GREG ALDERSON & ASSOCIATES PTY. LTD.
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CHARTERED PROFESSIONAL ENGINEERS & SCIENTISTS

OUR REF: S: 09094_LET19
YOUR REF: 2011.34

April 4, 2012

General Manager
Kyogle Shire Council
PO Box 11
KYOGLE NSW 2474

Attention: John Hession

Re: Stormwater Management for Proposed Extractive Industry, Lot 12 DP 582916 and Lot 1 DP 366036, 904 Edenville Road, Cedar Point

John,

We have been engaged to provide additional details regarding the management of stormwater for the proposed quarry as requested in the Final Record of Decision by the Joint Regional Planning Panel (JRPP), 1st November, 2011.

JRPP have requested the following to be addressed:

Offsite water discharge – *Further assessment of the need for, and nature of, any proposed off site water discharge, including further clarity on location, volume, impacts and proposed controls for discharge.*

Quarry Layout

The quarry can be developed as a closed system due to the pit style excavation. Therefore the operations could retain the stormwater run-off from the work area on the site.

The stormwater run-off from the work area will be treated in a series of ponds, being a sediment pond and sump pond constructed for each cell on the work area floor. These cells will be required to be re-constructed as required as the quarry extends vertically prior to the opening of the next work cell.

The stormwater will be used from the final sump cell for use on the quarry, being dust suppression on the work area and haul roads, dust suppression on crushers and screens and for establishing the landscaping and rehabilitation vegetation.

The recommended location of the pond is presented on the attached plan, **Exhibit No. 1**, in approximate relation to the proposed quarry and property boundaries.

Stormwater Discharge

Calculations were undertaken in accordance with Landcom (2004) and MUSIC to determine the suitable size of these ponds to reduce the pollutants to acceptable levels, prior to discharge. These ponds were sized for the overall work cell area and the haul road. The ponds required for the work cell were 740m^3 and 450m^3 for the sediment pond and sump respectively.

A closed system was considered which would contain all stormwater on the site. However, it was considered best practice to provide some of the stormwater back to the natural

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environment, outside the quarry limits, provided that the quality of stormwater was suitable for this to occur. Discharge of stormwater from the sump pond within the work area, can only occur when the water quality has achieved the Australian and New Zealand *Guidelines for Fresh and Marine Waters Quality* (ANZECC & ARMCANZ, 2000) or as amended. Namely Total Suspended Solids being less than 50 mg/L and a pH within the range of 6.5 to 8.5.

If water quality does not achieve the acceptable limits as per the above mentioned guidelines, then amelioration measures are required to be undertaken (ie flocculation).

Discharge from the work area is not mandatory, and is only recommended to provide additional work area for the site.

The point of discharge is to be within a constructed pond, outside the work area, and will not be constructed on-line to natural gullies or waterways. It is considered that these tertiary ponds are important to reduce the potential impacts that a concentrated flow of pumped water may cause scouring of the embankments if direct discharge was to occur.

Estimated Volume of Stormwater and Sizing of Pond

The estimated volume of stormwater to be pumped to the discharge pond will be dependent upon the usage of water for quarry requirements. As a conservative estimate, the size of the pond is determined using the 5 day rainfall depth, 85th percentile of the annual rainfall event.

No additional storage or settling zones are required for the pond, as these measures are required to occur within the ponds of within the quarry work area.

The discharge pond is required to be:

- 125m^2 in surface area;
- 125m^3;
- Average 1.0m depth;
- 1m weir;
- Discharge to rock lined channel, 1m wide with 60mm cobble

These ponds are sized for individual cells, however, the one pond can be utilised for the life of the quarry as the quarry operations will be progressive, requiring the opening of a new work cell only on completion of the old work cell, so that there is no more than one cell open at a time.

Details of the pond are presented on **Exhibit No. 2**.

Control of Discharge to the Discharge Pond

The control of discharge of stormwater to the discharge pond will be through manual pumping of the settled water from the sump pond within the work area to the discharge pond. Discharge is only permitted when water quality is achieved as nominated previously.

