined

CD-03

INSTALLATION (EARTH-LINED)

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. CLEAR THE LOCATION FOR THE CATCH DRAIN, CLEARING ONLY WHAT IS NEEDED TO PROVIDE ACCESS FOR PERSONNEL AND EQUIPMENT FOR INSTALLATION.

3. REMOVE ROOTS, STUMPS, AND OTHER DEBRIS AND DISPOSE OF THEM PROPERLY. DO NOT USE DEBRIS TO BUILD THE BANK.

4. GRADE THE DRAIN TO THE SPECIFIED SLOPE AND FORM THE ASSOCIATED EMBANKMENT WITH COMPACTED FILL. NOTE THAT THE DRAIN INVERT MUST FALL 10cm EVERY 10m FOR EACH 1% OF REQUIRED CHANNEL GRADIENT.

5. ENSURE THE SIDES OF THE CUT DRAIN ARE NO STEEPER THAN A 1.5:1 (H:V) SLOPE AND THE EMBANKMENT FILL SLOPES NO STEEPER THAN 2:1.

6. ENSURE THE COMPLETED DRAIN HAS SUFFICIENT DEEP (AS SPECIFIED FOR THE TYPE OF DRAIN) MEASURED FROM THE DRAIN INVERT TO THE TOP OF THE EMBANKMENT.

7. ENSURE THE DRAIN HAS A CONSTANT FALL IN THE DESIRED DIRECTION FREE OF OBSTRUCTIONS.

8. ENSURE THE DRAIN DISCHARGES TO A STABLE OUTLET SUCH THAT SOIL EROSION WILL BE PREVENTED FROM OCCURRING. SPECIFICALLY, ENSURE THE DRAIN DOES NOT DISCHARGE TO AN UNSTABLE FILL SLOPE.

MAINTENANCE

1. INSPECT ALL CATCH DRAINS AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING STORM EVENTS AND REPAIR ANY SLUMPS, BANK DAMAGE, OR LOSS OF FREEBOARD.

2. ENSURE FILL MATERIAL OR SEDIMENT IS NOT PARTIALLY BLOCKING THE DRAIN. WHERE NECESSARY, REMOVE ANY DEPOSITED MATERIAL TO ALLOW FREE DRAINAGE.

3. DISPOSE OF ANY SEDIMENT OR FILL IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

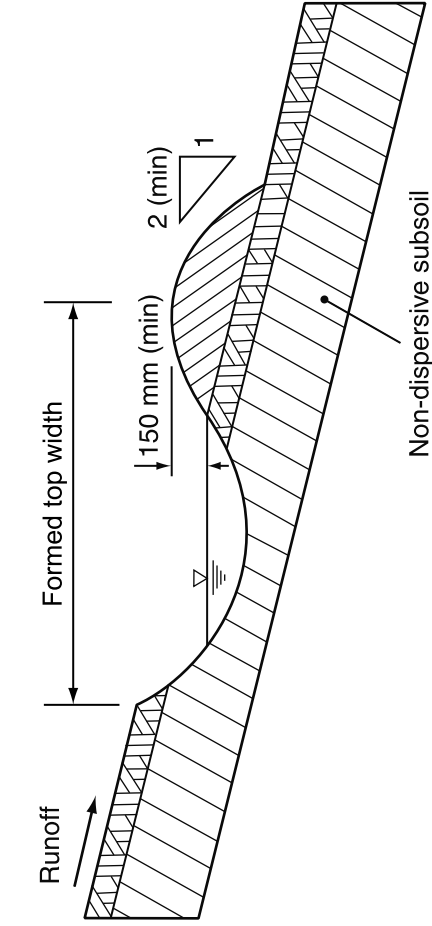
REMOVAL

1. WHEN THE SOIL DISTURBANCE ABOVE THE CATCH DRAIN IS FINISHED AND THE AREA IS STABILISED, THE TEMPORARY DRAIN AND ANY ASSOCIATED BANKS SHOULD BE REMOVED, UNLESS IT IS TO REMAIN AS A PERMANENT DRAINAGE FEATURE.

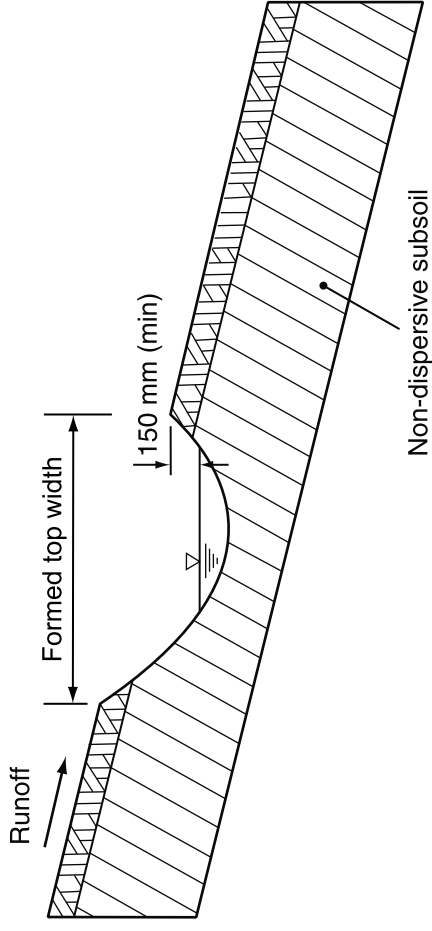
2. DISPOSE OF ANY SEDIMENT OR EARTH IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

3. GRADE THE AREA AND SMOOTH IT OUT IN PREPARATION FOR STABILISATION.

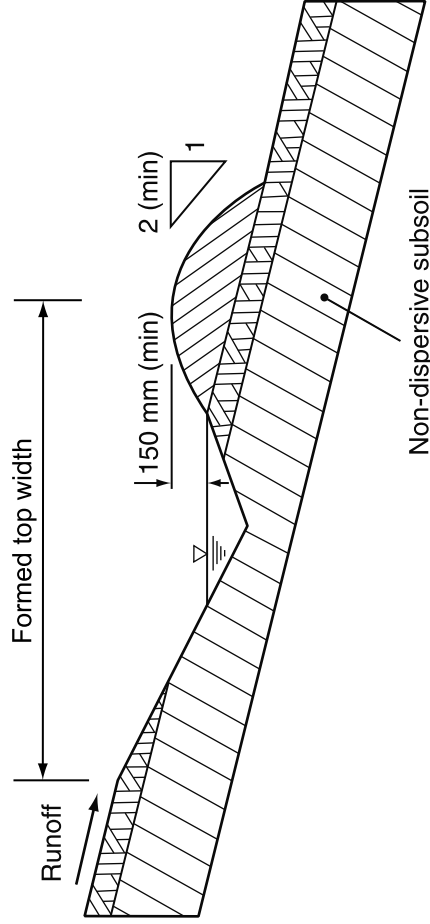
4. STABILISE THE AREA BY GRASSING OR AS SPECIFIED WITHIN THE APPROVED SITE REHABILITATION PLAN.



(a) Parabolic catch drain with down-slope bank



(c) Parabolic catch drain without bank



(b) Triangular V-drain with down-slope bank

Constructed dimensions of parabolic catch drains		
Drain type	Formed top width with or without bank	Formed depth with or without bank
Type-A	1.6 m	0.30 m
Type-B	2.4 m	0.45 m
Type-C	3.6 m	0.65 m

Constructed dimensions of triangular V-drains		
Drain type	Formed top width with or without bank	Formed depth with or without bank
Type-AV	2.0 m	0.30 m
Type-BV	2.7 m	0.45 m
Type-CV	3.9 m	0.65 m

NOT TO SCALE

Drawn: **GMW**

Date:

Dec-09

Catch Drains

CD-01

INSTALLATION

- REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.
- CLEAR THE LOCATION FOR THE BERM, CLEARING ONLY THE AREA THAT IS NEEDED TO PROVIDE ACCESS FOR PERSONNEL AND EQUIPMENT.
- REMOVE ROOTS, STUMPS, AND OTHER DEBRIS AND DISPOSE OF THEM PROPERLY.
- FORM THE BERM FROM THE MATERIAL, AND TO THE DIMENSION SPECIFIED IN THE APPROVED PLANS.
- IF FORMED FROM SANDBAGS, THEN ENSURE THE BAGS ARE TIGHTLY PACKED SUCH THAT WATER LEAKAGE THROUGH THE BAGS IS MINIMISED.
- CHECK THE ALIGNMENT OF THE BERM TO ENSURE POSITIVE DRAINAGE IN THE DESIRED DIRECTION.
- ENSURE THE BERM DISCHARGES TO A STABLE OUTLET.
- ENSURE THE BERM DOES NOT DISCHARGE TO AN UNSTABLE FILL SLOPE.

MAINTENANCE

- INSPECT FLOW CONTROL BERMS AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING RAINFALL.
- INSPECT THE BERM FOR ANY SLUMPS, WHEEL TRACK DAMAGE OR LOSS OF FREEBOARD. MAKE REPAIRS AS NECESSARY.
- CHECK THAT FILL MATERIAL OR SEDIMENT HAS NOT PARTIALLY BLOCKED THE DRAINAGE PATH UP-SLOPE OF THE EMBANKMENT. WHERE NECESSARY, REMOVE ANY DEPOSITED MATERIAL TO ALLOW FREE DRAINAGE.
- DISPOSE OF ANY COLLECTED SEDIMENT OR FILL IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.
- REPAIR ANY PLACES IN THE BERM THAT ARE WEAKENED OR IN RISK OF FAILURE.

REMOVAL

- WHEN THE SOIL DISTURBANCE ABOVE THE BANK IS FINISHED AND THE AREA IS STABILISED, THE FLOW CONTROL BERM SHOULD BE REMOVED, UNLESS IT IS TO REMAIN AS A PERMANENT DRAINAGE FEATURE.
- DISPOSE OF ANY SEDIMENT OR EARTH IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.
- GRADE THE AREA AND SMOOTH IT OUT IN PREPARATION FOR STABILISATION.
- STABILISE THE AREA BY GRASSING OR AS SPECIFIED IN THE APPROVED PLAN.

Table 1 - Recommended dimensions of flow control berms

Parameter	Earth banks	Vegetated banks	Compost berms	Sandbag berms
Height (min)	500 mm	500 mm	300 mm	N/A
Top width (min)	500 mm	500 mm	100 mm	N/A
Base width (min)	2500 mm	2500 mm	600 mm	N/A
Side slope (max)	2:1 (H:V)	2:1 (H:V)	1:1 (H:V)	N/A
Freeboard	300 mm	150 mm	100 mm	50 mm

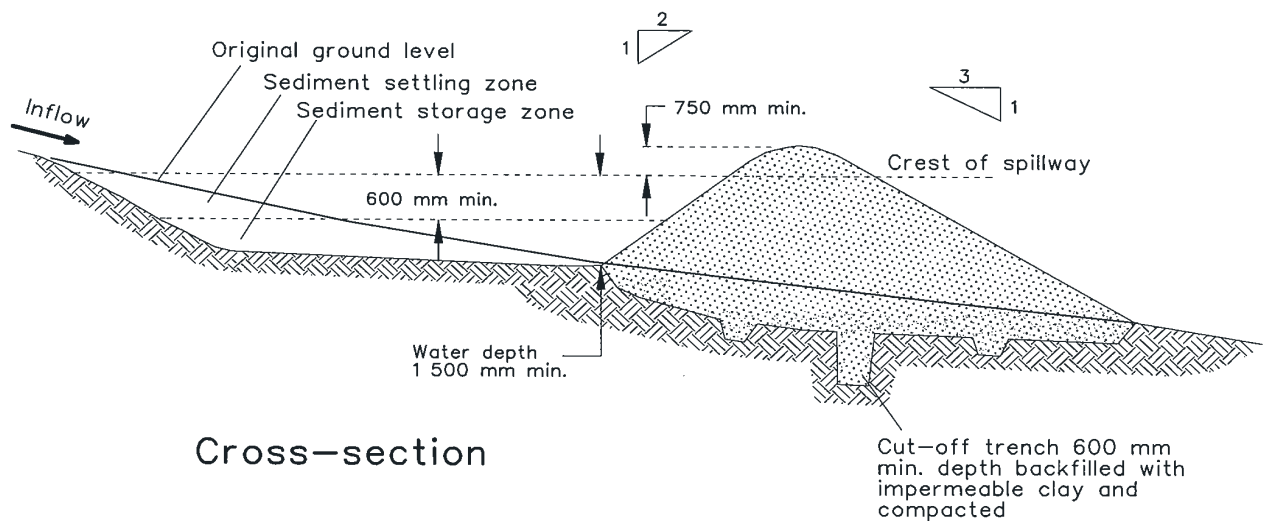
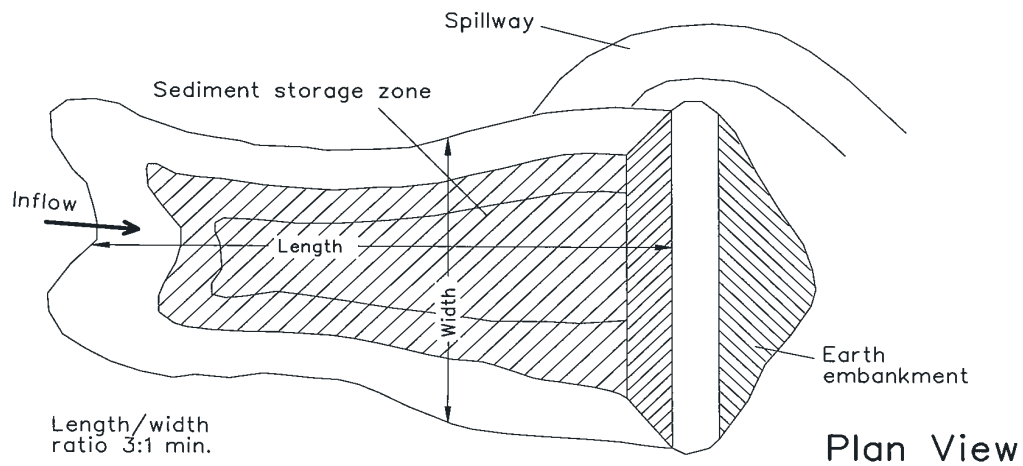
Drawn: **GMW**

Date:

Dec-09

Flow Control Berms

CB-01



Construction Notes

1. Remove all vegetation and topsoil from under the dam wall and from within the storage area.
2. Construct a cut-off trench 500 mm deep and 1,200 mm wide along the centreline of the embankment extending to a point on the gully wall level with the riser crest.
3. Maintain the trench free of water and recompact the materials with equipment as specified in the SWMP to 95 per cent Standard Proctor Density.
4. Select fill following the SWMP that is free of roots, wood, rock, large stone or foreign material.
5. Prepare the site under the embankment by ripping to at least 100 mm to help bond compacted fill to the existing substrate.
6. Spread the fill in 100 mm to 150 mm layers and compact it at optimum moisture content following the SWMP.
7. Construct the emergency spillway.
8. Rehabilitate the structure following the SWMP.

EARTH BASIN - WET

(APPLIES TO 'TYPE D' AND 'TYPE F' SOILS ONLY)

SD 6-4

Appendix D

Correspondence



**Planning Services
Resource Assessments**

Name: Lauren Evans

Phone: 9228 6311

Email: lauren.evans@planning.nsw.gov.au

Greg Thompson
VGT Environmental Compliance Solutions
PO Box 2335
Greenhills NSW 2323

Dear Mr Thompson

**Roberts Road Sand Quarry (DA 267-11-99)
Approval of Expert**

I refer to your letter dated 26 April 2016, seeking the Secretary's approval of a suitably qualified and experienced expert to prepare a Water Management Plan for the Roberts Road Sand Quarry, in accordance with condition 42 of Schedule 2 of the development consent.

The Department has considered the information supplied concerning the qualification and experience of Ms Tara O'Brien of VGT Pty Ltd and would like to advise you that the Secretary has approved her appointment.

If you have any enquiries about this matter, please contact Lauren Evans.

Yours sincerely

Howard Reed

29.4.16.

Director

Resource Assessments

As nominee of the Secretary

From: [WeTransfer](#)
To: [Lisa Thomson](#)
Subject: Download confirmation from jessie.evans@planning.nsw.gov.au via WeTransfer
Date: Tuesday, 19 July 2016 9:53:57 AM

jessie.evans@planning.nsw.gov.au
downloaded your files

'Hello,
I have attached the completed Environmental Strategy inclusive of Environmental Management Plan and Sub-Plans. Please note that the Water Management Plan and the Rehabilitation Management Plan are interim updates prior to the due date. Also note that the Groundwater Monitoring Plan will follow shortly.

Regards,
Lisa Thomson
VGT Pty Ltd
02 4028 6412'

Files (54.9 MB total)

2801_MA_EMP_EMS_2016_R1 complete.pdf

Will be deleted on

22 July, 2016

Download link

<https://we.tl/ccqYhm8uwl>

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From: Jessie.Evans@planning.nsw.gov.au
To: [Lisa Thomson](mailto:Lisa.Thomson)
Cc: tertius.greyling@planning.nsw.gov.au; info@hodgsonquarryproducts.com.au; "Martin Hodgson"; [Neil Kennan](mailto:Neil.Kennan)
Subject: RE: Roberts Road Maroota DA 267-11-99 2801_EMS R1
Date: Tuesday, 23 August 2016 9:42:39 AM

Morning Lisa,

These plans are currently sitting with me for review. I am about half way through. I will endeavour to get something to you by next week.

Thanks
Jessie

From: Lisa Thomson [mailto:Lisa@vgt.com.au]
Sent: Monday, 22 August 2016 3:27 PM
To: compliance@planning.com.au
Cc: Jessie Evans <Jessie.Evans@planning.nsw.gov.au>; Tertius Greyling <tertius.greyling@planning.nsw.gov.au>; info@hodgsonquarryproducts.com.au; 'Martin Hodgson' <hodgsonquarries@gmail.com>; Neil Kennan <kennan@ozemail.com.au>
Subject: RE: Roberts Road Maroota DA 267-11-99 2801_EMS R1

Hi All,

As you are aware, the Environmental Management Strategy and underlying management plans were submitted for your approval on the 15th July 2016. As it is now over a month later, I was wondering whether these plans will be approved. Condition 21 of this consent states:

21. The Applicant shall make copies of both EMPs available to Council, EPA and [DPI-Water](#) within 14 days of approval by the [Secretary](#). The Applicant shall also make a current copy of the EMPs available for inspection by the public or these agencies, for the duration of the Consent.

The EMPs are not as yet available to these authorities, nor to the public. Also, until these plans are approved, the site must necessarily be operating under outdated management plans that do not reflect the current conditions of consent. Please advise as to when approval of these plans can be expected.

Regards,
Lisa Thomson,
VGT Pty Ltd

Ph: 02 4028 6412
Mob: 0427 334471
Fax: 02 4028 6413
Web: www.vgt.com.au

[Have your say! Click here and fill in a short survey so we can improve for you!](#)



Please consider the environment before printing my email

From: Lisa Thomson
Sent: Tuesday, 19 July 2016 9:46 AM
To: 'compliance@planning.com.au' <compliance@planning.com.au>
Cc: 'Jessie.Evans@planning.nsw.gov.au' <Jessie.Evans@planning.nsw.gov.au>;
'tertius.greyling@planning.nsw.gov.au' <tertius.greyling@planning.nsw.gov.au>;
info@hodgsonquarryproducts.com.au; 'Martin Hodgson' <hodgsonquarries@gmail.com>
Subject: RE: Roberts Road Maroota DA 267-11-99 2801_EMS R1

Hi All,

Just checking that you have received this link ok? It will expire on Friday 22nd July. Please let me know if you need it sent in a different form.

Regards,
Lisa Thomson,
VGT Pty Ltd

Ph: 02 4028 6412
Mob: 0427 334471
Fax: 02 4028 6413
Web: www.vgt.com.au

[Have your say! Click here and fill in a short survey so we can improve for you!](#)



Please consider the environment before printing my email

From: Lisa Thomson
Sent: Friday, 15 July 2016 4:50 PM
To: 'compliance@planning.com.au' <compliance@planning.com.au>
Cc: 'Jessie.Evans@planning.nsw.gov.au' <Jessie.Evans@planning.nsw.gov.au>;
'tertius.greyling@planning.nsw.gov.au' <tertius.greyling@planning.nsw.gov.au>;
info@hodgsonquarryproducts.com.au; 'Martin Hodgson' <hodgsonquarries@gmail.com>
Subject: Roberts Road Maroota DA 267-11-99 2801_EMS R1

Hello,

I have placed version R1 of the Environmental Management Strategy for DA 267-11-99 in a wetransfer link. This document now has the updated Operational Environmental Management Plan and sub-plans incorporated within the document, as well as the requirements attached here addressed. Please reply if you do not receive the link, or have problems downloading the document. Please contact me as soon as this document is approved, to allow distribution to other authorities and uploading to the website.

