

Hanson Construction Materials Pty Ltd



Sediment and Erosion Control Plan:

Bass Point Quarry Project

P0902486JR06V01
June 2010

ENVIRONMENTAL



WATER



WASTEWATER



GEOTECHNICAL



CIVIL



PROJECT
MANAGEMENT



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1 Introduction

1.1 Background and Scope

The purpose of this report is to provide a Sediment and Erosion Control Plan (SECP) for Hanson's Bass Point Quarry located at Bass Point Road, Bass Point, NSW. The report was completed to form part of an Environmental Assessment (EA) to accompany an application for project approval under Part 3A of the *Environmental Planning and Assessment Act* (1979).

This report should be read in conjunction with Marten and Associates Surface Water Assessment and Stormwater Management Scheme for the project (report #P0902486JR04V01, February).

1.2 Objectives

Scope of the SECP is as follows:

1. Review sediment generation characteristics under both existing and proposed site conditions.
2. Review adequacy of existing SECP measures.
3. Assess SECP requirements for the proposed-development.
4. Size and locate necessary sediment and erosion control structures (SECS's).
5. Provide recommendations relating to sediment and erosion control for on-going site management.
6. Prepare engineering plan-set that outlines the location and management of required sediment and erosion control structures.

1.3 Approved-Development

The following extraction has been previously approved on the site:

- Extraction to 15 mAHD across whole site (Figure 1).
- Extraction to 7.5 mAHD across zones 1 to 7 (Figure 1).
- Extraction to 0 mAHD across zones 1 to 6 (Figure 1).

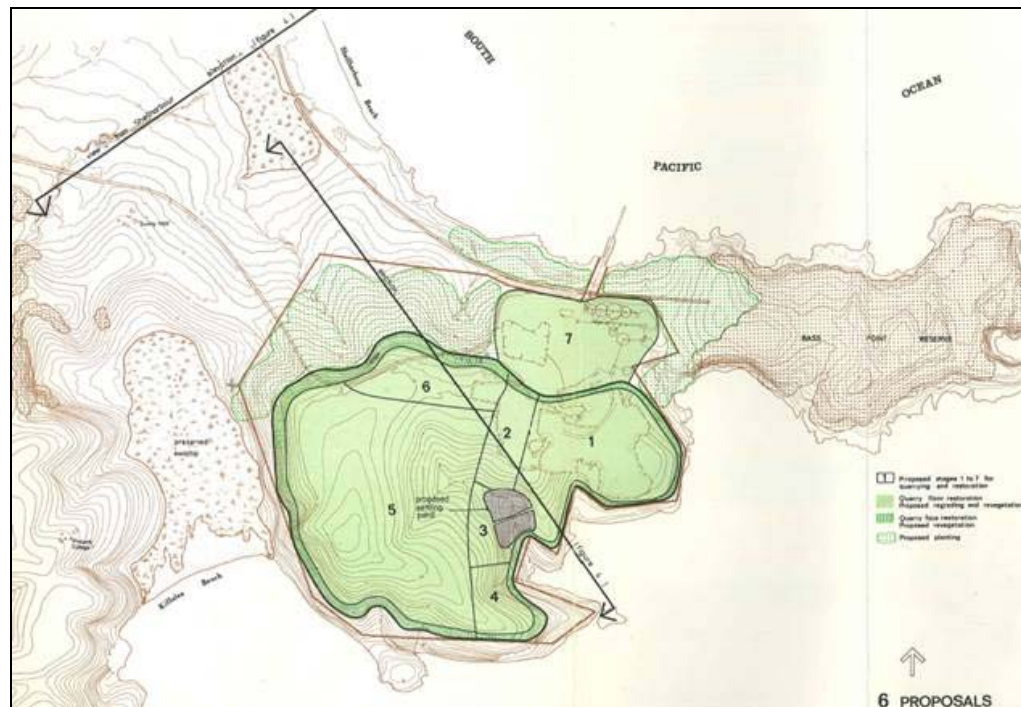


Figure 1: Approved extraction levels for site.

1.4 Proposed Development

1.4.1 Overview

Proposed development at the site is summarised as follows (Figure 2 and Attachment A – sheet 2):

1. Decommissioning of the existing processing plant and replacement with a new processing plant.
2. Relocation of the existing concrete plant, office, workshop and amenities.
3. Deepening of the western extraction area from the approved level (DA79/81 am) of 0 mAHD to -40 mAHD.
4. Reconfiguration of a bund approved by Shellharbour City Council under D947/2002.
5. Deepening of the eastern extraction area from the approved level of - 50 feet (DA98/73) to -40 mAHD.

