

Enforceable Undertaking

To:

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

This enforceable undertaking ("**Undertaking**") is given under section 9.5 of the *Environmental Planning and Assessment Act 1979 (NSW)* ("**EP&A Act**") by **Leadshine Pty Limited** (ABN 38 755 709 681).

1 Person giving the Undertaking

This Undertaking is given to the Secretary, Department of Planning, Industry and Environment (the "**Secretary**") by **Leadshine Pty Limited** (ABN 21 102 229 943) ("**Leadshine**"), for the purposes of section 9.5 of the EP&A Act.

2 Background

- (a) Leadshine is the operator of Broken Head Quarry and entitled to act on the Development Consent pursuant to leases granted to Leadshine by the registered proprietors of Broken Head Quarry dated 16 December 2005.
- (b) The Minister for Planning issued Leadshine with the Order requiring rehabilitation works to be carried out comply with the Development Consent.
- (c) The Undertaking was varied at the request of Leadshine to extend the dates for completion of commitments in clauses 4.1(d), 4.2(d), 4.4(b) and 4.4(b)(iv) due to the effects of drought, bushfire and plant supply shortages.

3 Commencement of this Undertaking

This Undertaking comes into effect when:

- (a) this Undertaking is executed by Leadshine, and
- (b) this Undertaking so executed is accepted by the Secretary or his delegate; and
- (c) the Minister for Planning revokes the Order.

(the "**Commencement Date**").

4 Undertaking

Leadshine hereby undertakes as follows and will:

4.1 Westside Land

In respect of the Westside Land:

- (a) to complete by 31 March 2019, landforming works in the Westside Land in accordance with the plans at Annexure 1. Any bunds, dams or other structures required by the plans at Annexure 1 must be constructed to a design which has been reviewed and approved as safe and stable for that site and use by an appropriate Australian chartered professional engineer.

- (b) To complete, by 31 March 2019, stormwater drainage and management works in accordance with the plans at Annexure 2.
- (c) To complete, by 30 April 2019, hand sowing of a 'cover crop' of Shirohie Millet and/or sterile Ryegrass, together with pre-treated native seed collected from the desired vegetation community on the areas identified as W2 in Annexure 3.1 (**W2**) which have not already been sowed at the Commencement Date, in accordance with paragraph 2.6.4 (iv) 'Final Rehabilitation Procedures – Blackbutt and Scribbly Gum Woodland Communities - Post Quarrying Activities' (i)-(vi) of the Western Quarry Sector FFMP. The application of 'cover crop' must be sowed directly after the conclusion of land-forming works to reduce the risk of erosion and stabilise the landform required by clause 4.1(a) above.
- (d) to complete by 30 April 2020, planting of the areas identified as W2 which have not already been planted at the Commencement Date with a variety of the species selected from the approved planting set out in table 2.6 in the Broken Head Quarry EIS (Annexure 4) for the vegetation communities identified in Annexure 6.1 for the area W2 in Annexure 3.1.

Plantings are to be undertaken on a progressive basis rather than being deferred until completion of the landforming works.

- (e) to complete by 30 June 2019, planting on the proposed dam wall for the new dam on the Westside Land. Such plantings are to be selected from the approved planting set out in table 2.7 in the Broken Head Quarry EIS (Annexure 5).
- (f) to undertake an inventory of existing plantings as at the Commencement Date in the area identified W3 in the plans at Annexure 3.1 (**W3**) within one month of the Commencement Date.
- (g) To the extent that the planting already existing in the area W3 is not compatible with the Blackbutt Forest vegetation community, to undertake additional plantings selected from the approved planting set out in table 2.6 in the Broken Head Quarry EIS (Annexure 4) to achieve vegetation compatible with the Blackbutt Forest vegetation community within 3 months of the completion of the inventory referred to in clause 4.1(f).
- (h) To undertake all landforming works and planting required to be undertaken under this Enforceable Undertaking after the Commencement Date in accordance with the steps set out in paragraph 2.6.4 and 2.7 of the Western Quarry Sector FFMP.
- (i) All works (including landforming works, stormwater works or planting) to be undertaken on the Westside Land must be undertaken in accordance with the Schedule of Works set out at Annexure 7.

4.2 Eastside

In respect of the Eastside Land:

- (a) to complete by 31 March 2019, landforming works in the Eastside Land in accordance with the plans at Annexure 1. Any bunds, dams or other structures required by the plans at Annexure 1 must be constructed to a design which has been reviewed and approved as safe and stable for that site and use by an appropriate Australian chartered professional engineer.
- (b) To complete, by 31 March 2019, stormwater drainage and management works in accordance with the plans at Annexure 2.
- (c) To complete, by 30 April 2019, hand sowing of a 'cover crop' of Shirohie Millet and/or sterile Ryegrass, together with pre-treated native seed collected from the desired

vegetation community for the vegetation communities identified in Annexure 6.2 on the areas identified as E2 in Annexure 3.2 (E2), which have not already been sowed at the Commencement Date in accordance with paragraph 2.6.4 (iv) 'Final Rehabilitation Procedures – Blackbutt and Scribbly Gum Woodland Communities - Post Quarrying Activities' (i)-(vi) of the Eastern Quarry Sector FFMP. The application of 'cover crop' should be sowed directly after the conclusion of land-forming works to reduce the risk of erosion and stabilise the landform required by clause 4.2(a).

- (d) to complete by 30 April 2020, planting of the areas identified as E2 which have not already been planted at the Commencement Date with a variety of species selected from the approved planting set out in table 2.6 in the Broken Head Quarry (Annexure 4) for the vegetation communities identified for areas.

Plantings are to be undertaken on a progressive basis rather than being deferred until completion of the landforming works.