Please note:

- 1) the Water Management Plan incorporated within this document is an interim, the new version is due 31/12/2016
- 2) the Rehabilitation Plan incorporated within this document is an interim, the new version is due 30/6/2017
- 3) the Groundwater Monitoring Plan is to be submitted separately

Should you have any queries, please contact Lisa Thomson on 02 4028 6412.


Regards,

Lisa Thomson

Principal Environmental Consultant

02 4028 6412


0427 334471



vgt
Environmental
Compliance
Solutions

VGT Pty Limited
Environmental and Geological Assessments
Environmental Monitoring and Management
Quarry/Mine Plans and Rehabilitation Plans
Sediment and Erosion Plans
Annual Reports
NATA Accredited Laboratory

Phone: (02) 4028 6412
Fax: (02) 4028 6413
www: vgt.com.au
Post: PO Box 2335 Greenhills NSW 2325
Location: 4/30 Glenwood Dr Thornton NSW 2322
ABN: 79 103 636 353



NATA
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OF TESTING AUTHORITIES

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Please consider the environment before printing my email

From: genevieve.seed@planning.nsw.gov.au
To: [Lisa Thomson](#)
Cc: Jessie.Evans@planning.nsw.gov.au
Subject: RE: Roberts Road Sand Quarry - Management Plan Review
Date: Friday, 14 October 2016 2:44:04 PM
Attachments: [image001.jpg](#)
[image002.jpg](#)
[image003.jpg](#)
[image004.jpg](#)
[image005.jpg](#)
[Response to review comments_14 Oct.pdf](#)
[Attachment A_14 Oct.docx](#)
[Attachment B.docx](#)

Hi Lisa

Please find the attached response to your review comments. I have also attached comments in relation to the Groundwater Monitoring Program.

Have a nice weekend.

Kind regards,

Gen

From: Lisa Thomson [mailto:Lisa@vgt.com.au]
Sent: Wednesday, 12 October 2016 1:54 PM
To: Gen Seed <genevieve.seed@planning.nsw.gov.au>
Cc: Jessie Evans <Jessie.Evans@planning.nsw.gov.au>
Subject: RE: Roberts Road Sand Quarry - Management Plan Review

Hi Genevieve and Jessie,
I have attached our comments on your responses. I hope this clarifies some of your issues.

Regards,
Lisa Thomson,
VGT Pty Ltd

Ph: 02 4028 6412
Mob: 0427 334471
Fax: 02 4028 6413
Web: www.vgt.com.au

[Have your say! Click here and fill in a short survey so we can improve for you!](#)



Please consider the environment before printing my email

From: genevieve.seed@planning.nsw.gov.au [mailto:genevieve.seed@planning.nsw.gov.au]
Sent: Friday, 7 October 2016 12:45 PM
To: Lisa Thomson <Lisa@vgt.com.au>
Cc: Jessie.Evans@planning.nsw.gov.au
Subject: RE: Roberts Road Sand Quarry - Management Plan Review

Hi Lisa

I have attached the document in word format.

Hope this helps.

Kind regards,

Gen

From: Lisa Thomson [<mailto:Lisa@vgt.com.au>]
Sent: Friday, 7 October 2016 10:07 AM
To: Gen Seed <genevieve.seed@planning.nsw.gov.au>
Cc: Jessie Evans <Jessie.Evans@planning.nsw.gov.au>
Subject: RE: Roberts Road Sand Quarry - Management Plan Review

Thanks Ladies,
Would it be possible to have attachment A in a spreadsheet format?

Regards,
Lisa Thomson,
VGT Pty Ltd

Ph: 02 4028 6412
Mob: 0427 334471
Fax: 02 4028 6413
Web: www.vgt.com.au

[Have your say! Click here and fill in a short survey so we can improve for you!](#)



Please consider the environment before printing my email

From: genevieve.seed@planning.nsw.gov.au [<mailto:genevieve.seed@planning.nsw.gov.au>]
Sent: Friday, 7 October 2016 9:49 AM
To: Lisa Thomson <Lisa@vgt.com.au>
Cc: Jessie.Evans@planning.nsw.gov.au
Subject: Roberts Road Sand Quarry - Management Plan Review

Good Morning Lisa

Please find the attached review comments for the Roberts Road Quarry Management Plans.

Kind regards,

Gen

Genevieve Seed
Planning Officer
Resource Assessments



Lisa Thomson
Principal Environmental Consultant
Vgt Environmental Compliance Solutions
PO Box 2335
GREENHILLS NSW 2323

Dear Ms Thomson

**Roberts Road Sand Quarry (DA 267-11-99)
Management Plans**

I refer to your email dated 12 October 2016 providing comments in response to the Department's review of the revised management plans for the Roberts Road Sand Quarry including the:

- Noise Management Plan (condition 46, Schedule 2);
- Air Quality Management Plan (condition 29, Schedule 2);
- Construction Environmental Management Plan (condition 18, Schedule 2);
- Road Noise Management Plan (condition 48, Schedule 2);
- Flora and Fauna Management Plan (condition 55, Schedule 2);
- Environmental Management Strategy (condition 63, Schedule 2); and
- Operations Environmental Management Plan (condition 19, Schedule 5).

The Department has responded to your comments in **Attachment A**.

Following recent correspondence from DPI-Water, the Department has also provided comments on the Groundwater Monitoring Program (condition 43, Schedule 2). These comments are provided in **Attachment B**.

If you have any enquiries about this matter, please contact Genevieve Seed.

Yours sincerely

Howard Reed

14.10.16

Director

Resource Assessments

As nominee of the Secretary



Department of
Primary Industries
Water

Contact: Janne Grose
Phone: 02 8838 7505
Email: janne.grose@dpi.nsw.gov.au

Our ref: V15/3875#23, OUT17/13999
File No:
Your Ref:

Lisa Thompson
VGT
PO Box 2335
GREENHILLS NSW 2323

4 April 2017

Lisa@vgt.com.au

Dear Ms Thompson

Re: Roberts Road Quarry Maroota (DA 267-11-99 Mod 2) – draft Surface Water Management Plan

Thank you for emailing a copy of the Surface Water Management Plan (dated 31 January 2017 – 2801_MA_EMP_SWMP_2016_F2). DPI Water has reviewed the draft Surface Water Management Plan (SWMP) and provides comments in Attachment A:

For further information please contact Janne Grose, Water Regulation Officer at DPI Water (Parramatta office) on t: (02) 8838 7505; e: janne.grose@dpi.nsw.gov.au

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Irene Zinger'.

Irene Zinger
Regional Manager - Metro,
Water Regulation

ATTACHMENT A

Roberts Road Quarry Maroota (DA 267-11-99 Mod 2) – Surface Water Management Plan

DPI Water has reviewed the draft Surface Water Management Plan (SWMP) and provides the following comments.

1 Executive Summary

Section 1 of the SWMP indicates a portion of clean water from the undisturbed areas and properties adjacent to the quarry enters the main quarry area (page 1). Clean water runoff should be diverted away from the quarry area. The SWMP should clarify if it is possible to divert this clean water around the site so it does not enter the quarry.

2.3.2 National Office of Water (NOW)

It is suggested the heading for Section 2.3.2 'National Office of Water (NOW)' is amended to 'DPI Water'.

It is recommended Section 2.3.2 includes licensing details on all the dams on the site.

It is noted there are aspects of groundwater monitoring in the SWMP. Aspects of the hydrogeology on the site are yet to be finalised.

Table 2 – Groundwater Bore Summary

The SWMP needs to include a figure which shows the location of the bores listed in Table 2 including the location of the groundwater bore (GW102451). It is unclear where this bore is located.

Table 2 indicates the Water Access Licences for 10CA114819 and 10CA104888 expired in February 2016. The SWMP needs to clarify if current approvals are held.

2.5 Consultation

Section 2.5 makes reference to email correspondence from the DPI on the '14 October 2016'. This needs to be amended to the '10 October 2016' (see page 13).

4.1 Drainage patterns

Section 4.1 notes surface water collected over properties east of Roberts Road enters the site via a road culvert. It indicates this catchment is approximately 10 Ha and is considered clean and is diverted into Dam 1. As water from Dam 1 is used for processing a Water Access Licence (WAL) is required.

The collection of dirty water in dams or sediment ponds for a water supply is exempt from requiring a licence under the Water Management (General) Regulation 2011. The collection of clean water from undisturbed areas in dams to provide a water supply is not exempt and is not supported by DPI Water unless it is in accordance with an appropriate WAL and a nominated work. If clean water is being collected, then the proponent must liaise with DPI Water to ensure appropriate licences are held.

4.2 Groundwater Inflows

The pumping bores need to be metered.

4.5 Surface Water Quality

The SWMP needs to clarify if the quarry discharges water off site. Section 4.5 states “*no discharge off-site has occurred recently*” (our emphasis) (page 18) but this is not consistent with:

- Section 4.6 which states “*at present the site does not discharge water off site*” (page 18)
- Section 7.6.5 which states “*no discharge of water off-site has occurred to date*” (page 41).

It is suggested the SWMP clarifies if any off-site discharge has occurred. It would appear from Section 7.6.5 that no offsite discharge has occurred. If off site discharge has occurred, Section 4.5 needs to include details such as when off-site discharge occurred and whether surface water quality monitoring was undertaken at this time.

Section 4.5 notes that should discharge be required surface water monitoring would be undertaken. The SWMP needs to provide details on where the surface water quality sampling points are located.

DPI Water supports a nil discharge approach for dirty/sediment laden water. Clean surface runoff, however should be diverted away from development and diverted to downstream catchments for the environment and other users (unless the water is captured under a WAL).

4.6 Discharge Points

The SWMP should identify where the discharge points are located.

5.3 Water Use on site

Section 5.3 notes that after processing liberated, water is drained into a ‘holding dam’ (page 19). The SWMP needs to clarify which dam is the holding dam and include a figure which locates it.

5.4 Recycling of Water

Section 5.4 refers to collecting water in the sediment dams for reuse (page 20). The SWMP needs to clarify which dams are the sediment dams and include details on the capacity of these dams. A figure needs to be included in the SWMP which shows the location of the sediment dams.

5.5 Modelling Assumptions

The modelling provides a ball park figure understanding but it does not represent reality.

5.6.2 Projected Future Water Usage

Section 5.6.2 notes water levels within the dam will be recorded annually and that to assist with this, loggers will be installed in key dams (page 26). DPI Water advised in its submission of 31 October 2016 that it requires a continuous water level logger to be placed on each of the dams at the site to determine if the water in the dams is originating from the Maroota sands aquifer. The SWMP needs to be amended to reflect this.

7.1 Clean Water Management

Section 7.1 notes clean water is diverted around the site via a series of earthen bunds and it refers to Figure 3. Figure 3 needs to be amended to show the location of the bunds. As the SWMP indicates clean water from undisturbed areas enters the quarry area (page 1), Section 7.1 should include details on this.

7.2.5 Final Stage catchment

Section 7.2.5 notes the potential volume of the final dam on the site would be 945 300 m³ (page 35), which equates to 945 ML. The proponent would need to purchase WAL(s) to account for the volume of water held by the dam. The SWMP assumes the final dam would

have an average depth of 7m. A groundwater WAL may also be required if the dam intercepts groundwater. It is recommended the proponent commences investigating the purchase of WAL(s)

The NSW Dams Safety Committee should be consulted in relation to this dam.

7.6.2 Transfer of Water to Offsite Dam

Section 7.6.2 indicates excess surface water from Dam 1 is to be transferred from the site to the neighbouring land owned by Mr Tony Portelli (page 38). The SWMP indicates the water is to be used for stock water and irrigation (pages 38 and 39). The SWMP needs to clarify whether Mr Portelli has the correct approvals under the Water Management Act 2000. Details are required on the location of Mr Portelli's property and the location of his dam(s). Clarification is required as to how the water is to be transferred, and whether it is to be transferred via a pipeline to his property.

10 Performance Criteria

Once the proponent clarifies the remaining groundwater issues, this section will be subject to change.

End of Attachment A

Tara O'Brien

From: Lisa Thomson
Sent: Wednesday, 4 October 2017 10:38 AM
To: Tara O'Brien
Subject: FW: Roberts Rd Sand Quarry DA 267-11-99 - review of IEA 2017

Regards,
Lisa Thomson,
VGT Pty Ltd

Ph: 02 4028 6412
Mob: 0427 334471
Web: www.vgt.com.au

[Have your say! Click here and fill in a short survey so we can improve for you!](#)



Please consider the environment before printing my email

From: Julia Pope [<mailto:Julia.Pope@planning.nsw.gov.au>]
Sent: Friday, 29 September 2017 4:13 PM
To: Lisa Thomson <Lisa@vgt.com.au>
Subject: RE: Roberts Rd Sand Quarry DA 267-11-99 - review of IEA 2017

I agree to an extension to 11 October.

Julia Pope
Senior Compliance Officer
Compliance Unit
320 Pitt Street | GPO Box 39 | Sydney NSW 2001
T 02 8217 2068 M 0448 229 658



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From: Lisa Thomson [<mailto:Lisa@vgt.com.au>]
Sent: Friday, 29 September 2017 3:14 PM
To: Julia Pope <Julia.Pope@planning.nsw.gov.au>
Cc: Hodgson Quarries and Plant Pty Ltd . <hodgsonquarries@gmail.com>
Subject: Re: Roberts Rd Sand Quarry DA 267-11-99 - review of IEA 2017

Hello Julia

Thankyou for your response. As you are aware, the review of the process dam has just been completed. Also the groundwater study was submitted within the requisite timeframe and is undergoing review following collection of data from the site.

Due to the public holiday next week, along with the fact that I will be out of the office next week, may we request an extension until 11th October to formally respond to your request.

Regards
Lisa Thomson
VGT Pty Ltd
02 4028 6412
0427 334471

----- Original message -----

From: Julia Pope <Julia.Pope@planning.nsw.gov.au>
Date: 29/9/17 2:45 pm (GMT+10:00)
To: Lisa Thomson <Lisa@vgt.com.au>
Cc: "Hodgson Quarries and Plant Pty Ltd ." <hodgsonquarries@gmail.com>
Subject: Roberts Rd Sand Quarry DA 267-11-99 - review of IEA 2017

Lisa

I have reviewed the Independent Environmental Audit report prepared by Newport Technical Services Pty Ltd dated 8 August 2017.

This email is to inform you that the Department is considering potential compliance action for breaches of Conditions 40 and 45 in accordance with the Department's Compliance Policy.

Condition 40

The audit report identified that the groundwater study report was not submitted to the Department and DPI-Water within six months of commissioning the study.

Further, the study report was found to be inadequate in determining the location of the wet weather high groundwater table and further information is required. This has caused undue delay in filling areas of the site as required by Condition 41.

Condition 45

The audit report identified that an assessment of the process water dam has not been carried out.

The purpose of this email is to give you the opportunity to provide any further information you would like the Department to consider in this matter.

Any response should be received by the Department by Friday 6 October 2017.

Julia Pope
Senior Compliance Officer
Compliance Unit
320 Pitt Street | GPO Box 39 | Sydney NSW 2001
T 02 8217 2068 M 0448 229 658





Ms Lisa Thomson
Principal Environmental Consultant
VGT – Environmental Compliance Solutions
PO Box 2335
Greenhills NSW 2323

Email: Lisa@vgt.com.au

Dear Ms Thomson

**Roberts Road Quarry – Modification 2 (DA 267-11-99 MOD 2)
Environmental Management Plans**

I refer to your email dated 15 November 2017 submitting revised management plans for the Roberts Road Quarry (DA 267-11-99) including the:

- Groundwater Study, dated October 2017 (condition 39 of Schedule 2);
- Water Management Plan, dated November 2017 (condition 42, Schedule 2); and
- Groundwater Monitoring Program, dated November 2017 (condition 43, Schedule 2).

I also refer to your email dated 29 June 2017 submitting the Landscape and Rehabilitation Management Plan, dated June 2017 (condition 60, Schedule 2).

The Department considers that these documents have not adequately addressed the relevant conditions of consent. The Department's comments on these documents are enclosed in **Attachment A**.

The Department notes that the Department of Industry – Water has also provided comments in relation to the water management plans. Please ensure these comments are satisfactorily addressed prior to resubmitting these plans.

The Department requests that these documents are revised and re-submitted no later than **23 March 2018**.

Should you have any enquiries in relation to this matter, please contact Jack Murphy at the details above.

Yours sincerely,

Howard Reed
Director

8.2.18

Resource Assessments

As nominee of the Secretary

Attachment A
Roberts Road Sand Quarry – Management Plan 2017 Reviews

Groundwater Study and Remediation Works – DA 267-11-99 MOD 2 – Condition 39 Schedule 2	Satisfactory (Yes/No/Partial)	Comment	Action Required
Within six weeks of the date of approval of Modification 2, the Applicant shall commission a comprehensive groundwater study of the site. This study must:			
(a) be prepared by suitably qualified and experienced person/s whose appointment has been endorsed by the Secretary and DPI-Water;	Yes		Nil actions required, other than those set out in the Comments and General Comments below.
(b) consult with DPI-Water;	Partial	Refer to DoI's comments.	
(c) examine all existing records of groundwater levels at the site;	Partial	Refer to DoI's comments.	
(d) develop an interim contour map of the wet weather high groundwater level of the regional aquifer, based on all available records (see also Condition 44); and	Partial	Refer to DoI's comments.	
(e) provide advice and recommendations on the Groundwater Monitoring Program as set out in Condition 43.	Partial	Refer to DoI's comments.	
General comments:			

Water Management Plan – DA 267-11-99 MOD 2 – Condition 42 Schedule 2	Satisfactory (Yes/No/Partial)	Comment	Action Required
<p>The Applicant shall prepare a Water Management Plan for the development to the satisfaction of the Secretary. This plan must be prepared in consultation with DPI-Water by suitably qualified and experienced person/s whose appointment has been approved by the Secretary, and be submitted to the Secretary for approval by 31 December 2016. The plan must be updated on an annual basis in consultation with DPI-Water for three years from the date of approval of Modification 2 and thereafter as agreed with by the Secretary.</p> <p>In addition to the standard requirements for management plans (see Condition 61), this plan must include a:</p>			
<p>(a) Site Water Balance that:</p> <ul style="list-style-type: none"> • includes details of: <ul style="list-style-type: none"> ○ sources and security of water supply, including contingency planning; ○ water use on site; ○ water management on site, including groundwater inflows to the quarry voids and site discharges; and ○ audit and reporting procedures, including comparisons of the site water balance each calendar year; and ○ describes the measures that would be implemented to minimise clean water use on site and maximise recycling opportunities; 	<p>Partial</p>	<ul style="list-style-type: none"> ○ See Section 5.2 – please include details of contingency planning. ○ Satisfied – See Section 5.3. ○ See Section 7 – Please include a discussion of how groundwater inflows to quarry voids will be managed. ○ Satisfied - See Section 11.4 and Table 35. ○ See Section 7– Refer to Dol Water’s Comments regarding a Water Access Licence. 	<p>Nil actions required, other than those set out in the Comments and General Comments below.</p>
<p>(b) Surface Water Management Plan, that includes:</p> <ul style="list-style-type: none"> • a detailed description of the surface water management system on site, including the: <ul style="list-style-type: none"> ○ clean water diversion systems; ○ erosion and sediment controls; ○ effluent irrigation system; ○ water transfers from the extraction areas; ○ water storages; and ○ discharge points; • design objectives and performance criteria for proposed: 	<p>Partial</p>	<ul style="list-style-type: none"> • Changes required for the surface water management system on site: <ul style="list-style-type: none"> ○ Satisfied – See Section 7.1, Section 5.2 and Figure 2. ○ See Section 9.3 – Please clarify how natural grasslands are managed. ○ Satisfied – See Section 4.5, no discharges are to occur offsite. ○ Satisfied – See Section 4.2 and Chart 1. ○ Satisfied – See Section 7 ○ Satisfied – See Section 4.5, no discharges are to occur offsite. • Design objectives and performance criteria require changes: <ul style="list-style-type: none"> ○ See Table 35: 	

Water Management Plan – DA 267-11-99 MOD 2 – Condition 42 Schedule 2	Satisfactory (Yes/No/Partial)	Comment	Action Required
<ul style="list-style-type: none"> ○ erosion and sediment control structures; ○ water storages, including quarry voids; ○ site discharges; and ○ control of water pollution from rehabilitated areas of the site; ● performance criteria, including trigger levels for investigating any potentially adverse impacts for surface water quality; ● a program to monitor: <ul style="list-style-type: none"> ○ the effectiveness of the water management system; ○ site discharge water quality; and ○ surface water level and quality in the Process Water Dam, including the quantification of rainfall inflow, groundwater inflow and evaporation; ● a plan to respond to any exceedances of the performance criteria, and mitigate and/or offset any adverse surface water impacts of the project; ● long term water quality management objectives and the measures to achieve these objectives; ● a plan that ensures surface stormwater runoff from the disturbed areas is directed to the sedimentation dam(s); ● a plan that ensures tailgate drainage does not discharge into or onto any adjoining public or Crown road, any other persons land, any Crown land, any river, creek or watercourse, any groundwater aquifer, any native vegetation as described under the Native Vegetation Conservation Act 1997 and any wetlands of environmental significance; ● a detailed description of design and construction criteria for the Process Water Dam based on a feasibility study of: 		<ul style="list-style-type: none"> - Row 5 – Please remove ‘dam wall failure’ as a performance trigger. The proposed triggers should allow for early identification of instability to prevent dam wall failure. - Please include performance and completion criteria relating to quarry voids. - Please include performance and completion criteria for water quality in water storages, including a plan to respond to any exceedances of the criteria. ● See Section 11 – The proposed once only monitoring of onsite dams is not acceptable to meet this condition. A program must be in place to monitor water quality in water storages. The Department recommends quarterly monitoring by an accredited lab for a two-year period. Following this period, monitoring frequency can be reviewed. ● Satisfied – Table 35 – Refer to comment above for additional inclusions in Table 35. ● Satisfied – See Section 7.5. ● Satisfied – See Section 4. ● Satisfied – See Section 7.6. ● Please include a detailed design and construction criteria for the Process Water Dam. 	