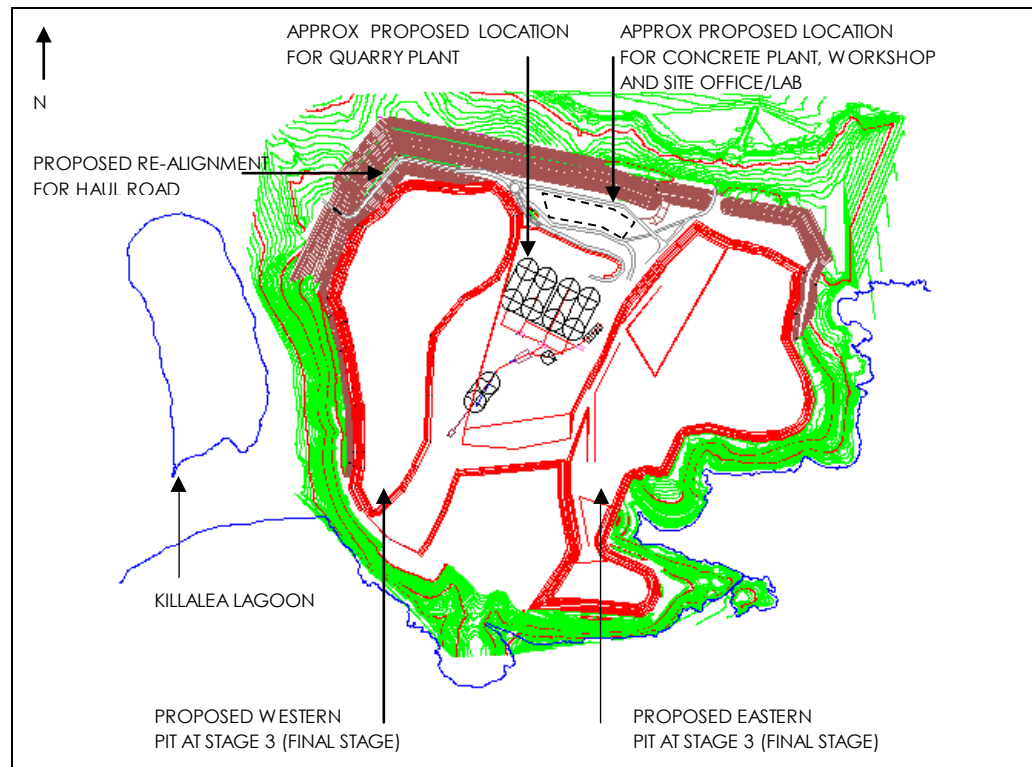


Figure 2: Proposed quarry pits and surrounding infrastructure.

1.4.2 Proposed Extraction Stages

Review of extraction stages proposed by the client (summarised in Attachment A) indicated a need for modification in order to generate neutral or beneficial impact when compared to the already approved-development. The recommended schedule requires extraction works to progress in two phases as follows:

1. Phase 1 - Extract resource to maximum depth of -40 mAHD within western pit. During this time the eastern pit is inactive.
2. Phase 2 - Once the resource is exhausted within the western pit, extraction ceases. Groundwater will then no longer be dewatered from this pit and will rise to approximately 0 mAHD. Extraction within the eastern pit proceeds to -40 mAHD.

1.5 Previous Investigations

A Surface Water Assessment and Stormwater Management Scheme (Martens and Associates, report # P0902486JR04V01, February) was prepared to form part of the EA. Water balances within this assessment were used to derive certain aspects of this SECP.

2 Site Description

2.1 Location and Landuse

The site (Lot 22 DP1010797) is located at Bass Point Quarry Road, Shellharbour, NSW and is within the Shellharbour Local Government Area. The site is located approximately 8 km north north east of Kiama and 2 km south east of Shellharbour on Bass Point. The site is bordered by Bass Point Reserve to the east, Killalea State Park to the west, the ocean to the south/north and Shell Cove (residential subdivision and boat harbour precinct) to the north west (Figure 3).

The primary site use is hard rock quarrying. The portion of grass land to the north of Bass Point Quarry Road accommodates a small number of cattle. A pistol club and concrete batching plant also operates on the site.



Figure 3: Aerial photograph of the site and surrounding environment (Google Earth, 2006).

2.2 Topography

Existing extraction pits collect stormwater from disturbed portions of the site. Undisturbed portions of the site drain either directly to the ocean to the north and south of the site, to Killalea Lagoon to the west of the site or to land to the north west of the site.

Based on the site survey (Attachment A) the invert level of the eastern pit is approximately 10 mAHD. The invert level of the western pit is approximately 16.7 mAHD. Natural ground levels on the site range from approximately 15 mAHD at the site's north western boundary to approximately 53.5 mAHD in the south of the site.

2.3 Site Surface Water

Detail of site surface waters is provided in Martens and Associates surface water report for the site (#P0902486JR04V01, 2010). Pertinent features are briefly described below.

Three unnamed drainage lines exist to the north of Bass Point Quarry Road which ultimately drain to the ocean based on 1:25,000 topographic mapping and the site survey (Figure 4). A fourth drainage line drains to the west of the site to Killalea Lagoon. Approximate catchment areas are 14.9, 7.4, 10.5 and 6.3 ha for drainage lines 1 to 4 respectively.

