Appendix 1

Modified Development Consent 250-09-01

Hawkesbury River Environment Centre and Neville Diamond v Planning NSW and Dixon Sand (Penrith) Pty Ltd

Land and Environment Court Proceedings No 10206 of 2003

CONDITIONS OF CONSENT

This instrument includes changes made by DA 250-09-01 Mod 1 in February 2006 (marked in blue)
This instrument includes changes made by DA 250-09-01 Mod 2 in August 2008 (marked in red)
This instrument includes changes made by DA 250-09-01 Mod 3 in September 2012 (marked in green)

SCHEDULE 1

Development Application:	DA No. 250-09-01, lodged with the then Department of Urban Affairs and Planning on 21 September 2001;
Applicant:	Dixon Sand (Penrith) Pty Ltd ("the Applicant");
Consent Authority:	The Minister for Infrastructure and Planning;
Land:	Lots 1 and 2, DP 547255, and Lots 29 and 196, DP 752025, Old Northern Road, Maroota, Baulkham Hills Shire local government area;
Proposed Development:	The operation of an extractive industry on Lots 1 and 2, DP 547255, and Lots 29 and 196, DP 752025; the continued use of the existing central processing plant on Lot 196 DP 752025; and water management and rehabilitation operations over Lots 1 and 2, DP 547255, and Lots 29 and 196, DP 752025, as described more particularly in Annexures "B" and "C".
State Significant Development	The proposed development is within a class of development classified as State Significant development by virtue of a declaration made by the then Minister for Urban Affairs and Planning on 3 August 1999 under section 76A of the *Environmental Planning and Assessment Act;*
Integrated Development	The proposed development requires an additional approval from the EPA under the *Protection of the Environmental Operations Act 1997.* Consequently it is classified as integrated development under section 91 of the *Environmental Planning and Assessment Act 1979.*
Designated Development	The proposed development would involve sand extraction and processing above the threshold in Schedule 3 of the *Environmental Planning and Assessment Regulation 2000.* Consequently it is classified as designated development under clause 4 of the *Environmental Planning and Assessment Regulation 2000.*

BCA Classification: This consent does not provide for construction of any buildings or structures.

SCHEDULE 2

INDEX

In this consent, except in so far as the context or subject-matter otherwise indicates or requires the following terms have the meanings indicated:

AEMR	Annual Environmental Management Report
Act	*Environmental Planning and Assessment Act, 1979*
Applicant	Dixon Sand (Penrith) Pty Ltd
BCA	Building Code of Australia
Council	Baulkham Hills Shire Council
DA	Development Application
Department	NSW Department of Planning and Infrastructure
Development	The development as described in the documents listed in condition 1.2
Director-General	Director-General of the Department, or nominee
DPI	Department of Primary Industries
DRE	Division of Resources and Energy within the Department of Trade and Investment, Regional Services and Infrastructure
Dust	Any solid material that may become suspended in air or deposited
EA	Environment assessment
EIS	Environmental Impact Statement for the development titled *Maroota Quarry Extension – Environmental Impact Statement for Dixon Sand (Penrith) Pty Ltd* (one volume), dated August 2001 and prepared by Environmental Resources Management Australia Pty Ltd
EMP	Environmental Management Plan
EPA	Environment Protection Authority
EPL	Environment Protection Licence issued under the *Protection of the Environment Operations Act, 1997*
Feasible	Feasible relates to engineering considerations and what is practical to build
GTA	General Terms of Approval
Material Harm to the environment	Actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial
Minister	Minister for Planning and Infrastructure, or nominee
OEH	Office of Environment and Heritage
Operation	Any activity that results in the production, or intended production, of quantities of quarry products to be transported off site including clearing, stripping, sand

	extraction and processing, and overburden emplacement.
POEO Act	*Protection of the Environment Operations Act, 1997*
Quarrying Operations	Removal of overburden and extraction, processing, handling, storage and transportation of extractive materials on site
Reasonable	Reasonable relates to the application of judgment in arriving at a decision; taking into account mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Regulation	*Environmental Planning and Assessment Regulation, 2000*
RMS	NSW Roads and Maritime Services
SEE	Statement of Environmental Effects
Site, project site	the land to which this consent applies

1. GENERAL

Obligation to Minimise Harm to the Environment

1.1 In addition to meeting the specific performance criteria established under this approval, the Applicant shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation or rehabilitation of the development.

Scope of Development

1.2 Incorporates EPA General Term of Approval. The Applicant shall carry out the development generally in accordance with:

aa) Environmental Impact Statement prepared by Southern Environmental Pty Limited, dated 1 June 1999, lodged with Council on 30 August 1999, and supplementary information received by Council on 22 November 1999, 4 January 2000 and 21 January 2000;

a) development application No.250-09-01,lodged with the then Department of Urban Affairs and Planning on 21 September 2001;

b) The extract from Chapter 2 and Chapter 5 of the *Maroota Quarry Extension – Environmental Impact Statement for Dixon Sand (Penrith) Pty Ltd* (one volume), dated August 2001 and prepared by Environmental Resources Management Australia Pty Ltd (ERM) forming Annexure "B" to this consent.

c) Statement of Environmental Effects (SEE) titled *Sand Quarry on Lots 29, 196, 1 & 2 Old Northern Road, Maroota, Section 96 Consent Modification*, dated July 2005 and prepared by Environmental Resource Management (Australia) Pty Limited;

d) the material contained in Annexure "C" being:
   (i) ERM Figures 1-4 in relation to the staging of rehabilitation works;
   (ii) ERM Figures 5 and 6 in relation to the final landform; and
   (iii) SEE Figure 1.3 in relation to the final landform;

e) Modification Application 250-09-01 Mod 2 and the accompanying Statement of Environmental Effects titled *"Section 96 Modification for Dixon Sand Pty Ltd"* and dated August 2007;

f) letters regarding the modification application 250-09-01 Mod 2 from Environmental Resources Management Australia to the Department dated 1 April 2008 and 29 May 2008;

g) Modification Application 250-09-01 Mod 3 and the accompanying Environmental Assessment titled *Environmental Assessment Section 75W Modification DA 250-09-01 Dixon Sand (Penrith) Pty Ltd Old Northern Road Maroota* (2 volumes), prepared by Nexus Environmental Planning Pty Ltd and dated 8

December 2011; response to submissions prepared by from Nexus Environmental Planning Pty Ltd dated 17 July 2012; and the figure in Annexure E; and

h) conditions of this consent.

1.3 If there is any inconsistency between the above documents, the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this consent shall prevail over all other documents to the extent of any inconsistency.

1.3A Extraction beneath 15.24 m below original ground level on Lot 196 DP 752025 is restricted to within the hatched area shown in the figure in Annexure E and to a depth not greater than 127.5 m Australian Height Datum.

1.3B Extraction on Lot 29 DP 752025 is limited to a depth not greater than 15.24 m below original ground level.

Surrender of Development Consent 796/00/HE

1.4 By 31 March 2013, or as otherwise agreed by the Director-General, the Applicant shall surrender development consent 796/00/HE in accordance with section 104A of the EP&A Act, to the satisfaction of the Director-General.

Period of Approval

1.5 This consent provides approval for quarry operations on the site until 24 May 2022 and for the:

a) continued use of processing facilities, haul roads, water management, weighbridge, offices, and associated infrastructure on site;
b) transport of extracted sand and concrete product to the site, and sand product from the site; and
c) decommissioning of equipment, rehabilitation and revegetation of the site,

for a period of twenty-five (25) years from the commencement of the development consent for the Haerses Road quarry (DA 165-7-2005).

Limits on Production

1.6 The combined production of quarry products from the site (Lots 196 and 29 DP 752025, and Lots 1 and 2 DP 547255, Old Northern Road, Maroota) and from the Haerses Road sand quarry shall not exceed 495,000 tonnes per annum.

1.7 Processing of extracted sandstone on the site shall not exceed 1750 tonnes per day.

1.8 The Applicant shall provide annual production data to the DRE using the standard form for the purpose.

Provision of Documents

1.9 Where practicable, the Applicant shall provide all draft documents and reports required to be submitted to the Director-General under this consent in an appropriate electronic format. Final approved documents shall be provided in hard copy format. Provision of documents and reports to other parties, as required under this consent, shall be in a format acceptable to those parties and shall aim to minimise resource consumption.

1.10 Nothing in this consent prevents the Applicant from combining reporting requirements under this consent with identical or similar reporting requirements for submission to another relevant party.

Access to Information

1.11 The Applicant shall:

(a) make the following information publicly available on its website:

- all documents listed in condition 1.2;
- current statutory approvals for the project;
- approved strategies, plans or programs;
- a summary of the monitoring results of the project, which have been reported in accordance with the various plans and programs approved under the conditions of this consent;
- a complaints register, updated on a quarterly basis;
- minutes of CCC meetings;
- copies of AEMRs for the past 5 years;
- any independent environmental audit, and the Applicant's response to the recommendations in any audit;
- any other matter required by the Director-General; and

(b) keep this information up-to-date,

to the satisfaction of the Director-General.

Dispute Resolution

1.12 In the event that a dispute arises between the Applicant and a public authority other than the Department, in relation to a specification or requirement applicable under this consent, the Applicant shall refer the matter to the Director-General, and if not resolved, to the Minister, whose determination of the dispute shall be final and binding on all parties. For the purpose of this condition, "public authority" has the same meaning as provided under section 4 of the Act.

Participation in Cumulative and Regional Studies

1.13 The Applicant shall provide all existing relevant information to assist the Director-General in any cumulative/regional studies related to extractive industry activities.

Fit and Proper Person

1.14 The Applicant must, in the opinion of the EPA, be a fit and proper person to hold a licence under the Protection of the Environment Operations Act 1997, having regard to the matters in s.83 of that Act.

Rehabilitation Bond

1.15 Prior to commencement of operations on Lots 1 and 2 DP 547255, the Applicant shall provide a Rehabilitation Bond in the sum of $255,000 in the form of an insurance bond or bank guarantee acceptable to the Director-General from any bank licensed pursuant to the *Banking Act 1959 (Cth).* The Rehabilitation Bond shall be made in favour of the Minister administering the *Environmental Planning and Assessment Act 1979* to ensure completion of the rehabilitation and landscaping works at the site. The sum of the Rehabilitation Bond is calculated based on $3.00 per square metre for a maximum exposed area of 8.5 ha. Should progressive AEMR's or Independent Environmental Audits determine that the exposed, non-rehabilitated, area on the site is greater than 8.5 ha, the Director-General may direct the Applicant to increase the value of the Rehabilitation Bond at the rate of $3.00 per square metre in excess of 8.5 ha.

The Director-General may at any time, and without notice to the Applicant, demand all or part of the monies available under the Rehabilitation Bond if, in the Director-General's opinion, the Applicant has failed to make satisfactory progress on the Rehabilitation and landscaping of the site. The Director-General shall apply the monies to ensure that the actions specified in the documents listed in condition 1.2 and/or any approved Site Environmental Management Plan are achieved.

The Rehabilitation Bond will be released when the Applicant submits documentation prepared by a qualified landscape and rehabilitation consultant certifying that the final rehabilitation has been completed in accordance with the conditions of this consent and/or any approved Site Environmental Management Plan to satisfaction of the Director-General.

1.15A The Applicant shall:

(a) by 31 December 2012, lodge with the Department an additional Rehabilitation Bond in a form suitable to the Department for the amount of $327,000, to supplement the bond provided under condition 1.15; and

(b) not request that Council release the Rehabilitation Bond required under DA 796/00/HE until the additional Rehabilitation Bond is submitted with the Department.

Note: The provisions of condition 1.15 relating to the release of the Rehabilitation Bond and the demand of monies available under the Rehabilitation Bond shall also apply to the Rehabilitation Bond required under this condition.

2. COMPLIANCE

2.1 The Applicant shall ensure that employees, contractors and sub-contractors are aware of, and comply with, the conditions of this consent relevant to their respective activities.

2.2 Prior to commencement of operations on Lots 1 and 2, DP 547255, the Applicant shall commission an independent person(s) or organization(s), approved by the Director-General, to certify in writing to the satisfaction of the Director-General, that the Applicant has complied with all conditions of this consent applicable prior to that event.

2.3 Notwithstanding condition 2.2 of this consent, the Director-General may require an update report on compliance with all, or any part, of the conditions of this consent. Any such update shall meet the requirements of the Director-General and be submitted within such reasonable period as the Director-General may agree.

2.4 Any compliance report or compliance update required under condition 2.2 or 2.3 of this consent shall be made available for public inspection on request.

2.5 The Applicant shall comply with any reasonable requirement/s of the Director-General arising from the Department's assessment of:

(a) any reports, strategies, plans, programs, reviews, audits or correspondence that are submitted in accordance with this approval; and

(b) the implementation of any actions or measures contained in these documents.

3. ENVIRONMENTAL PERFORMANCE

Setbacks and Buffer Zones

3.1 Prior to commencement of operations on Lots 1 and 2, DP 547255, the Applicant shall engage a registered surveyor to mark out buffer zones and setbacks generally in accordance with the provisions of Baulkham Hills Development Control Plan 500 relating to extractive activities at the date of this consent. In this regard, a buffer zone shall be established which excludes areas from extraction between the quarry and nearby landuses or sensitive environmental areas. The boundary of the buffer zone(s) shall be located:

a) Not less than 250m from the boundary of Maroota Public School (Lot 18 DP 752025);

b) Not less than 10m from the boundary of Lot 117 DP 752025;

c) Not less than 50m from the existing house on Lot 1 DP 547255;
d) In accordance with condition 3.50 around the threatened species conservation area;
e) At the edge of the area of shallow groundwater indicated on Fig 2.1 of the EIS;
f) Not less than 50m from the *Kunzea rupestris* plant species on Lot 29 DP 752025; and
g) Not less than 10m from the western boundary of Lot 196 DP 752025.

A survey plan of the buffer zone and setback boundary shall be submitted to the Director-General for approval at least one month prior to the commencement of operations on Lots 1 and 2, DP 547255. Once approved, the surveyed boundary and buffer zone shall be fenced to prevent vehicles and unauthorized persons entering the area(s). No works or operations on Lots 1 and 2, DP 547255 shall occur on the site until the approved boundary has been fenced.

Air Quality Impacts

Location of monitoring/discharge points

3.2 Incorporates an EPA General Term of Approval. The following points referred to in the table below are identified for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.

Air

ID Number	Type of Monitoring Point	Type of Discharge Point	Description of Location
1	Ambient air monitoring	-	To be determined between EPA and the Applicant

Air Quality Standards/Goals and Performance Criteria

3.3 The Applicant shall ensure that dust emissions from the development do not cause exceedences of the following ambient air quality standards/goals at affected residences and Maroota Public School:

Table 1 Particulate Matter Criteria

Pollutant	Standard/Goal	Agency
Total Suspended Particulate Matter (TSP)	90ug/m3 (annual mean)	NH & MRC
Particulate Matter < 10um (PM10)	30 ug/m3 (annual mean)	NSW EPA
Particulate Matter < 10um (PM10)	50ug/m3 (24 hr average)	NSW EPA

Table 2 NSW EPA Amenity Based Criteria for Dust Fallout

Pollutant	Averaging Period	Maximum Increase in Deposited Dust Level	Maximum Total Deposited Dust Level
Deposited dust	Annual	2 g/m2/month	4 g/m2/month Note: dust is assessed as insoluble solids as defined by AS 3580.10.1-1991 (AM-19)

Dust Emissions

3.4 Incorporates an EPA General Term of Approval. The site must be maintained in a condition which minimizes or prevents the emission of dust from the site, including the prompt and effective rehabilitation of all disturbed areas.

3.5 To prevent dust emissions from vehicles the Applicant shall ensure that all vehicles entering or leaving the site, carrying a load that may generate dust, are covered to prevent dust emissions at all times, except during loading and unloading. Vehicles leaving the site carrying a load that may generate dust are to be covered prior to final weighing.

3.6 The Applicant shall install, operate, and maintain dust control measures and/or equipment on the following areas at the site:

a) All processing equipment;
b) Internal haul roads and disturbed areas;
c) Truck loading areas; and
d) All stockpiles including raw material, product, topsoil, and overburden.

3.7 A mobile water tanker equipped with a pump and sprays must be provided to suppress dust from unsealed roads when in use.

3.8 Haul roads must be surfaced in selected hard, non-friable material. Soft mudstone, claystone and shale must not be used.

Soil and Land Management

3.9 *(deleted)*

3.10 The Applicant shall minimise the removal of trees and other vegetation from the project site, and restrict any clearance to the areas occupied by quarrying activities, processing plant, and those areas necessary for fire control.

3.11 Any topsoil removed during operations must be stockpiled for use in the rehabilitation of the site. Topsoil should not be mixed with other overburden products. The topsoil stockpile location should have easy access and be protected from erosion. The topsoil stockpiles shall be sown with appropriate vegetation to stabilise the soil if they are to be stored for longer than six months. Topsoil stockpiles must have a maximum depth of 1.5 metres.

3.12 The Applicant shall complete rehabilitation and revegetation works of extracted strips to a point requiring only ongoing monitoring and management before commencement of works on the extraction strip following the next strip in the extraction sequence. Strips 5 and 6 shall be rehabilitated before the end of the period of approval for extraction under condition 1.5. In this regard, strips shall be rehabilitated in the following sequence:

Strip to be rehabilitated	Before event
1	Commencement of operations on strip 3
2	Commencement of operations on strip 4
3	Commencement of operations on strip 5
4	Commencement of operations on strip 6
5	End of period of approval (condition 1.5)
6	End of period of approval (condition 1.5)

3.13 The Applicant shall undertake all rehabilitation works and construction of the final landform of the eastern highwall of the quarry within 250m of Maroota Public School in school holiday periods only.

3.14 The Applicant shall implement appropriate measures, in consultation with DRE and Maroota Public School, to ensure public safety and restrict unsupervised access of school children to the quarry site. Those measures may include the erection of safety fencing around the highwall of the quarry or at the school boundary as well as the fencing referred to in condition 3.1.

3.15 The Applicant shall regularly consult with adjoining property owners to ensure property management issues including maintenance of common fences, weed control measures, and bushfire management are coordinated. Details of consultation are to be reported in the AEMR.

3.16 The Applicant shall establish a riparian zone, revegetated with local native species, along the entire length of the reconstructed ephemeral waterway on the quarry extension site. The reconstructed waterway shall be located generally in accordance with the Final Landform Plan (Fig 2.5 of the EIS). The riparian zone shall be no less than 20m wide measured horizontally and at right angles to the flow from the top of both banks. No exotic plant species, other than sterile cover crops, are to be planted in the riparian zone.

Water Quality Impacts

Pollution of waters

3.17 Except as may be expressly provided by a licence under the *Protection of the Environment Operations Act 1997* in relation of the development, section 120 of the *Protection of the Environment Operations Act 1997* must be complied with in and in connection with the carrying out of the development.

Surface Water

3.18 The stormwater system must be designed and installed in accordance with Managing Urban Stormwater: Soil and Conservation, Department of Housing 1998, to contain and treat all rainfall and runoff at the site resulting from a 90 percentile, 5 day rainfall event ("the design event").

3.19 The Applicant must maintain stormwater basins with the capacity to contain all rainfall and runoff generated from the "design event" specified in condition 3.18.