- (e) to complete by 30 June 2019, planting of a variety of species selected from the approved planting set out in table 2.7 in the Broken Head Quarry EIS (Annexure 5), on the dam walls for the upper dam on the Eastside Land.
- (f) To supplement the plantings existing as at the Commencement Date in the area identified E3 in plan in Annexure 3.2 to achieve vegetation compatible with the Blackbutt Forest vegetation community.
- (g) To undertake all landforming works and planting required to be undertaken under this Enforceable Undertaking after the Commencement Date in accordance with the steps set out in paragraph 2.6.4 and 2.7 in the Eastern Quarry Sector FFMP.
- (h) All works (including landforming works, stormwater works or planting) to be undertaken on the Eastside Land must be undertaken in accordance with the Schedule of Works set out at Annexure 7.

4.3 Maintenance

Leadshine must carry out maintenance works in accordance with section 2.6.4(v) of the Western Quarry Sector FFMP and the Eastern Quarry Sector FFMP.

4.4 Reporting

- (a) Leadshine must provide a monthly update of the progress in complying with the obligations under this Enforceable Undertaking to the Minister within 7 days of the end of each month until such time as the Minister agrees in writing that Leadshine has met its obligations (excluding reporting obligations under this sub clause) under this Undertaking.
- (b) By 7 days after the Department endorses the proposed independent auditor, Leadshine must commission and pay the full cost of an Independent Ecological Audit. This Audit must:
 - (i) be conducted by a suitably qualified, experienced and independent ecologist and erosion and sediment control expert whose appointments have been endorsed by the Secretary;
 - (ii) assess the works undertaken by Leadshine and whether they comply with the requirements of this Enforceable Undertaking (excluding the maintenance obligations under clause 4.3);
 - (iii) recommend any measures or actions to improve the environmental performance of the works to be carried out under this Undertaking (excluding the maintenance obligations under clause 4.3) provided that such measures

or actions cannot require Leadshine to undertake works of a materially greater scope than those works required by this Undertaking, including timeframes for recommendation implementation (**Audit Recommendations**); and

- (iv) produce a report on the outcomes of the Audit, which must be submitted to the Minister by 30 June 2020 (**Audit Report**).
- (c) Within 3 months of the submission of the Audit Report, Leadshine must submit a Response to any recommendations made within that report.
- (d) Leadshine must comply with any reasonable requirement of the Secretary that results from a review of the Audit Report, which may include, but is not limited to implementing the Audit Recommendations.
- (e) In the event that an action specified in this Enforceable Undertaking cannot be achieved in the timeframe indicated, Leadshine undertakes to notify the Secretary of the delay, or anticipated delay, and the reason for such delay as soon as reasonably practicable. Notification of any such delay or potential delay does not in any way affect Leadshine's responsibilities under this Enforceable Undertaking.

4.5 Costs of proceedings

Leadshine undertakes not to seek any order for costs against the Secretary or the Department of Planning and Environment (**Department**) in respect of proceedings 2017/00272560 concerning the Order.

5 Acknowledgments

Leadshine acknowledges that:

- (a) the Secretary and/or the Department will make this Enforceable Undertaking publicly available including by publishing it on the Department's public register of section 9.5 undertakings on its website.
- (b) the Secretary and/or the Department will, from time to time, make public reference to this Enforceable Undertaking including in news media statements and in Department's publications.
- (c) this Enforceable Undertaking in no way derogates from the rights and remedies or liabilities available to or affecting any other person arising from or associated with the subject matter of this Enforceable Undertaking.
- (d) this Enforceable Undertaking does not affect the ability of the Secretary and/or the Department from taking any other enforcement action or otherwise, in accordance with the EP&A Act, including but not limited to the issuing of further orders under part 9 of the EP&A Act.

6 Definitions

In this Undertaking these meanings apply unless the contrary intention appears.

Broken Head Quarry means the former sand and gravel quarry operated on the land comprised in the Eastside Land and the Westside Land and consists of the following parcels of land:

- Lot 2, Deposited Plan ("DP") 700806;
- Lot 1, DP 123302;

- Lot 1, DP 184443;
- Lot 1, DP 245836;
- Lot 1, DP 245605; and
- Auto Consol 12993-34.

Broken Head Quarry EIS means the environmental impact statement for Broken Head Quarry referred to in the Development Consent.

Development Consent means consent to development application 97/0465 issued in May 1999 in respect of land including Broken Head Quarry and as modified on 10 April 2000 by the then Minister for Urban Affairs and Planning

Eastern Quarry Sector FFMP means the report entitled 'Flora and Fauna Management Plan for a Sand and Gravel Quarry at Suffolk Park – Part 1 – Eastern Quarry Sector', prepared for Batson's Sand & Gravel Pty Ltd by Greenloaning Biostudies Pty Ltd and dated October 1999.

Eastside Land means the land comprised in titles:

- Lot 1, DP 184443;
- Auto Consol 12993-34; and
- Lot 1, DP 245605.

Order means the order to Leadshine pursuant to section 121B of the *Environmental Planning and Assessment Act 1979* issued by the Minister for Planning on 11 August 2017.

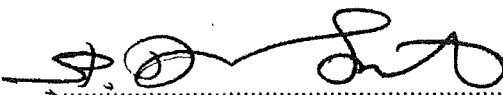
Western Quarry Sector FFMP means the report entitled 'Flora and Fauna Management Plan for a Sand and Gravel Quarry at Suffolk Park – Part 2 – Western Quarry Sector', prepared for Batson's Sand & Gravel Pty Ltd by Greenloaning Biostudies Pty Ltd and dated April 2000.

Westside Land means the land comprised in titles:

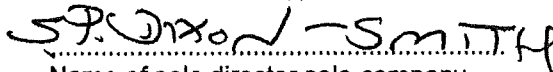
- Lot 1, DP 123302;
- Lot 1, DP 245836; and
- Lot 2, DP 700806.