These drainage lines represent grassed depressions in topography. No channel was observed in the location of any of the drainage lines. Drainage Lines 1 – 3 have very similar characteristics (grassed depressions). Drainage Line 4 has other vegetation (in addition to grass) along its centre line. This vegetation is predominantly Lantana. Photographs of some of the drainage lines are provided in Attachment C.

There are 2 licensed stormwater outlets to the ocean (hereafter referred to as Discharge Point 1 (DP1) and Discharge Point 2 (DP2)). These release water from the pond receiving the process area runoff and a pond located at the southern end of the subject site which otherwise feeds the terminal pond. Figure 5 demonstrates the stormwater and sediment and erosion control at the subject site.

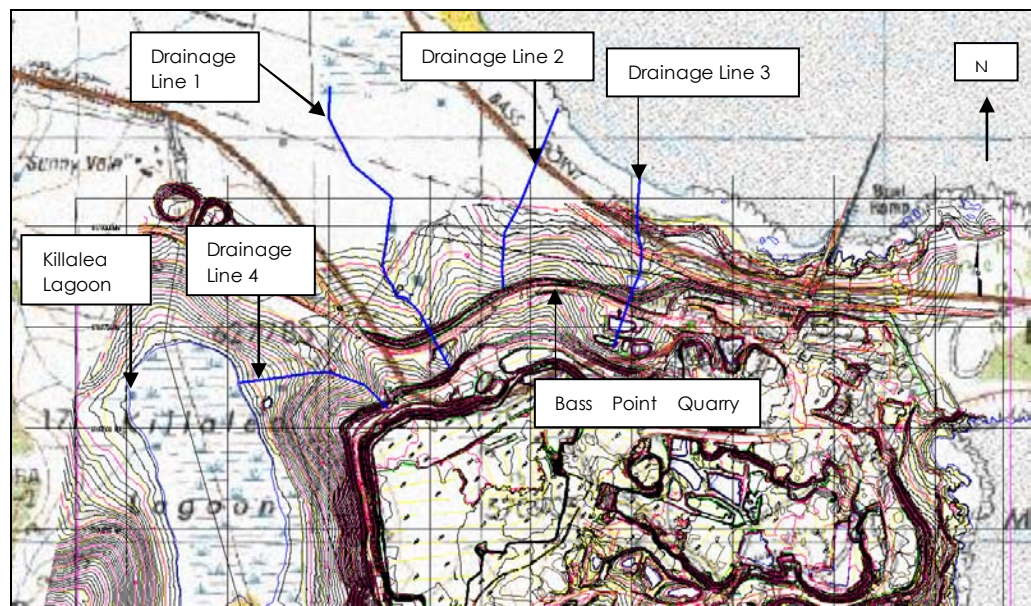


Figure 4: Unnamed drainage lines.