3.20 The Applicant must take all practical measures to avoid or minimise total suspended solids contained in wet weather discharges from the site.

3.21 The Applicant shall undertake appropriate measures to ensure that any vehicles which leave the site do not track materials onto public roads.

3.22 The Applicant shall consult with DPI prior to commencement of operations in strip 4 (as described in the EIS) on Lots 1 and 2, DP 547255 and, if required, obtain a permit under the *Fisheries Management Act 1994* for works to be carried out on the site.

3.23 Discharge of stormwater from the site is to be clear of sediment and pollution in accordance with the provisions of the Protection of the Environment Operations Act, 1997, and the EPL for the quarry, and to the satisfaction of the EPA.

Groundwater

3.24 The Applicant shall ensure that all bores and associated groundwater monitoring equipment on or associated with the site are maintained throughout the life of the development.

3.25 The Applicant shall ensure that no extraction or excavation works occur within two (2) metres of the highest recorded wet weather groundwater level.

3.26 The Applicant is to ensure that groundwaters managed under the *Water Sharing Plan for the Greater Metropolitan Groundwater Sources 2011* are not breached or contaminated by its operations. In the event of these groundwaters being breached or contaminated, operations are to cease within the vicinity of the affected area and the Applicant shall consult with the Director-General and NOW to determine the basis upon which extraction may recommence.

3.27 The Applicant shall carry out remedial works to protect the groundwater system, to the satisfaction of the Director-General, if it is determined that any of the existing dams on the site breach the groundwater table.

3.28 Maintenance and equipment refuelling operations shall only be carried out in the designated workshop and refuelling areas on the site.

Bunding and Spill Management

3.29 The Applicant shall store and handle all hazardous chemicals, dangerous goods, fuels and oils, strictly in accordance with:

a) All relevant Australian Standards;

b) A minimum bund volume requirement of 110% of the volume of the largest single stored volume within the bund; and

c) The EPA's Environment Protection Manual Technical Bulletin *Bunding and Spill Management.*

In the event of an inconsistency between the requirements listed from a) to c) above, the most stringent requirement shall prevail to the extent of the inconsistency.

Traffic and Transport Impacts

3.30 Truck movements at the site, including those provided for under this consent and DA 165-7-2005, shall not exceed:

d) a total of 180 per day (ie inbound combined with outbound);
e) 40 between the hours of 6.00am and 7.00am (inbound combined with outbound); and
f) 118 laden per day, of which no more than 28 may be inbound.

3.30A The Applicant shall:

a) keep daily records of the amount of sand transported from the site;
b) keep daily records of all traffic movements in and out of the site (including records of movements approved under condition 3.30; and
c) include detailed reports on these records in the AEMR.

3.31 *(deleted)*

3.32 All vehicles are to enter and leave the site in a forward direction and prominent and permanent signposting to this effect is to be provided and maintained at all times.

3.33 The Applicant is to ensure that the Old Northern Road pavement in the vicinity of the intersection with the Crown Access Road is regularly maintained and kept free of

sand, clay and soil at all times. All costs of these works are to be borne by the Applicant.

3.34 The Applicant shall advise its drivers and its clients not to arrive at the site prior to 5.45 am on any day. Certified (under company seal) weighbridge dockets and a log book or equivalent computer records are to be kept to verify the arrival and departure times of vehicles. Copies of these records shall be summarized in the AEMR.

3.35A The Applicant shall ensure all new truck drivers are provided with Site Induction for Drivers outlining site requirements, including the requirements of the Transport Code of Conduct referred to in condition 6.3 of this consent, and expected driver behaviour such as observing all speed limits (including school zone speed limits around Maroota Public School or other such speed limits as may be imposed from time to time), and not using exhaust brakes, especially during morning periods.

3.35B The Applicant shall liaise with representatives of Maroota Public School as required, but no less than annually, to discuss the effectiveness of traffic management procedures.

3.35C The Applicant shall impose a 20 km/hr speed limit on internal haul roads and shall ensure that all vehicles using internal haul roads do not exceed this speed limit.

Noise Impacts

Noise limit Interpretation and Measurement

3.35 All noise limits specified as part of this consent apply under:

a) Wind speeds up to 3 ms-1 at 10 metres above ground level; and
b) Temperature inversion conditions up to 3oC per 100 metres.

3.36 For the purpose of assessment of noise levels specified in this consent, noise from the development shall be:

a) Measured at the most affected point on or within the receptor site boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary to determine compliance with LAeq(15 minute) noise limits in condition 3.39;

b) Measured at 1 metre from the dwelling façade of the most affected classroom to determine compliance with LAeq(1 hour) noise limits in condition 3.40; and

c) Subject to the modification factors provided in Section 4 of the *New South Wales Industrial Noise Policy (EPA*, 2000).

3.37 Notwithstanding condition 3.36 of this consent, should direct measurement of noise from the site be impractical, the Applicant may employ an alternative noise assessment method deemed acceptable by the EPA (refer to Section 11 of the *New South Wales Industrial Noise Policy (EPA*, 2000)). Details of such an alternative noise assessment method accepted by the EPA shall be submitted to the Director-General prior to the implementation of the assessment method.

3.38 Noise limits identified in condition 3.39 do not apply for residential premises where there is a negotiated agreement between the Applicant and the Landowner of the premises.

Noise Limits

3.39 Noise from the premises must not exceed:

- An LAeq(15 minute) noise emission criterion of 44 dB(A) between 7am and 6pm Monday to Saturday; and
- An LAeq(15 minute) noise emission criterion of 37 dB(A) between 6am and 7am Monday to Saturday

at any residence not owned by the Applicant.

3.40 Noise from the premises must not exceed an LAeq(1 hour) noise emission criterion of 45 dB(A) at the most affected classroom of Maroota Public School.

Hours of Operation

3.41 Construction of earth bunds around the Maroota Public School setback perimeter, required for the mitigation of noise and dust, must only be carried out between 7am and 6pm Monday to Friday during school holiday periods unless otherwise approved in writing by the EPA.

3.42 Loading of trucks and truck movements at the site must only be carried out between 6am and 6pm Monday to Saturday, and at no time on Sundays and Public Holidays. All other activities at the premises must only be carried out between 7am and 6pm Monday to Saturday, and at no times on Sundays and Public Holidays.

Operational Noise – Management of Operations

3.43 The Applicant shall design and implement a management system that ensures operations at the quarry site meet the criteria in conditions 3.39 and 3.40. In this regard, the Applicant shall:

a) Construct all bunds on the eastern, southeastern and northern sides of the quarry extension site to at least 5 m above the existing ground level;

b) Not use the bulldozer concurrently with any other plant on strips 4,5 and 6 of the quarry extension site for any operations at quarry depths between existing ground level and six metres below the existing ground level; and

c) Only use the bulldozer for clearing, stripping and bund construction on the quarry extension site in calm wind conditions.

The Applicant shall report on monitoring results from the on-site weather monitoring station, and corresponding operations and noise impacts in adverse weather conditions, in the AEMR and compliance reports required under condition 3.45. The Director-General, in consultation with EPA, may approve variations to the operating restrictions in this condition based on actual noise monitoring conducted by the Applicant on the site and/or the results of compliance reports required in condition 3.45.

3.44 The Applicant shall design quarry operations to minimise the need for reversing of trucks and machinery where reversing beepers may contribute to noise impacts exceeding the criteria in conditions 3.39 and 3.40.

Operation Noise – Compliance Report

3.45 The Applicant must undertake noise monitoring after noise mitigation earth bunds at strips 4, 5 and 6 are completed. The results of the noise monitoring must be submitted to the EPA and the Director-General in a report within 3 months of completion of the earth bund construction. The report must include a statement of

whether compliance has been achieved with noise limits specified in the Environment Protection Licence and this consent.

Operational Noise – Negotiated Agreement with G&M Accurso

3.46 The Applicant is to implement the noise mitigation measures contained in the agreement with Mr and Mrs G&M Accurso dated 5 April 2004 titled *Letter of Agreement between Mr and Mrs G&M Accurso and Dixon Sand (Penrith) Pty Ltd* forming Annexure "D" to this Consent. Noise limits contained in condition 3.39 do not apply to the Accurso residence (Lot 117, DP 752025) while the agreement is in force.

3.47 Should the agreement referred to in condition 3.46 be terminated for any reason the Applicant shall comply with noise criteria in condition 3.39.

Operation Noise – Residential Noise Management

3.48 In the event that noise from the site exceeds noise criterion in condition 3.38 or condition 3.40, or the negotiated agreement in condition 3.46 is terminated for any reason, then the Applicant shall actively manage residual noise (ie noise in excess of the criteria) at the affected receptor. Residual noise shall be managed in accordance with the residual noise management measures detailed in the approved Site Environmental Management Plan. As a minimum to ensure compliance, the Applicant shall undertake the following measures:

a) Implement a reactive management system where site operations are modified in adverse weather conditions identified through meteorological monitoring;

b) Implement additional controls of treatments on individual sources on the site or on site operations, or otherwise modify operations to ensure compliance; or

c) Provide other forms of benefit or amelioration of impacts of noise agreed between the Applicant and the affected party, as providing acceptable compensation for noise levels experienced; and

d) Identify long term strategies to eliminate noise levels that exceed the noise criteria in condition 3.39 or 3.40.

Impacts on Flora and Fauna

3.49 Prior to commencement of operations on Lots 1 and 2, DP 547255, the Applicant shall engage a suitably qualified and experienced ecologist to identify all threatened plant species on the site and clearly mark vegetation to be conserved, generally in accordance with the proposed conservation areas in documents listed in condition 1.2. The Applicant shall then define a buffer zone(s) around threatened species conservation areas as follows:

a) A 50 metre buffer around the populations of *Tetratheca glandulosa* and shale-sandstone transitional forest; and

b) A reduced buffer of 20 m on the northern point of the conservation area.

The boundary of the conservation area shall be surveyed and fenced in accordance with condition 3.1. Fencing around the threatened species conservation area shall be sufficient to ensure excavation operations, truck movements, overburden dumping, dust generation, and weed infestation due to quarry operations do not adversely affect flora and fauna. No works or operations on Lots 1 and 2, DP 547255 shall occur on the site until the approved conservation area boundary has been fenced.

3.50 The Applicant shall ensure that all natural bushland directly adjoining the site and bushland to be conserved within the development site, is not damaged or disturbed by its operations.

3.51 Native bush regeneration and habitat reconstruction techniques shall be used to rehabilitate the threatened species conservation area, extraction areas, tailings ponds, and disturbed areas, and stabilize environmental bunds on the site in accordance with the SEMP. Bush regeneration shall include a specific program to translocate, propagate, and revegetate threatened plant species on the site including Tetratheca glandulosa. Shale/sandstone transition forest, Darwinia Fascicularis susp. oligantha, and Kunzea rupestris. The specialised techniques shall be carried out under the direction of a qualified Plant Ecologist and shall include the re-use of stored topsoil that has not been contaminated with exotic grasses or weed species and the collection and propagation of species from the site.

Indigenous Heritage

3.52 If, during the course of any activities conducted under this consent, the Applicant becomes aware of any heritage or archaeological sites not previously identified, all work likely to affect the site shall cease immediately. The Applicant shall then consult with relevant authorities and decide on an appropriate course of action prior to recommencement of work. The relevant authorities may include OEH, the NSW Heritage Office, and the relevant local Aboriginal community. Any necessary permits or consents shall be obtained and complied with prior to recommencement of work.

Waste Management Impacts

3.53 The Applicant shall not cause, permit or allow any waste generated outside the site to be received at the site for storage, treatment, processing, reprocessing or disposal, or any waste generated at the site to be disposed of at the site, except as expressly permitted by a licence under the *Protection of the Environment Operations Act 1997.* This condition only applies to the storage, treatment, processing, reprocessing or disposal of waste at the site if it requires an Environment Protection Licence under the *Protection of the Environment Operations Act 1997.*

3.54 All liquid and non-liquid wastes generated at the development shall be assessed, classified and managed in accordance with the EPA Environmental Guidelines *Assessment, Classification and Management of Liquid and Non-Liquid Wastes* (EPA, 1999).

3.55 Any waste generated at the development shall only be transported to an EPA - approved waste management facility for treatment, recycling and/or disposal, where relevant.

Section 94 Contributions

3.56 The Applicant shall pay or procure payment to the Council of a contribution under Section 94 of the *Environmental Planning and Assessment Act 1979* at a rate in accordance with Baulkham Hills Shire Council's *Contributions Plan No: 6 – Extractive Industries.* The said contribution will be calculated and paid monthly from the date on which development consent became effective. The said contribution will be indexed and adjusted annually in accordance with *Contributions Plan No: 6 – Extractive Industries.* On or before the fourteenth day of each month for the duration of the consent, the applicant shall deliver or procure delivery to the Council of true certified copy weighbridge or other returns or records showing the true quantities of extracted/processed material transported from the property during the immediately preceding month and the Council will then, as soon as it can

conveniently do so, issue an invoice to the applicant or its consenting assignee, who will pay to the Council within fourteen (14) days of the date thereof. The Council and the consent authority has the right to inspect and have the original records relation to any of the extracted/processed material, including numbers and types of laden trucks, trailers and load quantities transported from the property audited by any person nominated by its internal accountant any time when he may be written request so require. The Council will pay all of the said contribution payments into a specially identified account for payments towards the rehabilitation, restoration, repair and/or maintenance or Old Northern and Wisemans Ferry Roads from the intersection of the Crown Road access and the Baulkham Hills Shire boundary at Cattai Creek and other projects identified in the Plan of Management for Extractive Industries adopted by Council.

4. ENVIRONMENTAL MONITORING AND AUDITING

General Monitoring Requirements

4.1 The results of all monitoring required under this consent shall be:

a) In a legible form, or in a form that can be readily reduced to a legible form;

b) Kept for at least four years after the monitoring or event to which the results relate took place; and

c) Produced in a legible form to any authorized officer of the EPA or the Director-General, upon request; and

d) Kept with the following details for each sample required to be collected:
   i) the date(s) on which the sample was collected;
   ii) the time(s) at which the sample was collected;
   iii) the point at which the sample was collected; and
   iv) the name of the person who collected the sample.

4.2 Incorporates an EPA General Term of Approval. The Applicant shall monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1. The Applicant must use the sampling method, units of measure, averaging period and sample at the frequency, specified opposite in the other columns:

Parameter	Units of Measure	Averaging Period	Frequency	Method
Rainfall	mm/hr	1-hour	Continuous	AM-4
Sigma Theta @ 10 m		1-hour	Continuous	AM-2
Siting	-	-	-	AM-1
Temperature @ 2 m	K	1-hour	Continuous	AM-4
Wind Direction @ 10 m		1-hour	Continuous	AM-2
Wind Speed @ 10 m	m/s	1-hour	Continuous	AM-2

Note: the purpose of condition 4.2 of this consent is to provide a mechanism for collection and recording meteorological data relevant to the site for use in on-going air quality and noise assessment and management.

Air Quality Monitoring

4.3 For each monitoring point or utilisation area specified in condition 3.2, the Applicant must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1 of the table below. The Applicant must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:

Air

Pollutant	Units of measure	Frequency	Sampling Method
Particulate matter – PM10	ug/m3	1 day in 6 or continuous, or as otherwise approved by EPA	AM-18 or AS3580.9.8 – 2001
Particulate Matter (deposited matter)	g/m2/month	Continuous	AM-19
Siting	-	-	AM-1

4.3A The Applicant shall install a continuous monitoring device approved by the EPA and connected to an alarm system by electronic link at a central point in the operations area at sensitive sites such as Maroota school with a trigger level set at the maximum predicted level which respectively contributed to setting of the overall levels of 24 hour PM10 at 37.0Ug/m3 annual PM10 at 16.4ug/m3 annual TSP at 37.0ug/m3 and TSP at 2.5/m2/month tabulated by ERM Australia in its Air Quality Assessment for Proposed Maroota Quarry Extension September 2003 or such other level prescribed by the EPA from time to time. If the measured concentration of PM10 reaches the trigger level then the operations shall cease or be modified immediately such that the trigger level is not reached. The trigger level and period for averaging that level shall be certified by the EPA.

4.4 Monitoring for the concentration of a pollutant emitted to the air required to be conducted under this consent, or a licence under the *Protection of the Environment Operations Act 1997,* must be carried out in accordance with *Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (EPA 2001)* or latest document.

Noise Monitoring

4.5 The Applicant shall engage an independent person(s) to conduct noise monitoring at sensitive residential locations and Maroota Public School every six months, or as otherwise approved by the Director-General, during the operation of the development to determine compliance with the noise criteria in conditions 3.39 and 3.40. Noise monitoring shall seek to coincide with worst case operating scenarios for noise generation and adverse weather conditions.

4.6 Within six months of the date of this consent, the Applicant shall engage an independent person(s) to conduct road traffic noise monitoring at Maroota Public School to determine the actual impact of truck movements on existing traffic noise levels compared to predictions made in the EIS for the existing development consent (796/00/HE). In the event that monitoring indicates that the relevant criteria in EPA's *Environmental Criteria for Road Traffic Noise* is exceeded, the Applicant shall implement noise mitigation measures at the School in consultation with Maroota Public School, Council, RMS, and EPA and as directed by the consent authority and in accordance with a specification approved by the consent authority.

4.6A The Applicant shall engage an independent person(s) to conduct road traffic noise monitoring at Maroota Public School for 1 day per week (being the peak product dispatch day) for a period of 3 months within the 6 months following the commencement of truck movements in accordance with the approval of DA 250-09-01 Mod 2, or as directed by the Director-General. The monitoring shall be undertaken to determine compliance with the predicted noise levels in the SEE for DA 250-09-01 Mod 2 and comply with levels prescribed in condition 3.39. A copy of the monitoring results shall be provided to the Department and Maroota Public School.

In the event that monitoring indicates noise level exceedances, the Applicant shall implement reasonable and feasible noise mitigation measures at the Maroota Public School in consultation with the Maroota Public School, Council, RMS and EPA, and to the satisfaction of the Director-General.

Water Quality Monitoring

Surface Water

4.7 The Applicant shall undertake surface water monitoring and discharge monitoring in accordance with the EPL for the quarry.

Groundwater

4.8 The Applicant shall monitor groundwater levels in the four monitoring bores on Lots 1 and 2, DP 547255 and the two monitoring bores on Lot 196 DP 752025, monthly and following any periods of extreme wet weather. Water quality monitoring of groundwater shall be undertaken every six months. Results of groundwater monitoring shall be reported in the AEMR.

Flora and Fauna Monitoring

4.9 The Applicant shall prepare and implement a Flora and Fauna Monitoring Program to monitor the effects of the development on flora and fauna including known populations of *Tetratheca Glandulosa,* Shale-Sandstone Transitional Forest, *Darwinia fascicularis subsp. oligantha,* and *Kunzea Rupestris* on the site. The Program shall also monitor the success of revegetation works on the site. The Program shall be developed in consultation with OEH and Council. The Program shall include annual surveys for threatened species during quarry operations, and include monitoring of the threatened species conservation area. The Applicant shall include the Flora and Fauna Monitoring Program in the SEMP (condition 6.3(i)).

4.10 The Flora and Fauna Monitoring Program shall begin before commencement of operations on the quarry site and continue until at least two years beyond the period of approval in condition 1.5.