Water Management Plan – DA 267-11-99 MOD 2 – Condition 42 Schedule 2	Satisfactory (Yes/No/Partial)	Comment	Action Required
<ul style="list-style-type: none"> ○ capacity to construct multiple cells within the overall dam footprint (ie a two stage or three stage dam); ○ whether the dam floor and walls are able to be effectively lined with compacted clay (especially for multiple cells); ○ whether effective hydraulic separation can be achieved between such cells; ○ rehabilitating such cells to create a single dam within the final landform; and ○ the appropriateness of diverting runoff received from off-site around the dam; ● a strategy for the decommissioning of water management structures, including storage, sedimentation and leachate dams once extraction is complete; and ● audit and reporting procedures, including comparisons of the monitoring results each calendar year and quarterly reporting of surface water monitoring results; 		<ul style="list-style-type: none"> ● Satisfied – See Section 7.4 and Section 7.9. ● Satisfied See Section 11.4. 	
<p>(c) Groundwater Management Plan that takes into account the Web-based Reporting Guideline (DPE 2015) and Groundwater Monitoring and Modelling Plans – Information for Prospective Mining and Petroleum Exploration Activities (DPI 2014), and includes:</p> <ul style="list-style-type: none"> ● detailed baseline data on groundwater yield and quality in groundwater bores on privately owned land, that could be affected by the project; ● a program to undertake surveyed probe testing of all extracted areas where clay fines have been deposited to: <ul style="list-style-type: none"> ○ accurately determine the depth of extraction and depth of clay fines; 	Partial	<ul style="list-style-type: none"> ● Satisfied – See Section 5.4, Appendix C and Figure 9. Available baseline data presented. ● Further details required – Refer to DoI’s comments. 	

Water Management Plan – DA 267-11-99 MOD 2 – Condition 42 Schedule 2	Satisfactory (Yes/No/Partial)	Comment	Action Required
<ul style="list-style-type: none"> ○ identify any ongoing intersection or other interaction between clay fines and the regional groundwater aquifer; ○ identify any geotechnical characteristics of the emplaced clay fines which may pose risks to workplace safety or implementation of the process water dam design or the final landform; and ○ identify measures which can be successfully used in rehabilitating these areas; • a program to monitor potential groundwater quality impacts to the regional aquifer from receiving off-site runoff water in the Process Water Dam; • groundwater assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts, in accordance with the NSW Aquifer Interference Policy; • a program to monitor: <ul style="list-style-type: none"> ○ the impacts of the project on: <ul style="list-style-type: none"> - groundwater inflows to water storages; - any groundwater bores on privately-owned land that could be affected by the project; and ○ seepage from water storages or backfilled voids on site; • a plan to respond to any exceedances of the groundwater assessment criteria; • emergency contingency plans for implementation in the event that the groundwater is encountered during excavation; and • audit and reporting procedures, including comparisons of the monitoring results each 		<ul style="list-style-type: none"> • Refer to Dol's comments • Refer to Dol's comments. • Satisfied – See Section 6. • See Section 7 – Refer to Dol's comments. • See Section 7 – Refer to Dol's comments. • Satisfied – See Section 8. 	

Water Management Plan – DA 267-11-99 MOD 2 – Condition 42 Schedule 2	Satisfactory (Yes/No/Partial)	Comment	Action Required
calendar year and quarterly reporting of groundwater monitoring results			
The Applicant shall implement the approved management plan as approved from time to time by the Secretary.	-		
General comments:			
<ol style="list-style-type: none"> 1. Section 5.6.1 SWMP the phrase “the site would not overtop” is used, does this mean discharge or is it just describing a dam spilling? Please rephrase for clarity. 2. Section 9.3 SWMP “should” is used several times, replace with “will”. 3. SWMP – Please include an introductory paragraph that clarifies the scope of the project. Please discuss the scope of activities in the management plan in relation to the most recent approved MOD. Will the dam be separated with temporary walls? 4. Ensure the DoI Water’s comments are adequately addressed. 			

Groundwater Monitoring – DA 267-11-99 MOD 2 – Condition 43 Schedule 2	Satisfactory (Yes/No/Partial)	Comment	Action Required
The Applicant shall prepare a Groundwater Monitoring Program for the development to the satisfaction of the Secretary. This program must:			
(a) be prepared in consultation with DPI-Water and be submitted to the Secretary for approval within four months of the date of approval of Modification 2;	Yes	Evidence provided.	Nil actions required, other than those set out in the Comments and General Comments below.
(b) include proposed construction of a network of at least five active monitoring bores around the south-eastern, southern, western and north-western boundaries of the extraction area (but outside of the overall extraction footprint) in proximity to extraction Phases 1 to 6 as identified in Modification 2, to collect continuous groundwater level monitoring data from the regional aquifer;	Yes	Satisfied – See Section 3.	
(c) include proposed construction to deepen (or replace) PT84MW1 in order that a bore in that general location monitors the regional aquifer; and	Yes	Satisfied – See Figure 1 (MW1 replaced by MW7).	
(d) include proposed construction of active monitoring bores within the largest components of at least the two forthcoming extraction Phases (on a rolling basis), each to collect at least 2 years of continuous baseline groundwater monitoring data prior to extraction commencing with that Phase.	No	Refer to DoI's comments.	
General comments:			
<ol style="list-style-type: none"> 1. Figure 15 repeated, no Figure 16 please amend. 2. Ensure the DoI Water's comments are adequately addressed. 			

Landscape and Rehabilitation Management Plan – condition 60, Schedule 2	Satisfactory (Yes/No)	Comment	Action Required
The Applicant shall prepare a Landscape and Rehabilitation Management Plan for the development to the satisfaction of the Secretary. This plan must:			
a) be submitted to the Secretary for approval by 30 June 2017, unless otherwise agreed by the Secretary;	Yes	-	Nil actions required, other than those set out in the Comments and General Comments below.
b) provide details of the conceptual final landform and associated land uses for the site;	No	The conceptual final landform is reliant on the agree wet weather high groundwater level. This has not yet been approved.	
c) describe the short, medium and long-term measures that would be implemented to ensure compliance with the rehabilitation objectives and progressive rehabilitation obligations in this consent;	Yes	Sections 4.4 and 4.5.	
d) a detailed description of the measures that would be implemented over the next 3 years (to be updated for each 3 year period following the 3 years covered by the initial approval of the plan) including the procedures to be implemented for:			
• maximising the salvage of environmental resources within the approved disturbance area for beneficial reuse;	Yes		Nil actions required, other than those set out in the Comments and General Comments below.
• protecting vegetation and fauna habitat outside the approved disturbance area on-site;	Yes		
• minimising the impacts on native fauna;	Yes		
• landscaping the site to minimise visual and lighting impacts;	Partial	What is the timeframe for screening to be fully established?	
• reviewing improved pasture species and application rates;	Yes	Section 5.5	
• controlling weeds and feral pests;	Partial	Section 6.2.4 notes that ‘regular’ weed removal shall be conducted. Please specify the frequency of weed and pest inspections to determine if action is required.	
• controlling erosion;	Yes		
• controlling access; and	Yes		
• bushfire management;	Yes		
e) include a program to monitor and report on the effectiveness of these measures, and progress against the performance and completion criteria;	Yes		
f) include a mass balance calculation to ensure that appropriate volumes of material are available to implement the final landform as described in this plan;	Yes		
g) provide for the construction and maintenance of the process water dam in accordance with the approved design and construction criteria (see Condition 42(b));	No	Construction methodology of the process dam not provided.	
h) identify the potential risks to the successful rehabilitation of the site, and include a description of the contingency	Yes	Section 6.2	

measures that would be implemented to mitigate these risks; and			
i) include details of who would be responsible for monitoring, reviewing, and implementing the plan.	Yes	Section 11	
Other Comments			

OUT18/14628

Lisa Thomson
VGT Pty Ltd
PO Box 2335
GREENHILLS NSW 2323

Lisa@vgt.com.au

Dear Ms Thomson

**Roberts Road Maroota Sand Quarry - draft Groundwater Management Plan,
Groundwater Monitoring Program, Groundwater Study Report and Surface Water
Management Plan**

Thank you for providing copies of the following draft reports to the Department of Industry – Water (DoI Water) – formerly DPI Water - to review:

- Groundwater Management Plan (dated 21 September 2017)
- Groundwater Monitoring Program (dated 29 September 2017)
- Groundwater Study Report (dated 4 October 2017)
- Surface Water Management Plan (dated 11 October 2017).

DPI Water has previously reviewed the draft Groundwater Study Report (our letter dated 31 March 2017); Surface Water Management Plan (our letter dated 4 April 2017) and Groundwater Monitoring Program (our letters dated 26 September 2016 and 31 October 2016).

DoI Water has reviewed the current draft reports and provides the following recommendations below and detailed comments in Attachment A.

Prior to approval

Groundwater Management Plan

DoI Water recommends that before approval of the Groundwater Management Plan (GMP), the proponent is to submit a further updated version of the GMP:

1. Including an explanation of how the EC and pH trigger values in Table 17 were derived.

2. Include definitive time frames within the Trigger Action Response Plan (Table 19) for the “Response Action” and “Evidence of Responsive Effectiveness” categories.
3. Clarification is required of the geotechnical qualities (particularly the permeability / porosity in terms of prevention of water ingress to infill areas) of the clay fines and infill material.
4. Any hazards presented by the clay fines are to be identified and discussed in relation to ongoing operations.
5. Measures of rehabilitation need to be identified and the rehabilitation plan outlined.
6. Provide previously requested information / figures, as follows.
 - a. A diagrammatic plan of the regional elevations for the Hawkesbury Sandstone palaeo-topography.
 - b. A diagrammatic (contour) plan of the thickness (isopach) and regional elevations for the top surface of the Maroota Tertiary Sands palaeochannels.
 - c. A diagrammatic (contour) plan of the regional elevations for the perched water tables.
 - d. A diagrammatic (contour) plan of the thickness (isopach) and regional elevations for the top surface of occurrences of the confining clay aquitard.
 - e. A diagrammatic (contour) plan of the thickness (isopach) and regional elevations for the top surface of occurrences of the Hawkesbury Sandstone eluvium.

For expediency in reviewing and to meet due diligence obligations, it is recommended that the proponent includes the required information in an updated document and provides the revised version to DoI Water.

Groundwater Monitoring Program

DoI Water recommends that before approval of the Groundwater Monitoring Program the proponent is to provide:

1. a copy of Figure 16 (not included in the current Groundwater Monitoring Program report – Figure 15 was included twice), and
2. a production schedule plan showing monitoring bore locations, wet weather high groundwater levels (Maroota Sands and Hawkesbury Sandstone – eluvium regional groundwater table), perched groundwater levels, and flow contours.

Groundwater Study Report

DoI Water recommends that the Groundwater Study Report be revised in conjunction with the Groundwater Management Plan and the two be reconciled concurrently. The Groundwater Study Report needs to include the following information.

1. A detailed discussion of the hydrogeological / geological units intersected in drilling and mining operations on site.
2. Hydrogeology discussion to be bolstered by the inclusion of previously requested information / figures, as listed below.
 - a. A diagrammatic contour plan of the regional elevations for the Hawkesbury Sandstone palaeo-topography.
 - b. A diagrammatic contour plan of the thickness (isopach) and regional elevations for the top surface of the Maroota Tertiary Sands palaeochannels.

- c. A diagrammatic contour plan of the regional elevations for the perched water tables.
 - d. A diagrammatic contour plan of the thickness (isopach) and regional elevations for the top surface of occurrences of the confining clay aquitard.
 - e. A diagrammatic plan of the thickness (isopach) and regional elevations for the top surface of occurrences of the Hawkesbury Sandstone eluvium.
3. A discussion on the wet weather high water table and how it is being derived across the site. DoI Water note that there is a brief discussion on this matter in the Groundwater Management Plan but similar comments are not included in the Groundwater Study Report. The two reports need to be reconciled concurrently, updated and revised versions resubmitted to DoI Water.
 4. A discussion of the resources for mining from present day onwards, detailing information about the lithology, extents, depths and thickness of the target resource across the entire site and stages of mining in context to the identified water tables (both regional and perched), including appropriate maps or diagrammatic plans such as:
 - a. A contour map of the surface topography of proposed maximum mining depth across the quarry site.
 - b. A contour plan of the proposed post-mining rehabilitated topography.
 5. Short relevant discussions in relation to the geotechnical properties of, and any hazards presented by the clay fines / infill material identified, and discussed in relation to ongoing operations, back filling operations and effectiveness as a water ingress seal.
 6. Measures of rehabilitation need to be identified and rehabilitation plan briefly outlined.
 7. A brief discussion on the predicted impact upon groundwater level by the proposed closure and rehabilitation of the quarry site as currently planned.

For expediency in reviewing and to meet due diligence obligations, it is recommended that the proponent include the required information in an updated document and provide the revised version to DoI Water.

A timeframe of three month is proposed for the updated version of the Groundwater Study. The requirements on information noted above have been requested several times by now and must be addressed.

The update of the groundwater study will be concurrent to a regional hydrogeological study of the Maroota area proposed by DoI Water in the next three months. The aim of the regional study is to provide a uniform hydrogeological conceptualisation across the area that would be referred to by all proponents. Data collected and compiled by Hodgson Quarry will assist in the regional assessment. Contacts will be made with Hodgson Quarry to discuss data.

Not required prior to approval

DoI Water encourages the proponent to increase their knowledge of joints, fractures and any faults which occur throughout their operational area within the underlying Hawkesbury Sandstone aquifer.

DoI Water notes that detailed information of the water levels and pumping records for PT84PB1 and PT84PB2 were requested by DPI Water. DoI Water considers that the detailed pumping records should be provided and discussed as a component of the Site Water Balance, itself a component of the Water Management Plan. The Water Management Plan is expected to be provided for review in the near future.

Surface Water Management Plan

- The SWMP is updated to reflect the DoI Water's most recent name change
- Figure 10 should identify which dams are the sediment dams
- The SWMP should clarify if water loggers have been installed in each of the dams on the site, and if not it should explain why this has not occurred.
- Ongoing monitoring of water levels in dams must be a component of the SWMP to inform the Site Water Balance
- The proponent should contact WaterNSW for the proposed transfer of the required allocation of the current water licence on Lot 2 DP228308 for 'irrigation' to Lot 1 DP228308 (where Dam 1 is located), as WAL dealings are dealt with by WaterNSW.
- The SWMP should explain what the quarry intends to do during periods when there isn't enough water and clarify if the quarry proposes to stop processing during these periods.
- erosion and sediment control monitoring is also undertaken within 24 hours of expected rainfall and within 18 hours of a rainfall event of sufficient intensity and duration to cause runoff on-site
- the water quality of all on-site dams is sampled over 12 months -2 years on a 3 monthly basis to pick up any seasonal variation within the dam water to determine if there is any relationship to groundwater

In relation to groundwater related issues, a DoI Water hydrogeologist can be made available should a meeting or further discussion be required.

For further information please contact Irene Zinger on e: irene.zinger@dpi.nsw.gov.au while Janne Grose is away on a 12 month secondment.

Yours sincerely



Irene Zinger
Manager
Regulatory Operations – Metro
Water Regulation

30 January 2018

Roberts Road Maroota Sand Quarry - draft Groundwater Management Plan, Groundwater Monitoring Program, Groundwater Study Report and Surface Water Management Plan

The Department of Industry – Water (DoI Water) – formerly DPI Water has reviewed the following draft reports:

- Groundwater Management Plan (dated 21 September 2017)
- Groundwater Monitoring Program (dated 29 September 2017)
- Groundwater Study Report (dated 4 October 2017)
- Surface Water Management Plan (dated 11 October 2017)

and provides the following comments:

Groundwater Management Plan and Groundwater Monitoring Program

Conceptual Hydrogeology

Clarification of the three dimensional conceptual hydrogeology of the site has been provided in the form of the requested hydrogeological cross-sections and a discussion of the hydrogeology and existing data. This supplementary information supports the design, location and construction details for the proposed monitoring bores that the Proponent has installed.

Report Formatting

Some minor formatting and figure reference sequencing issues were noted (including the submission of a second Figure 15 instead of the referenced Figure 16) in the documents.

Statement of Approval

Provisional approval of the updated Groundwater Monitoring Program can be considered, provided several diagrams are submitted to L&W promptly.

However, the updated Groundwater Management Plan requires further clarification and provision of outstanding information previously requested.

Outstanding Matters

Groundwater Monitoring Program

DPI Water previously provided comments on the draft Groundwater Monitoring Program, Modification 2 (OUT16/46966, Sept. 2016) in which further information was requested to be provided by the proponent. Some of this requested information is mis-referenced in the document or remains outstanding.

The Groundwater Monitoring Program references a 'Figure 16', however there are two 'Figure 15's in the document and 'Figure 16' is missing.

Although a production schedule plan has been presented in the Groundwater Management Plan, it has not been presented in the context of plotted monitoring bore wet weather high groundwater levels (including perched levels) and flow contours in the Groundwater Monitoring Program document. Prompt provision of such a plot would greatly assist in understanding the production plan and potential groundwater interactions and monitoring as the quarry progresses.

A number of maps or plans of the thickness and regional elevations for; the perched water tables, confining clay aquitard and Hawkesbury Sandstone eluvium, have previously been requested by DPI Water (OUT16/46966, Sept. 2016). These have not been presented in the Groundwater Monitoring Program; however presentation of some of the information relating to these has been included in the encompassing updated Groundwater Management Plan.

Groundwater Management Plan

The Groundwater Management Plan requires further clarification regarding the derivation of electrical conductivity (EC) and pH trigger values in Table 17. A detailed discussion is needed to demonstrate their applicability and provide confidence that any adverse impacts of the quarrying will be recognised and responded to.

Further, the Trigger Action Response Plan (Table 19) would benefit from the inclusion of definitive time frames for the “Response Action” and “Evidence of Responsive Effectiveness” categories. These timeframes should be meaningful so that the responses can be implemented in a timely fashion, on-site impacts are appropriately managed and off-site impacts are prevented.

The proponent is to provide the above requested information as listed in the following recommendations as a further updated Groundwater Management Plan, within 3 months.