Executed as an Enforceable Undertaking

EXECUTED by LEADSHINE PTY
LIMITED in accordance with section
127(1) of the *Corporations Act 2001*
(Cth) by authority of its directors:



Signature of sole director and sole
company secretary*
*delete whichever is not applicable



Name of sole director sole company
secretary* (block letters)

*delete whichever is not applicable

Accepted by the Secretary of the Department pursuant
to section 9.5 Act on:

Manu Ray
GROUP DEPUTY SECRETARY
PLANNING AND ASSESSMENT AS DELEGATE OF
THE SECRETARY

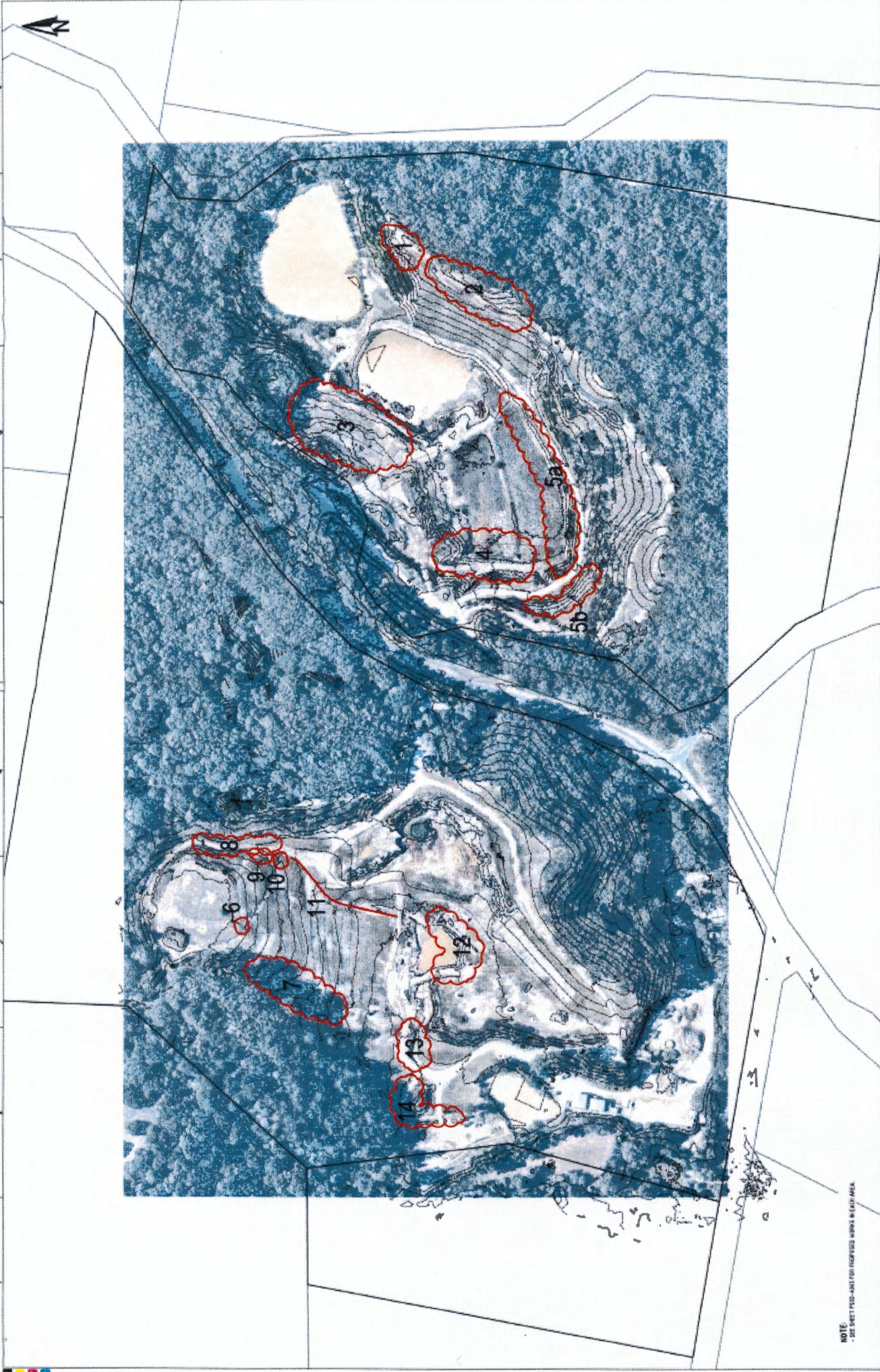
Date

and signed on behalf of the Department:

Secretary or his delegate

Date

Annexure 1 Leadshine Landforming Works Plans



NOTE
- SEE SHEET P502-A061 FOR PROPOSED WORKS IN EACH AREA.

PROJECT NO. P17062899		PLANNET NO. P502		RELEASE NO. R02		QUARRYING NO. PS02-A060		DESIGNER A	
SHOWN TITLE SUMMARY OF PROPOSED REHABILITATION WORKS									
Consulting Engineers martens & Associates Pty Ltd Environmental Mining Geotechnical Civil					CLIENT LEADSHINE PTY LTD BROKEN HEAD QUARRY QUARRY REHABILITATION PLANS BROKEN HEAD QUARRY, LEADSHINE, NSW LOT 1 OF 12/1072 & LOT 2 OF 12/1072				
DATE 2024		REVISION AM		PROJECT MANAGER AM		CLIENT PROJECT APPROVAL SHEET TITLE			
DESIGNED BY AM		CHECKED BY AM		DATE 2024		PROJECT NO. P17062899			
SCALE AS SHOWN		DATE 2024		PROJECT NO. P17062899		CLIENT PROJECT APPROVAL SHEET TITLE			
DATE 2024		REVISION AM		PROJECT MANAGER AM		CLIENT PROJECT APPROVAL SHEET TITLE			

PROPOSED REHABILITATION WORKS

REFER TO MARTENS PLAN PS02-A060 FOR NUMBERED LOCATIONS.