Independent Auditing

4.11 The Applicant shall commission an independent person(s) to undertake an Environmental Audit of the entire quarry at the following stages of the development:

a) Before commencement of operations on strips 2, 3, 4, 5, and 6;
b) At the end of the period of approval set out in condition 1.5; and
c) At the completion of the Flora and Fauna Monitoring Program in condition 4.10,

or as otherwise required by the Director-General.

The independent person(s) shall be approved by the Director-General prior to the commencement of the Audit. An **Environmental Audit Report** shall be submitted to the Director-General, the OEH, the EPA, the RMS and Council within one month of the completion of the Audit. The Audit shall:

a) Be carried out in accordance with *ISO 14010 – Guidelines and General Principles for Environmental Auditing* and *ISO 14011 – Procedures for Environmental Auditing;*
b) Assess compliance with the requirements of this consent, and other licences and approvals that apply to the development;
c) Assess the development against the predictions made and conclusions drawn in the documents referred to under condition 1.2 of this consent;

d) Review the effectiveness of the environmental management of the development, including any environmental impact mitigation works; and
e) Independently review and validate monitoring systems and outcomes.

The Director-General may, having considered any submission made by the OEH/ EPA, the RMS or Council in response to the Environmental Audit Report, require the Applicant to undertake works to address the findings or recommendations presented in the Report. Any such works shall be completed within such time as the Director-General may require. The Applicant shall make the Environmental Audit Report available for public inspection on request. The Director-General may make the Environmental Audit Report available on the Department's internet site.

4.12 The Applicant shall provide a compliance report(s) to the Director-General detailing the implementation of the recommendations of the Environmental Audit Report (refer to condition 4.11). The compliance report(s) shall be submitted to the Director-General within such time, and at such frequency, as the Director-General may require. The Applicant shall make the compliance report(s) available for public inspection.

5. COMMUNITY INFORMATION, CONSULTATION AND INVOLVEMENT

Complaints Procedure

5.1 Throughout the life of the development, the Applicant shall ensure that the following are available for community complaints:

a) A telephone number on which complaints about the development may be registered;
b) a postal address to which written complaints may be sent; and
c) an email address to which electronic complaints may be transmitted.

The telephone number, the postal address and the email address shall be advertised in at least one appropriate local newspaper prior to the commencement of operations on Lots 1 and 2, DP 547255. These details shall also be provided on the Applicant's internet site.

5.2 The Applicant shall record details of all complaints received through the means listed under condition 5.1 of this consent in a Complaints Register. The Register shall record, but not necessarily be limited to:

a) The date and time, where relevant, of the complaint;
b) The means by which the complaint was made (telephone, mail or email);
c) Any personal details of the complainant that were provided, or if no details were provided, a note to that effect;
d) The nature of the complaint;
e) Any action(s) taken by the Applicant in relation to the complaint, including any follow-up contact with the complainant; and
f) If no action was taken by the Applicant in relation to the complaint, the reason(s) why no action was taken.

The Complaints Register shall be made available for inspection by the EPA or the Director-General upon request. The Applicant shall also make summaries of the Register, without details of the complainants, available for public inspection.

Community Consultative Committee

5.3 The Applicant shall establish a Community Consultative Committee (CCC) to oversee the environmental performance of the development. The Applicant shall ensure that one committee is established for the entire site which meets the

requirements of both this consent and the existing consent for the site while that consent operates. This committee shall:

a) Be comprised of:
   - 1 independent chairperson nominated by the Director-General in consultation with the Council, and agreed to by the Applicant;
   - 2 representatives from the Applicant, including the Environmental Officer;
   - 1 representative from the Council;
   - 1 representative from the Maroota Public School; and
   - 2 representatives from the local community;

   whose appointment has been approved by the Director-General in consultation with the Council;
b) Meet at least once every six months; and
c) Review and provide advice on the environmental performance of the development, including the Site Environmental Management Plan, monitoring results, audit reports, compliance reports, AEMR's or complaints.

5.4 Representatives from the Department may attend committee meetings. Representatives from relevant government agencies, the local community, the local Aboriginal community, or other individuals may be invited to attend meetings as required by the Chairperson.

5.5 The Applicant shall, at its own expense:

a) Ensure that 2 of its representatives attend all the Committee's meetings;
b) Provide the Committee with regular information on the environmental performance and management of the development;
c) Provide meeting facilities for the Committee;
d) Meet all reasonable costs associated with operating the Committee;
e) Allow the Committee to inspect the site, if necessary;
f) Take minutes of the Committee's meetings;
g) Make these minutes available for public inspection at the Council within 14 days of the Committee meeting, or as agreed by the Committee;
h) Respond to any recommendations the Committee may have in relation to the environmental performance of the development;
i) Forward a copy of the minutes of each Committee meeting verified by the independent chairperson, and any responses to the Committee's recommendations to the Director-General within 14 days of the Committee meeting.

5.6 The Applicant shall ensure that the Committee has its first meeting prior to the submission of the Site Environmental Management Plan.

5.7 The Applicant shall prepare and implement a Community Relations Plan (CRP) to improve communications with the local community and Maroota Public School. The Plan shall be developed in consultation with Council, the CCC, and MPS. The Plan shall include, but not be limited to:

a) Identification of stakeholders potentially affected by the development;
b) Details of strategies to ensure open communication between the Applicant and the community and Maroota Public School;
c) Details of strategies to monitor and evaluate social impacts of the development on the local community and Maroota Public School;
d) Measures to improve community relations including:
   i. Quarry open days and education sessions to promote better understanding of quarry operations in the wider community;
   ii. Participation in community activities;

iii. Strategies involving in-kind exchanges of expertise and resources for activities such as bush regeneration, Landcare, Streamwatch, and other community-based environmental programs.

The CRP shall be included in the SEMP.

6. ENVIRONMENTAL MANAGEMENT

Environmental Officer

6.1 Within 3 months of the operation of this consent, the Applicant shall nominate a suitably qualified and experienced Environmental Officer(s), approved by the Director-General. The Applicant shall employ an Environmental Officer(s) on a full-time basis throughout the life of the development. The Environmental Officer(s) shall be:

a) The primary contact point for the Department, the OEH, the EPA, the RMS, Council and the community, as applicable, in relation to the environmental performance of the development;
b) Responsible for all Management Plans and Monitoring Programs required under this consent;
c) Responsible for considering and advising on matters specified in the conditions of this consent, and all other licences and approvals related to the environmental performance and impacts of the development;
d) Responsible for receiving and responding to complaints in accordance with condition 5.2 of this consent; and
e) Given the authority and independence to require reasonable steps be taken to avoid or minimize unintended or adverse environmental impacts, and failing the effectiveness of such steps, to direct that relevant actions be ceased immediately should an adverse impact on the environment be likely to occur.

The Applicant shall notify the Director-General, the OEH, EPA, the RMS, and Council of the name and contact details of the Environmental Officer upon appointment, and any changes to that appointment that may occur from time to time.

6.2 The Applicant shall prepare and implement a **Site Environmental Management Plan** (SEMP) to detail an environmental management framework, practices and procedures to be followed during the operation of the development. The SEMP shall cover operations on both the existing quarry site and the quarry extension. The Plan shall include, but not necessarily be limited to:

a) Demonstration of consistency with commitments made in documents listed in condition 1.2 and compliance with the conditions of this consent;
b) Identification of all statutory and other obligations that the Applicant is required to fulfil in relation to operation of the development, including all consents, licenses, approvals and consultations;
c) A description of the roles and responsibilities for all relevant employees involved in the operation of the development;
d) Overall environmental policies and principles to be applied to the operation of the development;
e) Standards and performance measures to be applied to the development, and a means by which environmental performance can be periodically reviewed and improved;
f) Management policies to ensure that environmental performance goals are met and to comply with the conditions of this consent;
g) Procedures to be followed to ensure the protection and conservation of Aboriginal cultural heritage;
h) The CRP required in condition 5.7
i) The Management Plans listed under condition 6.3 of this consent; and

j) The environmental monitoring requirements outlined under conditions 4.1 to 4.12 of this consent, inclusive.

The SEMP shall be submitted for the approval of the Director-General no later than one month prior to the commencement of operation of the development, or within such period otherwise agreed by the Director-General. Operation shall not commence until written approval has been received from the Director-General. Upon receipt of the Director-General's approval, the Applicant shall supply a copy of the SEMP to Council, the OEH, the EPA, the RMS as soon as practicable. The Applicant shall make the SEMP available for public inspection on request.

6.3 As part of the SEMP for the development, required under condition 6.2 of this consent, the Applicant shall prepare and implement the following Management Plans:

a) An **Air Quality Management Plan** to outline measures to minimise impacts from the development on local and regional air quality. The Plan shall address the requirements of the EPA and Council. The Plan shall include, but not necessarily be limited to:
   i. identification of all sources of dust emissions from the development and potentially affected properties;
   ii. detailed procedures for management and minimisation of dust emissions during operations on site;
   iii. procedures and schedules for rehabilitation of disturbed areas to minimise dust emissions;
   iv. a protocol for handling dust complaints;
   v. air quality monitoring, consistent with the requirements of this consent and any relevant Environment Protection Licence for the site; and
   vi. a contingency plan should an incident or weather event lead to air quality impacts above environmental performance goals/limits.

b) An **Erosion and Sedimentation Control Plan** to detail measures to minimise erosion during site preparation and operation. The Plan shall address the requirements of the Director-General, the EPA, and Council. The Plan shall include, but not necessarily be limited to:
   i. results of investigations into soils associated with the site, in particular the stability of the soil and its susceptibility to erosion;
   ii. details of erosion, sediment and pollution control measures and practices to be implemented;
   iii. procedures for removal of farm dams on site to ensure that large volumes of water and sediment are not released to natural waterways;
   iv. demonstration that erosion and sediment control measures will conform with, or exceed, the relevant requirements and guidelines provided in the former Department of Land and Water Conservation's publication *Urban Erosion and Sedimentation Handbook,* the EPA's publication *Managing Urban Stormwater: Soils and Construction;*
   v. design specifications for diversionary works, banks and sediment basins;
   vi. an erosion monitoring program during site preparation works and construction of the development; and
   vii. measures to address erosion, should it occur, and to rehabilitate/stabilise disturbed areas of the site.

c) A **Noise Management Plan** to detail measures to minimise noise impacts during the operation of the development and to manage residual noise (refer to condition 3.48 of this consent). The Plan shall be developed in consultation with Council and the EPA. The Plan shall include, but not necessarily be limited to:
   i. identification of a noise sources associated with the proposed development;

ii. program to investigate and monitor noise levels from the development on periodic basis;
iii. a protocol for handling noise complaints;
iv. a program to investigate additional noise mitigation measures for the development if it is determined that noise criteria in this consent are being exceeded;
v. a specific program to identify and implement, where appropriate, noise mitigation measures on the site, or at the receptor, to reduce residual noise impacts at the receptors including requirements of condition 3.48 of this consent; and
vi. a program to identify other forms of benefit or amelioration that may be applied, upon agreement of the Applicant and the affected party, at receptors the subject of condition 3.48 of this consent.

d) A **Water Management Plan** to outline measures to control and manage surface water, stormwater and groundwater on the site. The Plan shall address the requirements of the Director-General, the EPA and Council. The Plan shall include, but not necessarily be limited to:
i. identification of all potential sources of surface water and groundwater pollution;
ii. management measures to ensure separation of clean and dirty water on site;
iii. measures to rehabilitate erosion-affected areas and areas the subject of excavation, including tree, shrub and/or cover crop species and implementation;
iv. management procedures for all surface water collection and storage structures on the site, including a maintenance program for associated infrastructure (eg pumps, pipes, dam walls etc) and a program for desilting of those structures, where relevant;
v. a demonstration of consistency with the surface water management plan for the catchment, should one exist, or with the EPA's publication *Managing Urban Stormwater: Council Handbook* should a stormwater management plan for the catchment not exist;
vi. management measures to ensure the groundwater table is not breached by the quarrying operation;
vii. details of a program for monitoring surface water and groundwater quality and quantity at the site;
viii. details of measures to ensure a sustainable water management system is created in the final landform on the site; and
ix. a strategy for the decommissioning of water management structures, including storage, and sedimentation dams once extraction is complete.

e) A **Rehabilitation and Landscape Plan** to detail the proposed final landuse and landform for the site and measures to be undertaken to create that landform and vegetation cover. The Plan shall address the requirements of the Director-General, Council, OEH, the EPA and DRE. The Plan shall include, but not necessarily be limited to:
i. details of all landscaping to be undertaken on the site;
ii. maximisation of flora species endemic to the locality in landscaping the site;
iii. a specific program to translocate, propagate, and revegetate and monitor threatened plant species on the site including *Tetratheca glandulosa,* Shale/sandstone transition forest, *Darwinia Fascicularis susp.oligantha,* and *Kunzea rupestris;*
iv. Plans and cross-sections to scale, showing the proposed final landform demonstrating that it integrates with the surrounding terrain. The final landform shall be integrated across the entire site and adjoining land;

v. Site analysis used to determine compatible contours, shape, form, landscape features and quality of the final landform, including the identification of conservation areas;
vi. Details of rehabilitation and habitat construction works to be undertaken in the conservation area and buffer zones;
vii. Details of the progressive rehabilitation of both extraction areas, environmental bunds, and setback/buffer zones;
viii. Details of stream restoration works including:
- Methods to stabilise the bed and banks of the waterway;
- Establishment of riparian zones using local native vegetation;
- Vegetation monitoring, maintenance, and performance criteria; and
- Use of an environmentally sympathetic, soft-engineering approach;

ix. a schedule of works and associated time period for the rehabilitation of each disturbed and/or exposed extraction area or strip with the aim to restore vegetative covers and habitat at the earliest possible opportunity;
x. procedures for weed control and feral animal control;
xi. details of all backfilling works, including source of materials and the grades and stability of all batters. Batter design should be in accordance with the provisions of DCP No 500 – Extractive Industries, and certification is to be provided by appropriately qualified engineers regarding the stability of all designed batters;
xii. details including a soil drainage plan sufficient for growing crops that require free drainage.

f) A **Bushfire Management Plan** for the site, developed in consultation with Council and relevant emergency services. The Plan shall be consistent with any bushfire management measures for State Forests and National Parks in the region;

g) A **Traffic Management Plan** to outline measures to minimise traffic impacts associated with the development. The Plan shall address the requirements of Council and the RMS. The Plan shall include specific measures to minimise the impact of heavy vehicles, including restrictions on routes and times (particularly in relation to peak hours, holiday periods and times immediately before and after school hours, i.e. 8.30 am – 9.00am and 3.00pm – 3.30pm);

h) A **Transport Code of Conduct** to outline minimum requirements for the movement of heavy vehicles to and from the site. The Code shall meet the requirements of Council and the RMS. The Code shall include, but not necessarily be limited to:
i. restrictions to routes (consistent with the Transport Management Plan required under g) above, where relevant);
ii. speed limits to be observed within certain periods along routes to and from the site;
iii. restrictions to the hours of transport operations under this consent;
iv. minimum requirements for vehicle maintenance to address noise and exhaust emissions;
v. behavioural requirements for drivers; and
vi. load coverage requirements.

i) A **Flora and Fauna Management Plan** to detail measures to minimise impacts on flora and fauna, particularly populations of threatened plants, on the site during the operation of the development. The Plan shall be developed in consultation with OEH and Council and include:
i. details of the creation, landscaping and management of on-site vegetation to provide habitat for fauna species likely to occur on the site;

ii. details of strategic vegetation management, outlining timeframes for clearing and re-vegetation activities and a map illustrating the Plan. The Plan should aim to maximise scope for new vegetation to establish and restore ecological integrity;
iii. details of the schedule for clearing activities incorporating seasonal habitat requirements for species such as bats and other mammals, with the objective of avoiding incidents during sensitive hibernation and breeding periods.
iv. details of pre-clearance inspections, including the identification and inspection of trees containing tree hollows, including stags, prior to clearing of any vegetation;
v. details of how micro habitats including dead trees, stags, stumps and hollow branches will, where practical, be salvaged and relocated to areas depauperate of tree hollow habitat and in the recreation of habitat areas;
vi. details of measures to care for any animals injured or found during clearing activities, including the use of WIRES to attend to fauna as necessary, and the methods for their relocation if appropriate. This shall include measures for harbouring and releasing nocturnal animals at night;
vii. measures to re-instate or relocate plants and vegetation communities and to use local endemic species and local provenance seed for revegetation;
viii. details of the methods for strategically placing felled trees between cleared and remnant bushland to provide runways of ground cover for dispersion of animals;
ix. strategies for the establishment of wildlife corridor links to adjoining habitat areas and integration of rehabilitation works with nearby mines;
x. details of strategies for the exclusion of grazing stock on areas of native bushland reconstruction;
xi. measures to monitor the success of revegetated areas, including revegetation in the threatened species conservation area, and plant additional species where necessary;
xii. consideration of Aboriginal heritage management to ensure that activities under the Plan do not impact on Aboriginal heritage values; and
xiii. details of the flora and fauna monitoring required under this consent.

j) A **Waste Management Plan** to outline measures to minimise the production and impact of waste produced at the development during operation, through the implementation of waste reduction, reuse and recycling principles. The Plan shall meet the requirements of the EPA and Council. The Plan shall include, but not necessarily be limited to:
i. identification of the types and quantities of waste materials produced on the site during operation of the development;
ii. programs aimed at minimising the production of waste at the site through the implementation of operational and management measures;
iii. details of potential reuse and recycling avenues for waste materials produced on the site, including collection and handling procedures;
iv. details of appropriate disposal routes in the event that reuse and recycling avenues are not available or are not practicable; and
v. programs for involving and encouraging employees and contractors to minimise domestic waste production on the site and reuse/recycle where appropriate.

Revision of Strategies, Plans and Programs

6.4 Within 3 months of the submission of an:
(a) AEMR under condition 7.2 below:
(b) incident report under condition 7.1 below;
(c) audit report under condition 4.11 above; or
(d) any modifications to this consent,

the Applicant shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Director-General.

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 project.

7. ENVIRONMENTAL REPORTING

Incident Reporting

7.1 The Applicant shall notify, at the earliest opportunity, the Director-General and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the project, the Applicant shall notify the Director-General and any other relevant agencies as soon as practicable after the Applicant becomes aware of the incident. Within 7 days of the date of the incident, the Applicant shall provide the Director-General and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.

Annual Performance Reporting

7.2 The Applicant shall review the environmental performance of the project annually to the satisfaction of the Director-General. This review must be in the form of an Annual Environmental Management Report (AEMR) which must:

a) be prepared by an independent, qualified person(s), whose appointment has been approved by the Director-General;
b) describe the works (including rehabilitation) that were carried out in the year to 30 June, and the works that are proposed to be carried out over the year following 30 June;
c) include a comprehensive review of the monitoring results and complaints records of the project over the year to 30 June, which includes a comparison of these results against:
    - the relevant statutory requirements, limits or performance measures/criteria;
    - the monitoring results of previous years; and
    - the relevant predictions in the documents in condition 1.2 and SEMP.
d) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;
e) identify any trends in the monitoring data over the life of the project;
f) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and
g) describe what measures will be implemented over the current financial year to improve the environmental performance of the project.

