

Environmental Monitoring Program



Dixon Sand Haerses Road, Maroota

Dixon Sand (Penrith) Pty Ltd
June 2017

Version	Date	Author	Authorised by:	Comments:
1.0	15/05/2017	Hunsamon Churcher Environmental Officer	David Dixon Director – Dixon Sands (Penrith) Pty Ltd	Submitted for DP&E approval
2.0	16/06/2017	Hunsamon Churcher Environmental Officer	David Dixon Director – Dixon Sands (Penrith) Pty Ltd	Addressed DP&E comments, dated 1 June 2017

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ABBREVIATIONS

AEMR	Annual Environmental Management Report
Dixon Sand	Dixon Sand (Penrith) Pty Limited
Development Consent	Development Application 165-7-2005
EIS	Environmental Impact Statement (ERM, 2005)
EMP	Environmental Monitoring Program
EMS	Environmental Management Strategy
DPI Water	NSW Department of Primary Industries – Water
DP&E	Department of Planning and Environment
EMP	Environmental Monitoring Plan
EPA	NSW Environment Protection Authority
POEO Act	<i>Protection of Environment Operations Act 1997 (NSW)</i>
SEMP	Site Environmental Management Plan
THSC	The Hills Shire Council

1. INTRODUCTION

1.1. SCOPE AND PURPOSE OF DOCUMENT

Development consent (DA 165-7-2005) for the quarry was granted on 14 February 2006 by the then NSW Minister for Planning. Condition 3 of Schedule 5 of development consent 165-7-2005 requires:

‘Prior to the commencement of the development the Applicant, shall prepare (and following approval) implement an Environmental Monitoring Program for the development in consultation with relevant agencies, and to the satisfaction of the Director-General. This program must consolidate the various monitoring requirements in Schedule 3 of this consent into a single document.’

The Development consent permits Dixon Sand (Penrith) Pty Limited (Dixon Sand) to extract sand from Lot 170 DP 664767, Lots A and B DP 407341, and Lots 176 and 177 DP 752039 Haerses Road, Maroota (the site). The site is shown in Figure 1.

This Environmental Monitoring Program (EMP) has been prepared in response with this condition, and provides the procedures for the monitoring of noise, air quality and groundwater across the site in accordance with conditions 10, 14 and 17(b), respectively of Schedule 2 of consent DA 165-7-2005.

This EMP forms part of the Environmental Management Strategy (EMS) required under condition 1 of Schedule 5 of consent 165-7-2005, to be prepared within the first three months of commencement of operations on the site.

1.2. STRUCTURE OF THIS DOCUMENT

This EMP provides the environmental monitoring plans required to ensure all environmental obligations associated with quarry operations at the Haerses Road site are compliant.

Chapter 2 contains environmental monitoring plans for noise, air quality, groundwater, rehabilitation and waste management during the operations of the quarry.



		Source: Six Maps 2014	Hearses Road Monitoring Locations Figure 1
Dixon Sand (Penrith) Pty Ltd			

2. ENVIRONMENTAL MONITORING PLANS

The Environmental Monitoring Plans (EMP) have been compiled for the five key environmental issues; noise, air quality, groundwater, rehabilitation and waste management. The EMPs provide objectives and actions, monitoring and reporting requirements, and the responsible personnel carrying out the actions.