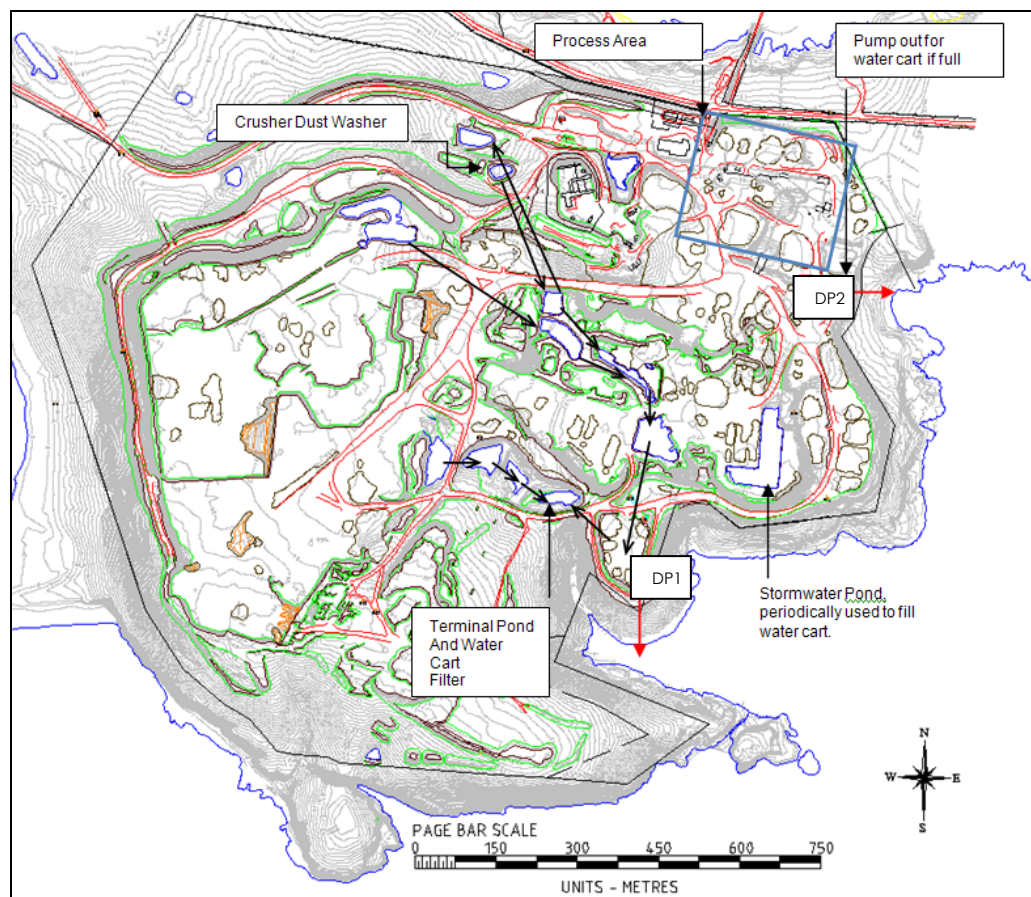


Figure 5: Stormwater and sediment and erosion control processes. Note red arrows indicate outlets; black arrows indicate movement of water through pumps and gravity flows.

2.4 Killalea Lagoon

2.4.1 Overview

Killalea Lagoon (Figure 4) is situated approximately 80 m west of the site's western boundary, approximately 230 m west of the proposed Stage 3 western extraction pit and approximately 250 m north of the ocean.

3 Sediment and Erosion Control Assessment

3.1 Stormwater and Groundwater Dewatering

Stormwater and groundwater dewatering will be required for Phase 1 and 2 in accordance with the schedule outlined in Table 1. This SECP is to address quality requirements for these discharge waters prior to release to receiving environments.

Table 1: Stormwater and groundwater dewatering schedule.

Phase	Western Pit Groundwater Dewatering (Y/N)	Western Pit Stormwater Dewatering (Y/N)	Eastern Pit Groundwater Dewatering (Y/N)	Eastern Pit Stormwater Dewatering (Y/N)
1	Y	Y	N	Y
2	N	N	Y	Y

3.2 Discharge Points

Under Environmental Protection License (EPL) #2193 the site has three discharge points (DP's) (Figure 5):

- DP1 – upstream end of the spillway pipe on drop cut dam.
- DP2 – Eastern side of quarry.
- DP3 – northern side of quarry.

The site EPL includes no load or concentration limits for discharge waters other than that for 'dam 7' which notes 'during dry weather conditions must not be de-watered if the TSS the discharge exceeds 50 mg/L'.

Review of the last 10 years of annual return information for DP3 indicates non-compliance for 4 years due to incomplete monitoring. No license data which relates to either DP2 or DP1 was found.

3.3 Adequacy of Existing SECS's

The site's EPL states that the licensee must comply with Section 120 of the Protection of the Environment Operations Act 1997 which states that 'A person who pollutes any waters is guilty of an offence'.

As the site's EPL lacks specific permissible load or concentration pollutant limit for discharge, it is unclear if existing SEC's are sufficient to satisfy site requirements.

3.4 Adopted Discharge Criteria

Based on Section 3.3 and prevailing industry practice the following discharge criteria are adopted for the proposed-development:

- TSS <50 mg/L.
- Oil and Grease < 5 mg/L and none visible on ponds prior to discharge.
- pH of 6.5 – 8.5.

3.5 Required Water Treatment Structures

3.5.1 Overview

Water treatment structures are to be provided to ensure that waters to be discharged to either the ocean or Killalea Lagoon are of appropriate quality. Requirements for each extraction phase are provided in Section 1.4.

3.5.2 Sedimentation Basins

Phase 1

1. Eastern Pit – stormwater collected within the eastern pit will be discharged to Killalea Lagoon after undergoing treatment within a sedimentation basin. Surplus waters will be discharged to the ocean (DP1 or DP2) after also undergoing sedimentation.

The sediment basin is proposed to be located within the eastern pit in a location where it is practical to grade the pit floor to. It is also desirable that the basin be as close as possible to the desired ocean discharge points (DP1 or DP2). The sedimentation basin will also act as the pit's sump.

Based on methods outlined in Landcom (2004) for sediment basin sizing for Type F soils, a 5 day design rainfall depth for Wollongong and an 85thile design rainfall depth, a sediment basin with a total volume of 29 ML will be required to treat stormwater flows in the eastern pit. This volume will comprise a settling zone volume of 19.5 ML and sediment storage volume of 9.7 ML. This volume will be accommodated by the site's storage reservoir.

Once the storage reservoir reaches capacity then excess waters will be pumped to the discharge point provided design discharge quality has been achieved. If design discharge quality has not been achieved then excess waters will be stored until discharge limits are achieved.