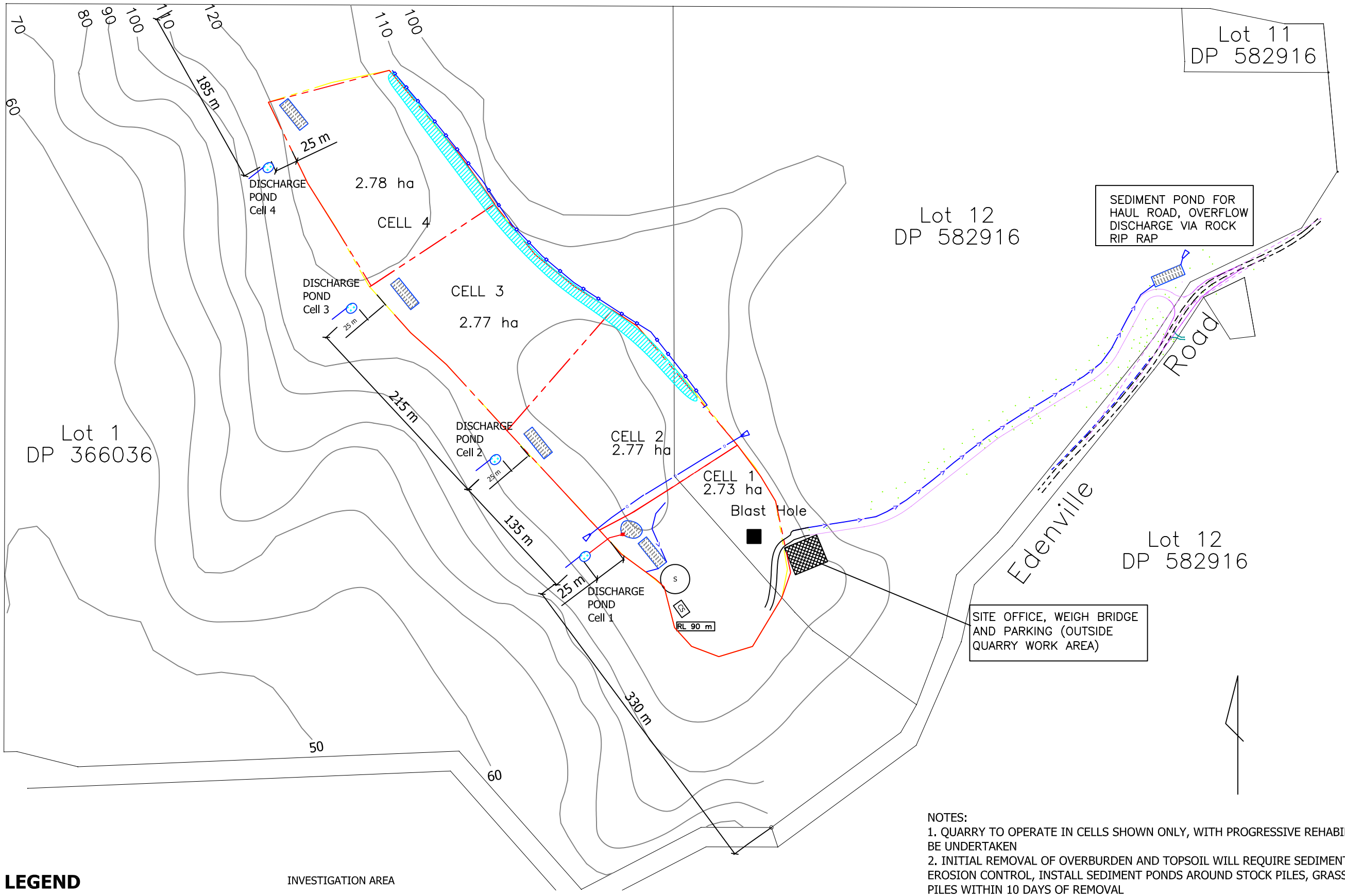
Summary

The quarry will operate as a closed system, due to the pit style nature of the site where all stormwater is contained to the work area, it is proposed that the treated stormwater can be discharged from the work area to a designated area if and when required. The stormwater can only be discharged through pumping from the sump pond, and only at times where the quality criteria of the water to be discharged, meets the criteria set in the Australian and New Zealand *Guidelines for Fresh and Marine Waters Quality* (ANZECC & ARMCANZ, 2000).

If you have any questions, please contact this office.