2.1 NOISE MONITORING

EMP 1 – Noise Monitoring																									
Consent/Licence Reference	DA 165-7-2005 Conditions 5 to 10 (inclusive) of Schedule 3 DA 165-7-2005 Schedules 4 and 5 EPL #12513 Conditions L6, M1, M4, M5, R1, R2 and R3																								
Objectives	<p>To ensure that noise generated by quarry operations does exceed the noise impact assessment criteria contained in the following table at the identified receiver locations:</p> <table border="1"> <thead> <tr> <th rowspan="2">Day</th> <th colspan="2">Shoulder</th> <th rowspan="2">Noise Receiver</th> </tr> <tr> <th>L_{Aeq}(15mins)</th> <th>L_A(max)</th> </tr> </thead> <tbody> <tr> <td>37</td> <td>37</td> <td rowspan="6">45</td> <td>F&J Roberts and J&D Young*</td> </tr> <tr> <td>40</td> <td>40</td> <td>E. Ramm**</td> </tr> <tr> <td>38</td> <td>38</td> <td>M. Ramm</td> </tr> <tr> <td>37</td> <td>37</td> <td>B. Ramm</td> </tr> <tr> <td rowspan="2">35</td> <td rowspan="2">35</td> <td rowspan="2">All other residences on privately owned land</td> </tr> <tr> </tr> </tbody> </table> <p><i>Note: The noise criteria are not applicable where a noise agreement between Dixon Sand and the resident is in place.</i></p> <ul style="list-style-type: none"> • *Dixon Sand owns the property previously owned by J&D Young • **A noise agreement is in place between Dixon Sand and E. Ramm <p>To minimise impact of noise on surrounding residents.</p> <p>To ensure employees are not subject to noise levels above those specified in the WH&S legislation.</p>			Day	Shoulder		Noise Receiver	L _{Aeq} (15mins)	L _A (max)	37	37	45	F&J Roberts and J&D Young*	40	40	E. Ramm**	38	38	M. Ramm	37	37	B. Ramm	35	35	All other residences on privately owned land
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Procedures	<p>1. Operating hours to be in accordance with the following table, unless deliveries are otherwise required by police or other authorities for safety reasons and prior notification has been provided to EPA and the affected residents:</p> <table border="1"> <thead> <tr> <th>Activity</th> <th>Permitted Operating Times</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • Vehicle access to and from site, and • Sand loading onto vehicles </td> <td>6am to 7am, Monday to Saturday (excluding Sunday and Public Holiday)</td> </tr> <tr> <td> <ul style="list-style-type: none"> • Topsoil / overburden stripping, • Sand extraction / screening, • Vehicle refuelling and washing, </td> <td>7am to 6pm, Monday to Saturday (excluding Sunday and Public Holiday)</td> </tr> </tbody> </table>			Activity	Permitted Operating Times	<ul style="list-style-type: none"> • Vehicle access to and from site, and • Sand loading onto vehicles 	6am to 7am, Monday to Saturday (excluding Sunday and Public Holiday)	<ul style="list-style-type: none"> • Topsoil / overburden stripping, • Sand extraction / screening, • Vehicle refuelling and washing, 	7am to 6pm, Monday to Saturday (excluding Sunday and Public Holiday)																
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	<ul style="list-style-type: none"> • Site rehabilitation, and • Maintenance works 	
	<ul style="list-style-type: none"> • Road works on Haerses Road and Wisemans Ferry Road, and • Acoustic bund construction 	8am to 5pm, Monday to Saturday (excluding Sunday and Public Holiday)
	<p>2. Two acoustic bunds are to be constructed in accordance with Figure 6.8 (attached in Appendix A of this EMP) of the EIS:</p> <p style="margin-left: 40px;">a) Western Bund - a 5m high earth mound above the natural ground level at the western side of Stage 4. Construction to be undertaken 3 weeks per year for 3 years starting in year 9,</p> <p style="margin-left: 40px;">b) Northern Bund - a 5m high earth mound above the natural ground level at the northern end of Stage 5. Construction to be undertaken 3 weeks in year 11.</p> <p>3. A <i>Construction Noise Management Plan</i> will be developed prior to construction of acoustic bunds above detailing:</p> <p style="margin-left: 40px;">a) How the surrounding residents (within 200m) will be informed of the proposed timing and duration of the bund construction;</p> <p style="margin-left: 40px;">b) How the noise generated by the works will be minimised and mitigated; and</p> <p style="margin-left: 40px;">c) How complaints relating to the works will be received, handled and responded.</p> <p>4. Ways to reduce noise generated by the development, including noise impacts that may be enhanced by temperature inversions during the shoulder period (6am to 7am, Monday to Saturday) are to be investigated.</p> <p>5. During Stages 4 and 5, the powerscreen is to be located as close to the extraction high wall.</p> <p>6. Manufacturers specifications for noise emission (SWL) values will be reviewed prior to purchase, with preference given to equipment of lower noise emission for equivalent performance.</p> <p>7. Acoustic checks on equipment to be undertaken prior to commencement of Stage 4 quarrying.</p> <p>8. All road surfaces, vehicles and equipment to be regularly maintained to reduce noise.</p> <p>9. Use lower gears on machinery to reduce “track slap” annoyance.</p> <p>10. Maintain a designated telephone complaints line, with the number advertised at the entry to the site and on Dixon Sand’s website.</p>	
Monitoring	<p>1. Annual attended and unattended noise monitoring to be undertaken at the nearest residence to the operations area as identified for each respective stage of quarrying.</p> <p>2. Unattended measurements to be undertaken by means of a noise logger, set up for one week each year.</p> <p>3. LAeq(15 minute) noise is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30</p>	