2. Western Pit – stormwater and groundwater collected from within the western pit will be required to be discharged after treatment. A sediment basin is proposed to be sited within the western pit in the southern part of the pit where the majority of groundwater ingress is anticipated, being closest to the ocean. This sedimentation basin will also act as the pit's sump.

Based on the same method of the sizing as used in Phase 1, a sediment basin with a total volume of 27.0 ML will be required to treat stormwater flows in the eastern pit. This volume will comprise a settling zone volume of 18.0 ML and sediment storage volume of 9.0 ML.

Once the sediment basin capacity is exceeded then excess waters will be pumped to the discharge point provided design discharge quality has been achieved. If design discharge quality has not been achieved then excess waters will be stored until discharge limits are achieved.

Waters for dust suppression are to be sourced from within the western pit's sedimentation basin.

Phase 2

Eastern Pit – a sedimentation basin will be required as per Phase 1, however, the basin is required to be of larger size to take into account the maximum modelled groundwater inflow rate. Based on the same method of sizing as used in Phase 1, a sediment basin with a total volume of 33.6 ML will be required to treat stormwater and groundwater flows in the eastern pit. This volume will comprise a settling zone volume of 22.4 ML and sediment storage volume of 11.2 ML.

Once the sediment basin capacity is exceeded excess waters will be pumped to the discharge point provided design discharge quality has been achieved. If design discharge quality has not been achieved then excess waters will be stored until discharge limits are achieved.

Waters for dust suppression are to be sourced from within the eastern pit's sedimentation basin.

3.5.3 Preliminary Sediment Basin Design

Sediment basins are to be designed at detailed design stage. Preliminary design for the basins is as follows:

- Length to width ratio of 3:1.

- Surface area of approximately 1 ha for the combined eastern pit storage reservoir/sediment basin. The maximum required average depth of 3.36 m will occur in Phase 2 and achieve the required total capacity of 33.6 ML. Note that a deeper or shallower pond is acceptable provided minimum depth of 1 m and adequate volume.
- Surface area of western pit sediment basin to be provided at detailed design stage. Area and depth will need to ensure a total capacity of 26.99 ML.
- Vertical side walls if rock permits.

3.5.4 Off-site Discharge to Killalea Lagoon

Killalea Lagoon recharge waters are to be transferred via pump/pipe to the site boundary after which the flow will pass down the existing drainage line and into the lagoon.

The recharge flow requirement will vary with the western pit's extraction level (see Martens report #P0902486JR04V01, 2010 for details). The maximum required recharge flow is 4.12 L/s.

3.6 Discharge Points and Discharge Point Licensing

3.6.1 Discharges from Eastern Pit to Ocean

It is proposed to make use of the already approved and licensed discharge points (DP1 and or DP2) to discharge excess waters from the eastern pit.

Current discharge point (DP1) and DP2) will be able to accommodate proposed discharge flow rates as it discharge directly onto latite rock adjacent (10 m) to the ocean.

Current discharge point (DP2) discharges from a sediment basin. Water then passes through/over a rubble wall then through vegetation/grass to the sea. This discharge point may require armouring. Armouring (if required) is to be designed at detailed design stage following a detailed inspection of the discharge point.

3.6.2 Discharges from Eastern Pit to Killalea Lagoon

Discharges from the eastern pit to Killalea Lagoon will be required to facilitate lagoon recharge. The proposed discharged point is shown in Attachment A. The proposed discharge point will need to be licensed under the Water Management Act (2000). As the maximum discharge flow will be only 4.1 L/s only minor local armouring will be required at the discharge point.

3.6.3 Discharges from the Western Pit

Excess waters (surface water and groundwater) from the western pit during Phase 1 will require discharging. As no licensed discharge point exists near the western pit a new discharge point is proposed. The proposed discharge point is shown in Attachment A. The proposed discharge point will need to be licensed under the Water Management Act (2000). The discharge point will be designed to discharge onto rock and therefore will not require armouring. Discharge point design is to be completed at detailed design stage.

3.6.4 Discharges from DP3 to Ocean

It is not proposed to use DP3 for the proposed-development.

3.6.5 Sediment Fencing

Disturbed areas of the site shall generally drain to either the western pit or the eastern pit sedimentation basin therefore sediment fencing is not considered necessary. The exception is the 'outside' batter of the fill mound. During construction; and prior to revegetation, sediment fencing as shown on the plan in Attachment A (sheet 2) shall be provided along the mound toe.

4 Recommendations

4.1 Sediment Basin Maintenance

The following procedures will take place to ensure the proper operation and maintenance of the sediment basin:

- The basin(s) will be inspected monthly.
- The accumulated sediment depth will be checked to ensure remaining storage capacity meets storage specifications (Section 3.5.2).
- Sediment shall be removed and the basin restored to its original dimensions when sediment accumulation has filled nominated sediment storage depth. The removed sediment shall be deposited on the site outside of concentrated flow paths, be allowed to dewater and then be used in site rehabilitation works.