Dol Water response to the proponent response on the Conditions of Approval

CoA SCHEDULE 2, SOIL AND WATER	Proponent Response	Dol Water Comment
<i>(c) Groundwater Management Plan that takes into account the Web-based Reporting Guideline (DPE 2015) and Groundwater Monitoring and Modelling Plans – Information for Prospective Mining and Petroleum Exploration Activities (DPI 2014), and includes:</i>		
• <i>detailed baseline data on groundwater yield and quality in groundwater bores on privately-owned land, that could be affected by the project;</i>	Section 5.4; Table 10, Table 11, associated discussion.	Satisfactory.
• <i>a program to undertake surveyed probe testing of all extracted areas where clay fines have been deposited to:</i>	Section 4.5, 7.	Satisfactory.
o <i>accurately determine the depth of extraction and depth of clay fines;</i>	"A probing survey conducted in September 2017 established the depth of to the top of sediment in Process Dam 1, finding that the water depth over most of the area of Dam 1 is between 0.1m and 0.7m, with a small localised area of greater water depth around the water supply pump inlet, where water depth reached a measured maximum of 2.935m."	Satisfactory. Process Dam 1 survey acknowledged, water level survey acknowledged for other dams - no other information on survey or survey of depth of fill in other dams was presented.

CoA SCHEDULE 2, SOIL AND WATER	Proponent Response	DoI Water Comment
<i>o identify any ongoing intersection or other interaction between clay fines and the regional groundwater aquifer;</i>	"Most of Process Dam 1 has a base elevation in the range 187.1 to 187.6 mAHD, with the deepest measured point near the pump inlet being at 184.8 mAHD. This compares with the current (September 2017) wet weather high regional groundwater level for the Maroota Sands aquifer of 184.6 to 184.7 mAHD beneath Process Dam 1." " The unnamed former tailings storage area contains only a small volume of superficial water, and is essentially dry most of the time."	Satisfactory. Process Dam 1 survey acknowledged, water level survey acknowledged for other dams - no other information on survey or survey of depth of fill in other dams was presented.
<i>o identify any geotechnical characteristics of the emplaced clay fines which may pose risks to workplace safety or implementation of the process water dam design or the final landform; and</i>	"The results of laboratory analysis for major ion composition are presented in Table E1 in Appendix E. EC and pH trends for all bores and the site dams are shown graphically on Figure 10." Section 4, 5, 6, 7.	Unsatisfactory. No geotechnical qualities of clay fines discussed or hazards identified. Clarification of this aspect of the operation is required.
<i>o identify measures which can be successfully used in rehabilitating these areas;</i>		Unsatisfactory. No measures of rehabilitation identified or rehabilitation discussed. Further detail needs to be provided.
• <i>a program to monitor potential groundwater quality impacts to the regional aquifer from receiving off-site runoff water in the Process Water Dam;</i>	Sections 6.2, 7, 8.1.	Unsatisfactory. A discussion of how the EC and pH trigger values were derived needs to be provided.
• <i>groundwater assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts, in accordance with the NSW Aquifer Interference Policy;</i>	Tables 14, 15, 16, 19; Section 6.4.	Satisfactory.
<ul style="list-style-type: none"> • <i>a program to monitor:</i> <i>o the impacts of the project on:</i> - <i>groundwater inflows to water storages;</i> - <i>any groundwater bores on privately-owned land that could be affected by the project; and</i> <i>o seepage from water storages or backfilled voids on site;</i> 	Section 6.	Satisfactory.
• <i>a plan to respond to any exceedances of the groundwater assessment criteria;</i>	Sections 6, 7.	Unsatisfactory. Specified timeframes for the "Action Response" need to be provided as part of the TARP.

CoA SCHEDULE 2, SOIL AND WATER	Proponent Response	DoI Water Comment
• <i>emergency contingency plans for implementation in the event that the groundwater is encountered during excavation; and</i>	Section 7.	Unsatisfactory. Specified timeframes for the “Action Response” need to be provided as part of the TARP.
• <i>audit and reporting procedures, including comparisons of the monitoring results each calendar year and quarterly reporting of groundwater monitoring results,</i>	Section 8 - restates criteria.	Satisfactory.
<i>The Applicant shall implement the approved management plan as approved from time to time by the Secretary.</i>		

<i>Groundwater Monitoring</i>		
<i>43. The Applicant shall prepare a Groundwater Monitoring Program for the development to the satisfaction of the Secretary. This program must:</i>	This plan.	Satisfactory.
<i>(a) be prepared in consultation with DPI-Water and be submitted to the Secretary for approval within four months of the date of approval of Modification 2;</i>	Previous draft Monitoring Program, comments supplied by DPI Water.	Satisfactory.
<i>(b) include proposed construction of a network of at least five active monitoring bores around the south-eastern, southern, western and north-western boundaries of the extraction area (but outside of the overall extraction footprint) in proximity to extraction Phases 1 to 6 as identified in Modification 2, to collect continuous groundwater level monitoring data from the regional aquifer;</i>	Section 3. Current: 9 monitoring bores. Placement shown on figures provided, Table 4, Figure 2.	Satisfactory.
<i>(c) include proposed construction to deepen (or replace) PT84MW1 in order that a bore in that general location monitors the regional aquifer; and</i>	Section 3. Table 4, Figure 2. MW7 installed adjacent to monitor regional groundwater level in Hawkesbury Sandstone.	Satisfactory.
<i>(d) include proposed construction of active monitoring bores within the largest components of at least the two forthcoming extraction Phases (on a rolling basis), each to collect at least 2 years of continuous baseline groundwater monitoring data prior to extraction commencing with that Phase.</i>	Sections 3, 4, and 5.	Unsatisfactory. Difficult to judge as no groundwater data was presented overlaid on the production schedule plan. A production schedule plan showing monitoring bore location and wet weather high groundwater level needs to be provided.

CoA SCHEDULE 2, SOIL AND WATER	Proponent Response	Dol Water Comment
<p><i>44. The results of the Groundwater Monitoring Program shall be reported the Department and DPI-Water, using contour plans depicting the surface topography, updated contour maps of the wet weather high groundwater level of the regional aquifer and proposed depth of extraction for each extraction Phase. Reporting is to occur on a six monthly basis for the duration of extractive operations, and throughout rehabilitation of the site, unless otherwise agreed with the Secretary.</i></p>	<p>Section 6 Reporting, reiterates criteria.</p>	<p>Satisfactory.</p>
<p><i>The Applicant shall implement the Groundwater Monitoring Program as approved from time to time by the Secretary.</i></p>		

Proponent Responses to DPI Water comment

DPI Water Response	Proponent Response to DPI Water comment	Dol Water Comment
<p>Prior to approval:</p>		
<p>1 Detailed cross-sections through the site in a north-south and east-west orientation and along the longest groundwater pathway as guided by the regional groundwater contours for the site.</p>	<p>Appendix C Cross-sections. "Five cross-sections have been prepared to illustrate the relationship between the observed groundwater levels in the monitoring bores. Cross-sections BB' and CC' have been extended to include relevant information from the adjacent PF Formation quarry to the west of the Roberts Road quarry."</p>	<p>Satisfactory.</p>
<p>2 Provide a clearer surface topography contour map in A3 format.</p>	<p>Figure 1 and 2 - Surface Contours and Quarry Status at June 2016 and Bore locations respectively.</p>	<p>Satisfactory. The surface contour maps provided are clear and of sufficient detail to enable enlargement without loss of clarity in the PDF format provided. Sufficient for purpose.</p>

DPI Water Response	Proponent Response to DPI Water comment	Dol Water Comment
3 Provide a map of the extent and thickness of the Maroota Sands palaeochannel on site including the top and bottom elevations.	Palaeochannel extent shown on wet weather high groundwater level plans.	Satisfactory. The requested plan has not been presented as such. However the data has been presented in cross sections and the wet weather groundwater level plans. From the data presented in the sections it is evident that not all drill holes are fully penetrating and therefore the control on the lower bound of the Maroota Sands is less than desired. The information presented is sufficient for its purpose.
4 Provide a map of the extent and thickness of the:		
a. Maroota Sands palaeochannel on site including the top and bottom elevations.	as above	Satisfactory. The requested plan has not been presented as such. However the data has been presented in cross sections and the wet weather groundwater level plans. From the data presented in the sections it is evident that not all drill holes are fully penetrating and therefore the control on the lower bound of the Maroota Sands is less than desired. The information presented is sufficient for its purpose.
b. clay confining layer identified on site at elevation ~183m AHD (including the top and bottom elevations).	Confining clay layer extent has not been shown on any plans or cross sections. Location of some perched water tables is indicated on a number of sections.	Satisfactory. The requested plan has not been presented as such. However related perched water table level data has been presented on a number of cross sections. From the data presented in the sections and the drill logs it is evident that not all of the limited number of drill holes penetrate the clay aquitard and therefore the control on the positioning of the clay aquitard is less than desired. The information presented is sufficient for its purpose.
c. Hawkesbury eluvium identified on site (including the top and bottom elevations).		Unsatisfactory. Information pertaining to the Hawkesbury eluvium has not been presented. This information needs to be provided.
5 Provide a map of the extent and surface topography of the underlying Hawkesbury Sandstone.		Unsatisfactory. No map of the palaeo-topography for the Hawkesbury Sandstone has been presented. This information needs to be provided.

DPI Water Response	Proponent Response to DPI Water comment	Dol Water Comment
6 Provision of all borelogs and surveyed locations for all existing boreholes on site including historical bores since destroyed by mining.	APPENDIX A BORE LOGS – SITE MONITORING BORES AND PRODUCTION BORES	Satisfactory.
7 Provision of groundwater contour maps for the:		
a. perched aquifer within the Maroota Sands Aquifer above the confining clay layer.		Satisfactory. Not presented. This data has been presented in cross sections. The information is sufficient for its purpose. However clarity on this matter would be better achieved by provision of the requested contour plot.
b. aquifer within the Maroota Sands and Hawkesbury Eluvium Aquifers beneath the confining clay layer.	"Wet weather High Groundwater Level Hawkesbury Sandstone" plan - Figure 8 and "Wet Weather Groundwater level Maroota Sands" plan - Figure 7	Satisfactory.
c. fractured Hawkesbury Sandstone Aquifer.	APPENDIX A BORE LOGS – SITE MONITORING BORES AND PRODUCTION BORES	Bore logs provided indicated the drill method was insufficient to enable the collection of fracture information within the sandstone. Hence L&W recognise that this information is not readily available. L&W encourage the proponent to increase their knowledge of this aspect of the aquifer.
These maps may be derived by the use of a groundwater model suitable for the task and provided after drilling.		
8 Provision of and analysis of historical pumping records from bores PT84PB1 and PT84PB2.	Water levels within PT84PB1 and PT84PB2 discussed - Hawkesbury Sandstone regional aquifer.	Unsatisfactory. This information was not provided. Water levels within PT84PB1 and PT84PB2 discussed - Hawkesbury Sandstone regional aquifer. (NOTE: pumping records should be provided and discussed as a component of the Site Water Balance).
9 All proposed boreholes to be drilled by a suitably qualified driller.	Ultra Drilling Waterbores.	Satisfactory.
10 All bores to be logged and monitoring bores on site to be designed by a suitably qualified and experienced groundwater consultant.	"The Secretary approved the appointment of Peter Dundon of Dundon Consulting Pty Ltd on 5th April 2016 for the preparation of the GWMP." "Approval was also received from DPI-Water on 10th May 2016."	Satisfactory.

DPI Water Response	Proponent Response to DPI Water comment	DoI Water Comment
<p>11 DPI Water considers that there are an insufficient number of clustered bores targeting multiple aquifers. The Proponent should consider this recommendation and discuss this with DPI Water.</p>	<p>DPI-Water provided initial advice on the draft of a Groundwater Monitoring Program (GMP) which forms a component of the GWMP, by letter dated 26th September 2016. A meeting was held with DPI-Water in their Parramatta offices on 24th October 2016 in relation to this draft GMP, and discussion of further groundwater studies including the installation of additional monitoring bores. The broad scope of additional studies was agreed to by DPI Water at that meeting. Further correspondence resulting from the outcomes of this meeting was provided by DPI-Water on 31st October 2016, 22nd November 2016 and 31st March 2017. Consultation in relation to the Groundwater study Report is ongoing.</p>	<p>Satisfactory.</p>
<p>12 Consultation with DPI Water Hydrogeologists to ensure a sufficient groundwater monitoring program is in place for the site for ongoing monitoring until 2025.</p>	<p>An email from the DP&E on 14th October 2016 provided comments on all Management Plans submitted thus far, including the GMP. Locations of the proposed new bores were approved.</p> <p>The draft Groundwater Monitoring Program (Dundon, 2016) submitted on 16 August 2016 was approved by DP&E by letter dated 28 November 2016 (see Appendix F).</p> <p>The Groundwater Study Report (Dundon, 2017) submitted on 24 February 2017 is still the subject of ongoing consultation with DPI Water.</p> <p>Copies of other relevant agency correspondence relating to either the Groundwater Study Report or the Groundwater Monitoring Program are also included in Appendix F.</p>	

DPI Water Response	Proponent Response to DPI Water comment	Dol Water Comment
13 Provide a detailed analysis of evapotranspiration and recharge on site.	Sections 4.6 and 5.4.3.	Satisfactory. Ongoing monitoring of rainfall/ recharge and evapotranspiration on site must be a component of the surface water management plan to inform the Site Water Balance.
14 Provide a complete water balance for the site that considers the water volumes in the dams, run off and any water supplementation from bores or other water supply sources.	"This report is intended to satisfy part (c) of Condition 42 of the March 2016 consent (NSW Department of Planning and Environment, 2016). It forms part of the overall Water Management Plan, which comprises three components, viz a Site Water Balance, a Surface Water Management Plan, and a Groundwater Management Plan. The Site Water Balance and Surface Water Management Plan have been included in VGT (2017), hereinafter referred to as "SWMP". This report is the Groundwater Management Plan."	Satisfactory.
15 Monitoring of water levels in the dams.	Survey during September 2017.	Satisfactory. Ongoing monitoring of water levels in dams must be a component of the surface water management plan to inform the Site Water Balance.
16 Proponents Groundwater Consultant to liaise with DPI Water Hydrogeologists who will be made available for a meeting to discuss the existing issues and recommendations.	As per points 11 and 12.	Satisfactory.

Groundwater Study Report

The draft Groundwater Study Report (dated 24 Feb 2017) was previously reviewed by DPI Water. The previous groundwater advice within the DPI Water submission (dated 31 March 2017) made a number of recommendations for the proponent to follow up on. Some, but not all, of these recommendations have been satisfactorily included in the revised current version of the Groundwater Study Report (dated 4 Oct 2017).

Dol Water find the Groundwater Study Report to be limited in content and it does not demonstrate a clear understanding of the hydrogeology at Hodgson Quarry and Plant Pty Limited Roberts Road sand quarry operations. Further recommendations to improve the Groundwater Study Report are provided in the covering letter.

DPI Water Recommendations	Proponent Response to DPI Water	Dol Water Comment
1. Additional detailed cross-sections through the site should be provided to DPI Water, and improvement of existing cross-sections is required to clearly show lithological differences, and a complete set of bore logging sheets need to be provided, as depicted on Figures 9, 10 and 11.	"Five cross-sections have been prepared to illustrate the relationship between the observed groundwater levels in the monitoring bores." "Bore logs are presented for all bores in Appendix A. Logs for the DPI-Water bores are presented in Appendix B."	Satisfactory. Major lithologies are identified on sections - minor critical clay lithologies are not identified at scale of diagrams. Notable seepage and groundwater table levels have been identified.
2. The Proponent should provide a map of the resources proposed as targets of mining from present day onwards. Detailed information about the lithology, extents, depths and thickness of the target resource is to be provided for the entire site and stages of mining are to be discussed. Contour maps of the surface topography of proposed maximum mining depth everywhere on site as well as post-mining rehabilitated topography are also to be provided.		Unsatisfactory. The requested maps have not been provided. The planned ongoing development is to be discussed in terms of the interaction with the various identified water tables, including the 'perched' water tables. The proponent is to provide the requested diagram in a revision of a further updated Groundwater Study Report and a copy of an updated Groundwater Management Plan.
3. Consultation with DPI Water Hydrogeologists is required to ensure a sufficient groundwater monitoring program is in place for the site for ongoing monitoring until 2025.	Groundwater Monitoring Plan.	Satisfactory. A Dol Water Hydrogeologist will be made available for a meeting or discussion of the site conceptual hydrogeology and recommendations if requested.
4. Monitoring of water levels in the dams using loggers.	"Dataloggers have now been installed in all monitored bores as well as on the Process Water Dam 1, Tailings Dam, Nursery Dam 3 and Farm Dam 4. The dataloggers have all been set to record water level at hourly intervals, so that both longer term fluctuations and diurnal	Satisfactory.

DPI Water Recommendations	Proponent Response to DPI Water	Dol Water Comment
	fluctuations (if any) can be detected, as well as any relationship between the fluctuating water levels in the Process Dam and Tailings Dam, and the nearby monitoring bores."	
5. The Proponents Groundwater Consultant should liaise with DPI Water Hydrogeologists who will be made available for a meeting to discuss the site conceptual hydrogeology and recommendations.		Satisfactory. A meeting was held between the parties, 24 October 2016. A Dol Water Hydrogeologist will be made available for a meeting or discussion of the site conceptual hydrogeology and recommendations if requested.
There is still uncertainty with regards to the conceptual hydrogeology. - The latest information provided does not provide certainty as to the pre-mining, present day and post mining wet weather high water table to enable a proper assessment of the conditions on site.		Unsatisfactory. There is no discussion on the wet weather high water table or how it is derived in the Groundwater Study Report. There is more discussion on this matter in the Groundwater Management Report than found in the Groundwater Study Report. The two reports need to be reconciled concurrently, updated and revised versions resubmitted to Dol Water.
- The Proponent appears to reference all water above the Hawkesbury Sandstone Basement as "perched groundwater". This diminishes the significance of a regional groundwater table in the Maroota Tertiary Sands Groundwater Source, for the establishment of maximum mining depths (which is to extend no deeper than within two metres of the wet weather high groundwater level at any location).	"Groundwater is present within the Maroota Sands and the underlying Hawkesbury Sandstone. Groundwater in each of these two formations is regionally extensive and forms a regional water table in each. Localised groundwater is also present in perched aquifers within the Maroota Sands, as well as on top of or within the Hawkesbury Sandstone, above the regional water tables. Thus, localised groundwater may be intersected at a number of elevations above the regional water table levels."	Satisfactory.
- The wet weather water table is variable across the site and what the Proponent terms as a "perched Maroota sands water table in a desaturated zone" is regarded by DPI Water to be a regional Maroota Sands aquifer water table	"Groundwater levels in both units (Maroota Sands and Hawkesbury Sandstone) display fluctuations that relate to episodic recharge associated with major rainfall events. The recharge response are particularly marked in the Maroota Sands." " MW2 became blocked in early 2000	Satisfactory. The proponent response is duly noted and is valid to the data presented. Dol Water recognise that the measurements are limited to sporadic data over an extended time for the region and locality, this hampers the recognition of pre-mining groundwater levels

DPI Water Recommendations	Proponent Response to DPI Water	Dol Water Comment
<p>that has already been significantly lowered by mining activities relative to baseline conditions that existed pre-mining. MW2 water levels (203 m AHD) suggest a much higher baseline regional water level than the present water level at MW5 and MW8 (193 m AHD).</p>	<p>by an obstruction above the water level in the bore, and was not able to be monitored thereafter." Hence MW2 is considered unreliable. "The deepest reported intersections of Maroota Sands were at MW6, MW10 and MW11, where the top of the Hawkesbury Sandstone was encountered at <173.5 mAHD, 168.1 mAHD and 164 mAHD respectively. At these locations, the water level in the Maroota Sands on 24 August 2017 was at elevations of 185.3 mAHD, 185.7 mAHD and 184.0 mAHD respectively. All three water levels are lower than the current water level in the main process area dam (Dam 1), where the water level on the same date was 188.1 mAHD. Similar water levels were reported from previous monitoring bores MW3 and MW4 before they were destroyed by the quarry expansion. These water levels in these five bores are believed to be true reflections of the regional water table level within the Maroota Sand aquifer. Elsewhere on the site, groundwater levels within the Maroota Sands formation are elevated, in the range 192 mAHD to 206 mAHD. In some locations, the perched water levels may be further elevated due to leakage from the various dams on the property."</p>	<p>and or any lowering of regional groundwater table. Recognition of groundwater levels for both regional (within the Maroota Sands and Hawkesbury Sandstone), and those of a 'perched' nature is reflecting the current situation as seen at the time of writing.</p>
<p>- The Proponent suggests that the extent of the saturated Maroota Sands is limited towards the west by the depiction of a red line on Figure 19. However multiple Maroota Sand screened bores show a standing water level reading in the western "desaturated zone". DPI Water would like some clarification justifying the suggestion and clarity about whether this desaturation was</p>	<p>Topographically and palaeo-topographically the bores both to the west and south of the depicted saturated Maroota Sands zone are significantly elevated to those within the saturated Maroota Sands zone. Standing water level in the bores to the west and south of the saturated Maroota Sands zone indicate discrete perched aquifers (with dry intervals between as indicated on cross sections) at levels above the regional Maroota Sands groundwater table.</p>	<p>Satisfactory.</p>