	<p>metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary.</p> <ol style="list-style-type: none"> 4. LA(Max) noise is to be measured at 1 metre from the dwelling façade during night time monitoring between 6am and 7am. 5. Attended monitoring not to be carried out when wind speed exceeds 3m/s or temperature inversion greater than 3°C/100m is present. 6. Noise monitoring to be continued during rehabilitation works involving earthworks. 7. If a noise complaint is received, attended noise monitoring will be undertaken to determine compliance with the noise assessment criteria and whether further actions are required.
Response	<ol style="list-style-type: none"> 1. Residual noise attenuation measures to be implemented if noise exceeds criterion detailed in the objectives. Measures include (but are not limited to): <ol style="list-style-type: none"> a) quarrying at ground level to cease when wind direction is towards nearest receivers; b) addition of controls or treatments on individual sources; c) provision of alternative measures to compensate neighbours; and d) actively investigating long-term strategies to eliminate noise levels. 2. If the monitoring results identify generated impacts are greater than the assessment criteria included in the objectives, the Secretary and affected landholders and/ or future tenants to be notified and quarterly results to be provided to these parties until the results show the development is complying with these criteria. 3. The monitoring plan to be reviewed and if required, revised within three months of the completion of the Independent Environmental Audit undertaken every 3 years. 4. An Independent Review may be required in accordance with the provisions of Schedule 4 of the Development Consent.
Reporting	<ol style="list-style-type: none"> 1. Annual noise monitoring report (including Statement of Compliance, monitoring and complaints summary, times of sampling, locations and name of person collecting sample) to be included in Annual Return to EPA. 2. Noise monitoring results/ report and the implementation of any new noise mitigation measures on site to be reported in the AEMR. 3. The AEMR to be supplied to the relevant authorities, including the Department of Planning and Environment (DP&E) and The Hills Shire Council (THSC), and made available to the public via the Community Consultative Committee, Dixon Sand's website and at the quarry site, within one month of its completion. 4. Within one month of the approval of the monitoring plans, the relevant documents to be distributed by the same means as for the

	<p>AEMR.</p> <p>5. The Independent Environmental Audit report and Dixon Sand's response to the findings to be submitted to the Secretary within 3 months of commissioning the audit.</p> <p>6. Monitoring results to be made publicly available at the quarry and on the website and updated every 3 months or as soon as available.</p>
Responsible Person	Site Environmental Officer or person(s) authorised by Site Environmental Officer to organise monitoring and reporting as required.