4.2 Contingency

If NSW EPA EPL conditions are not met with the revised SECP measures then sediment and erosion control management at the site is to be reviewed and changes are to be made to ensure license conditions are met. No discharge of waters shall be required should limits not meet discharge criteria as the pit's capacity is very large compared to volumes intercepted.

5 **References**

Landcom (2004) Soils and Construction: Managing Urban Stormwater.

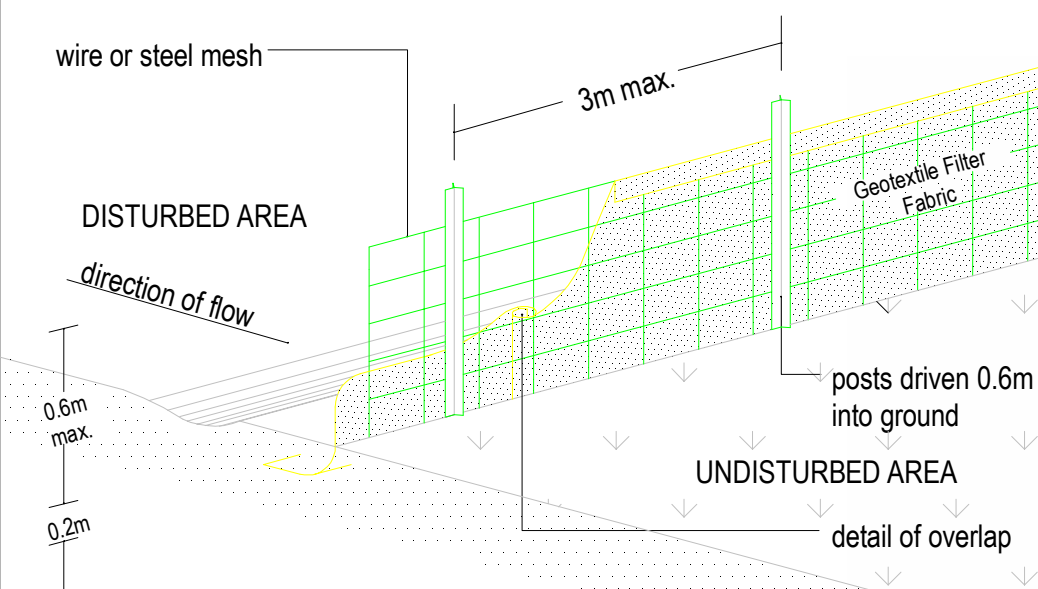
Martens and Associates (2010), Surface Water Assessment and Stormwater Management Scheme, report # P0902486JR04V01.

NSW Department of Lands and Water Conservation (DLWC) (1998) The Constructed Wetlands Manual: Volume 2.

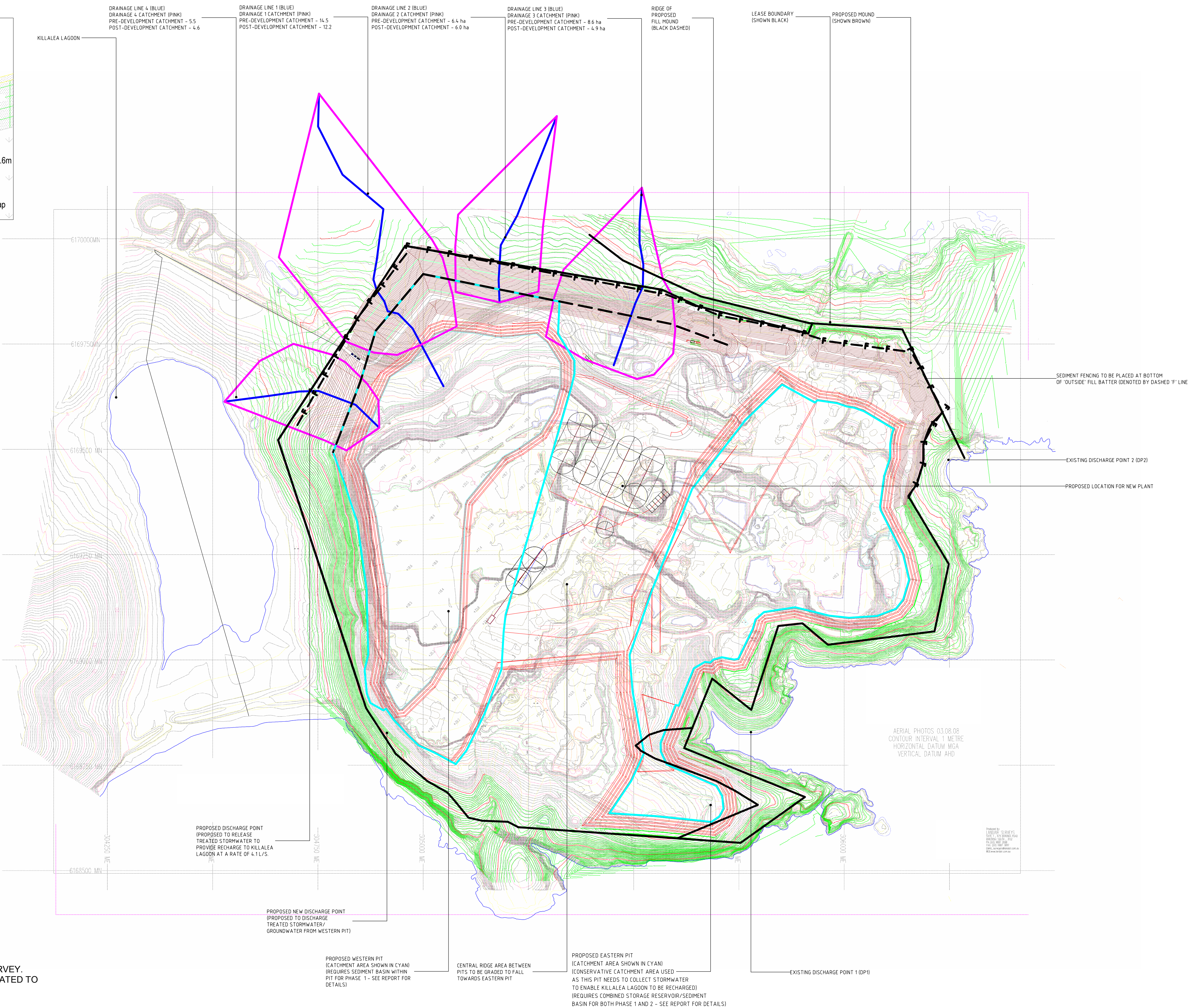
6 Attachment A – Sediment and Erosion Control Plan