The Applicant shall submit a copy of the AEMR to the Director-General, the EPA, OEH, DRE, the RMS and Council by 30 September every year.

Note: With the approval of the Director-General, the Applicant may lodge the first AEMR required under this condition after 30 September 2012, but no later than 31 December 2012.

ANNEXURE "B"

Chapter 2

DESCRIPTION OF PROPOSED DEVELOPMENT

2.1 OVERVIEW

The proposed development includes construction of bund walls and vegetation clearing prior to the staged extraction of sand from within Lots 1 and 2 DP 547255 Old Northern Road, Maroota. Extraction would commence from the west adjacent to the existing development and progress eastwards towards Old Northern Road. Non-extraction buffers would exclude areas of shallow groundwater, ecological significance or areas adjacent to lot boundaries. Once extracted, material would be trucked to the existing processing plant for washing and screening as required, prior to off site haulage using existing haulage roads and facilities. No additional buildings or processing facilities are proposed.

2.2 RESOURCE

Lots 1 and 2 and surrounding areas comprise Hawkesbury Sandstone overlain by a Tertiary deposit of fluvial sediments. The site generally comprises the deeply weathered upper units of the Hawkesbury Sandstone, referred to as Eluvial Sand, which vary in thickness between two and fifteen metres, comprising soft and friable rock that is easily ripped and crushed. The Eluvial Sand on the site extends to the water table at approximately 20 metres below ground level. Site geology is detailed in *Chapter 4,* which indicates that there are two general types of sandstone on the site; the orange/yellow upper layer and the finer, whiter layer beneath. These two types of material influence the extraction plan, which needs to expose both at the same time.

A preliminary resource assessment was provided by ERM to assist in determining the boundary buffer areas and the groundwater table buffer zone. This preliminary assessment was validated and updated by VGT Consulting using SURPAC software, taking into account buffer zones as described in *Section 2.4.1.* The first one metre of topsoil and residual soil was not included in the calculations. The resource calculations used vertical batters.

A volume to tonnage relative density factor was sourced from the *Field Geologists Manual* (Australian Institute of Mining and Metallurgy, 1995) which indicates that for dry sandstone, the average density factor of 2.24 kilograms/cubic metre is applicable. The

resource determination tables are presented in *Appendix C5*, a summary of which is provided in *Table 2.1*. The total estimated tonnage within Lots 1 and 2 able to be extracted is therefore approximately 3,038,500 tonnes. An estimated 150,000 cubic metres of waste overburden will be produced.

Table 2.1 RESOURCE SUMMARY

Area	(m^3)	(tonnes)
Lot 1	1, 155, 020	2, 587, 245
Lot 2 (west of ecology exclusion area)	72, 556	162, 525
Lot 2 – East of ecology exclusion area)	128, 863	288, 653
Total	1, 356, 439	3, 038, 423

2.3 PROPOSED LIFE OF OPERATION

Material extracted from Lots 1 and 2 will be trucked to the existing processing area and handled together with the material extracted from the existing operation. However, it is not proposed to increase the amount of processing or off site product sales, which are currently limited to a maximum of 60 laden trucks from the site per day. Therefore, it is envisaged that a twenty year consent will be required to enable all available resource to be extracted from Lots 1 and 2.

The existing consent for the processing plant and haul road to Old Northern Road is for ten years, based on the ten years of reserves on Lots 29 and 196. As this development application requires 20 years to extract the total resource, additional ten year consent is sought for the processing plant, office and amenities and haul road to Old Northern Road.

2.4 EXTRACTION, PROCESSING AND HAULAGE

2.4.1 Factors Influencing Extraction Plan

A number of factors have influenced the extraction plan, including setbacks, buffers, economic extraction limits, groundwater protection requirements and machinery and market requirements.

Baulkham Hills Shire Council's Extractive Industries Development Control Plan No. 500 (DCP 500) provides the following setbacks for quarries:

- 10 metres from adjoining property boundaries;
- 30 metres from Old Northern Road;
- 250 metres from the Maroota Public School;
- 100 metres from a residence not associated with extraction; and
- 50 metres from critical habitats or threatened species, populations, and ecological communities.

A population of *Tetratheca glandulosa* and an area of Shale-Sandstone Transition Forest are located on Lot 2. A 50 metre buffer has been reserved around these areas where relatively undisturbed native vegetation/woodland/heath forest abuts the threatened plants and community. Where the threatened plants and community abut grassland to the north in extraction strip 1 and 2, a 20 metre buffer from extraction is proposed. The purpose of the 20 metre buffer is to prevent direct impacts on the threatened plant and community from earthmoving plant and to minimise indirect effects such as dust and weeds, while still maximising sandstone available for extraction.

Dust modelling has predicted very small differences in PM_{10} dust concentrations for points 50 and 20 metres north of the northern end of the *Tetratheca* population and transition forest. The sixth highest 24 hour PM_{10} predictions are 62 and 65 micrograms per cubic metre respectively, indicating little effective difference in buffer dimensions regarding dust emissions. Similarly, dust deposition modelling predicts 1.275 and 1.321 grams per square metre per month due to quarrying at 50 and 20 metres respectively. Background monitoring indicates levels of 1.8 grams per square metre per month on average, which would indicate a total predicted deposition in the order of 3 grams per square metre per month. Mentor Consulting (1993) prepared a literature review of the impacts of mine generated dust on agriculture that cited Yang (1988, Effects of dust pollution from open-cut coal mining on farmland ecological environment. *Journal of Ecology China* 7(1):9-12), who noted that there would be no adverse effects on plant production unless dust deposition exceeded 22 to 45 grams per square metre per month.

In addition, DCP 500 limits quarrying to two metres above the wet weather high groundwater level. In developing this quarry plan, it has been assumed that the top two metres of material would be overburden and therefore the minimum economic extraction depth would be approximately four metres above wet weather high groundwater level. That is, if the available depth of resource between the wet weather groundwater level and two metres below surface were less than four metres, extraction would not occur. The area

excluded from extraction due to its shallow groundwater depth is to the east of the Shale-Sandstone Transition Forest, as shown on *Figure 2.1*.

A drilling program and resource assessment determined groundwater levels and resource depth. Ongoing groundwater depth monitoring would continue to ensure extraction did not occur below this level. This monitoring may also alter the proposed extraction areas in the future.

All the above buffers and exclusion areas are shown on *Figure 2.1*.

The other factor influencing the extraction plan is the desire to provide a uniform rehabilitated landscape. Although this extraction plan is not able to link all extraction areas together to provide a completely uniform landscape, as adjacent extraction areas are operated by other companies, this plan provides opportunities for future discussions with adjacent landowners to provide a uniform landscape.

The total area of Lots 1 and 2 is approximately 26 hectares. Approximately 10 hectares of this area is to be retained within buffers (including six hectares within the buffer to Maroota School).

2.4.2 Extraction Plan

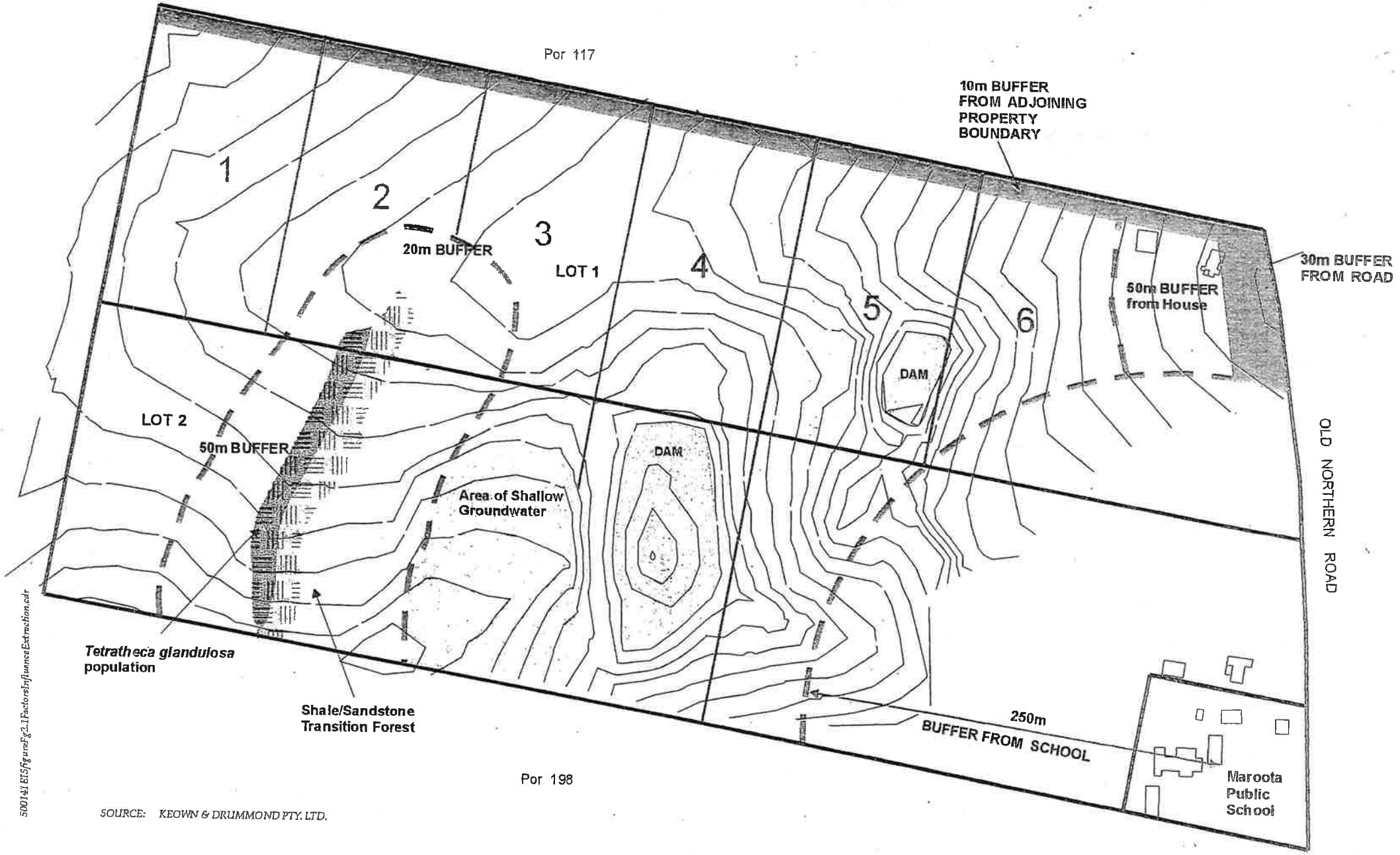
The proposed extraction plan is shown on *Figures 2.2 and 2.3*. This plan shows required setbacks, buffers and areas of resource.

The plan shows a series of nominally 100 metre wide strips extending across Lots 1 and 2. Quarrying in sequential strips allows efficient quarrying with progressive clearing and rehabilitation, therefore limiting the area active at any one time and reducing various environmental impacts.

Each strip will be benched to allow progressive quarrying to the east and to expose the different resources available in the geological sequence. For instance the upper benches of strip 1 will expose the orange/yellow sandstone material while the lower benches will supply the white sandstone.

Figure 2.1 shows areas of the two lots that have no accessible resource due to the required buffers or shallow groundwater. The school buffer and threatened community and species area restricts extraction in Lot 2. Where the strips are not able to extend the full width of the two lots, quarrying would occur over a shorter time period than the longer strips.

Three to five metre high acoustic bunds will be constructed along the northern boundary of Lot 1, on the 250 metre Maroota school buffer boundary and on the 50 metre buffer from the Lot 1 residence near Old Northern Road.

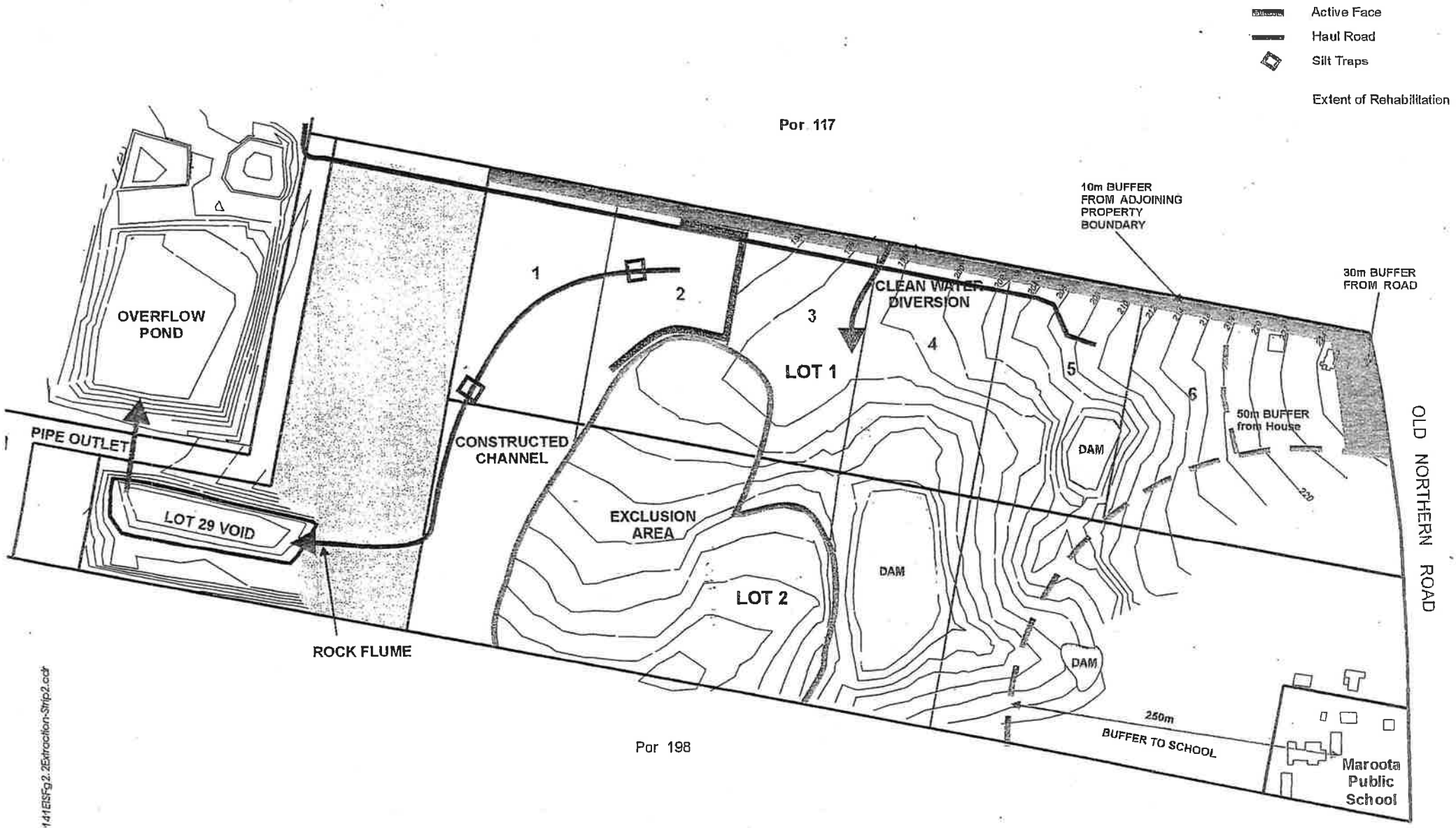


500141 EIS\figure\Fg2.1FactorsInfluenceExtraction.cdr

SOURCE: KEOWN & DRUMMOND PTY. LTD.

ERM

Figure 2.1 FACTORS INFLUENCING EXTRACTION PLAN

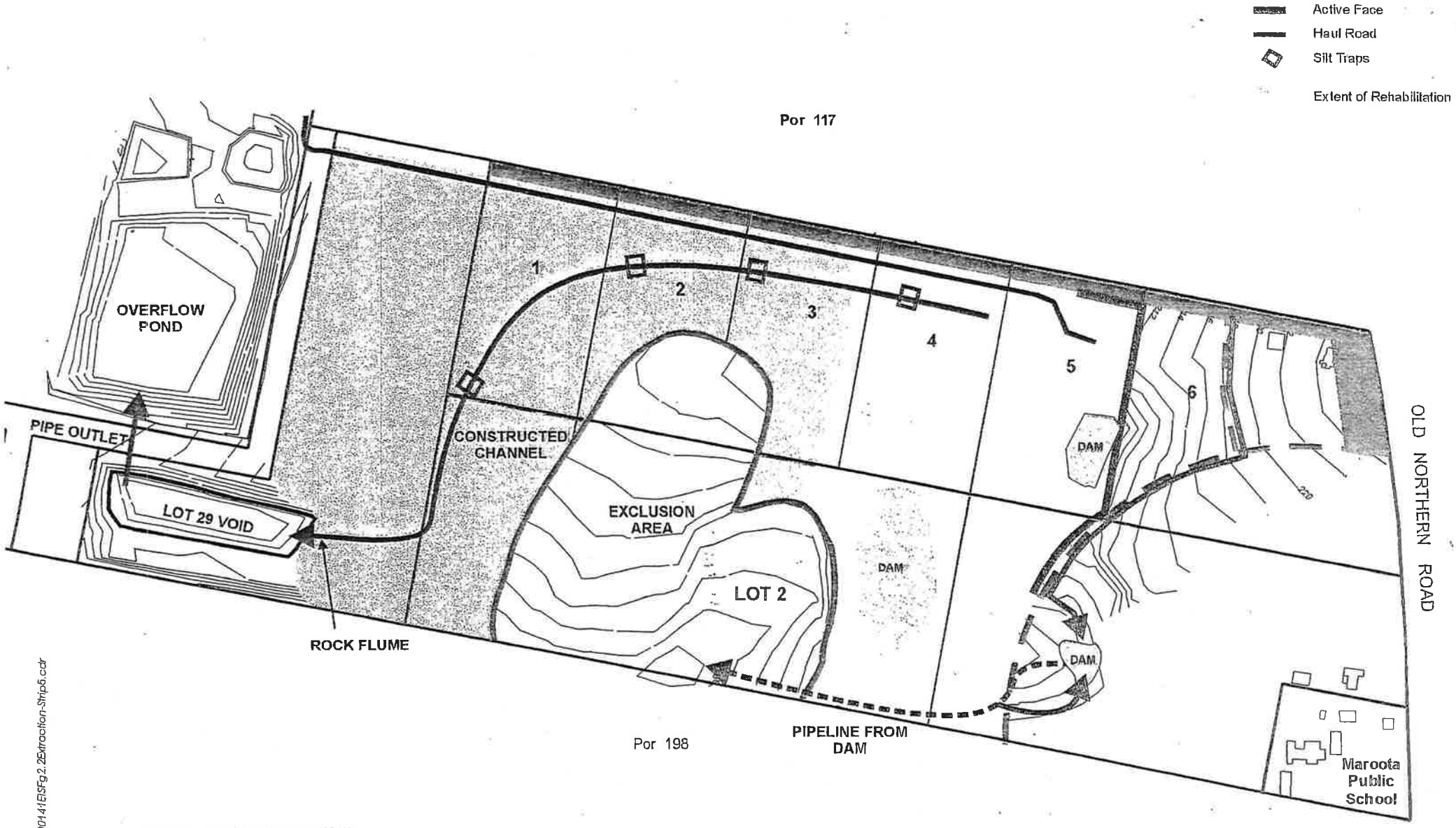


500141EISFg2.2Extraction-Strip2.cdr

SOURCE: KEOWN & DRUMMOND PTY. LTD.