AREA 1

REGRADE AREA TO LOWER TRACK ELEVATION TO MATCH GRADES TO SOUTH EAST. TRACK TO BE PROFILED WITH SINGLE CROSS FALL SOUTH EAST DISCHARGING TO EXISTING VEGETATED SLOPES. WHERE OUTFALL IS NOT POSSIBLE MITRE DRAINS TO BE PROVIDED AT 20 M INTERVALS. UNVEGETATED PORTIONS OF BATTER TO THE NORTH WEST OF TRACK TO BE REGRADE TO PROVIDE MAXIMUM 50% GRADE. BATTER TO BE TRACK ROLLED, TOPSOILED THEN REVEGETATED WITH SHORT TERM COVER CROP. FINAL REHABILITATION BY PLANTING WITH APPROVED SPECIES.

AREA 2

REGRADE BATTER FROM LOWER TRACK TO PROVIDE MAXIMUM 50% GRADE. UPPER TRACK WIDTH TO BE ADJUSTED TO SUIT. UPPER TRACK SINGLE CROSS FALL TO SOUTH EAST TO BE MAINTAINED WITH DISCHARGE TO MITRE DRAIN AT NORTH EASTERN END OF AREA. LOWER TRACK TO BE REPROFILED WITH OUTFALL DRAINAGE TO REVEGETATED SLOPE TO WEST.

AREA 3

ESTABLISHMENT OF VEGETATION TO BE MONITORED. WHERE VEGETATION ESTABLISHMENT IS INADEQUATE FURTHER SEEDING, HYDROMULCHING OR PLANTING TO BE UNDERTAKEN. WHERE SIGNIFICANT EROSION OCCURS (RILLS > 300 MM) FURTHER TOPSOILING, REPROFILING OR RIPPING WITH ADDITIONAL REVEGETATION WORKS TO ACHIEVE LONG TERM STABLE AND VEGETATED BATTER.

AREA 4

EXTEND BATTER WEST AND SOUTH TO PROVIDE MAXIMUM 50% BATTER SLOPES DOWN FROM ROAD. BATTER TO BE TRACK ROLLED, TOPSOILED THEN REVEGETATED WITH SHORT TERM COVER CROP. FINAL REHABILITATION BY PLANTING WITH APPROVED SPECIES.

AREA 5a and 5b

WHERE VEGETATION HAS NOT ESTABLISHED AND WHERE SURFACE RILLS HAVE FORMED REPROFILE WITH TOOTHED EXCAVATOR BUCKET (ACCESS FROM ROADWAY ABOVE OR ON SLOPE WHERE POSSIBLE). APPLY TOPSOIL THEN PROVIDE SHORT TERM COVER CROP. FINAL REHABILITATION BY PLANTING WITH APPROVED SPECIES.

AREA 6

RESHAPE DRAIN TO FORM PARABOLIC OR TRAPEZOIDAL DRAIN DISCHARGING TO EXISTING ROCK LINED WEST-EAST DRAIN. PROVIDE SHORT TERM COVER CROP AND PLANT WITH APPROVED SPECIES SUITABLE FOR A DRAIN (SEDGES OR SIMILAR).

AREA 7

ROCK CHECK DAMS TO BE RECONSTRUCTED TO PREVENT FLOW BYPASSING AND TO PROVIDE A SPILLWAY (150 MM LOWER THAN MAIN CREST) AT THE CENTRE OF THE DAM. DOWNSLOPE ROCK APRON TO BE PROVIDED TO PREVENT CHANNEL SCOUR. ACCUMULATED SEDIMENT TO BE (ROUTINELY) REMOVED FROM CHECK DAMS AND REVEGETATION WORKS TO PROCEED WITH APPROVED SPECIES.

AREA 8

WHERE CROSSFALL INADEQUATE REGRADE TRACK AND PROVIDE GRAVEL WEARING COURSE. REFORM CIRCULAR, PARABOLIC OR TRAPEZOIDAL DISH DRAINS CONNECTING TO DRAINAGE ELEMENT AT 'AREA 10' OR TO STABLE DRAINS DOWN REVEGETATED ADJACENT BATTER.

AREA 9

WHERE VEGETATION HAS NOT ESTABLISHED AND WHERE SURFACE RILLS HAVE FORMED REPROFILE WITH TOOTHED EXCAVATOR BUCKET (ACCESS FROM TRACK BELOW). APPLY TOPSOIL THEN PROVIDE SHORT TERM COVER CROP. FINAL REHABILITATION BY PLANTING WITH APPROVED SPECIES.

AREA 10

CONSTRUCT ROCK LINED CHUTE FROM EXISTING ROCK LINED DRAIN TO THE NORTH WEST AND 'AREA 10' REFORMED DRAIN.

AREA 11

FORM TRAPEZOIDAL DRAIN TO CONVEY COLLECTED FLOWS (SIZED FOR 5 YR ARI CAPACITY OR GREATER) TO CENTRAL DAM. STABILISE WITH EITHER: (1) ROCK UNDERLAIN BY GEOTEXTILE; OR (2) TOPSOILED WITH ORGANIC FIBRE MESH THEN SHORT TERM COVER CROP THEN PLANT WITH APPROVED SPECIES SUITABLE FOR A DRAIN (SEDGES OR SIMILAR).

AREA 12

REPROFILE SOUTHERN BATTER SURROUNDING CENTRAL DAM TO PROVIDE STABLE FORM. BATTER TO BE TRACK ROLLED, TOPSOILED THEN REVEGETATE WITH SHORT TERM COVER CROP. FINAL REHABILITATION BY PLANTING WITH APPROVED SPECIES.

AREA 13

PROPOSED DAM SPILLWAY TO BE ROCK LINED TO ADEQUATELY CONVEY 1 IN 100 YR ARI FLOWS WITHOUT EROSION.