2.2 AIR QUALITY MONITORING PROCEDURES

EMP 2 – Air Quality Monitoring	
Consent/Licence Reference	<p>DA 165-7-2005 Conditions 11 to 14 (inclusive) of Schedule 3</p> <p>DA 165-7-2005 Schedules 4 and 5</p> <p>EPL #12513 Conditions P1, L3, L7, O3, M1, M2, M3, M4, M5, R1, R2 and R3</p>
Objectives	<p>To minimise dust generation and air pollution to prevent impact on surrounding residences and comply with the following EPA ambient goals:</p> <ul style="list-style-type: none"> i) Long Term impact assessment for dust deposition: 4 g/m²/month (max. total) (annual average), or 2 g/m²/month (max. increase) (annual average); ii) Short Term impact assessment for particulate matter <PM10: 50 µg/m³ (average for rolling 24-hour period) iii) Long Term impact assessment for particulate matter <PM10: 30 µg/m³ (annual average); and iv) Long Term impact assessment for particulate matter TSP: 90 µg/m³ (annual average). <p>To operate in a manner that must not cause or permit the emission of offensive odour beyond the boundary of the premises and comply with Section 129 of the POEO Act 1997</p>
Procedures	<ol style="list-style-type: none"> 1. All practical measures to minimise and/or prevent the emission of dust from the site will be implemented. 2. All vehicles entering or leaving the site, carrying a load that have the potential to generate dust to be covered at all times, except during loading and unloading. 3. Minimise exposed areas and disturbance as much as practicable, including restricting traffic to designated roads. 4. Progressively rehabilitate extracted areas as per the Rehabilitation and Landscape Management Plan. 5. Limit speed to 20kph on internal, unsealed access tracks. 6. Surface initial 300m of Haerses Road in selected hard, non- friable material. 7. During operating hours, water cart to be used to suppress dust on unsealed roads, truck loading areas and stockpiles where required. 8. Use chemical stabilisation on roads if required. 9. Seed any stockpiles present for more than four months. 10. Regularly maintain equipment to minimise exhaust emissions 11. Detect faulty or poorly functioning equipment through regular emissions monitoring. 12. The local community, with particular attention to residents within 200m of any construction works to be notified of the timing for

	<p>commencement of works.</p> <p>13. Maintain a designated telephone complaints line, with the number advertised at the entry to the site and on Dixon Sand's website</p>
Monitoring	<ol style="list-style-type: none"> 1. Conduct targeted TSP and PM₁₀ readings during each stage under adverse weather conditions and on the boundary closest to nearest residence. This monitoring to be conducted using a high-volume air sampler on two consecutive days, one prior to implementation of dust suppression measures and one following their implementation, to ascertain the effectiveness of these measures. 2. Continuous PM₁₀ monitoring at TEOM air quality monitoring station near the Maroota Public School by a device connected to an alarm system triggered by a maximum PM₁₀ level of 42µg/m³ (rolling 24-hour average). 3. Wind speed, direction, temperature and rainfall to be measured daily by meteorological station near the Maroota Public School. 4. Air monitoring to be continued during rehabilitation works involving earthworks.
Response	<ol style="list-style-type: none"> 1. If the 42 µg/m³ trigger level (24-hour average PM₁₀) is reached during a prevailing south-westerly wind, an alarm will be received by Management and the Environmental Officer via text message and the following procedures must be undertaken: <ol style="list-style-type: none"> a. The EPA to be immediately notified; b. immediate action to be taken to reduce PM₁₀ emissions generated by the development; c. if dust levels do not return below this level within one hour, all dust generating activities at the site to be ceased as authorised by the general manager or production manager; and d. dust generating activities onsite will only recommence when it is below this level for four consecutive 15 minute periods as determined by the Environmental Officer. 2. If the monitoring results identify generated impacts are greater than the assessment criteria included in the objectives, the Secretary and affected landholders and/ or future tenants to be notified and quarterly results will be provided to these parties until the results show the development is complying with these criteria. 3. Results of targeted dust monitoring to dictate the need for further mitigation measures. 4. The monitoring plan to be reviewed and if required, revised within three months of the completion of each Independent Environmental Audit. 5. An Independent Review may be required in accordance with the provisions of Schedule 4 of the Development Consent.
Reporting	<ol style="list-style-type: none"> 1. Exceedance of the allowable PM₁₀ level, where the prevailing wind is a south-westerly, will be immediately reported to EPA. 2. Annual air quality monitoring results (records must include times of sampling, locations and name of person collecting sample) to be included in Annual Return to EPA. 3. Complaints received, annual meteorological data and annual air