ERM

Figure 2.2 EXTRACTION PLAN - STRIP 2



50014\EIS\Fg 2.2Extraction-Strip5.cdr

SOURCE: KEOWN & DRUMMOND PTY. LTD.

ERM

Figure 2.3 EXTRACTION PLAN - STRIP 5

The general quarry process in each strip will be:

- chainsaw down habitat trees outside threatened arboreal animal's roosting and breeding times;
- with dozer, strip and use or stockpile vegetation and groundcover for rehabilitation. Larger stumps, logs and branches will be shredded or mulched and used for rehabilitation as required. Areas of native vegetation will be stripped and used or stockpiled separately from grassed areas. Note that as habitat trees will already have been cut down outside roosting and brooding periods, no seasonal limitations will apply to this clearing;
- with dozer, excavator and trucks, strip and use or stockpile topsoil. Topsoil from areas of native vegetation will be stripped and used or stockpiled separately from topsoil form grassed areas;
- with dozer rip and push overburden into an acoustic bund at the eastern edge of the strip;
- with dozer, excavator and truck, rip and remove surplus overburden for shaping rehabilitation areas either on Lots 1 and 2 or 29; and
- commence quarrying with dozer, excavator and trucks. A dozer will rip, blend and stockpile either on the benches or the quarry floor. An excavator will load from these stockpiles into a single articulated dump truck for haulage to the processing plant. An additional dump truck may be used in the eastern strips due to the longer haul distances to the plant.

2.4.3 Plant and Equipment

The following major plant will be used on Lots 1 & 2. In some instances similar alternative plant may be used:

- one Komatsu 375A dozer;
- one Komatsu PC400-6 excavator;
- one 30 tonne articulated dump truck. In the eastern strips, an additional truck maybe used due to the increased haulage distance to the plant;
- one water cart;
- one Caterpillar 12G grader (irregularly); and

- one service vehicle (irregularly).

Additional mobile and fixed plant will be used at the processing plant, including crushers and screens, loaders, trucks and ancillary plant. No additional or alternative equipment is proposed at the processing plant, which will continue to operate in accordance with the existing development consent.

2.4.4 On-Site Haulage and Processing

Sandstone extracted from Lots 1 and 2 will be hauled by truck across Lot 29 to the existing processing plant on Lot 196. The haulage route and plant are shown on *Figure 1.2*. The haul road across Lot 29 will be extended eastwards within Lot 1 as quarrying progresses. The haul road will have an unsealed, graded surface with a drainage channel to the lower side. The channel will contain erosion control devices as required. Water management and erosion and sediment control are described in *Sections 2.5 and 2.7*.

Hauled material will be unloaded at the plant for crushing and screening. Approximately 80 percent of extracted material will be dry processed while the remainder will be washed to remove clay fines.

The processing plant has three dump hoppers, belt feeders and conveyors, vibrating screens, crushers, scrubbers, a radial stacker and cyclones. The processing plant has a maximum capacity of 250 tonnes per hour.

Approximately 15 percent of material that is washed is fine clays and silts that are removed as tailings and pumped to a tailings storage dam. This dam is dewatered and rehabilitated when full. Existing tailings dams and voids on Lot 196 will also be used for tailings disposal for material from Lots 1 and 2.

Adjacent to the processing plant are a raw material stockpile and five product stockpiles for washed sand, mortar or brickies' sand, yellow brickies' sand and concrete sand. Approximately two weeks production is stockpiled at any one time.

2.4.5 Product Haulage

Product is currently trucked from the quarry and all sales are made from the on-site weighbridge. Once loaded, trucks leave via the access road and Crown Reserve Road to Old Northern Road. Trucks generally travel south along Old Northern Road to the Wisemans Ferry Road intersection. From this intersection, approximately 65 percent continue south along Old Northern Road towards Glenorie and Dural, 35 percent turn right into Wisemans Ferry Road and travel towards Windsor, Richmond and Penrith.

It is proposed that sand extracted from Lots 1 and 2 will supply the same markets as the current operation and the same transport routes will be used. As it is not proposed to increase production rates from the quarry, the number of truck movements will remain the same. This is currently approved at 60 laden trucks per day (120 truck movements).

2.4.6 Workforce and Hours of Operation

The current workforce numbers will remain at ten to fifteen staff, depending on sales. Truck drivers contracted or employed by others would pick up loads from the plant site.

The hours of operation on Lots 1 and 2 will be in accordance with the approved hours of operation for the existing site, being:

- 5.45 am Monday to Saturday Site - gates open to allow entry of vehicles to site;
- 6.00am – 7.00 am Monday to Saturday (not including Public Holidays) - 30 truck movements (15 loaded vehicles) may enter or leave site;
- 7.00 am – 6.00 pm Monday to Saturday (not including Public Holidays) - extraction, transportation and processing or running of machinery for maintenance purposes permitted; and
- no extraction, transportation or processing on Sundays and Public Holidays.

2.5 SURFACE WATER MANAGEMENT

2.5.1 Existing Water Management

The existing quarry's surface water management system aims for:

- discharge of stormwater from the site is clear of sediment (<50 mg/litre total suspended solids);
- a base flow through a low flow pipe is provided to the downstream creek;
- downstream ecosystems are protected;
- on site re-use of water is maximised; and
- groundwaters are not breached or contaminated.

Water management structures include diversion banks, crushed sandstone check dams, sediment basins, catch ponds, tailings ponds and storage ponds.

The acidity of a small spring that discharges into an unnamed watercourse on Lot 196 has been measured for some time and generally ranges from 4 to 4.5 units as reported in the existing quarries environmental management plan (ERM, 2000).

Surface runoff from the southern sub-catchments on Lots 1 and 2 currently discharges to an ephemeral creek that flows across the southern boundary of Lot 2. This ephemeral creek is a tributary of an unnamed creek that discharges to the Hawkesbury River 4.5 kilometres north west of the site. The other sub-catchment on Lots 1 and 2 flows into a dam on the adjacent Lot 196 Lots 1 and 2 have no current active water management apart from two dams used for stock water.

2.5.2 Proposed Surface Water Management

i. Outline

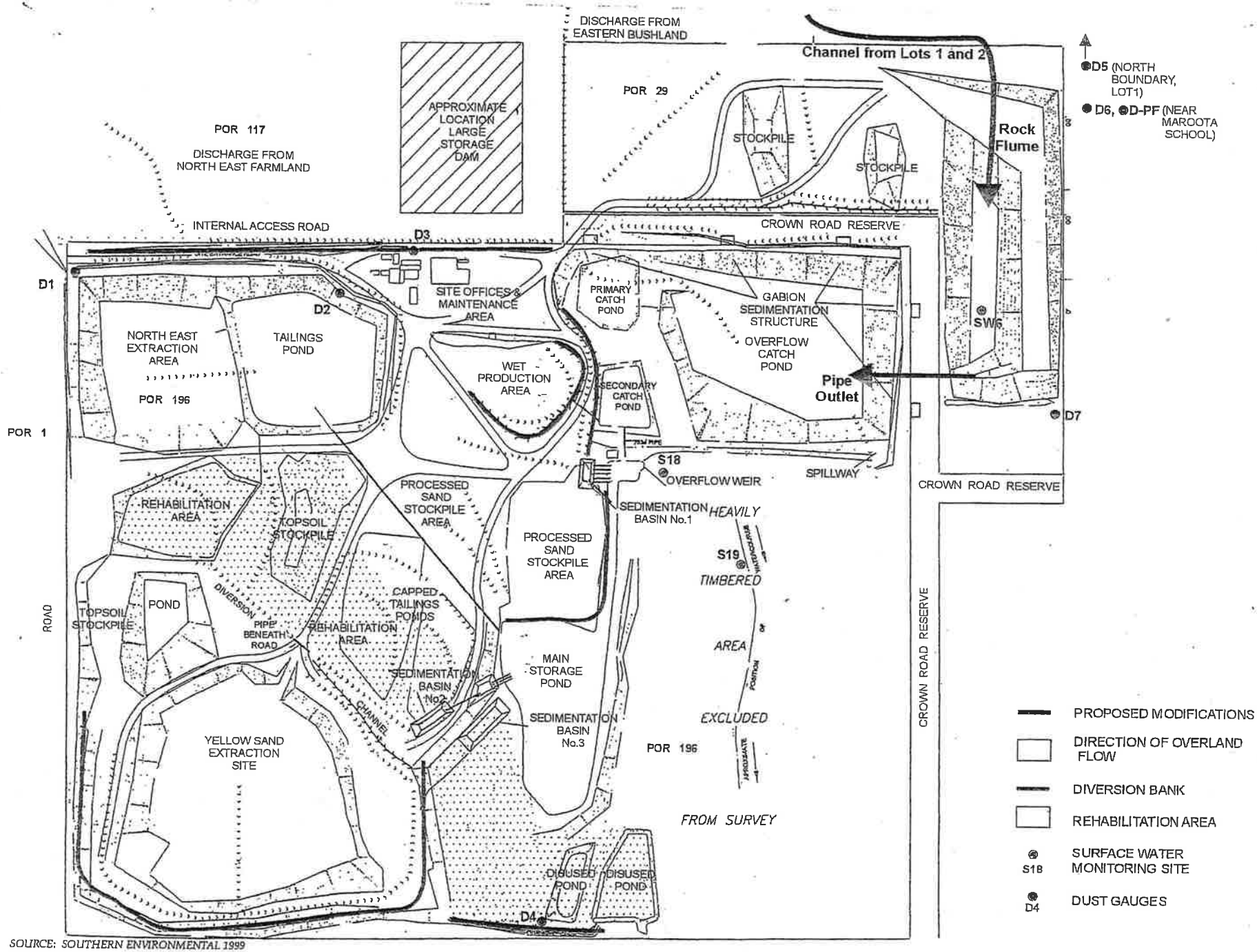
It is proposed to direct surface water runoff from the extraction areas on Lots 1 and 2 to the existing pond on Lot 29. Surplus water will discharge to a creekline via a weir on Lot 196 (refer *Figure 2.4*). The proposed water system for two representative stages of quarrying is provided as follows.

ii. Stage 2 of Quarrying

Water management at stage 2 of quarrying is shown on *Figure 2.2*. A backpush bank into the buffer area around the threatened plant and community will divert clean water from uphill of the stage 2 area.

Lot 29 (which by then will have been extracted to about 15 metres below ground level) will drain west into the Lot 196 water management system. The large void on Lot 29 currently has a volume of about 65,000 cubic metres, but extraction on this lot will reduce this to approximately 2,500 cubic metres. Dirty water from the stage 2 quarry area will be directed through a constructed channel along the quarry floor into the Lot 29 void. Small silt traps as shown on *Figure 2.2* will be excavated into the floor along the channel.

Table 2.2 details calculations and design specifications for Stage 2 water management works.



SOURCE: SOUTHERN ENVIRONMENTAL 1999

ERM

Figure 2.4 EXISTING DEVELOPMENT WATER MANAGEMENT SYSTEM & MONITORING LOCATIONS

Table 2.2 STAGE 2 WATER MANAGEMENT DESIGN

	Units	Lot 29 less void	Stage 2 quarry	Clean catch above stage 2
Catchment Area	sq.m	28,500	36,750	22,750
Time of Concentration, tc	min	11.8	13.0	10.8
Average Coefficient of Runoff		0.80	0.80	0.30
Rainfall Intensity ARI 20 tc	mm/hr	121.00	120.00	124.00
Peak Discharge Flow rate, Q	c.m/sec	0.77	0.98	0.24
WATERWAY				
Friction Factor	Choice		4	
1. Long Grass, 2. Short Grass, 3. Concrete, 4 Rocks, 5. Corrugated, 6 Earth	Material n		Rocks 0.04	
Bed Slope	mV/mH		0.0270	
Design Velocity	m/sec		2	
Average Batter Grade	mH/ mV		2	
Base Width	m		3.0	
Depth	m		0.22	
Wetted Perimeter	m		3.98	
Flow Cross Sectional Area	sq.m		0.76	
Actual Velocity	m/sec		1.36	
Flow Comparison			105%	
Velocity Comparison			68%	
TRIANGULAR CHANNEL				
Left side slope	m H:V			37
Right side slope	m H:V			2.5
Manning's n	factor			.045
Channel slope	m/m			.1
Depth	m			.11
Discharge	c.m/sec			.24

Table 2.2 STAGE 2 WATER MANAGEMENT DESIGN

	Units	Lot 29 less void	Stage 2 quarry	Clean catch above stage 2
CATCHMENT YIELD .25 1ARI tc				
Catchment Area	sq.m	28,500	36,750	
Time of Concentration, tc	min	11.8	13.0	
Average Coefficient of Runoff		0.80	0.80	
Rainfall Intensity .25 1ARI TC	mm/hr	13.00	12.00	
Peak Discharge Flow rate, Q	c.m/sec	0.08	0.10	
Catchment Yield	c.m	87	115	
TYPE C BASIN SURFACE AREA				
q	m3/sec	0.08	0.10	
settling velocity (Dept Housing table 6.2)	m/sec	0.00029	0.00029	
surface area	sq.m	284.14	338.20	
20 ARI tc				
Catchment Area	sq.m	28,500	36,750	
Time of Concentration, tc	min	11.8	13.0	
Average Coefficient of Runoff		0.80	0.80	
Rainfall Intensity 20 ARI tc	mm/hr	122.00	118.00	
Peak Discharge Flow rate, Q	c.m/sec	0.77	0.96	
Catchment Yield	c.m	821	1128	

The last column in *Table 2.2* details the catchment characteristics and backpush bank design for the clean catchment above the stage 2 quarry.

Table 2.2 also details characteristics and predicted water yields from the void and the stage 2 quarry floor. The design storm was chosen in accordance with the Department of Housing's Managing Urban Stormwater handbook (Section 6.3.3). This handbook recommends a type C sediment basin should be designed for coarse soils, such as exist at the quarry. These basins require calculation of the following:

- surface area based on a 0.25 ARI time of concentration storm with an assumed particle size of 0.02 millimetres;
- settling zone depth of 0.6 metres minimum;

- length to width ratio of 3:1 or more; and
- sediment storage zone volume the same as settling zone depth.

While the EIS requirements letter from the EPA suggested a 90 percentile five day event as the design storm, the Department of Housing's Managing Urban Stormwater handbook, page 6.19 suggests this is more appropriate to fine soils that take longer to settle. Particle size analysis of crushed sandstone from Lot 196 recorded only 12 percent finer than 0.02 millimetres (Southern Environmental, 1999). While there is no doubt that the Hawkesbury sandstone topsoils are highly erodible once disturbed, the same cannot be said of the friable sandstone below. This material is far less erodible, and in most cases is solid rock. A coarse type C basin is more appropriate.

To calculate the required basin, the following method was used in accordance with the Department of Housing's Managing Urban Stormwater handbook:

Surface area = design discharge/particle settling velocity

Where design discharge is calculated for a 0.25 ARI time of concentration storm (see *Table 2.2*). Peak discharge was calculated in accordance with Australian Rainfall and Runoff (Pilgrim, 1987) although runoff coefficients were estimated by the method described by Turner and reproduced in the Soil Conservation Service Design Manual for Soil Conservation Works (Aveyard, 1990) to consider land management and surface cover. Time of concentration was determined for each section of channel by $Tc = 0.76\ A^{0.38}$ as described in Pilgrim (1987).

Where settling velocity equals 0.00029 metres per second as per Table 6.2 of Department of Housing's Managing Urban Stormwater handbook.

The resulting required surface area is approximately 220 square metres. Therefore a basin to settle water from the stage 2 quarry floor would have a surface area of 220 square metres, a settling and sediment storage zone of 1.2 metres depth and a length to width ratio of three to one.

The remnant of the void on Lot 29 will have capacity of approximately 2,500 cubic metres, a surface area of 1500 square metres and a length to depth ratio of four to one when extraction on Lot 29 is complete. The void will therefore have excess capacity for settling and will be able to retain a single ARI 20 time of concentration storm yield from both the stage 2 quarry floor and the void itself (1100 plus 800 cubic metres respectively from *Table 2.2*). Additional capacity will be provided in the small silt traps to be excavated along the constructed drainage channel.

Overflows from the Lot 29 void will occur in prolonged wet weather when water usage is low and repeated flows from the quarry fill the void. Overflows will be piped from the

pond into the overflow dam. The pipe will be buried under the Crown Road separating the Lot 29 pond from the overflow dam as shown on Figure 2.4. The operation of the overflow dam is detailed in Appendix 5 of the Rehabilitation and Revegetation Strategy, Department of Land and Water Conservation, 2000). The overflow dam overflows into the current discharge point.

Table 2.2 details the constructed channel that will convey dirty water through the working quarry into the void. The channel will be three metres wide and has been designed with a bare channel grade. The channel will be slightly below quarry floor level, which will be graded to drain into the channel.

iii. Stage 5 of Quarrying

Stage 5 has been used to represent later quarrying. The overall management will remain the same as for stage 2, however, the clean water diversion is more complicated and the total flow volumes are higher, owing to the larger quarry floor. Separate diversion of clean water from rehabilitated sections of the quarry (for example strips 1 and 2) was considered, but while it is possible to divert this water direct through Lot 29 and off site, this would require floor regrading that would consequently require additional rehabilitation. The preferred option is to continue passing all water through the main quarry floor channel into the Lot 29 void.

Table 2.3 details catchment characteristics and design specifications for Stage 5 works.

Table 2.3 STAGE 5 WATER MANAGEMENT DESIGN

	Units	Lot 29 Void	school catchment	stage 5 quarry
Catchment Area	sq.m	16,500	53,000	110,750
Time of Concentration, tc	min	9.6	14.9	19.8
Average Coefficient of Runoff		1.00	0.30	0.80
Rainfall Intensity ARI 20 tc	mm/hr	125.00	115.00	90.00
Peak Discharge Flow rate, Q	c.m/sec	0.57	0.51	2.22

Table 2.3 STAGE 5 WATER MANAGEMENT DESIGN

WATERWAY				
Friction Factor	Choice			4
1. Long Grass, 2. Short Grass,	Material			Rocks
3. Concrete, 4 Rocks,	n			.04
5 Corrugated, 6 Earth				
Bed Slope	mV/mH			0.0244
Design Velocity	m/sec			2
Average Batter Grade	mH/ mV			2
Base Width	m			3.0
Depth	m			0.36
Wetted Perimeter	m			4.61
Flow Cross Sectional Area	sq.m			1.34
Actual Velocity	m/sec			1.71
Flow Comparison				103%
Velocity Comparison				86%
CATCHMENT YIELD .25 1ARI tc				
Catchment Area	sq.m	16,500	53,000	110,750
Time of Concentration, tc	min	9.6	14.9	19.8
Average Coefficient of Runoff		1.00	0.30	0.80
Rainfall Intensity .25 1ARI TC	mm/hr	13.75	11.85	9.95
Peak Discharge Flow rate, Q	c.m/sec	0.06	0.05	0.25
Catchment Yield	c.m	54	70	436
TYPE C BASIN SURFACE AREA				
Q	m3/sec	0.06	0.05	0.25
settling velocity (Dept Housing table 6.2)	m/sec	0.00029	0.00029	0.00029
surface area	m2	217.49	180.62	845.09
20ARI tc				
Catchment Area	sq.m	16,500	53,000	110,750
Time of Concentration, tc	min	9.6	14.9	19.8
Average Coefficient of Runoff		1.00	0.30	0.80
Rainfall Intensity 20 ARI tc	mm/hr	125.00	107.00	90.00
Peak Discharge Flow rate, Q	c.m/sec	0.57	0.47	2.22
Catchment Yield	c.m	495	636	3943

Construction of the noise bund along the edge of the Maroota School buffer will separate approximately five hectares of clean water catchment. It is not desirable to have this water enter the pit, so an existing small dam within the buffer area will be used to hold the yield

from two ARI 20 time of concentration storms. This 1,200 cubic metre dam will have a secondary earthen spillway that would discharge back into the quarry void, although most flows will be drained through a small diameter pipe. This pipe will be installed to drain the entire dam over several days to maintain storage capacity for the next design storm. The outlet pipe will discharge into the existing drainage depression in the centre of Lot 2 (see *Figure 2.3).* Catch banks will direct water from the northeast corner of Lot 1 and the southeast corner of Lot 2 into the dam.