DPI Water Recommendations	Proponent Response to DPI Water	Dol Water Comment
<p>present pre-mining and to address the contradiction.</p>		
<p>- The submitted document could benefit from further clarification by the provision of further detailed hydrogeological cross-sections in other orientations. Seepages in Maroota sands were noted at elevations immediately to the west of the main dam that were higher than current dam water levels. Historical data suggests that Maroota Sands water levels were significantly higher than existing water levels. The drawdown could be attributed to water supply dewatering, evaporation from the capillary zone or evaporation from open water on the dams.</p>	<p>"Five cross-sections have been prepared to illustrate the relationship between the observed groundwater levels in the monitoring bores." "There is evidence for seepage from at least one of the site dams. All dam water levels are higher than the nearby groundwater, and seepage from the dams may account for some of the observed perched groundwater within the site." "A persistent seepage zone has been observed in the active quarry about 120m east of Dam 4 (Farm Dam), at the location marked "Seepage" on Figure 2, close to the edge of Tailings Dam 2. This seepage is observed at an elevation of approximately 195 mAHD, ie about 18m lower than the Dam 4 water level and about 7m higher than the water level in Dam 2. The seepage has been observed to dry up whenever water is pumped for an extended period from Dam 4 causing the water level in Dam 4 to be lowered, indicating a clear connection between the dam and the seepage."</p>	<p>Satisfactory.</p>
<p>DPI Water finds the report inadequate towards determining the location of the wet weather high groundwater table on site and requires further information.</p>		<p>Unsatisfactory. There is no discussion on the wet weather high water table or how it is derived in the Groundwater Study Report. There is more discussion on this matter in the Groundwater Management Report than found in the Groundwater Study Report. The two reports need to be reconciled concurrently, updated and revised versions resubmitted to Dol Water.</p>

Surface Water Management Plan

DPI Water Comment	Proponent Response to DPI Water	DoI Water Comment
Section 1 of the SWMP indicates a portion of clean water from the undisturbed areas and properties adjacent to the quarry enters the main quarry area. Clean water runoff should be diverted away from the quarry area. The SWMP should clarify if it is possible to divert this clean water around the site so it does not enter the quarry.	Section 2.4.6 Section 4.1 and Section 7.4	Section 4.1 confirms it is not physically possible to divert the clean water around the site due to the topography.
It is suggested the heading for Section 2.3.2 'National Office of Water (NOW)' is amended to 'DPI Water'.	Whole Document	It is noted the whole management plan has been amended to refer to DPI Water. DPI Water has since become DoI Water. It is suggested the SWMP is updated to reflect the department's most recent name change.
It is recommended Section 2.3.2 includes licensing details on all the dams on the site.	Section 2.4.6	Noted.
It is noted there are aspects of groundwater monitoring in the SWMP. Aspects of the hydrogeology on the site are yet to be finalised.	Groundwater aspects have been removed from this report and are covered in the GWMP	Noted.
The SWMP needs to include a figure which shows the location of the bores listed in Table 2 including the location of the groundwater bore (GW102451). It is unclear where this bore is located.	Groundwater aspects have been removed from this report and are covered in the GWMP	Noted.
Table 2 indicates the WAL for 10CA114819 and 10CA104888 expired in February 2016. The SWMP needs to clarify if current approvals are held.	Table 5 Groundwater aspects have been removed from this report and are covered in the GWMP	Noted
Section 2.5 makes reference to email correspondence from the DPI on the '14 October 2016'. This needs to be amended to the '10 October 2016 (see page 13).	Reference deleted Groundwater aspects have been removed from this report and are covered in the GWMP. No reference to SWMP in correspondence	Noted

DPI Water Comment	Proponent Response to DPI Water	DoI Water Comment
<p>Section 4.1 notes surface water collected over properties east of Roberts Road enters the site via a road culvert. It indicates this catchment is approximately 10 Ha and is considered clean and is diverted into Dam 1. As water from Dam 1 is used for processing a Water Access Licence (WAL) is required.</p>	<p>Section 2.4.6 Section 4.1 and Section 7.4</p>	<p>As clean water is diverted into Dam 1 and it is used in the quarry processing, a WAL will be required for the use of this water.</p>
<p>The collection of dirty water in dams or sediment ponds for a water supply is exempt from requiring a licence under the Water Management (General) Regulation 2011. The collection of clean water from undisturbed areas in dams to provide a water supply is not exempt and is not supported by DPI Water unless it is in accordance with an appropriate WAL and a nominated work. If clean water is being collected, then the proponent must liaise with DPI Water to ensure appropriate licences are held.</p>	<p>Section 2.4.6 Section 4.1 and Section 7.4</p>	<p>Section 2.4.6 confirms that Dam 1 receives clean water from the property next door and the dam is used to feed the processing plant. The SWMP indicates the proponent intends to investigate the transfer of the required allocation of the current water licence on Lot 2 DP228308 for 'irrigation' held by Mr Leonard Martin (the landowner) to Lot 1 DP228308 (where Dam 1 is located) for works where Mr Martin is also the landowner. The proponent is advised to contact WaterNSW on this issue, as WAL dealings are dealt with by WaterNSW.</p>
<p>Groundwater Inflows. The pumping bores need to be metered.</p>	<p>Groundwater aspects have been removed from this report and are covered in the GWMP.</p>	<p>Noted</p>

DPI Water Comment	Proponent Response to DPI Water	DoI Water Comment
<p>The SWMP needs to clarify if the quarry discharges water off site. Section 4.5 states “no discharge off-site has occurred recently” but this is not consistent with:</p> <ul style="list-style-type: none"> • Section 4.6 which states “at present the site does not discharge water off site” • Section 7.6.5 which states “no discharge of water off-site has occurred to date” <p>It is suggested the SWMP clarifies if any off-site discharge has occurred. It would appear from Section 7.6.5 that no offsite discharge has occurred. If off site discharge has occurred, Section 4.5 needs to include details such as when off-site discharge occurred and whether surface water quality monitoring was undertaken at this time.</p>	<p>Section 4.5. No discharge off-site occurs and none is planned.</p>	<p>Section 2.4.5 also addresses this issue</p>
<p>Section 4.5 notes that should discharge be required surface water monitoring would be undertaken. The SWMP needs to provide details on where the surface water quality sampling points are located.</p>	<p>Section 4.5 No discharge off-site occurs and none is planned</p>	<p>Sections 2.4.5 and 4.4 also address this issue.</p>
<p>DPI Water supports a nil discharge approach for dirty/sediment laden water. Clean surface runoff, however should be diverted away from development and diverted to downstream catchments for the environment and other users (unless the water is captured under a WAL.</p>	<p>Section 2.4.6, Section 4.1, Section 4.5 and Section 7.4. No discharge off-site occurs and none is planned</p>	<p>The SWMP confirms it is not physically possible to divert the clean water around the site due to the topography.</p>
<p>Discharge Points. The SWMP should identify where the discharge points are located.</p>	<p>Section 4.5 No discharge off-site occurs and none is planned</p>	<p>Noted</p>

DPI Water Comment	Proponent Response to DPI Water	DoI Water Comment
<p>Water Use on site. Section 5.3 notes that after processing liberated water is drained into a 'holding dam'. The SWMP needs to clarify which dam is the holding dam and include a figure which locates it.</p>	<p>Section 4, Section 5.3, Section 7 and Figure Ten</p>	<p>Sections 5.2 and 5.3 confirm that Dam 2 is currently the holding dam and its location is shown on Figure 10.</p>
<p>Recycling of Water. Section 5.4 refers to collecting water in the sediment dams for reuse. The SWMP needs to clarify which dams are the sediment dams and include details on the capacity of these dams. A figure needs to be included in the SWMP which shows the location of the sediment dams.</p>	<p>Section 4, Section 5.4, Section 7 and Figure Ten</p>	<p>Figure 10 should identify which dams are the sediment dams.</p>
<p>Modelling Assumptions. The modelling provides a ball park figure understanding but it does not represent reality.</p>	<p>Section 5. Water balance has been updated</p>	<p>Ongoing monitoring of water levels in dams must be a component of the SWMP to inform the Site Water Balance.</p>
<p>Projected Future Water Usage. Section 5.6.2 notes water levels within the dam will be recorded annually and that to assist with this, loggers will be installed in key dams. DPI Water advised in its submission of 31 October 2016 that it requires a continuous water level logger to be placed on each of the dams at the site to determine if the water in the dams is originating from the Maroota sands aquifer. The SWMP needs to be amended to reflect this.</p>	<p>Section 5.6.2, Section 11.2</p>	<p>DPI Water advised that it requires a continuous water level logger to be placed on each of the dams at the site to determine if the water in the dams is originating from the Maroota sands aquifer. Section 5.6.2 indicates that a water logger has recently been installed in Dam 1. The SWMP should clarify if loggers have been installed in each of the dams at the site and if not it should explain why this has not occurred.</p>
<p>Clean Water Management. Section 7.1 notes clean water is diverted around the site via a series of earthen bunds and it refers to Figure 3. Figure 3 needs to be amended to show the location of the bunds. As the SWMP indicates clean water from undisturbed areas enters the quarry area, Section 7.1 should include details on this.</p>	<p>Figure Two, Figure Three, Figure Four, Figure 5, Figure Six, Figure Seven and Figure Eight</p>	<p>The amendments made to Section 7.1 and the figures provide greater clarity.</p>

DPI Water Comment	Proponent Response to DPI Water	DoI Water Comment
<p>Final Stage catchment Section 7.2.5 notes the potential volume of the final dam on the site would be 945 300 m³, which equates to 945 ML. The proponent would need to purchase WAL(s) to account for the volume of water held by the dam. The SWMP assumes the final dam would have an average depth of 7m. A groundwater WAL may also be required if the dam intercepts groundwater. It is recommended the proponent commences investigating the purchase of WAL(s)</p>	<p>Section 7.2.5, Section 7.4 and Section 8</p>	<p>It is noted that the estimated volume of the final dam has been reduced from 945 ML which was included in the previous draft SWMP to 570 ML and that the site currently holds a water licence for 264 ML (Section 7.2.5, page 50)</p> <p>Section 7.4 notes the landholder holds a WAL for the two nursery dams (Dams 3 and 4) on the site which will be transferred to the dam in the final landform (page 52). Transferring the WAL for the 2 nursery dams will not be sufficient, as the WAL for dams 3 and 4 only amounts to 264 ML. The proponent will need to purchase a WAL for the additional 306 ML. Alternatively the final void could be constructed so that it is only large enough to account for the 264 ML</p>
<p>The NSW Dams Safety Committee should be consulted in relation to this dam.</p>	<p>Section 8.2</p>	<p>Noted</p>
<p>Transfer of Water to Offsite Dam. Section 7.6.2 indicates excess surface water from Dam 1 is to be transferred from the site to the neighbouring land owned by Mr Tony Portelli. The SWMP indicates the water is to be used for stock water and irrigation. The SWMP needs to clarify whether Mr Portelli has the correct approvals under the Water Management Act 2000. Details are required on the location of Mr Portelli's property and the location of his dam(s). Clarification is required as to how the water is to be transferred, and whether it is to be transferred via a pipeline to his property.</p>	<p>Section 4.5 No Discharge off-site occurs and none is planned</p>	<p>Noted</p>
<p><u>Performance Criteria</u> Once the proponent clarifies the remaining groundwater issues, this section will be subject to change.</p>	<p>Section 10</p>	<p>Section 10 of the previous draft SWMP included an objective in Table 36 for 'no impacts to groundwater quality and quantity'. It is noted the revised SWMP has deleted this objective from Table 35.</p>

Additional Comments

Deficit in water supply

Sections 5.2 and 5.6.1.4 note there may be some periods in the life of the quarry where there will be a deficit in water supply. The SWMP should explain what the quarry intends to do during periods when there isn't enough water and clarify if it is proposed to stop processing during these periods.

9.3 Erosion Control

The SWMP notes lands planted recently will be watered regularly until an effective cover has established (page 62). The SWMP should also require follow up watering, in addition to the application of follow up seed and fertiliser, where minor erosion and inadequate vegetative protection occurs.

Section 10

An 'action to be implemented' for the onsite dams and earth embankments should include:

- vegetation on the earth embankments should regularly be watered especially during dry weather conditions

This will assist to ensure the embankments remain adequately vegetated.

11.1 Erosion and Sediment Monitoring

It is noted monitoring of the soil erosion, sediment and water control is undertaken monthly (page 66). It is recommended erosion and sediment control monitoring is also undertaken:

- Within 24 hours of expected rainfall
- Within 18 hours of a rainfall event of sufficient intensity and duration to cause runoff on-site

11.2 Surface Water Monitoring

Section 11.2 indicates that the surface water monitoring will include automatic data loggers to monitor the dam levels (page 66). The SWMP needs to clarify which dams will have automatic data loggers installed. Ongoing monitoring of water levels in dams must be a component of the SWMP to inform the Site Water Balance.

The quarry also proposes to sample and test the water quality of all on-site dams on "a once only basis" to determine if there is a relationship to groundwater. It is recommended water quality sampling of the dams is undertaken over 12 months -2 years on a 3 monthly basis to pick up any seasonal variation within the dam water to determine if there is any relationship to groundwater.

End of Attachment A



Ms Lisa Thomson
Principal Environmental Consultant
VGT – Environmental Compliance Solutions
PO Box 2335
Greenhills NSW 2323

Email: Lisa@vgt.com.au

Dear Ms Thomson

**Roberts Road Quarry – Modification 2 (DA 267-11-99 MOD 2)
Environmental Management Plans**

The Department has reviewed the following revised management plans for the Roberts Road Quarry (DA 267-11-99) including the:

- Groundwater Study, dated April 2018 (condition 39 of Schedule 2);
- Water Management Plan, dated July 2018 (condition 42, Schedule 2);
- Groundwater Monitoring Program, dated July 2018 (condition 43, Schedule 2); and
- Landscape and Rehabilitation Management Plan, dated May 2018 (condition 60, Schedule 2).

The Secretary has approved the above-mentioned plans. Please ensure these plans are made available on the company's website.

Should you have any enquiries in relation to this matter, please contact Jack Murphy at the details above.

Yours sincerely,

Howard Reed

Director

Resource Assessments

As nominee of the Secretary

22.8.18

24th August 2021

Secretary

Department of Planning, Industry and Environment
4 Parramatta Square
12 Darcy Street
Parramatta NSW 2150

Dear Ms Divis,

RE: Rehabilitation Inspection, Water Management Plan Submission Roberts Road Sand Quarry (DA 267-11-99)

VGT Environmental Compliance Solutions Pty Ltd have been engaged by Hodgson Quarries and Plant Pty Ltd to respond to your letter dated 29/07/21 regarding a site inspection undertaken in June 2021. The letter requests 4 action points and these will be addresses separately. Action point 2 states:

“Submit the updated WMP for consultation with the Department as required under Condition 42 of the Consent”.

The Water Management Plan was updated in February 2021 and submitted for consultation initially via email (as per phone call advice), then through the Major Projects Portal. Please find attached the evidence and responses. In response to this action request, we have again requested consultation on the draft plan, and re-submitted the WMP along with a copy of the letter. There has been no response from NRAR or DPI-Water to date.

If you have any questions please do not hesitate to contact me.

Regards,



Lisa Thomson, BAppSc (Chem), MIQA, CChem MRACI
Environmental Consultant

Direct Email: lisa@vgt.com.au

Mobile: 0427 334471

From: [Lisa Thomson](#)
To: [CS Connect Service Centre](#)
Cc: [Submissions](#)
Subject: RE: FIN0450763 - NRAR - Consultation re: Water Management
Date: Monday, 22 March 2021 4:10:33 PM
Attachments: 9853_HMA_EMP_SWMP_2020.pdf

Hi Tash,

Thanks so much for your assistance on the phone today.

I have attached the updated Water Management Plan for DA 269-11-99 Roberts Rd Maroota Sand Quarry for consultation in accordance with consent condition:

42.The Applicant shall prepare a Water Management Plan for the development to the satisfaction of the Secretary. This plan must be prepared in consultation with DPI-Water by suitably qualified and experienced person/s whose appointment has been approved by the Secretary, and be submitted to the Secretary for approval by 31 December 2016. The plan must be updated on an annual basis in consultation with DPI-Water for three years from the date of approval of Modification 2 and thereafter as agreed with by the Secretary.

Regards,
Lisa Thomson
BAppSc, CChem

Phone: (02) 4028 6412 | Mobile: 0427 334471
www.vgt.com.au



From: CS Connect Service Centre <cspconnect@service-now.com>
Sent: Monday, 22 March 2021 3:52 PM
To: Lisa Thomson <Lisa@vgt.com.au>
Subject: FIN0450763 - NRAR - Consultation re: Water Management

Hi Lisa,

Thank you for contacting the Natural Resources Access Regulator (NRAR) today.

As discussed if you could reply to this email with any supporting documentation you would like to include in your enquiry I will be able to forward this to the NRAR Team.

If you have any further questions or should require further assistance, please do not hesitate to contact me on 1800 633 362 or NRAR at nrar.enquiries@nrar.nsw.gov.au

Kind regards,

Tash.

Natural Resources Access Regulator
Phone: 1800 633 362
Email: nrar.enquiries@nrar.nsw.gov.au

Ref:MSG2577553_ZjTwclNHKTAiEhkvZWId

From: no-reply@majorprojects.planning.nsw.gov.au
To: [Submissions](#)
Subject: Roberts Road Quarry Water Management Plan - Response from WaterNSW
Date: Thursday, 15 April 2021 10:33:10 AM
Attachments: [..datacontent\img\arte\ImagesNew_DPIE_Logo1561956956365.png](#)

WaterNSW has responded to your request for advice in relation to the Roberts Road Quarry Water Management Plan . The response is below and/or attached. Record of this consultation has been automatically saved to the portal.

When you are ready, login to your profile to submit the final document to the Department.

Public Authority Response

Please note this was referred to WaterNSW and not DPI Water.

WaterNSW has no comment to make and it should be referred to DPI Water as per referral notes.

Regards Justine Clarke

Catchment and Asset Protection Adviser

To sign in to your account click [here](#) or visit the [Major Projects Website](#).

Please do not reply to this email.

Kind regards

The Department of Planning, Industry and Environment



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From: no-reply@majorprojects.planning.nsw.gov.au
To: [Submissions](#)
Subject: Roberts Road Quarry Water Management Plan - Response from Water Group
Date: Tuesday, 20 April 2021 3:38:34 PM
Attachments: [..datacontent\img\arte\images\New_DPIE_Logo1561956956365.png](#)

Water Group has responded to your request for advice in relation to the Roberts Road Quarry Water Management Plan. The response is below and/or attached. Record of this consultation has been automatically saved to the portal.

When you are ready, login to your profile to submit the final document to the Department.

Public Authority Response

Please action this post approval engagement request to the Natural Resources Access Regulator (NRAR). Email address: nrar.servicedesk@dpi.nsw.gov.au

To sign in to your account click [here](#) or visit the [Major Projects Website](#).
Please do not reply to this email.

Kind regards

The Department of Planning, Industry and Environment



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From: no-reply@majorprojects.planning.nsw.gov.au
To: [Submissions](#)
Subject: Roberts Road Quarry Water Management Plan - Response from Department of Regional NSW - Primary Industries
Date: Wednesday, 21 April 2021 11:22:23 AM
Attachments: [.datacontent\ImagerteImagesNew_DPIE_Logo1561956956365.png](#)

Department of Regional NSW - Primary Industries has responded to your request for advice in relation to the Roberts Road Quarry Water Management Plan . The response is below and/or attached. Record of this consultation has been automatically saved to the portal.