Yours faithfully,
Greg Alderson and Associates Pty Ltd

Greg Alderson
Chartered Professional Engineer
Att: Exhibit No. 1 Exhibit No. 2
CC: R & R Graham, P & R Carlill



LEGEND

- SEDIMENT POND - 495m² FOR CELLS AND 250m² FOR HAUL ROAD
  WILL BE REQUIRED TO BE RECONSTRUCTED AS QUARRY PROGRESSES LATERALLY AND VERTICALLY
- DISCHARGE (FINAL) POND - DISCHARGE POINT FOR SUMP POND WATER 125 m³
- SUMP POND 300m² - DOWNSTREAM OF SEDIMENT POND. TO COLLECT ONLY OVERFLOW WATER FROM SEDIMENT POND.
  POINT FOR MANUAL DISCHARGE FROM QUARRY WORK AREA AND WATER REQUIREMENTS IN WORK AREA
  CAN REMAIN FOR LIFE OF QUARRY (ONCE ON QUARRY FINAL FLOOR) OR REINSTATED AS QUARRY PROGRESSES

- INVESTIGATION AREA
- QUARRY CELLS
- D — DIVERSION BANK SD 5-6
- SEDIMENT FENCE
- ROCK LINED DRAINAGE CHANNEL
- S — MATERIAL STOCKPILE SD 4-1

NOTES:
1. QUARRY TO OPERATE IN CELLS SHOWN ONLY, WITH PROGRESSIVE REHABILITATION TO BE UNDERTAKEN
2. INITIAL REMOVAL OF OVERBURDEN AND TOPSOIL WILL REQUIRE SEDIMENT AND EROSION CONTROL, INSTALL SEDIMENT PONDS AROUND STOCK PILES, GRASS STOCK PILES WITHIN 10 DAYS OF REMOVAL
3. CLEAN WATER DIVERSION DRAINS TO BE INSTALLED AROUND QUARRY SITE
4. QUARRY CELL TO BE FENCED
5. SEDIMENT POND AND SUMP POND TO BE CONSTRUCTED IN QUARRY WORK AREA
6. DISCHARGE ONLY FROM SUMP POND, TO NEW PONDS/DAMS TO BE CONSTRUCTED PURPOSELY FOR RECEIVING QUARRY DISCHARGE WATER
7. WATER TO BE USED FOR DUST SUPPRESENT AND ESTABLISHING VEGETATION

Scale: 1:400 @ A3 Date: 28/4/12
Source: Wade Engineering Surveying
Drawing file: 09094_SWM2 discharge pond.dwg