AREA 14

REPROFILE CHANNEL WHERE REQUIRED TO PROVIDE 5 YR ARI CAPACITY WITH CHANNEL BATTERS OF 1 IN 3. WHERE INADEQUATE, EXISTING VEGETATION BATTERS TO BE REVEGETATED WITH SHORT TERM COVER CROP. FINAL REHABILITATION BY PLANTING WITH APPROVED SPECIES. ACCUMULATED SEDIMENT IN CHANNEL FLOOR TO BE (ROUTINELY) REMOVED. ONCE DAM CONSTRUCTION WORKS ARE COMPLETED CHANNEL BED TO BE PLANTED WITH APPROVED SPECIES SUITABLE FOR A DRAIN (SEDGES OR SIMILAR).

MONITORING REQUIREMENTS AND CONTINGENCY PLANNING

ALL AREAS OF REVEGETATION AND ALL DRAINAGE STRUCTURES ARE TO BE REGULARLY MONITORED AS FOLLOWS:

- 3 - MONTHLY INSPECTION OF ALL DRAINAGE STRUCTURES INCLUDING DRAINAGE SWALE AND ROAD SIDE DISH DRAINS, DAM SPILLWAY, ROCK CHECK DAMS.
- 3 - MONTHLY INSPECTION OF ALL REVEGETATION AREAS TO ASSESS ADEQUACY OF PLANTINGS AND PROGRESS OF VEGETATION ESTABLISHMENT.
- FOLLOWING MAJOR RAINFALL EVENTS (>50 MM IN 24 HOUR PERIOD) ALL DRAINAGE STRUCTURES TO BE INSPECTED TO ASSESS ANY DAMAGE.

WHERE DRAINAGE STRUCTURES ARE ASSESSED AS EITHER ERODING (>300 MM RILL DEPTH) OR INADEQUATELY VEGETATED (<70% COVER) FURTHER REMEDIATION WORKS ARE TO BE UNDERTAKEN. THESE MAY INCLUDE BUT IS NOT LIMITED TO:

- REGRADE AND RECONSTRUCTION WORKS TO REINSTATE REQUIRED FORM.
- REVIEW OF DESIGN CAPACITY AND MODIFICATION OF DESIGN AS REQUIRED.
- ADDITIONAL REVEGETATION WORKS (SEEDING, HYDROMULCHING ETC) TO IMPROVE STABILITY.
- LINING OF DRAIN WHERE REPEATED SCOUR HAS OCCURED - LINING MAY BE: TEMPORARY (ORGANIC FIBRE MESH OR MATTING) TO ALLOW VEGETATION ESTABLISHMENT; SEMI PERMANENT (DURABLE GEOTEXTILES) WITH REVEGETATION FOR PERMANENT SOLUTION; OR PERMANENT (ROCK LINED OR OTHER) DEPENDING ON THE LOCATION.

WHERE REHABILITATION AREAS ARE ASSESSED AS EITHER ERODING (>300 MM RILL DEPTH) OR INADEQUATELY VEGETATED (<70% COVER) FURTHER WORKS ARE TO BE UNDERTAKEN. THESE MAY INCLUDE BUT IS NOT LIMITED TO:

- MINOR REPROFILING / TOPSOILING TO REINSTATE DESIRED LAND FORM AND REMOVE EROSION.
- RIPPING OF SURFACE TO IMPROVE VEGETATION ESTABLISHMENT. THIS MAY BE COMPLETED USING TOOTHED EXCAVATOR BUCKETS, DIAMOND HARROWS OR OTHER EQUIPMENT AS SUITED TO THE AREA. PLACEMENT OF TOPSOIL MAY BE REQUIRED IN CONJUNCTION WITH THESE WORKS.
- SEEDING, HYDROMULCHING AND OTHER REVEGETATION TECHNIQUES AS REQUIRED TO ACHIEVE MINIMUM 70% VEGETATION COVER.

REV	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED	SCALE	ORIG	DATUM	PROJECT MANAGER	CLIENT	PROJECT NAME/CLIENT TITLE	CONSULTING ENGINEERS	DRAWING TITLE
A	PROPOSED REHABILITATION WORKS	15/04/2018	LZ	AM	AM				AM		LEADSHINE PTY LTD BROKEN HEAD QUARRY QUARRY REHABILITATION PLANS BROKEN HEAD ROAD, BROKEN HEAD PARK, NSW LOT 1 SP 12552 & LOT 2 SP 7000	martens & Associates Pty Ltd Consulting Engineers (Environment) Water Geotechnical Civil	PROPOSED REHABILITATION WORKS NOTES
													PROJECT NO P1784289
													PLANSET NO PS02
													RELEASE NO R02
													DRAWING NO PS02-A065
													REVISION A

Annexure 2 Leadshine Stormwater Management Works Plans



NOTE:
 -SEE SHEET P102-ANST FOR PROPOSED WORKS IN EACH AREA.

PROJECT TITLE BROKEN HEAD QUARRY QUARRY REHABILITATION PLANS 10000 8242 ROAD, GATESHEAD PARK, NSW LOT 159 820813, LOT 158 10000		CLIENT LEADSHINE PTY LTD PROJECT LEAD: JIMMY WARE		PROJECT MANAGER AN AM		DATE 15/08/2024		SCALE 1:1000		DATE 15/08/2024	
CONSULTING ENGINEERS martens & Associates Pty Ltd 10/11-13/15 ST GEORGE'S ROAD, GATESHEAD PARK, NSW 1585 PHONE: 02 9429 2000 FAX: 02 9429 2001 WWW.MARTENS.COM.AU		CONSULTING ENGINEERS Environment Geotechnical Civil		PROJECT NO. P102-ANST		PLANNING NO. P501		RELEVANT NO. R02		ISSUANCE NO. P502-A060	
REVISION A		DATE 15/08/2024		SCALE 1:1000		DATE 15/08/2024		DATE 15/08/2024		DATE 15/08/2024	

PROPOSED REHABILITATION WORKS

REFER TO MARTENS PLAN P502-A065 FOR NUMBERED LOCATIONS.