	<p>quality monitoring report and results, including identified dust exceedances, to be reported in the AEMR.</p> <p>4. The AEMR will be supplied to the relevant authorities, including DPE and THSC, and made available to the public via the Community Consultative Committee, Dixon Sand's website and at the quarry site, within one month of its completion.</p> <p>7. Within one month of the approval of the monitoring plans, the relevant documents to be distributed by the same means as for the AEMR.</p> <p>5. The Independent Environmental Audit report and Dixon Sand's response to the findings to be submitted to the Secretary within 3 months of commissioning the audit.</p> <p>6. Monitoring results to be made publicly available at the quarry and on the website and updated every 3 months or as soon as available.</p>
Responsible Person	Site Environmental Officer or person(s) authorised by Site Environmental Officer will be responsible for dust and air quality monitoring and reporting, and implementation of dust suppression controls.

2.3 GROUNDWATER MONITORING

2.3.1 Wet Weather Groundwater Levels

Contour Plan

In accordance with Condition 2 of Schedule 3 of DA 165-7-2005, the site's wet weather groundwater levels were established based on more than 12 months of monitoring of the 10 bores on the Haerses Road site.

Wet Weather Groundwater Levels and Maximum Extraction Depth Map (ERM, 2005)

A groundwater contour plan was generated using Surfer contouring software based on the existing monitoring data, and conservatively used the average wettest month during the monitoring period (November 2005). Data was not used from MW3 due to a lack of water or from MW4 which is believed to be screened in a perched water bearing zone.

As the majority of the bores in the north of the site are either dry (MW3) or have been demonstrated through pumping to have a low yield, these wells were not considered to be hydraulically interconnected as a continuous water-bearing zone. Pumping data also suggested that it is the sandstone contact beneath the sand resource that retains a small amount of groundwater in this area of the site. As MW1 and MW4 (located in the south of the site) were not purged dry during pumping the data suggests that these bores may be within a water bearing zone(s).

On this basis, the contour plot generated on the spatially isolated monitoring data was therefore considered to be over-conservative and an additional four groundwater monitoring bores were recently installed in the centre and to the south of the Haerses Road site (MW11-MW14).

Wet Weather Groundwater Levels and Maximum Extraction Depth Map (Dundon Consulting, 2017)

The wet weather groundwater levels and maximum extraction depth map were reviewed and revised in May 2015.

A copy of the revised maximum extraction depth map is contained in Appendix B.

Refer to Figure 1 for monitoring locations of active groundwater bores. Table 1 contains the status of the monitoring wells on site.

Table 1: Monitoring well locations and status.

Monitoring Well	Location	Status
MW1	Stage 2 Extraction (west)	Decommissioned – in active extraction area
H2 (MW2)	Stage 4 Extraction	Active
MW3	Stage 3 Extraction (east)	Decommissioned – borehole dry
MW4	Stage 2 Extraction (west)	Decommissioned – in active extraction area
MW5	Stage 4 Extraction	Decommissioned – removed for road work
H6 (MW6)	Stage 5 Extraction	Active
H7 (MW7)	Stage 5 Extraction	Active
MW8	Stage 1 Extraction	Decommissioned – in active extraction area
H9 (MW9)	Stage 3 Extraction (east)	Active
MW10	Stage 2 Extraction (west)	Decommissioned – in active extraction area
MW11	Stage 1 Extraction	Decommissioned – in active extraction area
H12 (MW12)	Stage 3 (west)	Active
H13 (MW13)	South of Stage 2 extraction limit	Active
H14 (MW14)	South of Stage 2 extraction limit	Active
BH4	South-west of Stage 2 extraction limit	Active
BH5	Stage 2 Extraction (east)	Active

On-going Monitoring

Due to the long-term nature of the approved quarry and in accordance with the EIS prepared for the development, ongoing monitoring of groundwater levels will be carried out to establish the wet weather groundwater level prior to commencement of quarrying in each stage.