SEDIMENT FENCE SECTION SCALE: NTS

Drainage area 0.4ha max. slope gradient 1:2 max.
slope length 60m max.

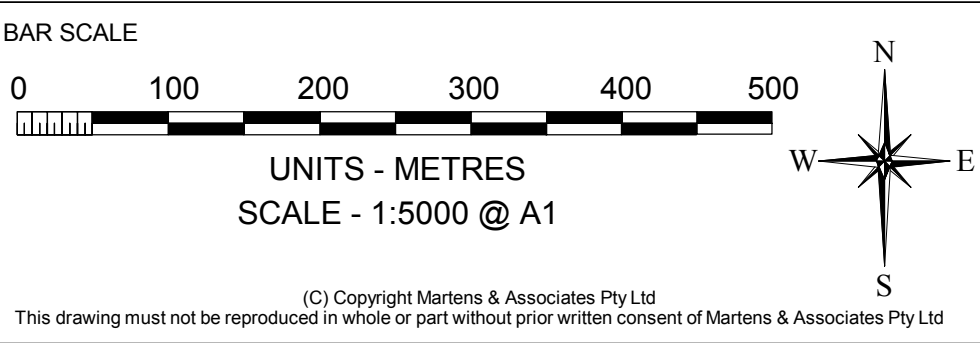


SEDIMENT FENCE SCALE: NTS



- NOTES:
1. PROPOSED DEVELOPMENT IS SHOWN OVERLAYING SITE SURVEY.
 2. EASTERN AND WESTERN PITS ARE PROPOSED TO BE EXCAVATED TO A LEVEL NO DEEPER THAN -40 mAHd.