When you are ready, login to your profile to submit the final document to the Department.

Public Authority Response

I would suggest you need to contact the Department of Planning, Industry and Environment. I don't have a particular contact for this area, but you should be able to find information on their website at:
<https://www.industry.nsw.gov.au/water/what-we-do/contact-us>

To sign in to your account click [here](#) or visit the [Major Projects Website](#).

Please do not reply to this email.

Kind regards

The Department of Planning, Industry and Environment



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PLEASE CONSIDER THE ENVIRONMENT BEFORE PRINTING THIS EMAIL

From: [NRAR Service Desk Mailbox](#)
To: [Lisa Thomson](#)
Cc: [Jane Curran](#)
Subject: FIN0450763 - NRAR - Consultation re: Water Management Plan Updates for Roberts Road Quarry – case ID DA267-11-99-PA-1
Date: Monday, 17 May 2021 6:33:12 PM

Dear Lisa,

Thank for your enquiry about the progress of your Water Management Plan Updates for Roberts Road Quarry – case ID DA267-11-99-PA-1 with reference No: V15/3875#23.

We apologise for the delay in providing our response to your enquiry, and any inconvenience this delay has caused.

We are currently experiencing a high number of enquiries which is affecting our response times.

We are endeavouring to address all enquiries as soon as possible, in the order in which we have received them.

An NRAR officer Jane has been assigned to your enquiry and we will update you as soon as possible regarding its progress.

If you have any further questions or should require further assistance, please do not hesitate to contact our team at nrar.servicedesk@dpie.nsw.gov.au.

Kind regards,

Ilse

Reg Coord - Service Support Team

Natural Resources Access Regulator | Lands & Water Division | Department of Planning, Industry & Environment

Locked Bag 5022, Parramatta NSW 2124

T: 1800 633 362

E: nrar.servicedesk@dpie.nsw.gov.au

W: www.industry.nsw.gov.au/nrar

To contact the NRAR Hotline and make a suspicious activity report call: 1800 633 362



[Read the NRAR Progress Report 2019-20](#)

The Department of Planning, Industry and Environment acknowledges that it stands on Aboriginal land. We acknowledge the Traditional Custodians of the land and we show our respect for Elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically

From: CS Connect Service Centre <cspconnect@service-now.com>
Sent: Friday, 14 May 2021 9:54 AM
To: NRAR Service Desk Mailbox <nrar.servicedesk@dpie.nsw.gov.au>
Subject: FIN0450763 - NRAR - *2nd Urgent* - * Consultation re: Water Management

Cloned ticket - FIN0449676

Name - Lisa Thomson

Phone - 0427 334 471

Email - lisa@vgt.com.au

Location - Hodgson Quarries Roberts Road Maroota Sand Quarry - Hodgson Quarry Products Pty Ltd

14/05/21-

reply from: Lisa@vgt.com.au

Hi Tash,

NRAR has still not responded to the request for consultation regarding the Water Management Plan updates.

This is regarding the Roberts Road Quarry – Water Management Plan; case ID DA267-11-99-PA-11

Regards,

Lisa Thomson

BAppSc, CChem

Phone: (02) 4028 6412 | Mobile: 0427 334471

www.vgt.com.au

22.04.2021

reply from: Submissions@vgt.com.au

Hi Tash,

You were so helpful on the phone last month that I thought I would reach out to you again if possible.

In response to the email below, I received the following:

[cid:image001.png@01D736CC.2EB80880]

I have followed the instructions and submitted the WMP update via the portal. As it was unclear to me which of the options in the drop-down box was DPIE-Water I tried firstly NRAR who have not responded, then:

1. WaterNSW:

[cid:image012.png@01D736CC.2EB80880]

1. Water Group

[cid:image013.png@01D736CC.2EB80880]

1. Department of Regional NSW – Primary Industries

[cid:image014.png@01D736CC.2EB80880]

Is there another way to submit this report for consultation? The Major Projects Portal will not allow the lodgement to proceed without consultation.

Thanks for your help.

Regards,

Lisa Thomson

BAppSc, CChem

22.03.2021

** Please note the customer will need to be contacted regarding the file mentioned in the below email as it is too large for us to obtain. **

reply from: Lisa@vgt.com.au

Hi Tash,

Thanks so much for your assistance on the phone today.

I have attached the updated Water Management Plan for DA 269-11-99 Roberts Rd

Maroota Sand Quarry for consultation in accordance with consent condition:

42. The Applicant shall prepare a Water Management Plan for the development to the satisfaction of the Secretary. This plan must be prepared in consultation with DPI-Water by suitably qualified and experienced person/s whose appointment has been approved by the Secretary, and be submitted to the Secretary for approval by 31 December 2016. The plan must be updated on an annual basis in consultation with DPI-Water for three years from the date of approval of Modification 2 and thereafter as agreed with by the Secretary.

Regards,

Lisa Thomson

BAppSc, CChem

Phone: (02) 4028 6412 1 Mobile: 0427 334471

www.vgt.com.au

Hi Lisa,

Thank you for contacting the Natural Resources Access Regulator (NRAR) today.

As discussed if you could reply to this email with any supporting documentation you would like to include in your enquiry I will be able to forward this to the NRAR Team.

If you have any further questions or should require further assistance, please do not hesitate to contact me on 1800 633 362 or NRAR at

nrar.enquiries@nrar.nsw.gov.au<<mailto:nrar.enquiries@nrar.nsw.gov.au>>

Kind regards,

Tash.

Have you spoken to another agency/department regarding your enquiry?

No.

Are you representing an organisation or yourself?

VGT - Environmental consultant working for Hodgson Quarries.

Is your enquiry related to a specific license or approval? If so, what is the number?

DA 267-11-99

How can I help with your enquiry?

Lisa's calling as she needs consultation on a water management plan for state significant development.

Existing plan from 2017 requirements amendments and Lisa would like advise if this is something NRAR can assist with.

Department of Planning consent that the water department is consulted with in relation to DA 267-11-99

FIN0449676

19.03.2021

Name - Lisa Thomson

Phone - (02) 4028 6412 1 Mobile: 0427 334471

Email - Lisa@vgt.com.au

Location - Maroota NSW

Have you spoken to another agency/department regarding your enquiry?

Are you representing an organisation or yourself?

VGT- Environmental Compliance Solutions and Laboratories.

Is your enquiry related to a specific license or approval? If so, what is the number?

(DA267-11-99) SSD

How can I help with your enquiry?

I wish to submit an updated Water Management Plan for a State Significant Development in Maroota NSW (DA267-11-99) for consultation. Please advise the best way to achieve this outcome – the pdf report is 35MB inclusive of plans and figures.

Do you require information to assist you in lodging an application?

YES

Is there anything further you would like to advise?

NO

RE: Consultation regarding a Water Management Plan

received from: Lisa@vgt.com.au

To Whom it may concern,

I wish to submit an updated Water Management Plan for a State Significant Development in Maroota NSW (DA267-11-99) for consultation. Please advise the best way to achieve this outcome – the pdf report is 35MB inclusive of plans and figures.

Regards,

Lisa Thomson

BAppSc, CChem

Phone: (02) 4028 6412 | Mobile: 0427 334471

www.vgt.com.au

From: [Jane Curran](#)
To: [Submissions](#)
Cc: [NRAR Coordination Mailbox](#); [Luke McIver](#); [Jessica Braden](#)
Subject: FW: Roberts Road Quarry Water Management Plan - Due Date Reminder trk:00910000294
Date: Thursday, 5 August 2021 10:42:31 AM
Attachments: [image002.png](#)

Hi Lisa,

This report is currently awaiting review with DPIE-Water. NRAR do not have a due date at this point in time for the return of DPIE-Waters comments.

Thank you

Kind regards,

Jane Curran

A/Manager Licensing & Approvals (East)

Natural Resources Access Regulator | Department of Planning, Industry and Environment

P: 02 4275 9327 | **M:** +61 437 832 227 | **E** jane.curran@nrar.nsw.gov.au

Level 0, 84 Crown Street, Wollongong NSW 2500

PO Box 53 Wollongong NSW 2520

www.industry.nsw.gov.au/nrar



To contact the NRAR Hotline and make a report call: 1800 633 362

[Read the NRAR Progress Report 2019-20](#)

The Department of Planning, Industry and Environment acknowledges that it stands on Aboriginal land. We acknowledge the Traditional Custodians of the land and we show our respect for Elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

----- Original Message -----

From: no-reply@majorprojects.planning.nsw.gov.au <no-reply@majorprojects.planning.nsw.gov.au>;

Received: Wed Jul 28 2021 00:46:36 GMT+1000 (Australian Eastern Standard Time)

To: NRAR Industry mailbox <nrar.servicedesk@industry.nsw.gov.au>;

Subject: Roberts Road Quarry Water Management Plan - Due Date Reminder

This is a reminder that your advice for the Roberts Road Quarry - Water Management Plan is due on 07/04/2021.

If you cannot complete this task by this date, please contact Lisa Thomson at submissions@vgt.com.au.

To sign in to your account click [here](#) or visit the [Major Projects Website](#).

Please do not reply to this email.

Kind regards

The Department of Planning, Industry and Environment



Planning,
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Roberts Road Quarry

Post Approval (DA267-11-99-PA-11)

Lodge



Evidence of Consultation

Actions

Attach Evidence

Below is a list of any consultation you have initiated through the portal. Once the public authority responds it will be automatically attached as evidence. Once each of the public authorities has responded, click "Continue". Please attach any other evidence of consultation not captured by the portal by attaching it below.

Public Authority Response Summary

WaterNSW (PAE-16706028)

Status: Closed Due Date: Wednesday, 7 April 2021

Notes:
Please note this was referred to WaterNSW and not DPI Water.
WaterNSW has no comment to make and it should be referred to DPI Water as per referral notes.
Regards Justine Clarke
Catchment and Asset Protection Adviser

Natural Resources Access Regulator (PAE-16707306)

Status: Pending Advice Due Date: Wednesday, 7 April 2021

No response received

Department of Regional NSW - Primary Industries (PAE-17783343)

Status: Closed Due Date: Tuesday, 4 May 2021

Notes:
I would suggest you need to contact the Department of Planning, Industry and Environment. I don't have a particular contact for this area, but you should be able to find information on their website at: <https://www.industry.nsw.gov.au/water/what-we-do/contact-us>

Department of Regional NSW - Primary Industries (PAE-17791980)

Status: Pending Advice Due Date: Tuesday, 4 May 2021

No response received

Water Group (PAE-17789184)

Status: Closed Due Date: Tuesday, 4 May 2021

Notes:
Please action this post approval engagement request to the Natural Resources Access Regulator (NRAR). Email address: nrar.servicedesk@dpie.nsw.gov.au

Natural Resources Access Regulator (PAE-25945522)

Status: Pending Advice Due Date: Thursday, 26 August 2021

Attachments

[Add Attachment](#)

Note: Click the back button to consult with additional authorities through this portal.

Details Resources

Current Stage

- Initiate
- Lodge
- Check
- Assessment
- Determination
- Close

Related Projects

Part4 (DA267-11-99)
Resolved-Completed (Major Project)

2 November 2021

Attention: Lisa Thomson

Uploaded to the Major Projects Portal

Dear Lisa,

Re: Roberts Road Maroota Sand Quarry Surface Water Management Plan (DA267-11-99-PA-11)

Thank you for giving the Department of Planning, Industry and Environment – Water (DPIE-Water) and Natural Resources Access Regulator (NRAR) the opportunity to review Roberts Road Maroota Sand Quarry Surface Water Management Plan (DA267-11-99-PA-11).

DPIE-Water and NRAR have no comments.

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



Jane Curran
A/Manager Licensing & Approvals
Water Regulatory Operations
Natural Resources Access Regulator

Appendix E

PHMP

Hodgson Quarries & Plant Pty Ltd

Principle Hazard Management Plan

Inundation and Inrush

What is inundation or inrush?

An inundation or inrush occurs when a liquid, gas or other substance that can flow, enters a workplace at a rate or volume or concentration that creates an emergency situation and presents a risk to health and safety of mine workers.

How could an inundation or inrush occur?

An inundation or inrush hazard could include the existence of the following:

- Significant quantities of water or other fluid material, including precipitation.
- Any material that flows when wet.
- Material that may be fluidized as a result of vibrations such as earthquakes, blasting or other means.
- Irrespirable atmospheres or flammable gases.
- Paste or hydraulic filled stopes.
- Water storage dams, tailings dams or other man-made water bodies.
- Rivers, lakes, the ocean or other natural water bodies.

These hazards may be pressurised and swiftly flow, or be released into or within a mine.

What are the risk for the Maroota site (Inundation or Inrush)?

The main area for concern at the Maroota site is

- Tailings dam.

Hodgson Quarries & Plant Pty Ltd	
PHMP-INUNDATION or INRUSH	
Author: Stuart Reed	
Approved by: Martin Hodgson	
DATE OF ISSUE: 10/03/20	ISSUE NUMBER: 1.0
PAGE NUMBER: 1 of 2	

Hodgson Quarries & Plant Pty Ltd

How can we managed the risk of Inundation or Inrush?

There are a number of controls in place that minimise the chance for inundation or inrush.

Tailings Dam

- 1 m free board around the entire dam, (excluding overflow).
(See appendix A).
- Ensure the plug height or overflow is at least 1 m below the free board at all times.
- The plug is set at a height in the tailing dam to drain away all free running water in the event of excessive rain event, mitigating any chance of a rush of water.
- Installed overflow that will funnel any excessive water back to the process dam along a channel free of workers, this is a fall safe measure in the event of a plug failure.
- A visual inspection of the dam wall, plug and drain is conducted every morning before any workers or contractors enter the areas that maybe affected by inundation or inrush.
- Establish an Inrush Control Zone (ICZ). It was agreed in the event of inundation or inrush to make your way to the tip off pad if you are unable to vacate yourself from the area entirely.
- Visual inspections of the dam periodically conducted throughout the day.
- Toolbox training and education on what to do in the case of an inundation or inrush occurrence.

How do we measure our controls are working

- Nil breaches.
- Regular Risk Assessments. (See appendix B)

Hodgson Quarries & Plant Pty Ltd	
PHMP-INUNDATION or INRUSH	
Author: Stuart Reed	
Approved by: Martin Hodgson	
DATE OF ISSUE: 10/03/20	ISSUE NUMBER: 1.0
	PAGE NUMBER: 2 of 2

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Risk Assessment / Management

INJURY PROBABILITY	
A	ALMOST CERTAIN TO HAPPEN
B	LIKLEY TO HAPPEN
C	MODERATE, POSSIBLY COULD HAPPEN
D	UNLIKLEY TO HAPPEN
E	RARE, PRACTICLY IMPOSSIBLE

CONSEQUENCES	
1	FATALITY
2	MAJOR LTI
3	LTI OR MTI
4	FIRST AID
5	NO INJURY

PROB	CONSEQUENCE				
	1	2	3	4	5
A	H	H	H	M	M
B	H	H	M	M	L
C	H	M	M	L	L
D	M	M	L	L	L
E	M	L	L	L	L

LOCATION: Maroota

UNDERTAKEN BY: M. Hodgson, S.Reed, P.McKenzie

DATE: 18/03/20

DESCRIPTION OF PROJECT: Feeding Plant & Carting feed

WORK ACTIVITY	POTENTIAL HAZARD	R/R	PREVENTITIVE ACTION	R/R	HOC
Feeding the plant with loader.	Hitting screen or Fred.	C4 Low	Use mirrors and reversing camera and drive to conditions. Always wear your seat belt.	D5 Low	3
Entering & existing Loader, Excavator & Dumpy.	Slips, trips and falls.	C3 Med	Always have 3 point contact, eyes on steps / ladders, ensure all steps / ladders are clear and clean. Look at ground before stepping down.	D3 Low	3
Feed plant with Loader. Loading Dumpy with Excavator. Carting feed in Dumpy.	Mud in rush or water in rush risk.	C1 High	Have a minimum 1 meter free board around the dam (excluding overflow).	D5 Low	3

SIGNED OFF BY PERSONS WORKING ON JOB:

WORK ACTIVITY	POTENTIAL HAZARD	R/R	PREVENTITIVE ACTION	R/R	HOC
Feed plant with Loader. Loading Dumpy with Excavator. Carting feed in Dumpy.	Mud rush or water in rush risk.	C1 High	Ensure the plug height or overflow is at least 1 meter below the free board.	D5 Low	3
Feed plant with Loader. Loading Dumpy with Excavator. Carting feed in Dumpy.	Mud rush or water in rush risk.	C1 High	Check the plug and overflow is clear and in good order before starting work or entering in rush zones.	D5 Low	3
Feed plant with Loader. Loading Dumpy with Excavator. Carting feed in Dumpy.	Mud rush or water in rush risk.	C1 High	Complete the dam wall inspection before starting work.	D5 Low	5
Feed plant with Loader. Loading Dumpy with Excavator. Carting feed in Dumpy.	Mud rush or water in rush risk.	C1 High	Visual inspections of the dam periodically throughout the day.	D5 Low	3
Feed plant with Loader. Loading Dumpy with Excavator. Carting feed in Dumpy.	Mud rush or water in rush risk.	C1 High	Establish an Inrush Control Zone.	D5 Low	4

HIERARCHY OF CONTROLS: 1 - ELIMINATION, 2 - SUBSTITUTION, 3 - ENGINEERING, 4 - ISOLATION, 5 - ADMIN, 6 - PPE

Appendix F

DPIE Review and Comments

Document: Water Management
Schedule 2 Condition 44 B Surface Water Management Plan
Revision: Revision
Reviewed: " Charissa Pillay in April 2022"

Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
<p>Water Management Plan</p> <p>44. The Applicant shall prepare a Water Management Plan for the development to the satisfaction of the Secretary. This plan must be prepared in consultation with DPIE Water by suitably qualified and experienced person/s whose appointment has been approved by the Secretary, and be submitted to the Secretary for approval by 31 December 2016. The plan must be updated on an annual basis in consultation with DPIE Water for three years from the date of approval of Modification 2 and thereafter as agreed with by the Secretary.</p>	Yes	This Report, Appendix C, Section 1.5	\	
<p>In addition to the standard requirements for management plans (see Condition 65), this plan must include a:</p> <p>(a) Site Water Balance that:</p> <ul style="list-style-type: none"> • includes details of: <ul style="list-style-type: none"> o sources and security of water supply, including contingency planning; o water use on site; o water management on site, including groundwater inflows to the quarry voids and site discharges; and 	Yes	Section 4 and section 10 addresses the requirement.	-	

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Schedule 2 Condition 44 B Surface Water Management Plan
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Reviewed: "Charissa Pillay in April 2022"

Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
o audit and reporting procedures, including comparisons of the site water balance each calendar year; and o describes the measures that would be implemented to minimise clean water use on site and maximise recycling opportunities;				
Surface Water Management Plan, that includes:				
• a detailed description of the surface water management system on site, including the:				
o clean water diversion systems; o erosion and sediment controls; o effluent irrigation system; o water transfers from the extraction areas; o water storages; and o discharge points;	Partial	Section 3 include sufficient information. Section 6 includes details of a proposed water management system. It is unclear of this is an existing system as work is currently being carried out. Section 8 addresses erosion and sediment control.	Use of words such as "proposed" suggest mitigations have not been implemented. Include committed mitigation measures.	References to 'Proposed' have been removed from the SWMP update.
• design objectives and performance criteria for proposed:	Yes	Section 9 addresses the requirement.	-	
o erosion and sediment control structures;				
o water storages, including quarry voids;				
o site discharges; and;				

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Schedule 2 Condition 44 B Surface Water Management Plan
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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
o control of water pollution from rehabilitated areas of the site				
<ul style="list-style-type: none"> performance criteria, including trigger levels for investigating any potentially adverse impacts for surface water quality; 	Yes	Section 9 addresses the requirement.	-	
<ul style="list-style-type: none"> a program to monitor: 				
o the effectiveness of the water management system;	Partial	Section 10 includes broad details of monitoring of site water management system. Section 10 does not include details of who will be responsible for monitoring erosion and sediment, and surface water.	<p>Include a program with details of monitoring the elements discussed in section 6.</p> <p>Include who will be responsible for monitoring and the reporting procedures.</p>	Section 4.9.3 of the updated SWMP outlines the monitoring elements and responsibilities.
o site discharge water quality; and	Partial	See above, section 10 does not include who will be responsible for monitoring or reporting procedure.	Include the responsible person for surface water.	Section 4.9.3 of the updated SWMP outlines the monitoring elements and responsibilities. Section 4.18 outlines the reporting responsibilities.
o surface water level and quality in the Process Water Dam, including the quantification of rainfall inflow, groundwater inflow and evaporation;	Partial	Section 10.2 includes broad details of the monitoring undertaken in sediment basin 1 and process dam levels.	Include details to confirm that the logger will monitor the requirements consistent with the condition. Include who will review the results.	Section 4.9.3 of the updated SWMP outlines the monitoring elements and responsibilities.