By stage 5, the quarry floor will have expanded to about 11 hectares. The same three metre wide channel used for stage 2 will be adequate to take flow rates from an ARI 20 time of concentration storm from stage 5 (see *Table 2.3).* By stage 5, three silt traps will have been excavated along the length of the channel to provide additional settling capacity. *Table 2.3* shows that the larger floor area of the stage 5 quarry requires additional settling area (850 square metres), although the Lot 29 void will still be adequate.

iv. Final Landform Surface Water Management

The proposed final landform is shown on *Figure 2.5* and it aims to mimic existing flow patterns where possible. The previous quarry floor will grade gradually southwest, following a level two metres above standing water level. The quarry face against the school buffer zone will be battered to three in one (vertical to horizontal) to join the quarry floor, as will the northern boundary and the threatened species and community area. While the quarry face against the school buffer zone will be pushed down from the buffer zone. The other faces will be backfilled with reject. The rehabilitation plan is detailed in *Section 2.8.*

After quarrying is complete, the school buffer zone catchment will continue to drain into the 1,200 cubic metres dam with pipe outlet. Once the quarry face is battered to the required angle, a rock flume will be built to accept water from the dam's secondary earthen spillway. This flume will discharge onto the quarry floor and into the main excavated channel. Minor flows from the small diameter pipe will continue to discharge into the unquarried drainage depression on Lot 2.

The undisturbed threatened species and community buffer area will continue to drain predominately south, although the backfilled batters against the buffer areas will drain onto the quarry floor.

The quarry floor will continue to drain via the constructed channel into the Lot 29 void with overflows passing along the spillway channel along the western boundary of Lot 29 and through Lot 196. Once revegetation of the batters and quarry floor is complete, desilting of the small silt traps in the constructed channel will cease and the traps are expected to revegetate with semi-aquatic and emergent plants.

2.6 SOIL MANAGEMENT

Topsoil will be stripped immediately prior to extraction and used in rehabilitation. In most cases the topsoil will be stripped and spread immediately over areas to be rehabilitated. In the event that a rehabilitation area is not ready for topsoil spreading, the topsoil will be stockpiled temporarily (less than 12 months) away from drainage lines. Silt fences around the base of the stockpiles will prevent soil loss off-site. The stockpiles will be no more than three metres high to preserve aerobic soil microbes and organic material.

In most cases, topsoil will be stripped and used directly for rehabilitation of a previously quarried area.

2.7 EROSION AND SEDIMENT CONTROL

Given the soils on site are highly erodible under concentrated flows, erosion and sediment controls have been proposed to control drainage on the site and minimise the area of soil exposed to surface water flows. Controls will include the following:

- maintain buffers/boundary setbacks and install silt fences where appropriate to prevent sediment transport and impact on adjoining land;
- minimise the area of disturbance by only clearing areas immediately prior to extraction within each stage or precinct and progressive rehabilitation of completed precincts (refer to rehabilitation strategy for soil stabilisation techniques);
- divert upslope drainage away from disturbed areas;
- diversion of dirty runoff to sediment basins; and
- regular inspection and maintenance of sediment controls.

The environmental management plan to be implemented for the works will detail these controls in more detail, including types, locations, inspections and monitoring.

2.8 REHABILITATION AND FINAL LAND USE

2.8.1 Rehabilitation Plan

Figure 2.5 show the conceptual final landform for the proposed quarry. The objectives of the rehabilitation plan are to:

- form a final landform similar to the surrounding landscape;
- ensure rehabilitation works are implemented progressively;
- enhance the scenic and environmental quality of the site;
- maintain existing flow paths wherever possible and reinstate the ephemeral watercourse through Lot 2;
- protect and enhance habitat for threatened species and communities; and
- continue agricultural land uses on Lots 1 and 2.

As the extractable resource approximately follows existing topography, the quarry floor would be similar in form to the current landform, but approximately three to twenty metres lower. Those parts of Lots 1 and 2 that are low lying and closer to the watertable and consequently not available for quarrying will remain at their current levels.

Buffers required to reduce noise around the school and protect threatened vegetation provide a useful role in rehabilitation in that they retain mature stands of vegetation on site. Disturbance to these buffers would be kept to a minimum and modified only to reduce differences in slope towards extracted areas. The buffer protecting the Shale-Sandstone Transition Forest and *Tetratheca glandulosa* will be higher than the extracted area. Development between this buffer and the final landform has attempted to integrate this area with the extraction area by backfilling to reduce batter grades and rehabilitation with similar species.

No buffer is provided along the southern boundary of Lot 2 as it adjoins the adjacent quarry.

The western edge of the quarry will blend into the floor of the quarried area on Lot 29. The quarry floor on the northern and eastern edges of Lots 1 and 2 will be backfilled and battered respectively up to the top of the existing landform to an average grade of 3:1 (horizontal to vertical). An estimated 145,000 cubic metres of backfill is required to form the batters around the threatened species exclusion zone and the northern boundary; all this material will be sourced from overburden stripped off site. An additional 150,000 cubic metres will be required to rehabilitate the eastern batters and as estimates show there will be insufficient overburden available, this batter will be cut from the east to 3:1 after quarrying is complete.

After quarrying is complete, it is proposed to reinstate the ephemeral watercourse through Lot 2 as shown in *Figure 2.5*. As these works would be carried out about 15 years from now, details have not been designed. A conceptual plan will be formulated in consultation with DLWC as part of the environmental management plan, and as quarrying approaches its

final extent, full specifications will be designed, using latest methodology proven at that time. An outline of sections of this rebuilt channel follows:

- the small existing dam will be retained to capture and release storm flows, although the pipe outlet will be shortened to discharge immediately downstream of the dam;
- flows from the dam and the rest of the catchment will be directed into a rock flume built on the quarry highwall;
- the flume will discharge into a stilling basin and then along a relatively flat grassed channel along the old quarry floor; and
- the floor channel will accept additional flows from the rehabilitated quarry and discharge into the undisturbed section of the watercourse and then through the southern boundary.

2.8.2 Rehabilitation Process

Extraction and rehabilitation would be undertaken in strips that progressively follow quarrying eastwards. Each strip would be cleared, extracted and then rehabilitated. Cleared vegetation and topsoil from one strip would be transferred directly for use in rehabilitation of another strip. This process requires a staged approach where a number of strips would be either cleared, extracted or rehabilitated concurrently. An example of this process follows, where strip 3 is being cleared prior to extraction, strip 2 is in the final stages of extraction and, strip 1 is being rehabilitated:

- fell large trees in strip 3 and temporarily stockpile on strip 1;
- clear remaining vegetation and topsoil on strip 3 with a dozer and stockpile on strip 3. Stockpiles would be small, less than three metres high and would not be left for more than three months to minimises decomposition of seeds, sticks and leaves;
- strip overburden from strip 3 and truck to backfill the vertical cuts on strip 1;
- truck topsoil stockpiled on strip 3 and spread over strip 1;
- cover topsoiled areas of strip 1 with large trees felled from strip 3 that had been temporarily stockpiled on strip 1.
- plant and maintain tubestock on strip 1. Weed and replace dead plants as necessary.

It should be noted that this is a summary of the rehabilitation process and that a comprehensive Rehabilitation Strategy would be prepared as part of the Environmental

Management Plan. Other components of the Rehabilitation Strategy would minimise clearing or extraction to not more than two strip areas at any one time and include an ongoing weed control program.

2.8.3 Rehabilitation Species and Technique

Rehabilitation techniques will be similar to:

- those described in the Rehabilitation and Revegetation Strategy prepared by Soil Service, Department of Land and Water Conservation (DLWC, 2000); and
- those being undertaken for Lot 196.

Rehabilitation of Lot 196 involves a combination of brush matting, sowing and transplanting. Seeds of species dependent on fire for germination would be heat-treated before planting. Instead of manual brush matting as used on Lot 196, the mixture of topsoil, leaf litter and brush stripped by dozer is expected to supply the main seed source.

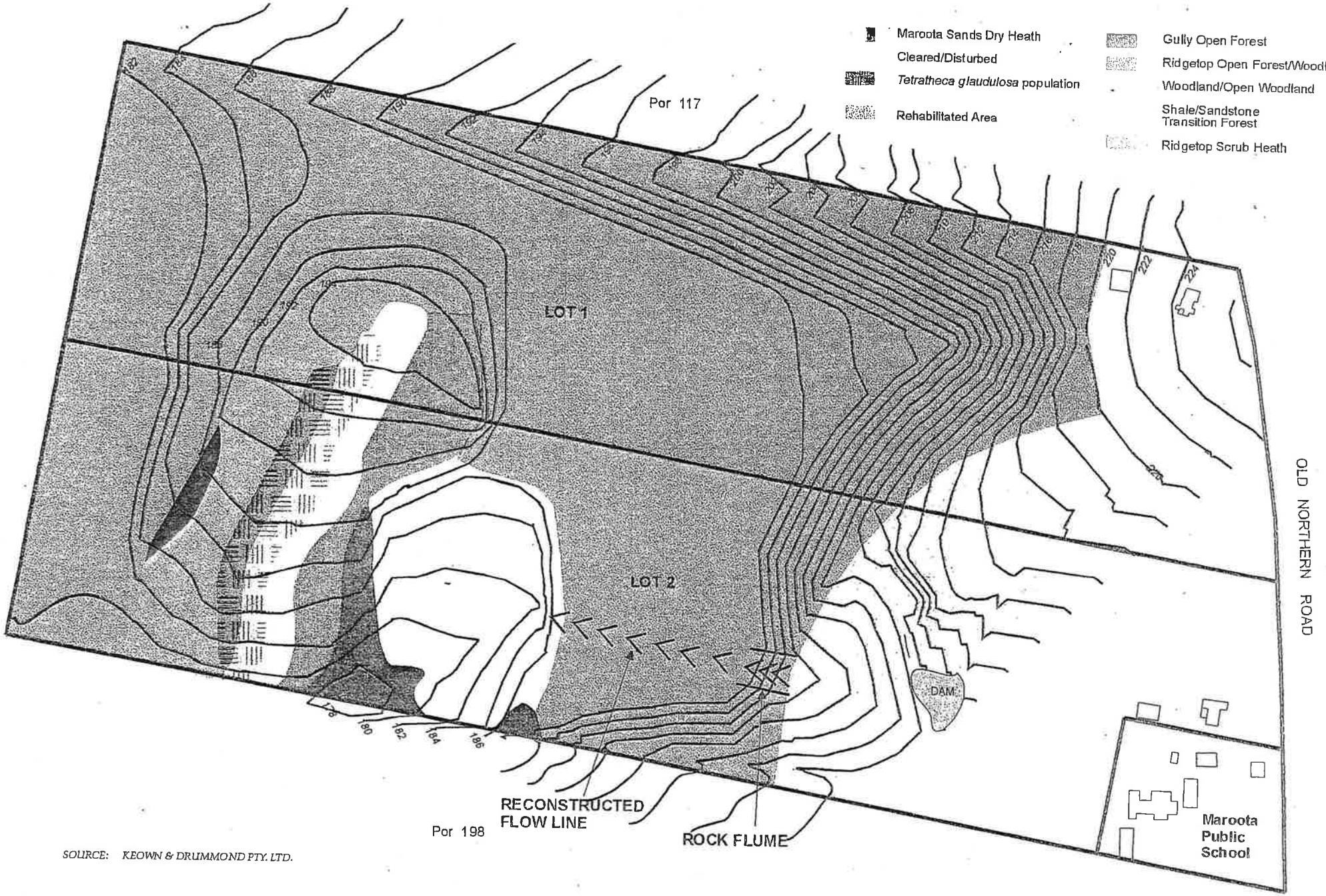
Broad vegetation groups (genus level) to be used in rehabilitation of Lots 1 and 2, and their associated rehabilitation techniques, have been detailed in *Table 2.4*. It should be noted that this is not a comprehensive list and that more than one rehabilitation technique may be applied to one species to optimise germination. Species for each vegetation group would be selected from those currently occurring on Lots 1 and 2.

Table 2.4 REHABILITATION TECHNIQUES AND VEGETATION GROUPS

Rehabilitation Technique.	**Broad Vegetation Group (genus)**
Brush matting	*Allocasuarina, Banksia*, Hakea, Leptospermum*, Acacia** and *Eucalypt.*
Topsoil	*Grevillea, Pultenaea, Hibbertia, Bossiaea* and other native grasses and herbs
Transplanting	*Lomandra, Dillwynia, Pultanaea*
Broad Sowing	*Acacia*, Iosopogon, Banksia *, Hakea** and native grasses
Tubestock	*Persoonia, Eucalypt* and other small shrubs that do not germinate from topsoil.

* may require heat treatment

The rehabilitation program would also involve use of cleared logs and felled trees for ground fauna habitat and soil stabilisation.



SOURCE: KEOWN & DRUMMOND PTY. LTD.

5001411\Figures\Fig 2.4\RehabPlan.cdr

ERM

Figure 2.5 FINAL LANDFORM PLAN

Chapter 5

ENVIRONMENTAL MANAGEMENT

5.1 SUMMARY OF MITIGATION MEASURES

This chapter provides a summary of mitigation measures, as required by the Department of Urban Affairs and Planning Director-General requirements. The following information on mitigation measures has been drawn from the various sections of this EIS.

Mitigation measures have been implemented for each stage of development, categorised here as pre-extraction, extraction and rehabilitation.

5.1.1 Pre-Extraction

Prior to any works commencing on Lots 1 and 2, the following mitigation measures will be implemented.

i. Environmental Monitoring System

The current environmental monitoring system will be reviewed to ensure that any additional sites or parameters required to monitor extraction within Lots 1 and 2 are included, in accordance with the consent conditions. This could include installation of any additional dust gauges or samplers required by the EPA, acoustic checks on equipment (for example, to measure sound power levels to validate predictions), and any flora and fauna monitoring required prior to extraction. Groundwater wells installed in early 1998 have been regularly monitored to gather background information on the groundwater depth. No additional monitoring systems or groundwater wells are proposed for Lots 1 and 2, however, existing gauges, wells and other systems will be checked to ensure they are operational.

ii. Water Management and Erosion/Sedimentation Control

Prior to extraction, the initial water management controls will be constructed for stage 1 works. These include construction of the clean water diversion drain around strip 1, and implementation of temporary sediment controls in drainage lines to catch any sediment laden runoff from clearing works.

Groundwater wells will be checked to ensure they are functional and their location reviewed in terms of the latest extraction plan, to check whether they require relocation prior to extraction.

iii. Community Notification and Complaints Management

The local community will be notified of the commencement of works within Lots 1 and 2 and a reminder of the current complaints procedure will be provided.

iv. Flora and Fauna

The buffer area surrounding the *Tetratheca glandulosa* community and the transitional forest will be surveyed and permanently staked to identify the boundaries. Permanent staking around the ecological area will ensure vehicles do not encroach on the buffer area. The 250 metre buffer boundary from the Maroota Public School will also be fenced to ensure extraction does not encroach into this buffer.

The 20 metre buffer north of the *Tetratheca glandulosa* and Shale-Sandstone Transition Forest buffer will be revegetated as described in the rehabilitation plan described in *Chapter* 2.

v. Noise Bunding

A three metre high noise bund is proposed along the northern boundary of Lot 1. It is proposed to build this bund progressively with each extraction stage. However the bund for the full length of strip 1 will be constructed prior to extraction of this strip. The bund will be built from overburden from strip 1. Temporary erosion control will be used during construction. The northern side of this bund will be seeded with pasture species to improve its appearance from the north.

A five metre high bund on the eastern buffer boundary will be built in the same manner as the northern bund, with the eastern face shaped and seeded. Trees and shrubs will be planted between this bund and Old Northern Road to reduce its visibility from the road.

vi. Tree Screening

The 30 metre buffer from Old Northern Road will be planted with trees and shrubs from the rehabilitation list to assist in screening views to the quarry from this direction. This planting will occur on commencement of strip 1 extraction, to

provide maximum growing time for the screen so that it is effective when extraction is occurring closer to the road.

vii. Staff Training

Staff will receive training on particular environmental protection requirements for Lots 1 and 2, including instructions on the buffer areas, bunding, screening and any noise restrictions.

viii. Traffic

No additional traffic controls are required as all traffic will enter and leave the site via the existing Crown Road from Lot 196 to Old Northern Road.

5.1.2 *Extraction*

During extraction on Lots 1 and 2, the following mitigation measures will be implemented. Extraction includes topsoil and overburden stripping, extraction of resource, trucking to the plant and back-filling for rehabilitation.

i. Water Management and Erosion/Sediment Control

Water management and erosion/sediment controls will be implemented as described in *Chapter* 2. These include clean water diversion drains around the eastern side of the extraction strips. A drainage channel will be formed in the extracted floor of the quarry, which will be directed to a void on Lot 29. Silt traps will be excavated into this channel at intervals.

A detailed water management strategy will be developed for each strip prior to its extraction, locating all required water management and erosion/sediment controls.

Regular surveys of extraction depth, combined with monthly groundwater level monitoring will ensure extraction does not occur within two metres of the wet weather high groundwater level.

The majority of groundwater monitoring wells are within buffer areas. One well is within the active extraction area of strip 6 and one is close to the western boundary of the Shale-Sandstone Transition Forest buffer. These wells will be removed as extraction occurs within these strips.

ii. Noise Mitigation

The selected extraction method requires the excavator to dig into the sandstone as quickly as possible so that it can work on a bench below natural ground surface. The face then reduces noise from further extraction works. The amount of time the excavator works at natural ground level will therefore be minimised.