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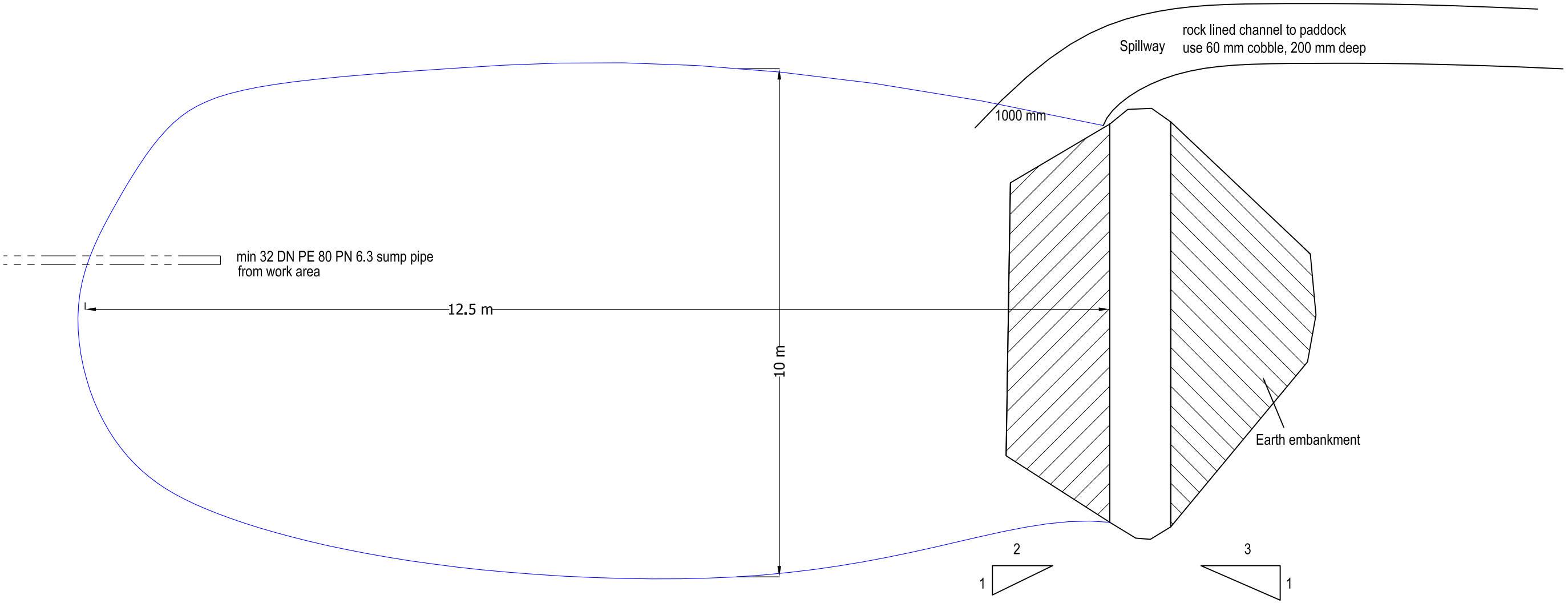
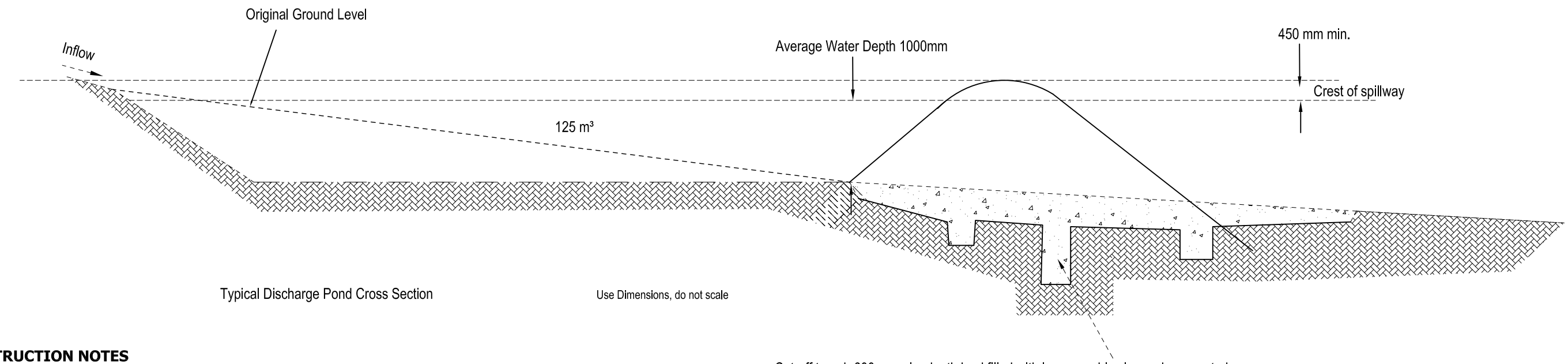
SOIL AND WATER MANAGEMENT PLAN

PROPOSED QUARRY
Lot 1 DP 366036 and Lot 12 DP 582916
For: Rodney Graham

Job No. 09094
01 / 02
exhibit 1





Typical Discharge Pond Cross Section

Use Dimensions, do not scale

CONSTRUCTION NOTES

1. Remove all vegetation and topsoil under the dam wall and from within the storage area
2. Construct a cut trench 500 mm deep and 1200 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 to achieve 95% Standard Proctor Density
4. Select fill free of roots, wood, rock, large stone
5. Prepare site under the embankment by ripping to at least 100 mm to help bond compacted fill to existing substrate
6. Spread fill in 100 mm to 150 mm layers to compact to optimum moisture content
7. Construct emergency spillway 1 m wide to rock lined channel 1 m wide 5 m length
8. Only for collection of clean stormwater from work area after water quality analysis checks

Scale: NTS Date: 28/4/12 Source: Landcom (2004) amended Drawing file: 09094_SWM2 discharge pond.dwg	**GREG ALDERSON & ASSOCIATES PTY LTD** ABN 60 059 559 858 Scarrabelottis Rd NASHUA NSW 2479 Ph: 02 6629 1552 Fax: 02 6629 1566 Email: g_alderson@bigpond.com	**SOIL AND WATER MANAGEMENT PLAN** PROPOSED QUARRY Lot 1 DP 366036 and Lot 12 DP 582916 For: Rodney Graham	**Job No. 09094** **04 / 04** **exhibit 1**