EMP 3 – Groundwater Monitoring	
Consent/Licence Reference	DA165-07-05 Condition 10 of Schedule 2, Conditions 2, 3, 15, 17, 19 and 20 of Schedule 3, and Conditions of Schedules 4 and 5 EPL 12513 Conditions L1 and O4
Objectives	To ensure compliance with section 120 of the POEO Act 1997.
Procedures	<ol style="list-style-type: none"> 1. Decommissioning of the septic tanks on the site and the removal of potentially contaminating appliances to be carried out as outlined by the extraction plan. 2. Any additional groundwater monitoring bores required by DPI Water to be installed and existing monitoring wells to be checked to ensure that they are in good working order. 3. Extraction not to occur within 2 metres of the groundwater table (wet weather high level) based on groundwater monitoring and survey information of the working area of the quarry. The wet weather groundwater level is to be established immediately prior to commencement of quarrying each stage. 4. In the event of groundwater being breached, operations near the affected area are to cease and DP&E to be consulted with respect to the basis upon which extraction may recommence. 5. No fuel, oil or other chemicals to be stored on site. 6. Maintenance and equipment refuelling shall only be carried out in the designated workshop or refuelling areas on Lot 196.
Monitoring	<ol style="list-style-type: none"> 1. At least 12 months of site specific groundwater monitoring to be undertaken prior to extraction, to establish the wet weather groundwater level for the site and baseline physical and chemical groundwater conditions. 2. Monitoring to be used to establish the wet weather groundwater level prior to commencement of quarrying in each stage. 3. Groundwater level to be measured at the site's monitoring bores monthly and following periods of prolonged wet weather. 4. Groundwater quality monitoring within each of the water bearing bores to be undertaken each year. 5. Review and update Maximum Extraction Depth Map every three years, within 3 months of the completion of each Independent Environmental Audit.
Response	<ol style="list-style-type: none"> 1. If monitoring notes a degradation of the groundwater resource quality due to quarry activities on the site, a contingency plan for the remediation of the aquifer to be prepared and implemented. 2. If groundwater is breached, the Secretary to be notified and provided with quarterly monitoring results until operation complies. 3. The monitoring plan to be reviewed and if required, revised within three months of the completion of each Independent Environmental Audit.

	<p>4. An Independent Review may be required in accordance with the provisions of Schedule 4 of the Development Consent.</p>
Reporting	<p>1. Annual water quality monitoring results (records must include times of sampling, locations and name of person collecting sample) to be included in Annual Return to EPA.</p> <p>2. Annual summary of groundwater monitoring results, incorporating water quality, level and extraction data to be reported in AEMR.</p> <p>3. The AEMR to be supplied to the relevant authorities, including the DP&E and THSC, and made available to the public via the Community Consultative Committee, Dixon Sand's website and at the quarry site, within one month of its completion.</p> <p>8. Within one month of the approval of the monitoring plans, the relevant documents to be distributed by the same means as for the AEMR.</p> <p>4. The Independent Environmental Audit report and Dixon Sand's response to the findings to be submitted to the Secretary within 3 months of commissioning the audit.</p> <p>5. Monitoring results to be made publicly available at the quarry and on the website and updated every 3 months or as soon as available.</p>
Responsible Person	<p>Site Environmental Officer or person(s) authorised by Site Environmental Officer.</p>