Other noise mitigation measures include:

- construction of a three metre high stabilised bund to the east and north of each strip prior to its extraction;
- annual monitoring of noise levels to check compliance with predicted levels and that works are below required levels; and
- monitoring of truck movements in accordance with the consent for the existing development.

iii. Air Quality

Air quality mitigation measures include:

- the use of a water truck on all active extraction areas and the haul road to suppress dust;
- ongoing air quality monitoring; and
- minimising the active extraction area through progressive clearing and rehabilitation in the strips before and after the active extraction area.

iv. Flora and Fauna

Mitigation measures include:

- the buffer areas to be excluded from extraction will be located and the boundaries staked prior to extraction commencing;
- rehabilitation of the grass area in the northern section of the *Tetratheca glandulosa*/Transition Forest buffer;
- felled trees, logs and rocks will be removed from the strip being cleared and either stockpiled or immediately used in rehabilitation of previous strips, where they will be laid on the surface to provide habitat opportunities;

- species native to the local area will be used in rehabilitation to encourage long term use of the site by native fauna; and
- training of staff in threatened flora and fauna identification and reporting procedures.

v. Archaeology

No archaeological items were located on Lots 1 and 2, however, if any are identified work in the vicinity of the item will stop until National Parks and Wildlife Service or the NSW Heritage Office are notified and advice sought.

vi. Traffic

No additional traffic controls are required as all traffic will enter and leave the site via the existing Crown Road from Lot 196 to Old Northern Road.

vii. Waste Management

All general office/amenity waste is handled on the existing site. Overburden from Lots 1 and 2 will be used in rehabilitation works in nearby strips and buffers. Tailings from material sourced from Lots 1 and 2 will be disposed in the existing voids on the existing development.

viii. Hazard

All fuels and oils will be stored on Lot 196 within the approved bunded storage areas. No refuelling of equipment will be undertaken on Lots 1 and 2. Fire extinguishers will be carried by all machinery used in Lots 1 and 2. In the event of fire, the water cart is able to access Lots 1 and 2 to assist with fire fighting.

5.1.3 *Rehabilitation*

Rehabilitation works include backfilling, topsoil spreading, seeding and planting and maintenance, such as weed control and watering until establishment. Mitigation measures to be implemented during the progressive rehabilitation stages include:

- retention of erosion and sediment controls until rehabilitation works complete, with specific controls put in place where required for rehabilitation works;

- completion of an annual survey of rehabilitation to assess floristic structure and diversity, robustness and fauna species diversity;
- continued use of the water cart to water areas where earthmoving is occuring as part of rehabilitation works (eg: backfilling);
- maintenance of rehabilitation areas until sufficiently established, including watering, weed control and feral animal protection; and
- noise and air monitoring to continue during rehabilitation works involving earthworks.

5.2 ENVIRONMENTAL MANAGEMENT PLAN FRAMEWORK

5.2.1 *Introduction*

An environmental management strategy has been prepared for the existing development on Lots 29 and 196 (ERM, 2000) and it is intended to extend this strategy to incorporate environmental management requirements for the proposed development area.

5.2.2 *Environmental Objectives*

The existing environmental management strategy has the following objectives:

- to satisfy Baulkham Hills Shire Council and other relevant authorities of the environmental management and performance of the operation and compliance with the conditions of consent;
- to provide a system to manage the site environment to minimise potential environmental impacts;
- to ensure all site users are aware of environmental protection measures and their own environmental responsibilities;
- to monitor site actions and environmental performance to determine compliance with required actions; and
- to provide a system to quickly identify and correct environmental degradation or non-compliance with consent requirements.

The environmental objectives for the proposed development are generally the same as those stated above, however, as State Significant Development, the proposed development works will also need to satisfy the requirements of the Director - General of Urban Affairs and Planning.

5.2.3 *Environmental Procedures*

Environmental procedures have been developed for the existing development. These procedures each provide:

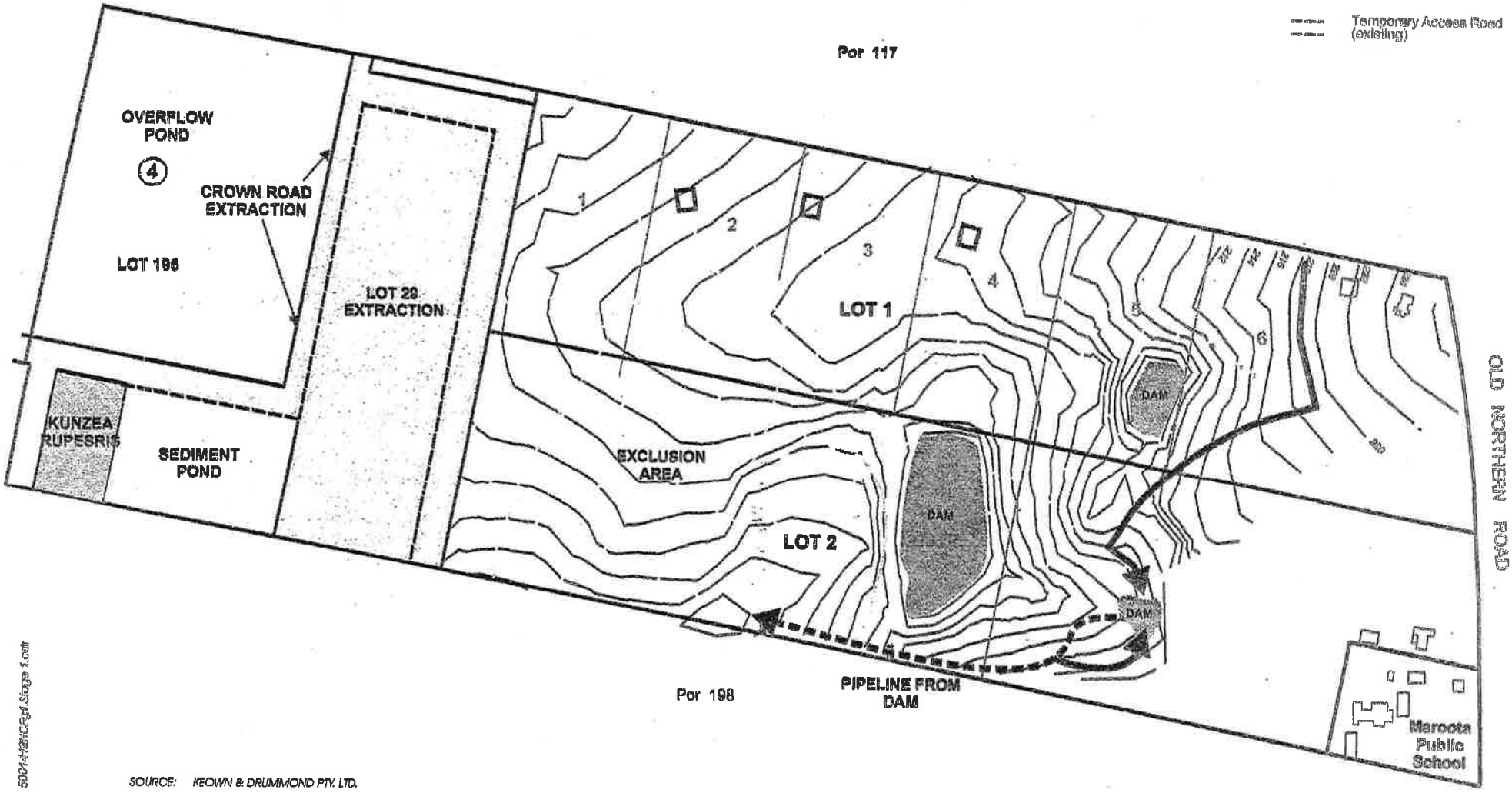
- reference information for the operator, including relevant consent conditions and EIS reference sections;
- objectives;
- actions, or procedures, to be completed;
- monitoring requirements;
- reporting requirements;
- persons responsible for carrying out the required actions; and
- any plans, tables or schedules that illustrate or locate required actions.

Environmental procedures for the existing development have been developed for:

- Induction and Training;
- Incident Management;
- Complaints Management;
- Environmental Review and Reporting;
- Roads and Traffic Management;
- Hours of Operation;
- Permissible Extraction Program;
- Buffer Zones and Protection of Adjoining Lands;
- Water Management;

- Erosion and Sediment Control;
- Heritage Management;
- Noise and Vibration Management;
- Air Quality Management;
- Flora and Fauna Management;
- Rehabilitation and Revegetation;
- Community Relations; and
- Waste Management.

The strategy will be revised to incorporate additional environmental management requirements for the proposed development area and will include the mitigation measures provide in *Section 5.1* as well as any additional requirements provided by the consent conditions.

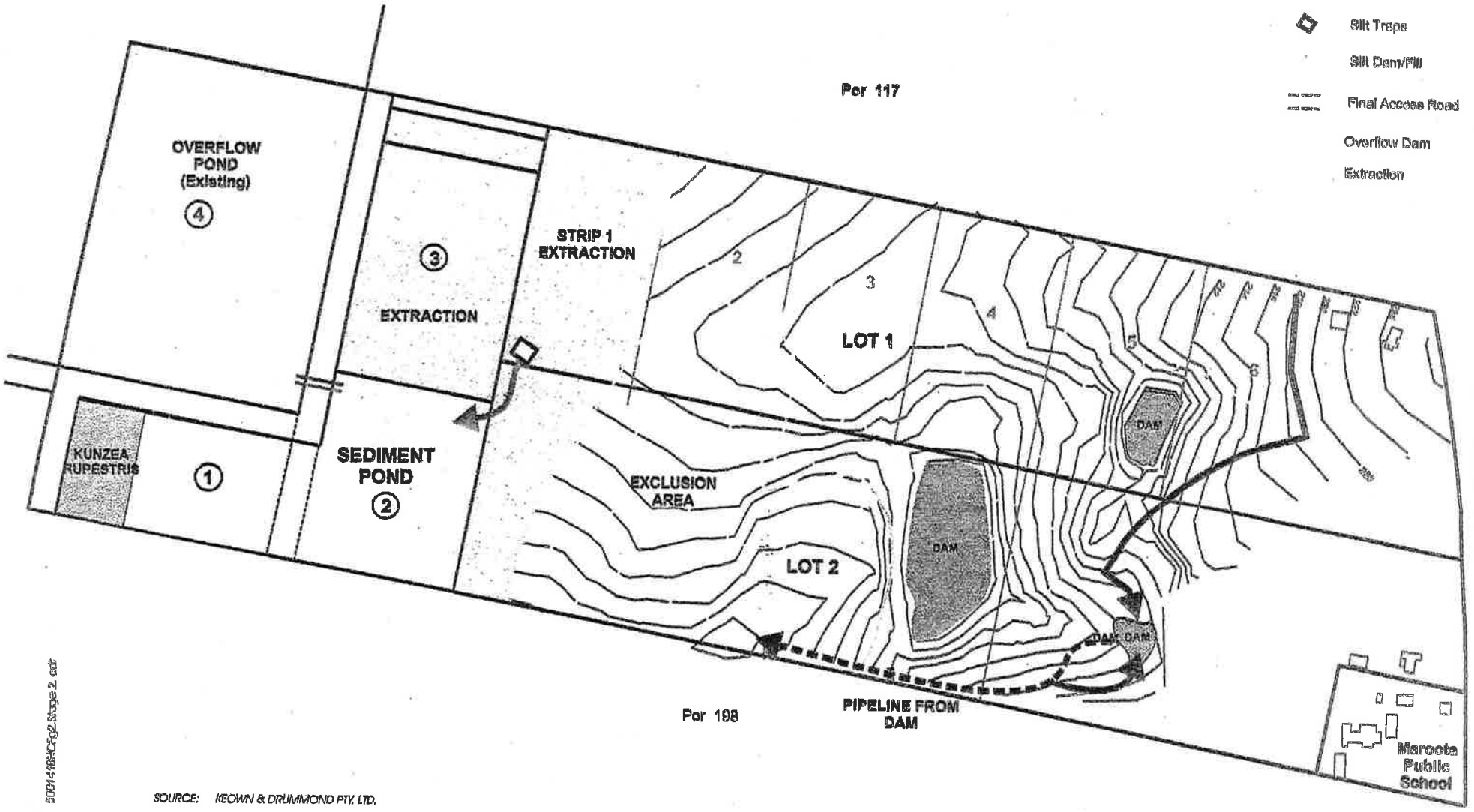


SOURCE: KEOWN & DRUMMOND PTY. LTD.

ERM

Figure 1 STAGE 1 (Existing)

ANNEXURE [illegible]

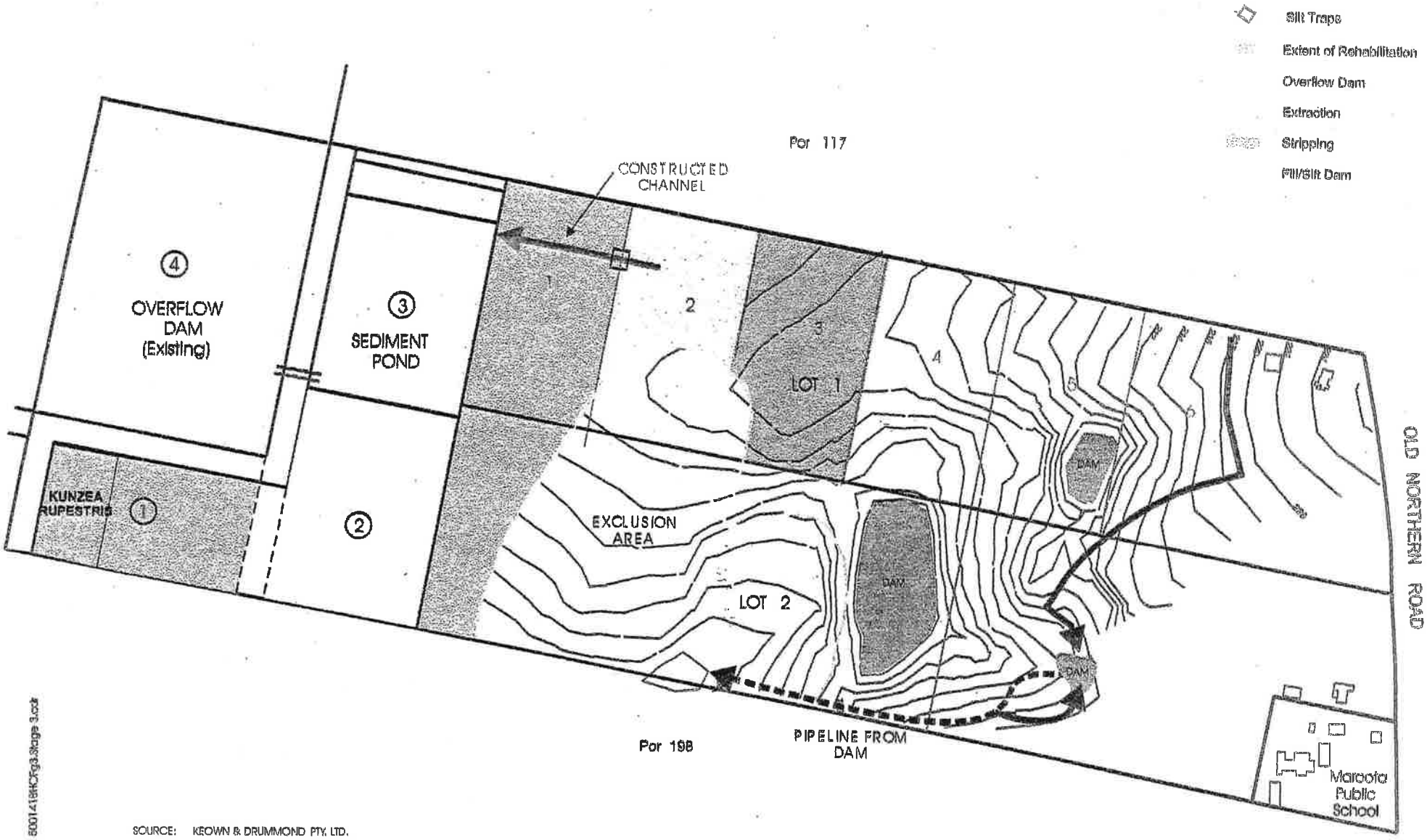


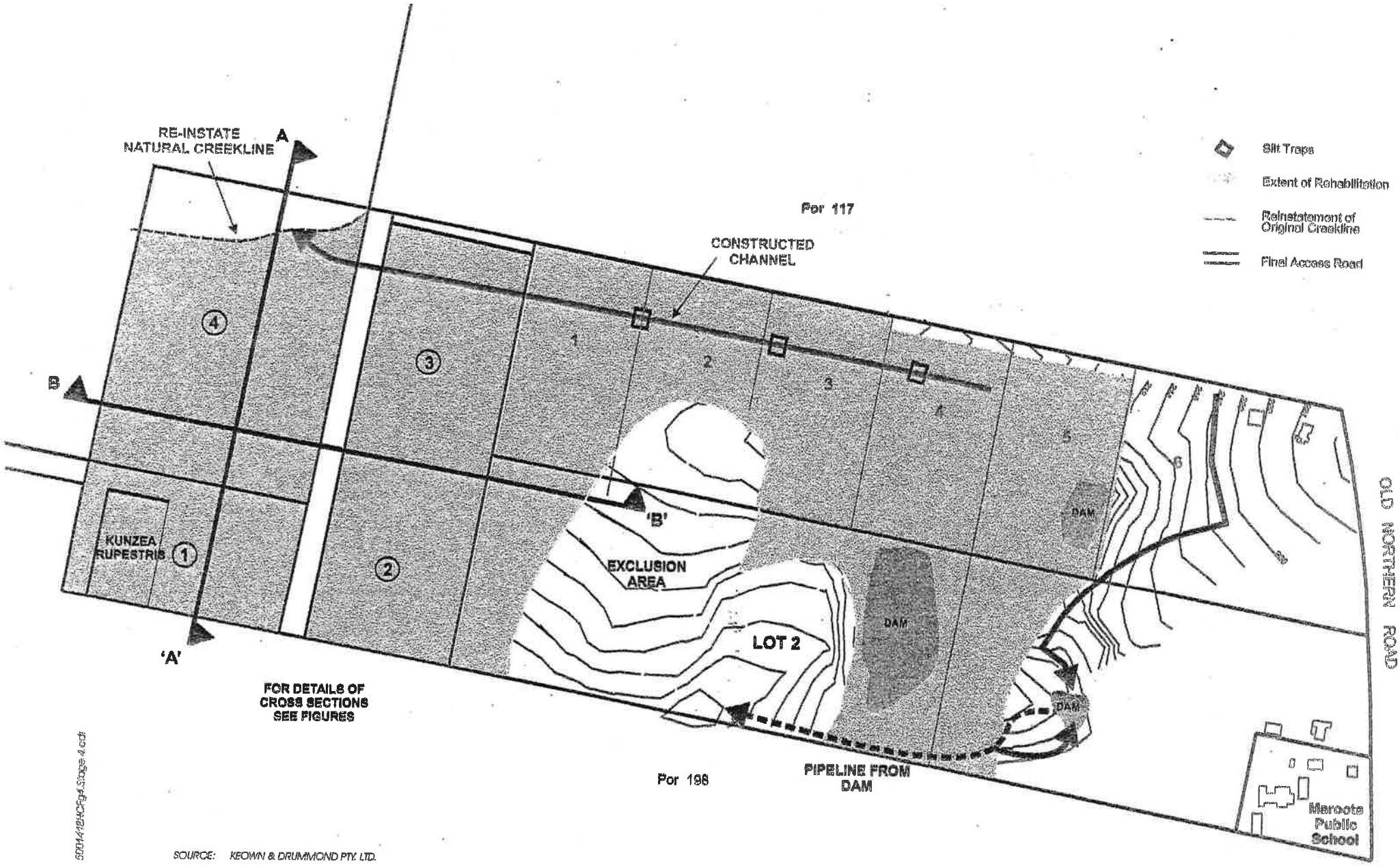
SOURCE: KEOWN & DRUMMOND PTY. LTD.