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<i>Surface Water Management</i>	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
				Section 4.18 outlines the review and reporting responsibilities. Section 4.19 outlines who will be responsible for reviews of the SWMP
<ul style="list-style-type: none"> a plan to respond to any exceedances of the performance criteria, and mitigate and/or offset any adverse surface water impacts of the project; 	Partial	Section 9 includes actions to mitigate any adverse surface water impacts of the project. There are no response details to any exceedances on the described potential adverse outcome	Include a response plan when an exceedance occurs.	The response plan has been updated. See Sections 4.8 and 4.11.
<ul style="list-style-type: none"> long term water quality management objectives and the measures to achieve these objectives; 	Partial	How often will the testing of the dam water discussed in Section 6.6 be undertaken?	Include details on who will undertake testing and how often	The testing frequency has been updated in Section 4.9.
<ul style="list-style-type: none"> a plan that ensures surface stormwater runoff from the disturbed areas is directed to the sedimentation dam(s); 	Yes	Section 3 and Figure Two addresses the requirement. Section 6.2 addresses the requirement.		
<ul style="list-style-type: none"> a plan that ensures tailgate drainage does not discharge into or onto any adjoining public or Crown road, any other persons land, any Crown land, any river, creek or watercourse, any groundwater aquifer, any native vegetation as described under the Native 	No	Section 6.7 discusses the unlikely event of tailgate to discharge due to low moisture. The condition requires a plan to ensure tailgate drainage does	Include measures such as: <ul style="list-style-type: none"> Visual/regular inspections inspection when trucks exit site Sediment controls at site exit 	Section 4.13 has been updated.

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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Vegetation Conservation Act 1997 and any wetlands of environmental significance;		not discharge into or onto any adjoining public or Crown road.		
• a detailed description of design and construction criteria for the Process Water Dam based on a feasibility study of				
o capacity to construct multiple cells within the overall dam footprint (ie a two stage or three stage dam);	Partial	It is unclear if the condition is addressed in section 4.2 or section 7.	Include details to confirm the process dam has capacity of multiple cells.	The Process Dam Design and Construction (section 4.14) has been updated. As discussed in the plan it has been determined that a multiple cell construction is not required. The dam is currently hydraulically separated from the groundwater as determined by the Groundwater Study and the GMP and therefore does not require clay lining.
o whether the dam floor and walls are able to be effectively lined with compacted clay (especially for multiple cells);	Partial	See above	Include details to confirm dam floors are lined with compacted clay	As above.
o whether effective hydraulic separation can be achieved between such cells;	Partial	As above	Include details if there is hydraulic separation can be achieved between such cells.	As above.

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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
o rehabilitating such cells to create a single dam within the final landform; and	Partial	Section 7 contains broad information, and it is unclear if the cells have been or are rehabilitated to create a single dam within the final landform.	Include details to confirm if the cells have been or are rehabilitated to create a single dam within the final landform	As above.
o the appropriateness of diverting runoff received from off-site around the dam;	No	Section 7 does not include details on diverting runoff off-site around the dam.	Include information on diverting runoff received from off-site around the dam;	Addressed in Section 4.1 and 4.14.5
a strategy for the decommissioning of water management structures, including storage, sedimentation and leachate dams once extraction is complete; and	Partial	Section 6.10 addresses most of the condition however there is no detail on leachate dams	Include details on the location of leachate dams and the strategy for decommissioning of leachate dams.	There are no leachate dams on the site. Section 4.15 has been updated to reflect this.
audit and reporting procedures, including comparisons of the monitoring results each calendar year and quarterly reporting of surface water monitoring results;	Partial	Section 10.4 does not include comparisons of monitoring results in the reviews. There is no information on quarterly reporting of surface water monitoring results	Include a commitment to review a comparison of the monitoring results each calendar year. Include details to confirm if quarterly reporting of surface water monitoring results are undertaken.	Section 4.18 updates the Audit and Reporting procedures to include reference to the Annual Review where the comparison of water monitoring results are discussed.
(b) Groundwater Management Plan that takes into account the Web-based Reporting Guideline (DPE 2015) and Groundwater Monitoring and Modelling Plans – Information for Prospective	Partial	Section 7 includes broad details on the condition. There is no Ground Water Management Plan attached to the WMP.	Include a summary to confirm all the requirements have been addressed.	The GMP has been included as an attachment to this report.

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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
<p>Mining and Petroleum Exploration Activities (DPI 2014), and includes:</p> <ul style="list-style-type: none"> • detailed baseline data on groundwater yield and quality in groundwater bores on privately owned land, that could be affected by the project; • a program to undertake surveyed probe testing of all extracted areas where clay fines have been deposited to: <ul style="list-style-type: none"> o accurately determine the depth of extraction and depth of clay fines; o identify any ongoing intersection or other interaction between clay fines and the regional groundwater aquifer; o identify any geotechnical characteristics of the emplaced clay fines which may pose risks to workplace safety or implementation of the process water dam design or the final landform; and o identify measures which can be successfully used in rehabilitating these areas; • a program to monitor potential groundwater quality impacts to the regional aquifer from receiving off-site runoff water in the Process Water Dam; • groundwater assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts, in accordance with the NSW Aquifer Interference Policy; • a program to monitor: o the 		<p>It is unclear if the requirements of the condition are addressed.</p>		

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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
<p>impacts of the project on: - groundwater inflows to water storages; - any groundwater bores on privately-owned land that could be affected by the project; and o seepage from water storages or backfilled voids on site;</p> <ul style="list-style-type: none"> • a plan to respond to any exceedances of the groundwater assessment criteria; • emergency contingency plans for implementation in the event that the groundwater is encountered during excavation; and • audit and reporting procedures, including comparisons of the monitoring results each calendar year and quarterly reporting of groundwater monitoring results, 				
<p>The Applicant shall implement the approved management plan as approved from time to time by the Secretary.</p>	No	<p>There is no commitment to implement the condition or if there is a separate plan.</p>	<p>Include a commitment to implement the approved management plan as approved from time to time by the Secretary.</p>	<p>The GMP has been included as an attachment to this report.</p>
<p>Groundwater Monitoring</p> <p>45. The Applicant shall prepare a Groundwater Monitoring Program for the development to the satisfaction of the Secretary. This program must:</p> <p>(a) be prepared in consultation with DPIE Water and be submitted to the Secretary for approval within four months of the date of approval of Modification 2;</p>	No	<p>The plan has no information to address the condition.</p>	<p>Include details to address condition 45.</p>	<p>The GMP has been included as an attachment to this report.</p>

Document: Water Management
Schedule 2 Condition 44 B Surface Water Management Plan
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<i>Surface Water Management</i>	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
<p>(b) include proposed construction of a network of at least five active monitoring bores around the southeastern, southern, western and north-western boundaries of the extraction area (but outside of the overall extraction footprint) in proximity to extraction Phases 1 to 6 as identified in Modification 2, to collect continuous groundwater level monitoring data from the regional aquifer;</p> <p>(c) include proposed construction to deepen (or replace) PT84MW1 in order that a bore in that general location monitors the regional aquifer; and</p> <p>(d) include proposed construction of active monitoring bores within the largest components of at least the two forthcoming extraction Phases (on a rolling basis), each to collect at least 2 years of continuous baseline groundwater monitoring data prior to extraction commencing with that Phase.</p>				
<p>46. The results of the Groundwater Monitoring Program shall be reported the Department and DPIE Water, using contour plans depicting the surface topography, updated contour maps of the wet weather high groundwater level of the regional aquifer and proposed depth of extraction for each extraction Phase. Reporting is to occur on a six monthly basis for the duration of extractive operations, and throughout rehabilitation of the site, unless otherwise agreed with the Secretary.</p>	No	There is no detail in the plan to confirm if results of the Groundwater Monitoring Program were reported to the Department.	Include details to confirm results of the Groundwater Monitoring Program were reported to the Department and will be reported throughout rehabilitation of the site	The GMP has been included as an attachment to this report.

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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
The Applicant shall implement the Groundwater Monitoring Program as approved from time to time by the Secretary.	No	The plan does not include the condition.	Include a commitment to implement the Groundwater Monitoring Program as approved from time to time by the Secretary.	The GMP has been included as an attachment to this report.
Process Water Dam Design and Construction 47. The Applicant must ensure that the Process Water Dam is designed and constructed in a manner that satisfies the design and construction criteria for the Process Water Dam as developed under the Surface Water Management Plan (see condition 42(b) above).	No	There is broad detail in section 4.2 and section 7 to confirm if the Process Water Dam was designed and constructed in a manner that satisfies the design and construction criteria	Include information to confirm if the Process Water Dam was designed and constructed in a manner that satisfies the design and construction criteria	The Process Dam Design and Construction (Section 4.14) has been updated.
Revision of Strategies, Plans and Programs 67. Within 3 months of the submission of: (a) an annual review under Condition 66 above; (b) an incident report under Condition 68 below; (c) an audit report under Condition 70 below; or (d) any modification to the conditions of this Consent (unless the conditions require otherwise), the Applicant shall review, and if necessary revise, the strategies, plans, and programs required under this Consent to the satisfaction of the Secretary.	No	Plan does not include the condition.	Include the requirements of condition 67.	The revision of the plan is addressed in Section 4.19.

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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
<p>Where this review leads to revisions in any such document, then within 4 weeks of the review, unless the Secretary agrees otherwise, the revised document must be submitted to the Secretary for approval.</p> <p>Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.</p>				
<p>REPORTING AND AUDITING</p> <p>Incident Notification</p> <p>68. The Applicant must immediately notify the Department and any other relevant agencies immediately after it becomes aware of an incident. The notification must be in writing via the Major Projects Website and identify the development (including the development application number and name) and set out the location and nature of the incident.</p>	No	Plan does not include condition	Include the requirements of condition 68	Section 4.10 addresses incident notification.
<p>Non-Compliance Notification</p> <p>68A. Within seven days of becoming aware of a non-compliance, the Applicant must notify the Department of the non-compliance. The notification must be in writing via the Major Projects Website and identify the development (including the development application</p>	No	Plan does not include requirements of the condition	Include requirements of condition 68A	Section 4.9.4 addresses non-compliance notification.

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Revision: Revision
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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
number and name), set out the condition of this 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				
Regular Reporting 69. The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this Consent.	No	Plan does not include the condition.	Include the requirement of condition 69	Section 4.18 addresses reporting requirements.
Independent Environmental Audit 70. Every 3 years from the date of this consent and at the completion of works under this consent, unless the Secretary directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must: (a) be 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;	No	Plan does include details of the audit conducted	Include requirements consistent with condition 70	Section 1.8 addresses the independent audit. The audit is available on the company website www.vgt.com.au/hodgsons

Document: Water Management
Schedule 2 Condition 44 B Surface Water Management Plan
Revision: Revision
Reviewed: "Charissa Pillay in April 2022"

Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
<p>(c) assess the environmental performance of the development and assess whether it is complying with the requirements in this Consent and any relevant EPL (including any assessment, plan or program required under these approvals);</p> <p>(d) review the adequacy of strategies, plans or programs required under the abovementioned approvals; and</p> <p>(e) recommend appropriate measures or actions to improve the environmental performance of the development, and/or any assessment, plan or program required under the abovementioned approvals. Note: This audit team must be led by a suitably qualified auditor and include experts in any field specified by the Secretary.</p>				
<p>71. Within 6 weeks of the completion of this audit, unless the Secretary agrees otherwise, the Applicant shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.</p>	No	Plan does not include a copy of the audit.	Include a copy of the audit and evidence of submission to the Secretary.	As above Evidence of submission is included in the Response
<p>ACCESS TO INFORMATION</p> <p>72. By 30 June 2016 the Applicant shall:</p> <p>(a) make copies of the following publicly available on its website:</p> <ul style="list-style-type: none"> the documents identified in Condition 2(a) above; 	No	Plan does not include the requirements of the condition.	Include the requirements of condition 72.	All documents are available on the company website. www.vgt.com.au/hodgsons

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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
<ul style="list-style-type: none"> • current statutory approvals for the development; • approved strategies, plans and programs required under the conditions of this Consent; • a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this Consent, or any approved plans and programs; • a complaints register, which is to be updated monthly; • the annual reviews of the development (for the last 5 years, if applicable); • any independent environmental audit of the development, and the Applicant's response to the recommendations in any audit; • any other matter required by the Secretary; and (b) keep this information up-to-date, to the satisfaction of the Secretary. 				
NRAR				
Dear Lisa, Re: Roberts Road Maroota Sand Quarry Surface Water Management Plan (DA267-11- 99-PA-11) .	Closed		Thank you for giving the Department of Planning, Industry and Environment – Water (DPIEWater) and Natural Resources Access Regulator (NRAR) the opportunity to review	

Document: Water Management
Schedule 2 Condition 44 B Surface Water Management Plan
Revision: Revision
Reviewed: " Charissa Pillay in April 2022"

Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
			Roberts Road Maroota Sand Quarry Surface Water Management Plan (DA267-11-99-PA-11). DPIE-Water and NRAR have no comments. 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	
Independent Audit				
Schedule 2, Condition 42 – Non-compliance Water Management Plan	Closed	The most current Water Management Plan is dated 20 March 2018. This was received and acknowledged by DPIE.	Recommendation The Water Management Plan has not been subject to annual review in consultation with DPIE-W for the three years from the date of approval of Mod 2. The current version is dated 20 March 2018. The Water Management Plan should be updated in consultation with DPIE-W in order to meet this requirement, and then subject to ongoing review as agreed by the Secretary.	As the plan has been reviewed by DPE Water and NRAR – no further comments- Closed

Document: Water Management
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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Schedule 2, Condition 45 – Non-compliance Process Water Dam Design and Construction 45. The Applicant must ensure that the Process Water Dam is designed and constructed in a manner that satisfies the design and construction criteria for the Process Water Dam as developed under the Surface Water Management Plan (see condition 42(b) above).	Open	The Surface Water Management Plan has been revised to address this condition (refer Section 8 of the SWMP), however Section 8.2 of the SWMP contains conflicting recommendations with respect to the requirement to consult with the Dam Safety Committee and the requirement for assessment by a suitably qualified engineer.	Recommendation Section 8.2 of the SWMP contains conflicting measures regarding consultation with the NSW Dams Safety Committee and the assessment of the dam construction by a suitably qualified engineer. It is recommended that the SWMP be reviewed and updated to clearly detail and explain why the NSW Dam Safety Committee and engineering input is not required as per the condition Include evidence from the Resources Regulator on Dam Safety as discussed in section 7.2.	Addressed in Section 4.14.4
Table 5: 2014 – 2017 Audit Recommendations and Action Status 9. Engage a suitably qualified engineer to assess the designed and construction of the Process Water Dam. Consult with Dam Safety Committee to ensure dam construction compliance.	Open	Some additional commentary provided in Section 8 of the revised Surface Water Management Plan dated 20.3.2018, however not adequately addressed.	Outstanding Engage a suitably qualified engineer to assess the designed and construction of the Process Water Dam. Consult with Dam Safety Committee to ensure dam construction compliance	As above
Table 6: 2019 Annual Review Actions and Recommendations	Open	To be completed once MOD 4 is approved	Outstanding	The SWMP has been updated to include the Mod 3&4 details.

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Revision: Revision
Reviewed: “ Charissa Pillay in April 2022”

Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Water Management Plans to be implemented and updated to include impact criteria.			Include Approved Modification 4 details.	
General				
The post approval details trigger on the Major portal states the <i>WMP required to be updated annually. Main changes are around safety and engineering requirements for the Process Dam. An explanation has been included as to why these are no longer required in Section 7.2.</i>	Open	Upon reading the plan, details of the independent audit undertaken was noted.	Include details of when the audit was carried out. Update the plan to include modification 4 and modification 3 details	The updated SWMP contains details of the date the audit was carried out (Section 1.6) and provides links to the company website where the audits and Response Reports are available. The SWMP has been updated to include the Mod 3&4 details.

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Schedule 2 Condition 44 B Surface Water Management Plan

Revision: Revision

Reviewed: " Charissa Pillay in April 2022"

Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
<p>Water Management Plan</p> <p>44. The Applicant shall prepare a Water Management Plan for the development to the satisfaction of the Secretary. This plan must be prepared in consultation with DPIE Water by suitably qualified and experienced person/s whose appointment has been approved by the Secretary, and be submitted to the Secretary for approval by 31 December 2016. The plan must be updated on an annual basis in consultation with DPIE Water for three years from the date of approval of Modification 2 and thereafter as agreed with by the Secretary.</p>	Yes	This Report, Appendix C, Section 1.5	-	
<p>In addition to the standard requirements for management plans (see Condition 65), this plan must include a:</p> <p>(a) Site Water Balance that:</p> <ul style="list-style-type: none"> • includes details of: <ul style="list-style-type: none"> o sources and security of water supply, including contingency planning; o water use on site; o water management on site, including groundwater inflows to the quarry voids and site discharges; and 	Yes	Section 4 and section 10 addresses the requirement.	-	

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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
o audit and reporting procedures, including comparisons of the site water balance each calendar year; and o describes the measures that would be implemented to minimise clean water use on site and maximise recycling opportunities;				
Surface Water Management Plan, that includes:				
• a detailed description of the surface water management system on site, including the:				
o clean water diversion systems; o erosion and sediment controls; o effluent irrigation system; o water transfers from the extraction areas; o water storages; and o discharge points;	Yes	Section 3 include sufficient information. Section 6 includes details of a proposed water management system. It is unclear of this is an existing system as work is currently being carried out. Section 8 addresses erosion and sediment control.	Use of words such as “proposed” suggest mitigations have not been implemented. Include committed mitigation measures.	References to ‘Proposed’ have been removed from the SWMP update.
• design objectives and performance criteria for proposed:	Yes	Section 9 addresses the requirement.	-	
o erosion and sediment control structures;				
o water storages, including quarry voids;				
o site discharges; and;				

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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
o control of water pollution from rehabilitated areas of the site				
<ul style="list-style-type: none"> performance criteria, including trigger levels for investigating any potentially adverse impacts for surface water quality; 	Yes	Section 9 addresses the requirement.	-	
<ul style="list-style-type: none"> a program to monitor: 				
o the effectiveness of the water management system;	Yes	Section 10 includes broad details of monitoring of site water management system. Section 10 does not include details of who will be responsible for monitoring erosion and sediment, and surface water.	<p>Include a program with details of monitoring the elements discussed in section 6.</p> <p>Include who will be responsible for monitoring and the reporting procedures.</p>	Section 4.9.3 of the updated SWMP outlines the monitoring elements and responsibilities.
o site discharge water quality; and	Yes	See above, section 10 does not include who will be responsible for monitoring or reporting procedure.	Include the responsible person for surface water.	Section 4.9.3 of the updated SWMP outlines the monitoring elements and responsibilities. Section 4.18 outlines the reporting responsibilities
o surface water level and quality in the Process Water Dam, including the quantification of rainfall inflow, groundwater inflow and evaporation;	Yes	Section 10.2 includes broad details of the monitoring undertaken in sediment basin 1 and process dam levels.	Include details to confirm that the logger will monitor the requirements consistent with the condition. Include who will review the results.	Section 4.9.3 of the updated SWMP outlines the monitoring elements and responsibilities.