AREA 1

REGRADE AREA TO LOWER TRACK ELEVATION TO MATCH GRADES TO SOUTH EAST. TRACK TO BE PROFILED WITH SINGLE CROSS FALL SOUTH EAST DISCHARGING TO EXISTING VEGETATED SLOPES. WHERE OUTFALL IS NOT POSSIBLE MITRE DRAINS TO BE PROVIDED AT 20 M INTERVALS. UNVEGETATED PORTIONS OF BATTER TO THE NORTH WEST OF TRACK TO BE REGRADE TO PROVIDE MAXIMUM 50% GRADE. BATTER TO BE TRACK ROLLED, TOPSOILED THEN REVEGETATED WITH SHORT TERM COVER CROP. FINAL REHABILITATION BY PLANTING WITH APPROVED SPECIES.

AREA 2

REGRADE BATTER FROM LOWER TRACK TO PROVIDE MAXIMUM 50% GRADE. UPPER TRACK WIDTH TO BE ADJUSTED TO SUIT. UPPER TRACK SINGLE CROSS FALL TO SOUTH EAST TO BE MAINTAINED WITH DISCHARGE TO MITRE DRAIN AT NORTH EASTERN END OF AREA. LOWER TRACK TO BE REPROFILED WITH OUTFALL DRAINAGE TO REVEGETATED SLOPE TO WEST.

AREA 3

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AREA 4

EXTEND BATTER WEST AND SOUTH TO PROVIDE MAXIMUM 50% BATTER SLOPES DOWN FROM ROAD. BATTER TO BE TRACK ROLLED, TOPSOILED THEN REVEGETATED WITH SHORT TERM COVER CROP. FINAL REHABILITATION BY PLANTING WITH APPROVED SPECIES.

AREA 5a and 5b

WHERE VEGETATION HAS NOT ESTABLISHED AND WHERE SURFACE HILLS HAVE FORMED REPROFILE WITH TOOTHED EXCAVATOR BUCKET (ACCESS FROM ROADWAY ABOVE OR ON SLOPE WHERE POSSIBLE). APPLY TOPSOIL THEN PROVIDE SHORT TERM COVER CROP. FINAL REHABILITATION BY PLANTING WITH APPROVED SPECIES.

AREA 6

RESHAPE DRAIN TO FORM PARABOLIC OR TRAPEZOIDAL DRAIN DISCHARGING TO EXISTING ROCK LINED WEST-EAST DRAIN. PROVIDE SHORT TERM COVER CROP AND PLANT WITH APPROVED SPECIES SUITABLE FOR A DRAIN (SEDGES OR SIMILAR).

AREA 7

ROCK CHECK DAMS TO BE RECONSTRUCTED TO PREVENT FLOW BYPASSING AND TO PROVIDE A SPILLWAY (150 MM LOWER THAN MAIN CREST) AT THE CENTRE OF THE DAM. DOWNSLOPE ROCK APRON TO BE PROVIDED TO PREVENT CHANNEL SCOUR. ACCUMULATED SEDIMENT TO BE (ROUTINELY) REMOVED FROM CHECK DAMS AND REVEGETATION WORKS TO PROCEED WITH APPROVED SPECIES.

AREA 8

WHERE CROSSFALL INADEQUATE REGRADE TRACK AND PROVIDE GRAVEL WEARING COURSE. REFORM CIRCULAR, PARABOLIC OR TRAPEZOIDAL DISH DRAINS CONNECTING TO DRAINAGE ELEMENT AT 'AREA 10' OR TO STABLE DRAINS DOWN REVEGETATED ADJACENT BATTER.

AREA 9

WHERE VEGETATION HAS NOT ESTABLISHED AND WHERE SURFACE HILLS HAVE FORMED REPROFILE WITH TOOTHED EXCAVATOR BUCKET (ACCESS FROM TRACK BELOW). APPLY TOPSOIL THEN PROVIDE SHORT TERM COVER CROP. FINAL REHABILITATION BY PLANTING WITH APPROVED SPECIES.

AREA 10

CONSTRUCT ROCK LINED CHUTE FROM EXISTING ROCK LINED DRAIN TO THE NORTH WEST AND 'AREA 10' REFORMED DRAIN.

AREA 11

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AREA 13

PROPOSED DAM SPILLWAY TO BE ROCK LINED TO ADEQUATELY CONVEY 1 IN 100 YR ARI FLOWS WITHOUT EROSION.

AREA 14

REPROFILE CHANNEL WHERE REQUIRED TO PROVIDE 5 YR ARI CAPACITY WITH CHANNEL BATTERS OF 1 IN 3. WHERE INADEQUATE, EXISTING VEGETATION BATTERS TO BE REVEGETATED WITH SHORT TERM COVER CROP. FINAL REHABILITATION BY PLANTING WITH APPROVED SPECIES. ACCUMULATED SEDIMENT IN CHANNEL FLOOR TO BE (ROUTINELY) REMOVED. ONCE DAM CONSTRUCTION WORKS ARE COMPLETED CHANNEL BED TO BE PLANTED WITH APPROVED SPECIES SUITABLE FOR A DRAIN (SEDGES OR SIMILAR).

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- 3 - MONTHLY INSPECTION OF ALL DRAINAGE STRUCTURES INCLUDING DRAINAGE SWALE AND ROAD SIDE DISH DRAINS, DAM SPILLWAY, ROCK CHECK DAMS.
- 3 - MONTHLY INSPECTION OF ALL REVEGETATION AREAS TO ASSESS ADEQUACY OF PLANTINGS AND PROGRESS OF VEGETATION ESTABLISHMENT.
- FOLLOWING MAJOR RAINFALL EVENTS (>50 MM IN 24 HOUR PERIOD) ALL DRAINAGE STRUCTURES TO BE INSPECTED TO ASSESS ANY DAMAGE.