5001418:KCFg2.Stage 2.cdr

ERM

Figure 2 STAGE 2

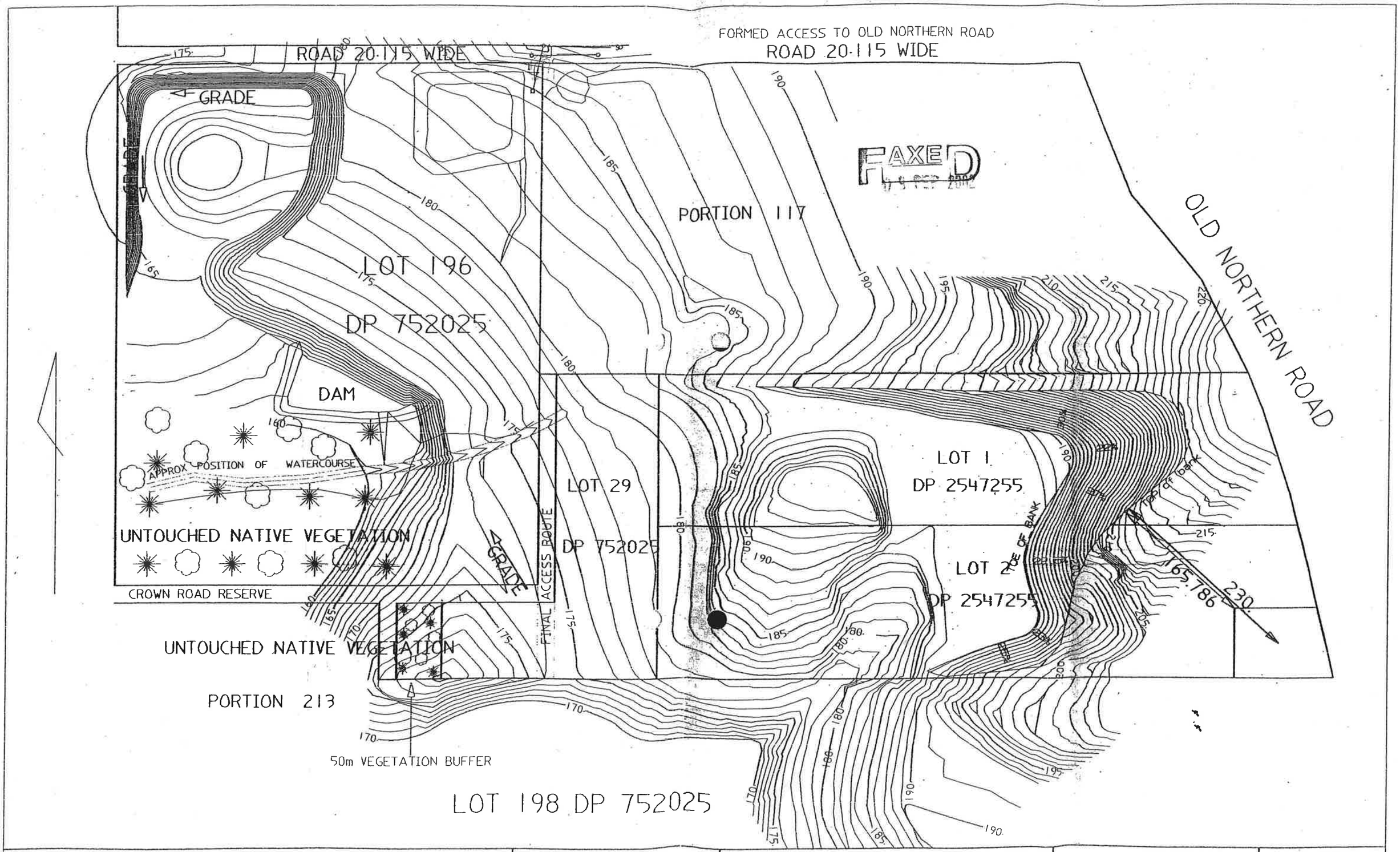

Silt Traps
Extent of Rehabilitation
Overflow Dam
Extraction
Stripping
Fill/Silt Dam
Por 117
CONSTRUCTED CHANNEL
OVERFLOW DAM (Existing)
SEDIMENT POND
KUNZEA RUPESTRIS
EXCLUSION AREA
LOT 1
LOT 2
DAM
PIPELINE FROM DAM
Por 198
OLD NORTHERN ROAD
Maroota Public School
SOURCE: KEOWN & DRUMMOND PTY. LTD.
ERM
Figure 3 STAGE 3
0
80m
N



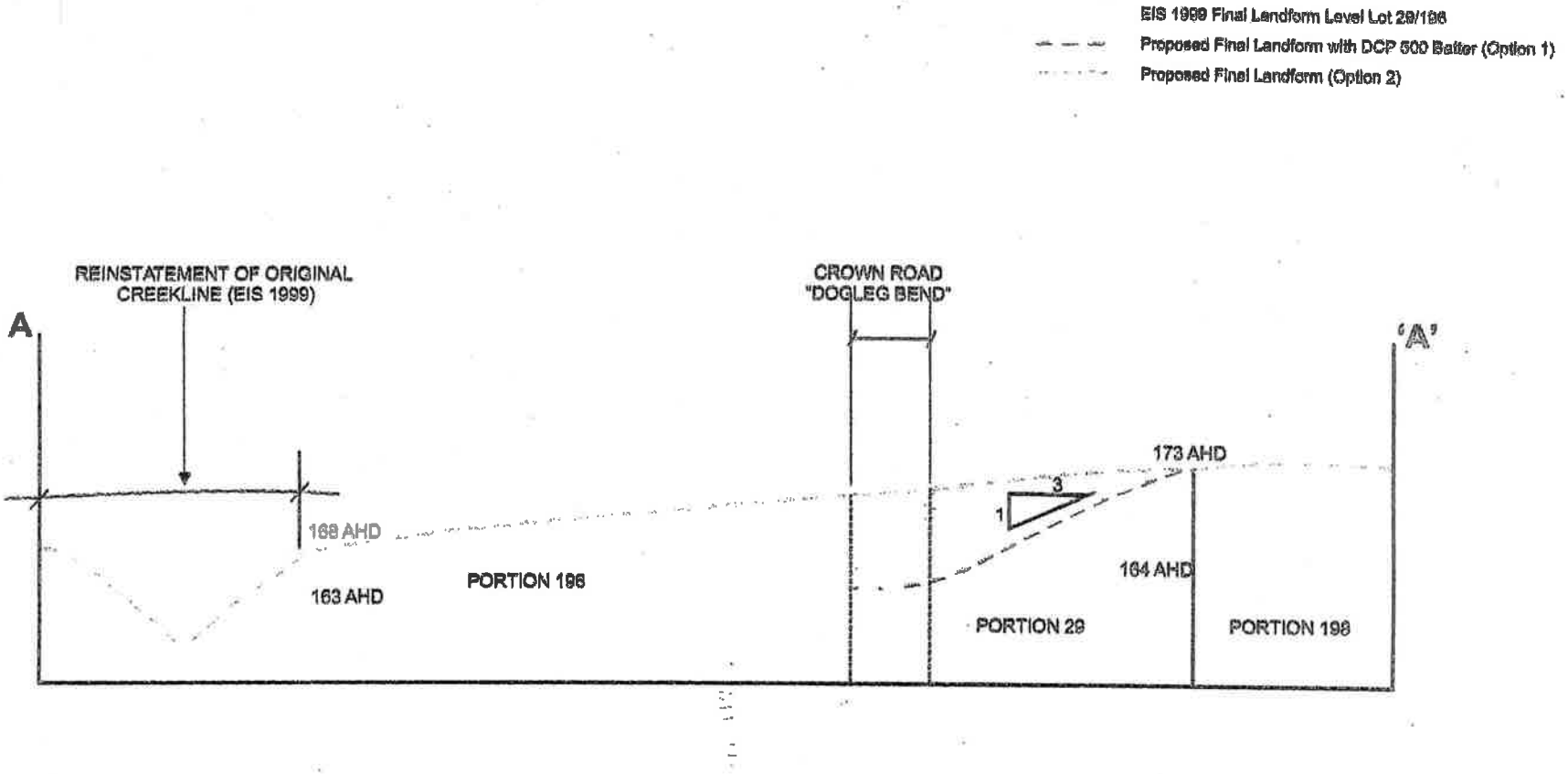
SOURCE: KEOWN & DRUMMOND PTY. LTD.

ERM

Figure 4 FINAL LANDFORM



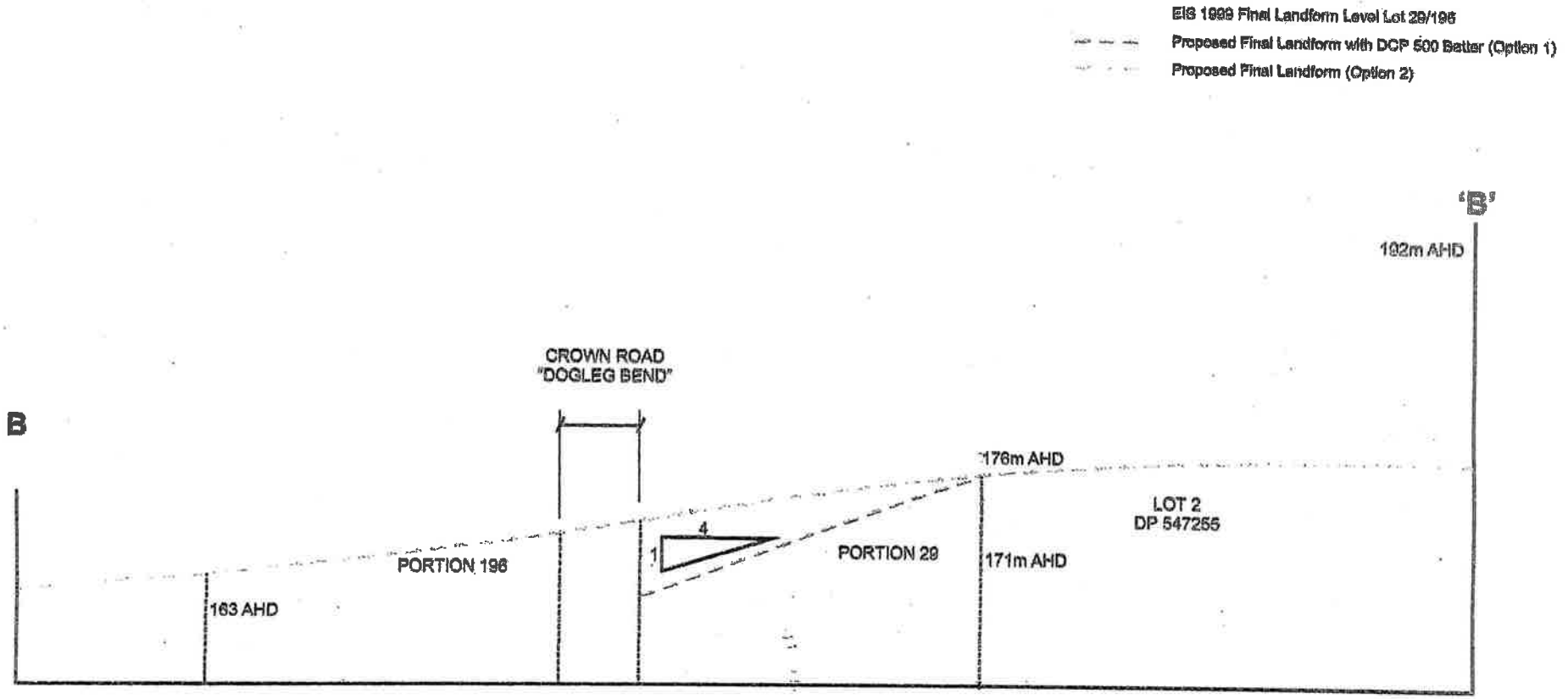
PLAN SHOWING: SHOWING FINAL LANDFORM CONTOURS OVER LOTS 29 AND 196 DP 752025 OLD NORTHERN ROAD MAROOTA	SCALE 1:4000 DATUM A.H.D. CONTOUR INT 1.0m DRAWN BY SB/RW	MATTHEW & PETER FREEBURN LAND, ENGINEERING & MINING SURVEYORS 2/2 CASTLEREAGH STREET PENRITH 2750	Ph 02-47212289 FAX 02-47215646 EMAIL: A.WARD@FREEBURNSURVEYORS.COM	DATE: 4/09/02 REFERENCE: DWG.SC00



600141BHCFig5.Cross Section A4.cdr

ERM

Figure 5 SECTION A-'A' FINAL LANDFORM LEVEL PORTION 29/ 196 (Concept Only)



500141B\CFig6.Cross Section BB.cdr

ERM

Figure 6 SECTION B-'B' FINAL LANDFORM LEVEL LOT 29/LOT 196 (Concept Only)

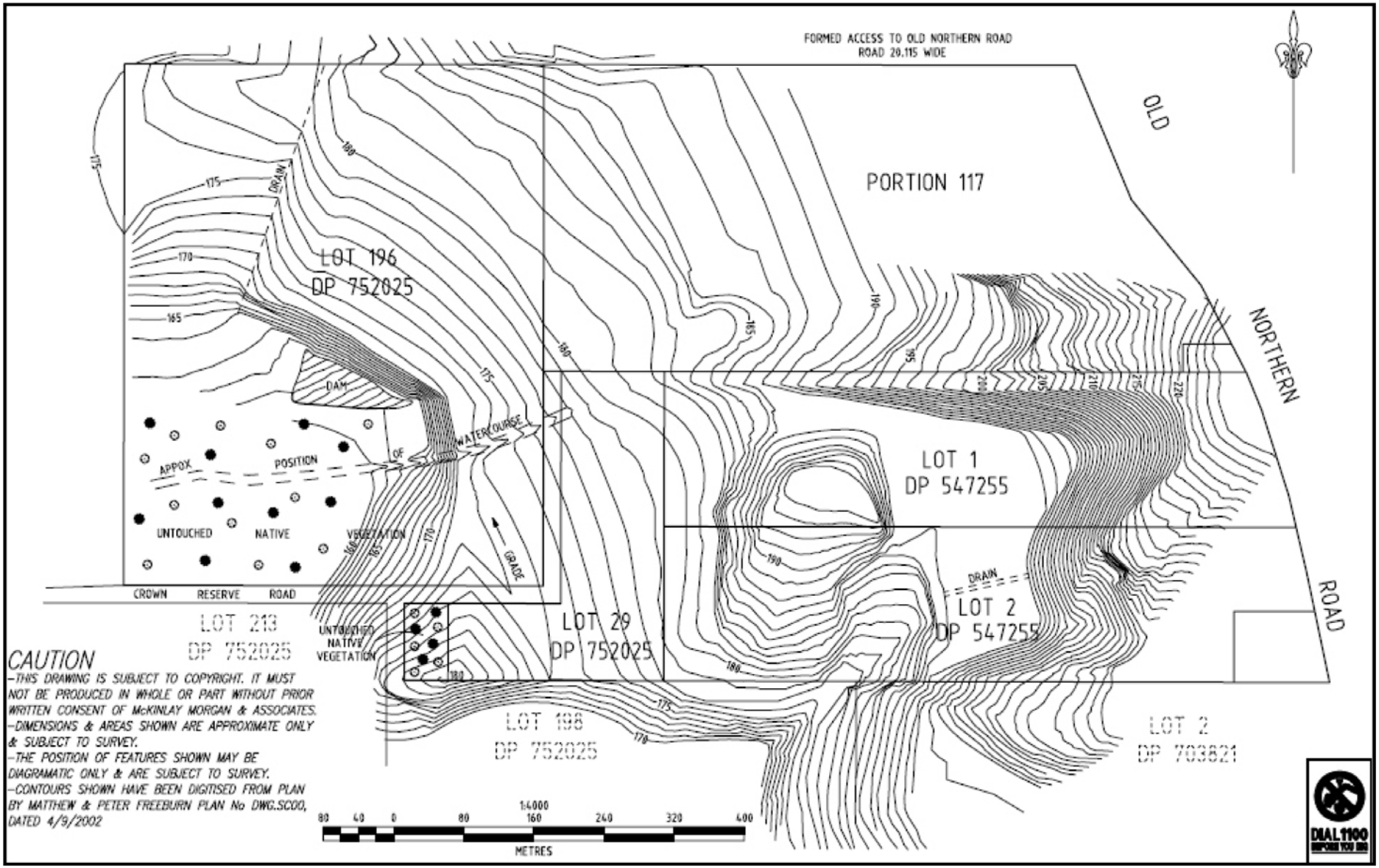


Figure 7 – Proposed amended final landform

ANNEXURE "D"

Letter of Agreement between Mr and Mrs G & M Accurso and Dixon Sand (Penrith) Pty Limited

Dixon Sand (Penrith) Pty Limited have submitted an application to extract sand resources from Lots 1 and 2 DP 547255 (the proposed site) and rehabilitate. Kenneth Herbert Dixon is the registered proprietor of Lot 1 DP 547255.

Mr and Mrs G & M Accurso are the registered proprietors of Lot 117 neighbouring the proposed site.

During the noise impact study for the proposed site, it was found that Residence 1 (Accurso) could potentially experience some noise exceedances from the operations in the North/East of the site, especially during windy conditions in the direction of the Accurso residence.

To reduce noise levels to reasonable criteria at Residence 1 (Accurso) the following modifications to operating conditions are to be made:-

1. Between 0-6 metres depth (below Natural Ground Surface Level), a Dozer-Dump Truck combination will be replaced by an Excavator-Dump Truck combination to strip overburden. When operations reach a depth of approximately 6 metres a Dozer-Dump Truck shall be used. This condition is applicable to Strip 2 to 6 inclusive.
2. A 3-metre high bund wall will be replaced by a 5-metre high bund wall surrounding Strip 6.

We, Kenneth Herbert Dixon being the registered proprietor of Lot 1 DP 547255 and Dixon Sand (Penrith) Pty Limited being the applicant for the proposal (namely DA No. 250-09-01) agree to the above two conditions of operations during the extraction of the proposed site.

We, G & M Accurso being the registered proprietors of Lot 117 DP752025 are satisfied that all reasonable and feasible mitigation measures have been applied to mitigate noise impacts at our residence. We understand that some exceedances may still occur under the above modified operating conditions.

Signed by
G & M Accurso

T.D. Accurso

G. Accurso

5-4-04
Date

Signed by
Kenneth Herbert Dixon

5.4.04
Date

The Common Seal of Dixon Sand (Penrith) Pty Limited was hereunto affixed by order of the Board in the presence of:

Director

H. E. Dixon
Secretary

Date 5.4.04

Common
DIXON SAND (PENRITH) PTY. LIMITED A.C.N. 002 278 686

Annexure E

Extent of Deeper Extraction on Lot 196