2.4

REHABILITATION MONITORING PROCEDURES

EMP 4 – Rehabilitation Monitoring	
Consent/Licence Reference	DA 165-7-2005 Conditions 21 and 22 of Schedule 3 DA 165-7-2005 Schedules 4 and 5
Objectives	<p>Progressively rehabilitate all disturbed areas to a final land use of agricultural land (minimum Class 4)</p> <p>Ensure that a consistent landform is achieved on either side of Hitchcock Road through consultation with local landholders of Lot 167 DP 752039</p> <p>Conserve, maintain and enhance the vegetation on the site that will not be disturbed by quarry operations.</p> <p>Undertake screen planting in general accordance with the EIS (ERM, 2005).</p>
Procedures	<ol style="list-style-type: none"> 1. Undertake vegetation clearing and rehabilitation in accordance with EIS Figures 2.2 a to d (inclusive) contained in Appendix C. 2. The top 100 to 300 millimetres of soil will be stripped immediately prior to extraction and applied directly over areas to be rehabilitated. 3. Where rehabilitation area is not ready for topsoil spreading, topsoil is to be stockpiled no greater than 3 metres high and away from drainage lines. 4. Establish the following buffer zones and setbacks: <ol style="list-style-type: none"> a) 10 metres from adjoining property boundaries b) 30 metres from Wisemans Ferry Road c) 40 metres from the Maroota State Forest d) 40 metres from archaeological site # 45-2-0081 e) 40 metres from the top bank of Little Cattai Creek, and f) 100 metres from the dwellings adjacent to Hitchcock Road and Wisemans Ferry Road. 5. Boundaries of buffer zones to be clearly delineated. 6. Supplementary vegetation planting to be undertaken in: <ol style="list-style-type: none"> a) 30 metre buffer zone from Wisemans Ferry Road, and g) 100 metres from the dwellings adjacent to Hitchcock Road and Wisemans Ferry Road during quarrying of Stage 3. 7. Undertake rehabilitation in accordance with the Final Landform Plan contained in Appendix D. 8. Utilise grass and cover crop species commonly grown in Maroota for initial stabilisation and to increase organic content of soils. 9. Utilise legume species to encourage nitrogen accumulation and

	<p>improve soil fertility.</p> <p>10.Planting of native vegetation within drainage lines and in windrows along the lot boundaries to be undertaken in accordance with EIS Figures 2.2 a to d (inclusive) contained in Appendix C.</p> <p>11.Undertake maintenance of buffer areas to native vegetation.</p> <p>12.Undertake supplementary planting of unvegetated buffer zones along Wisemans Ferry Road and south of the resident to the north-east of Stage 5 extraction.</p> <p>13.Undertake pre-clearance surveys prior to removal of dead trees containing hollows and the return of trees, logs and rocks to previously extracted areas.</p> <p>14.Construction of environmental bunds as follow:</p> <ul style="list-style-type: none"> a) 5 metre bund along the western boundary during Stage 3 extraction. b) 5 metre bund on the north-east boundary prior to Stage 5 extraction <p>15.Environmental bunds to be constructed to the following specification:</p> <ul style="list-style-type: none"> a) maximum final gradients of 1 in 3 (vertical to horizontal) b) initial seeding of cover crops c) on-going planting of native vegetation and trees on the long-term bunds (western and north-western bunds) for visual screening d) bunds to be removed when the area is due for reshaping to final landform. <p>16.Establish 2 offset areas:</p> <ul style="list-style-type: none"> a) Offset 1: 1.1 hectares of offset within the buffer to Maroota State Forest, and b) Offset 2: 30 metre buffer strip adjacent to Wisemans Ferry Road <p>17.Implement a weed management program, targeting and prioritising weed control in rehabilitated, buffer and offset areas.</p> <p>18.Establish and maintain erosion and sediment control devices.</p> <p>19.A Farm Management Plan (FMP) to be developed and incorporated into the EMP during year 15. The FMP to be amended as required to reflect changes to future farming practices on site.</p> <p>20.Implement a feral animal control program where applicable.</p>
Monitoring	<p>1. Undertake monthly inspection of the rehabilitated and offset areas to determine:</p> <ul style="list-style-type: none"> a) the progress, success and species selection for rehabilitation, b) variation of the recommended strategies,