WHERE DRAINAGE STRUCTURES ARE ASSESSED AS EITHER ERODING (>300 MM RILL DEPTH) OR INADEQUATELY VEGETATED (<70% COVER) FURTHER REMEDIATION WORKS ARE TO BE UNDERTAKEN. THESE MAY INCLUDE BUT IS NOT LIMITED TO:

- REGRADE AND RECONSTRUCTION WORKS TO REINSTATE REQUIRED FORM.
- REVIEW OF DESIGN CAPACITY AND MODIFICATION OF DESIGN AS REQUIRED.
- ADDITIONAL REVEGETATION WORKS (SEEDING, HYDROMULCHING ETC) TO IMPROVE STABILITY.
- LINING OF DRAIN WHERE REPEATED SCOUR HAS OCCURRED - LINING MAY BE TEMPORARY (ORGANIC FIBRE MESH OR MATTING) TO ALLOW VEGETATION ESTABLISHMENT; SEMI PERMANENT (DURABLE GEOTEXTILES) WITH REVEGETATION FOR PERMANENT SOLUTION; OR PERMANENT (ROCK LINED OR OTHER) DEPENDING ON THE LOCATION.

WHERE REHABILITATION AREAS ARE ASSESSED AS EITHER ERODING (>300 MM RILL DEPTH) OR INADEQUATELY VEGETATED (<70% COVER) FURTHER WORKS ARE TO BE UNDERTAKEN. THESE MAY INCLUDE BUT IS NOT LIMITED TO:

- MINOR REPROFILING / TOPSOILING TO REINSTATE DESIRED LAND FORM AND REMOVE EROSION.
- RIPPING OF SURFACE TO IMPROVE VEGETATION ESTABLISHMENT. THIS MAY BE COMPLETED USING TOOTHED EXCAVATOR BUCKETS, DIAMOND HARROWS OR OTHER EQUIPMENT AS SUITED TO THE AREA. PLACEMENT OF TOPSOIL MAY BE REQUIRED IN CONJUNCTION WITH THESE WORKS.
- SEEDING, HYDROMULCHING AND OTHER REVEGETATION TECHNIQUES AS REQUIRED TO ACHIEVE MINIMUM 70% VEGETATION COVER.

REV	DESCRIPTION	DATE	DRAWN	CHECKED	ISSUED	SCALE
1	PROPOSED REHABILITATION WORKS	15/05/2018	LT	MR	MR	

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LEADSHINE PTY LTD

BROKEN HEAD QUARRY QUARRY REHABILITATION PLANS

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 Geotechnical
 CIVIL

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REVISION TITLE				
PROPOSED REHABILITATION WORKS NOTES				
PROJECT NO	PLANS NO	RELEASE NO	DRAWING NO	REVISED
P706289	P502	R02	P502-A065	A