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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
<ul style="list-style-type: none"> • a plan to respond to any exceedances of the performance criteria, and mitigate and/or offset any adverse surface water impacts of the project; 	Yes	Section 9 includes actions to mitigate any adverse surface water impacts of the project. There are no response details to any exceedances on the described potential adverse outcome	Include a response plan when an exceedance occurs.	Section 4.18 outlines the review and reporting responsibilities. Section 4.19 outlines who will be responsible for reviews of the SWMP
<ul style="list-style-type: none"> • long term water quality management objectives and the measures to achieve these objectives; 	Yes	How often will the testing of the dam water discussed in Section 6.6 be undertaken?	Include details on who will undertake testing and how often	The response plan has been updated. See Sections 4.8 and 4.11.
<ul style="list-style-type: none"> • a plan that ensures surface stormwater runoff from the disturbed areas is directed to the sedimentation dam(s); 	Yes	Section 3 and Figure Two addresses the requirement. Section 6.2 addresses the requirement.	-	-
<ul style="list-style-type: none"> • a plan that ensures tailgate drainage does not discharge into or onto any adjoining public or Crown road, any other persons land, any Crown land, any river, creek or watercourse, any groundwater aquifer, any native vegetation as described under the Native Vegetation Conservation Act 1997 and any wetlands of environmental significance; 	Yes	Section 6.7 discusses the unlikely event of tailgate to discharge due to low moisture. The condition requires a plan to ensure tailgate drainage does not discharge into or onto any adjoining public or Crown road.	Include measures such as: <ul style="list-style-type: none"> - Visual/regular inspections - inspection when trucks exit site - Sediment controls at site exit 	Section 4.13 has been updated.

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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
<ul style="list-style-type: none"> • a detailed description of design and construction criteria for the Process Water Dam based on a feasibility study of 				
<ul style="list-style-type: none"> o capacity to construct multiple cells within the overall dam footprint (ie a two stage or three stage dam); 	Yes	It is unclear if the condition is addressed in section 4.2 or section 7.	Include details to confirm the process dam has capacity of multiple cells.	The Process Dam Design and Construction (section 4.14) has been updated. As discussed in the plan it has been determined that a multiple cell construction is not required. The dam is currently hydraulically separated from the groundwater as determined by the Groundwater Study and the GMP and therefore does not require clay lining
<ul style="list-style-type: none"> o whether the dam floor and walls are able to be effectively lined with compacted clay (especially for multiple cells); 	-	See above	Include details to confirm dam floors are lined with compacted clay	-
<ul style="list-style-type: none"> o whether effective hydraulic separation can be achieved between such cells; 	-	As above	Include details if there is hydraulic separation can be achieved between such cells.	-
<ul style="list-style-type: none"> o rehabilitating such cells to create a single dam within the final landform; and 	-	Section 7 contains broad information, and it is unclear if the cells have been or are	Include details to confirm if the cells have been or are rehabilitated to create a single dam within the final landform	-

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<i>Surface Water Management</i>	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
		rehabilitated to create a single dam within the final landform.		
o the appropriateness of diverting runoff received from off-site around the dam;	Yes	Section 7 does not include details on diverting runoff off-site around the dam.	Include information on diverting runoff received from off-site around the dam;	Addressed in Section 4.1 and 4.14.5
a strategy for the decommissioning of water management structures, including storage, sedimentation and leachate dams once extraction is complete; and	Yes	Section 6.10 addresses most of the condition however there is no detail on leachate dams	Include details on the location of leachate dams and the strategy for decommissioning of leachate dams.	There are no leachate dams on the site. Section 4.15 has been updated to reflect this.
audit and reporting procedures, including comparisons of the monitoring results each calendar year and quarterly reporting of surface water monitoring results;	yes	Section 10.4 does not include comparisons of monitoring results in the reviews. There is no information on quarterly reporting of surface water monitoring results	Include a commitment to review a comparison of the monitoring results each calendar year. Include details to confirm if quarterly reporting of surface water monitoring results are undertaken.	Section 4.18 updates the Audit and Reporting procedures to include reference to the Annual Review where the comparison of water monitoring results are discussed.
(b) Groundwater Management Plan that takes into account the Web-based Reporting Guideline (DPE 2015) and Groundwater Monitoring and Modelling Plans – Information for Prospective Mining and Petroleum Exploration Activities (DPI 2014), and includes:	Partial	Section 7 includes broad details on the condition. There is no Ground Water Management Plan attached to the WMP.	Include a summary to confirm all the requirements have been addressed.	The GMP has been included as an attachment to this report.

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<i>Surface Water Management</i>	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
<ul style="list-style-type: none"> • detailed baseline data on groundwater yield and quality in groundwater bores on privately owned land, that could be affected by the project; • a program to undertake surveyed probe testing of all extracted areas where clay fines have been deposited to: <ul style="list-style-type: none"> o accurately determine the depth of extraction and depth of clay fines; o identify any ongoing intersection or other interaction between clay fines and the regional groundwater aquifer; o identify any geotechnical characteristics of the emplaced clay fines which may pose risks to workplace safety or implementation of the process water dam design or the final landform; and o identify measures which can be successfully used in rehabilitating these areas; • a program to monitor potential groundwater quality impacts to the regional aquifer from receiving off-site runoff water in the Process Water Dam; • groundwater assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts, in accordance with the NSW Aquifer Interference Policy; • a program to monitor: <ul style="list-style-type: none"> o the impacts of the project on: - groundwater inflows to water storages; - any groundwater bores on privately-owned 	<p>Partial</p>	<p>It is unclear if the requirements of the condition are addressed.</p> <p>Section 4 of the ground water monitoring program provides broad details on depth of extraction and depth of clay fines.</p> <p>There are no details if measures can be successfully used in rehabilitating these areas;</p> <p>It is unclear if there is emergency contingency plans for implementation in the event</p>	<p>Include details on depth of extraction and depth of clay fines.</p> <p>Include measures that were identified to be used in successfully rehabilitating areas,</p> <p>Include details of emergency contingency plans for implementation in the event that</p>	

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<i>Surface Water Management</i>	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
<p>land that could be affected by the project; and o seepage from water storages or backfilled voids on site;</p> <ul style="list-style-type: none"> • a plan to respond to any exceedances of the groundwater assessment criteria; • emergency contingency plans for implementation in the event that the groundwater is encountered during excavation; and • audit and reporting procedures, including comparisons of the monitoring results each calendar year and quarterly reporting of groundwater monitoring results, 		<p>that the groundwater is encountered during excavation</p> <p>There are no details on the comparisons of the monitoring results each calendar year and quarterly reporting of groundwater monitoring results</p>	<p>the groundwater is encountered during excavation</p> <p>Update plan to commit to compare monitoring results each calendar year and quarterly report on ground monitoring results.</p>	
<p>The Applicant shall implement the approved management plan as approved from time to time by the Secretary.</p>	No	<p>There is no commitment to implement the condition or if there is a separate plan.</p>	<p>Include a commitment to implement the approved management plan as approved from time to time by the Secretary.</p>	<p>The GMP has been included as an attachment to this report.</p>

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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
<p>Groundwater Monitoring</p> <p>45. The Applicant shall prepare a Groundwater Monitoring Program for the development to the satisfaction of the Secretary. This program must:</p> <p>(a) be prepared in consultation with DPIE Water and be submitted to the Secretary for approval within four months of the date of approval of Modification 2;</p> <p>(b) include proposed construction of a network of at least five active monitoring bores around the southeastern, southern, western and north-western boundaries of the extraction area (but outside of the overall extraction footprint) in proximity to extraction Phases 1 to 6 as identified in Modification 2, to collect continuous groundwater level monitoring data from the regional aquifer;</p> <p>(c) include proposed construction to deepen (or replace) PT84MW1 in order that a bore in that general location monitors the regional aquifer; and</p> <p>(d) include proposed construction of active monitoring bores within the largest components of at least the two forthcoming extraction Phases (on a rolling basis), each to collect at least 2 years of continuous baseline groundwater monitoring data prior to extraction commencing with that Phase.</p>	Yes	The plan has no information to address the condition.	Include details to address condition 45.	The GMP has been included as an attachment to this report.

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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
46. The results of the Groundwater Monitoring Program shall be reported the Department and DPIE Water, using contour plans depicting the surface topography, updated contour maps of the wet weather high groundwater level of the regional aquifer and proposed depth of extraction for each extraction Phase. Reporting is to occur on a six monthly basis for the duration of extractive operations, and throughout rehabilitation of the site, unless otherwise agreed with the Secretary.	Yes	There is no detail in the plan to confirm if results of the Groundwater Monitoring Program were reported to the Department.	Include details to confirm results of the Groundwater Monitoring Program were reported to the Department and will be reported throughout rehabilitation of the site Updated	
The Applicant shall implement the Groundwater Monitoring Program as approved from time to time by the Secretary.	Yes	The plan does not include the condition.	Include a commitment to implement the Groundwater Monitoring Program as approved from time to time by the Secretary. Updated	
Process Water Dam Design and Construction 47. The Applicant must ensure that the Process Water Dam is designed and constructed in a manner that satisfies the design and construction criteria for the Process Water Dam as developed under the Surface Water Management Plan (see condition 42(b) above).	Yes	There is broad detail in section 4.2 and section 7 to confirm if the Process Water Dam was designed and constructed in a manner that satisfies the design and construction criteria	Include information to confirm if the Process Water Dam was designed and constructed in a manner that satisfies the design and construction criteria	The Process Dam Design and Construction (Section 4.14) has been updated.
Revision of Strategies, Plans and Programs 67. Within 3 months of the submission of:	Yes	Plan does not include the condition.	Include the requirements of condition 67.	The revision of the plan is addressed in Section 4.19.

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<p>(a) an annual review under Condition 66 above; (b) an incident report under Condition 68 below; (c) an audit report under Condition 70 below; or (d) any modification to the conditions of this Consent (unless the conditions require otherwise), the Applicant shall review, and if necessary revise, the strategies, plans, and programs required under this Consent to the satisfaction of the Secretary.</p> <p>Where this review leads to revisions in any such document, then within 4 weeks of the review, unless the Secretary agrees otherwise, the revised document must be submitted to the Secretary for approval.</p> <p>Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.</p>				
<p>REPORTING AND AUDITING</p> <p>Incident Notification</p> <p>68. The Applicant must immediately notify the Department and any other relevant agencies immediately after it becomes aware of an incident. The notification must be in writing via the Major Projects</p>	Yes	Plan does not include condition	Include the requirements of condition 68	Section 4.10 addresses incident notification.

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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Website and identify the development (including the development application number and name) and set out the location and nature of the incident.				
Non-Compliance Notification 68A. Within seven days of becoming aware of a non-compliance, the Applicant must notify the Department of the non-compliance. The notification must be in writing via the Major Projects Website and identify the development (including the development application number and name), set out the condition of this consent that the development is non-compliant with, 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	Yes	Plan does not include requirements of the condition	Include requirements of condition 68A	Section 4.9.4 addresses non-compliance notification.
Regular Reporting 69. The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this Consent.	Yes	Plan does not include the condition.	Include the requirement of condition 69	Section 4.18 addresses reporting requirements.
Independent Environmental Audit 70. Every 3 years from the date of this consent and at the completion of works under this consent, unless the	Yes	Plan does include details of the audit conducted	Include requirements consistent with condition 70	Section 1.8 addresses the independent audit. The audit is available on the

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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
<p>Secretary directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:</p> <p>(a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;</p> <p>(b) include consultation with the relevant agencies;</p> <p>(c) assess the environmental performance of the development and assess whether it is complying with the requirements in this Consent and any relevant EPL (including any assessment, plan or program required under these approvals);</p> <p>(d) review the adequacy of strategies, plans or programs required under the abovementioned approvals; and</p> <p>(e) recommend appropriate measures or actions to improve the environmental performance of the development, and/or any assessment, plan or program required under the abovementioned approvals. Note: This audit team must be led by a suitably qualified auditor and include experts in any field specified by the Secretary.</p>				<p>company website www.vgt.com.au/hodgsons</p>
<p>71. Within 6 weeks of the completion of this audit, unless the Secretary agrees otherwise, the Applicant shall submit a copy of the audit report to the Secretary,</p>	Yes	Plan does not include a copy of the audit.	Include a copy of the audit and evidence of submission to the Secretary.	As above Evidence of submission is included in the Response

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<i>Surface Water Management</i>	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
together with its response to any recommendations contained in the audit report.				
<p>ACCESS TO INFORMATION</p> <p>72. By 30 June 2016 the Applicant shall:</p> <p>(a) make copies of the following publicly available on its website:</p> <ul style="list-style-type: none"> • the documents identified in Condition 2(a) above; • current statutory approvals for the development; • approved strategies, plans and programs required under the conditions of this Consent; • a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this Consent, or any approved plans and programs; • a complaints register, which is to be updated monthly; • the annual reviews of the development (for the last 5 years, if applicable); • any independent environmental audit of the development, and the Applicant's response to the recommendations in any audit; • any other matter required by the Secretary; and (b) keep this information up-to-date, to the satisfaction of the Secretary. 	Yes	Plan does not include the requirements of the condition.	Include the requirements of condition 72.	<p>All documents are available on the company website. www.vgt.com.au/hodgsons</p> <p>There needs to be details in the plan to confirm this, however I will accept this.</p>

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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
NRAR				
Dear Lisa, Re: Roberts Road Maroota Sand Quarry Surface Water Management Plan (DA267-11- 99-PA-11) .	Closed		Thank you for giving the Department of Planning, Industry and Environment – Water (DPIEWater) and Natural Resources Access Regulator (NRAR) the opportunity to review Roberts Road Maroota Sand Quarry Surface Water Management Plan (DA267-11-99-PA-11). DPIE-Water and NRAR have no comments. 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	
Independent Audit				
Schedule 2, Condition 42 – Non-compliance Water Management Plan	Closed	The most current Water Management Plan is dated 20 March 2018. This was received and acknowledged by DPIE.	Recommendation The Water Management Plan has not been subject to annual review in consultation with DPIE-W for the three years from the date of approval of Mod 2. The current	As the plan has been reviewed by DPE Water and NRAR – no further comments- Closed

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<i>Surface Water Management</i>	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
			version is dated 20 March 2018. The Water Management Plan should be updated in consultation with DPIE-W in order to meet this requirement, and then subject to ongoing review as agreed by the Secretary.	
Schedule 2, Condition 45 – Non-compliance Process Water Dam Design and Construction 45. The Applicant must ensure that the Process Water Dam is designed and constructed in a manner that satisfies the design and construction criteria for the Process Water Dam as developed under the Surface Water Management Plan (see condition 42(b) above).	Closed	The Surface Water Management Plan has been revised to address this condition (refer Section 8 of the SWMP), however Section 8.2 of the SWMP contains conflicting recommendations with respect to the requirement to consult with the Dam Safety Committee and the requirement for assessment by a suitably qualified engineer.	Recommendation Section 8.2 of the SWMP contains conflicting measures regarding consultation with the NSW Dams Safety Committee and the assessment of the dam construction by a suitably qualified engineer. It is recommended that the SWMP be reviewed and updated to clearly detail and explain why the NSW Dam Safety Committee and engineering input is not required as per the condition Include evidence from the Resources Regulator on Dam Safety as discussed in section 7.2.	Addressed in Section 4.14.4
Table 5: 2014 – 2017 Audit Recommendations and Action Status	Closed	Some additional commentary provided in Section 8 of the revised Surface Water Management Plan dated	Outstanding Engage a suitably qualified engineer to assess the designed and construction of the Process	As above

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Surface Water Management	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
9. Engage a suitably qualified engineer to assess the designed and construction of the Process Water Dam. Consult with Dam Safety Committee to ensure dam construction compliance.		20.3.2018, however not adequately addressed.	Water Dam. Consult with Dam Safety Committee to ensure dam construction compliance	
Table 6: 2019 Annual Review Actions and Recommendations Water Management Plans to be implemented and updated to include impact criteria.	Closed	To be completed once MOD 4 is approved	Outstanding Include Approved Modification 4 details.	The SWMP has been updated to include the Mod 3&4 details.
General				
The post approval details trigger on the Major portal states the <i>WMP required to be updated annually. Main changes are around safety and engineering requirements for the Process Dam. An explanation has been included as to why these are no longer required in Section 7.2.</i>	Closed	Upon reading the plan, details of the independent audit undertaken was noted.	Include details of when the audit was carried out. Update the plan to include modification 4 and modification 3 details	The updated SWMP contains details of the date the audit was carried out (Section 1.6) and provides links to the company website where the audits and Response Reports are available. The SWMP has been updated to include the Mod 3&4 details.

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<i>Surface Water Management</i>	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response

8th May 2022

Dear Charissa,

The submitted report was a Surface Water Management Plan. Please confirm whether you have received the approved, unchanged Groundwater Management Plan and Groundwater Monitoring Program as attached to the Appendix of the Surface Water Management Plan. Also within that Appendix is the approval letter.

As required by the consent, all Groundwater monitoring data is available on a public website (www.vgt.com.au/hodgsons) and in each Annual Review.

Regards
Lisa Thomson

0427334471

From: [Charissa Pillay](#)
To: [Submissions](#)
Cc: [Lisa Thomson](#); [hodgsonquarries](#)
Subject: RE: Roberts Road Quarry - Water Management Plan DA267-11-99-PA-11 – Request for Information
Date: Wednesday, 22 June 2022 10:15:27 PM
Attachments: [image005.png](#)
[image001.png](#)
[image002.png](#)
[image013.png](#)
[image014.png](#)
[image015.png](#)
[image016.png](#)
[image017.png](#)
[image018.png](#)

Hi Lisa

Please submit a plan in accordance with the post approval requirements.

If you would like a Surface Water Management Plan assessed please only submit a plan to address the surface water conditions of approval.

In addition to the above, please provide specific details under the post approval details tab the reason for submission.

The Department can only review and approve documents submitted through the portal for assessment. If there are any other plans embedded in the one plan submitted, then those plans are also subject to being assessed.

Regards

Charissa Pillay
Senior Planning Officer – Post Approvals
Energy and Resources
Department of Planning and Environment
T 02 99955944 E: charissa.pillay@planning.nsw.gov.au

Level 16, 4PSQ,
12 Darcy Street
Parramatta, NSW, 2150

Working days Monday, Tuesday, Thursday and Friday



Department of Planning and Environment





I acknowledge the traditional custodians of the land and pay respects to Elders past and present. I also acknowledge all the Aboriginal and Torres Strait Islander staff working with NSW Government at this time.

Please consider the environment before printing this email.

From: Submissions <Submissions@vgt.com.au>
Sent: Wednesday, 22 June 2022 8:49 AM
To: Charissa Pillay <Charissa.Pillay@planning.nsw.gov.au>
Cc: Lisa Thomson <Lisa@vgt.com.au>; hodgsonquarries <hodgsonquarries@gmail.com>
Subject: RE: Roberts Road Quarry - Water Management Plan DA267-11-99-PA-11 – Request for Information

Dear Charissa,

Thankyou for your phone call on Friday 17th June.

Your confirmation in writing that you require the Groundwater Management Plan to be removed from the Surface Water Management Plan would be greatly appreciated.

Regards,
Lisa Thomson
BAppSc, CChem

Phone: (02) 4028 6412 | Mobile: 0427 334471
www.vgt.com.au



From: no-reply@majorprojects.planning.nsw.gov.au <no-reply@majorprojects.planning.nsw.gov.au>
Sent: Friday, 17 June 2022 10:45 AM
To: Submissions <Submissions@vgt.com.au>
Cc: Charissa.Pillay@planning.nsw.gov.au
Subject: Roberts Road Quarry - Water Management Plan DA267-11-99-PA-11 – Request for Information

Dear Lisa Thomson,

I refer to your response to the Department's request for information on the Roberts Road Quarry - Water Management Plan.

The Department is requesting you provide additional information before accepting your response.

Please access your profile for details of this request and to upload your revised response. You are requested to provide this response by 24/06/2022 .

If you have any enquiries, please contact Charissa Pillay at Charissa.Pillay@planning.nsw.gov.au .

To sign in to your account click [here](#) or visit the [Major Projects Website](#).

Please do not reply to this email.

Kind regards

The Department of Planning and Environment



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Stuart Reed
Environmental Officer
Hodgson Quarries and Plant Hire Pty Ltd
PO Box 1778
Gosford New South Wales 2250

28/06/2022

Dear Mr. Reed

**Roberts Road Quarry - (DA267-11-99)
Water Management Plan**

Thank you for submitting the Water Management Plan which was submitted in accordance with Condition 44 of Schedule 2 of the consent for the Roberts Road Quarry (DA267-11-99-PA-11).

The Department has carefully reviewed the document and is satisfied that it generally meets the requirements of the condition.

Accordingly, the Secretary has approved the Water Management Plan (Revision F2, dated June 2022). Please ensure that the approved plan is placed on the project website at the earliest convenience.

If you wish to discuss the matter further, please contact Charissa Pillay on 02 99955944.

Yours sincerely

A handwritten signature in black ink that reads 'Wayne Jones'.

Wayne Jones
Team Leader - Post Approval
Resource Assessments

As nominee of the Secretary



Beyond Compliance

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