	<p>c) the need for reworking, reseeding or application of fertiliser.</p> <p>2. Undertake monthly inspection to ensure:</p> <p>a) the erosion and sediment control devices are in good working order.</p> <p>b) The fencing and marking of buffer areas are intact and undertake maintenance where required.</p> <p>c) Sufficient ground cover on banded areas and minimal erosion.</p> <p>3. Undertake annual survey the rehabilitated and offset areas.</p>
Response	<p>1. Undertake the following treatment in the rehabilitated and offset areas where required:</p> <p>a) Reseed and rework</p> <p>b) Supplementary planting</p> <p>c) Revision of planting methodology</p> <p>d) Application of fertiliser</p> <p>e) Maintenance and replacement of erosion and sediment control devices</p> <p>f) Various weeding techniques including chemical and mechanical.</p> <p>g) Maintenance of fencing and boundary delineation.</p> <p>2. Undertake the following treatment for environmental bunds where required:</p> <p>a) Reapplication of cover crop</p> <p>b) Maintenance of erosion and sediment devices</p>
Reporting	<p>1. The rehabilitation and revegetation performance report will be included in the AEMR which will be supplied to the relevant authorities, including DPE and THSC, and made available to the public via the Community Consultative Committee, Dixon Sand's website and at the quarry site, within one month of its completion.</p> <p>9. Within one month of the approval of the monitoring plans, the relevant documents to be distributed by the same means as for the AEMR.</p> <p>2. The Independent Environmental Audit report and Dixon Sand's response to the findings to be submitted to the Secretary within 3 months of commissioning the audit.</p>
Responsible Person	<p>Site Environmental Officer or person(s) authorised by Site Environmental Officer will be responsible for implementing the Rehabilitation Land Management Plan, revegetation works, monthly reporting on revegetation, monthly inspection of fencing / buffer markers.</p> <p>Qualified Ecologist to undertake pre-clearance surveys, rehabilitation performance and weed survey.</p> <p>Pest contractor to implement feral animals control program.</p>

2.5

WASTE MONITORING PROCEDURES

EMP 5 – Waste Monitoring	
Consent/Licence Reference	DA 165-7-2005 Conditions 32 of Schedule 3 DA 165-7-2005 Schedule 5 EPL 12513 Condition L5
Objectives	To minimise waste generated and disposal, maximise reuse and recycling and ensure wastes are managed effectively to minimise impact on the environment.
Procedures	<ol style="list-style-type: none"> 1. Maintain separate bins for different waste streams. 2. Recyclables and Putrescible waste to be collected by Council Waste contractor. 3. No building wastes or putrescible material to be disposed on site. 4. No waste generated offset to be stored, treated, processed, or disposed on site except as permitted by a license. 5. Maintain on-site sewage treatment and disposal using on-site sewage treatment facility. 6. Implement a waste reduction program by adopting the following measures: <ol style="list-style-type: none"> a) Implementing the NSW Waste Management Hierarchy of avoidance and reduction, reuse, recycling, reprocessing, recovering energy, treatment and disposal of waste. b) Undertake site inductions and waste reduction awareness for staff and contractors, c) use of waste hierarchy and minimisation posters, d) labelling bins to assist waste separation, and e) planning and managing procurement of materials to minimise over-ordering of products and minimise excess packaging 7. Waste minimisation and waste hierarchy forms part of the environmental induction for staff and contractors.
Monitoring	Monthly inspection of on-site sorting and storage of waste, and to ensure the site is generally tidy and free of rubbish. Monthly update of waste register
Response	On-going revision and assessment of the effectiveness of the waste management strategy.
Reporting	Waste management and minimisation to be reported in the AEMR.
Responsible Person	Site Environmental Officer to undertake monthly site inspection and maintain the Waste Register Licensed waste transporter to transport waste offsite.

APPENDIX A

FIGURE 6.8 of the EIS – location of Acoustic Bunds

APPENDIX B

Maximum Extraction Depth Map (Dundon Consulting, May 2017)

APPENDIX C

Quarry Staging and Rehabilitation Plans

APPENDIX D

Final Landform Plan