REV.	DESCRIPTION	DATE	ISSUED
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PAPER SIZE: A1	VERTICAL RATIO: 1:5000

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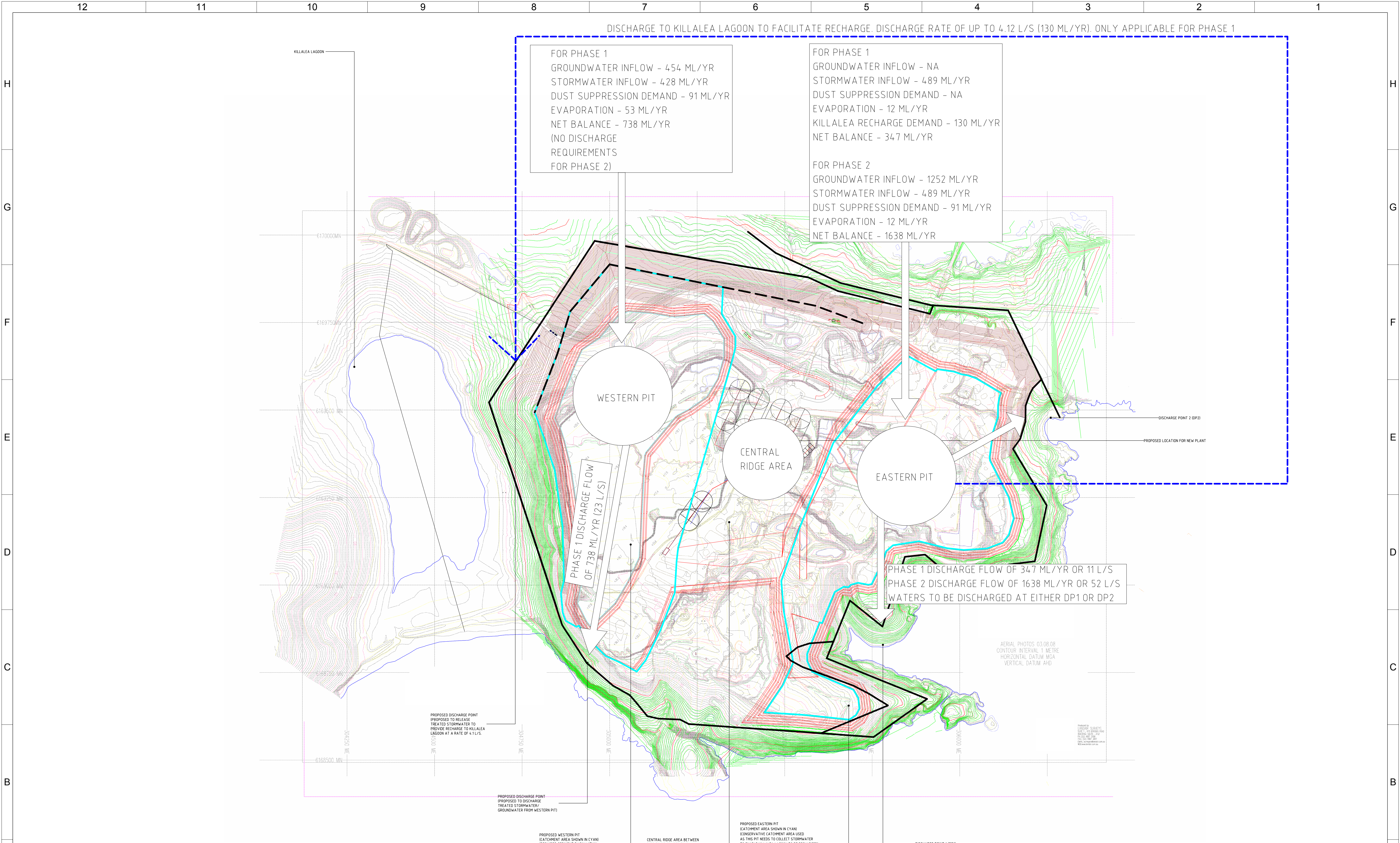
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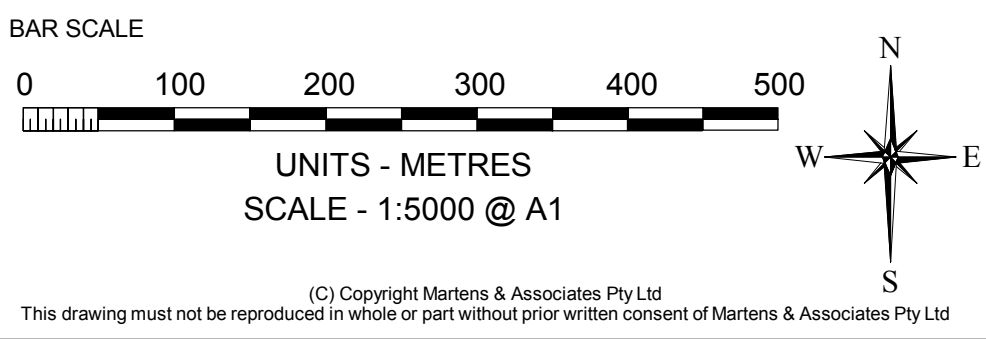
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TITLE: BASS POINT QUARRY - SITE PLAN AND SURFACE WATER MANAGEMENT	SHEET 2
PROJECT MANAGER: ANDREW NORRIS	DRAWING NUMBER: P0902486JD05V01
OF 3 SHEETS	



NOTES:
1. WATER BALANCE VALUES BASED ON MEAN MONTHLY WATER BALANCE.
2. PROPOSED DEVELOPMENT IS SHOWN OVERLAYING SITE SURVEY.
3. EASTERN AND WESTERN PITS ARE PROPOSED TO BE EXCAVATED TO A LEVEL NO DEEPER THAN -40 mAH.

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1	SECP	24.02.2010	BR



DESIGNED: BR	DATUM: mAH
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TITLE: BASS POINT QUARRY - SITE PLAN AND WATER BALANCE SCHEMATIC	SHEET 3
PROJECT MANAGER: ANDREW NORRIS	DRAWING NUMBER: P0902486JD05V01
OF 3 SHEETS	

7 Attachment B – Initial Proposed Stages