4: CHANGING PLAN AREA

Annexure 3 Vegetation Areas

Annexure 3.1 Westside Areas to be vegetated

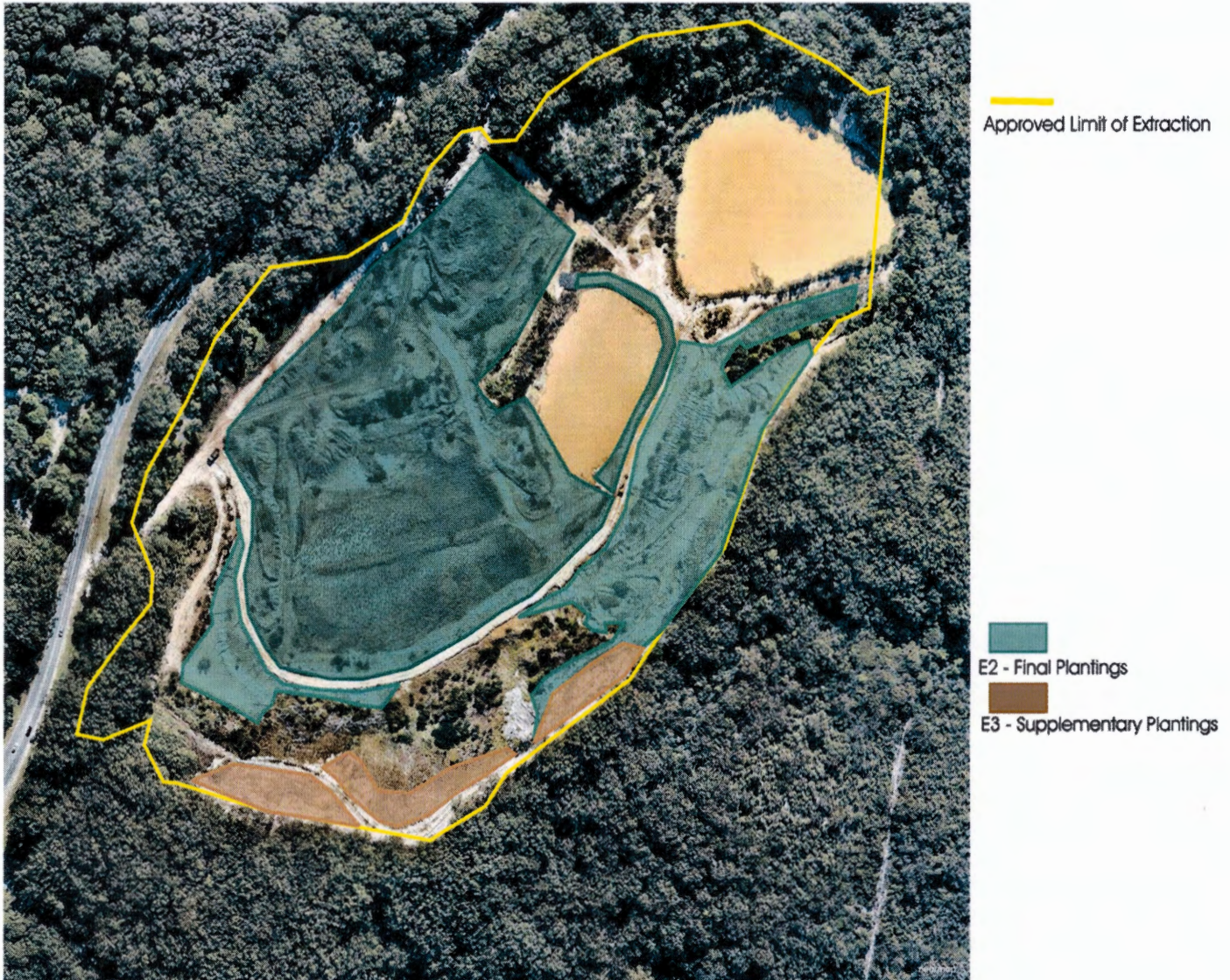


AREA W2 - Final Plantings



AREA W3- Planting Inventory

Annexure 3.2 Eastside Areas to be vegetated



Annexure 4 Table 2.6 of the Broken Head Quarry EIS

TABLE 2.6
Final Rehabilitation Species

Community Stratum or Micro-Habitat	Blackbutt Forest	Scribbly Gum Woodland	Moist Forest/Rainforest/Brush Box Forest	Wetlands	
				Eastern Sector	Western Sector
TREES	Blackbutt (<i>Eucalyptus pilularis</i>) Red Bloodwood (<i>E. gummifera</i>) Red Mahogany (<i>E. resinifera</i>) Turpentine (<i>Syncarpia glomulifera</i>)		Blackwood (<i>Acacia melanoxylon</i>) Brown Kurrajong (<i>Commerconia bartramia</i>) Brush Box (<i>Lophostemon confertus</i>) Coast Banksia (<i>Banksia integrifolia</i>) Cabbage Palm (<i>Livistona australis</i>) Cutgerie (<i>Findleria schottiana</i>) Fireweel Tree (<i>Stenocarpus sinuatus</i>) Foambrak (<i>Jagera pseudorhus</i>) Hard Quandong (<i>Elaeocarpus obovatus</i>) Hoop Pine (<i>Araucaria cunninghamii</i>) Swamp Turpentine (<i>Lophostemon suaveolens</i>) Tuckeroo (<i>Cupaniopsis anacardioides</i>) Red Ash (<i>Alphitonia excelsa</i>) Turpentine (<i>Syncarpia glomulifera</i>)	Dump/Waterlogged Areas Broad-leaved Paperbark (<i>Melaleuca quinquevneria</i>) Swamp Mahogany (<i>Eucalyptus robusta</i>)	Blackwood (<i>Acacia melanoxylon</i>) Brown Kurrajong (<i>Commerconia bartramia</i>) Cabbage Palm (<i>Livistona australis</i>) Cutgerie (<i>Findleria schottiana</i>) Foambrak (<i>Jagera pseudorhus</i>) Hard Quandong (<i>Elaeocarpus obovatus</i>) Swamp Turpentine (<i>Lophostemon suaveolens</i>)
TREES/TALL SHRUBS		Scribbly Gum (<i>Eucalyptus signata</i>) Wallum Banksia (<i>Banksia aemula</i>) Common Tea-Tree (<i>Leptospermum polygalifolium</i>)			
SMALL TREES/TALL SHRUBS	Corkwood (<i>Dalboisia myoporoides</i>) Forest Oak (<i>Allocasuarina torulosa</i>) Midgen Berry (<i>Austromyrtus dulcis</i>) Wattle spp. (<i>Acacia longistoma</i> , <i>A. longifolia</i>)		Black Wattle (<i>Callicoma serratifolia</i>) Blueberry Ash (<i>Elaeocarpus reticulatus</i>) Umbrella Cheese Tree (<i>Glochidion sumatranum</i>) Corkwood (<i>Dalboisia myoporoides</i>) Gucua (<i>Gucua semiglaucua</i>) Lilly Pilly (<i>Acmena smithii</i>) Macaranga (<i>Macaranga tanarius</i>) Sweet Pittosporum (<i>Pittosporum undulatum</i>) Native Peach (<i>Trema aspera</i>) Red Kamala (<i>Mallotus philippensis</i>)		Adjacent to Wetlands Gucua (<i>Gucua semiglaucua</i>) Scrub Turpentine (<i>Rhodanisia rubescens</i>) Umbrella Cheese Tree (<i>Glochidion sumatranum</i>)
UNDERSTOREY/ GROUND COVER	False suspanilla (<i>Hardenbergia violacea</i>) Feather Plant (<i>Restia tetraphyllus</i>) Kangaroo Grass (<i>Themeda australis</i>) Rauing Possum (<i>Kennedia rubicunda</i>) Sedge (<i>Casuaria blakei</i>) Twining Guinea Flower (<i>Hibbertia scandens</i>) Wonga Vine (<i>Pandorea pandorana</i>)	Christmas Bells (<i>Blandfordia grandiflora</i>) Feather Plant (<i>Restia tetraphyllus</i>) Grass Tree (<i>Xanthorrhoea johnsonii</i>) Midgen Berry (<i>Austromyrtus dulcis</i>) Rock Banksia (<i>Banksia oblongifolia</i>) Sweet-scented Wattle (<i>Acacia suaveolens</i>)	Aristolochia (<i>Aristolochia prarvenosa</i>) Bleeding Heart (<i>Omalanthus populifolius</i>) Five-leaf Watervine (<i>Cissus hypoglauca</i>) Midgen Berry (<i>Austromyrtus dulcis</i>) Slender Palm Lily (<i>Corydine stricta</i>) Spiky Mat-rush (<i>Lomandra longifolia</i>) Tree Heath (<i>Trochocarpa laurina</i>) Twining Guinea Flower (<i>Hibbertia scandens</i>) Bolly Gum (<i>Litsea lepteanu</i>)	Dump Areas Pouched Coral Fern (<i>Gleichenia dioarpa</i>) Saw-ridge (<i>Gahnia clarkei</i>) Selaginella (<i>Selaginella uliginosa</i>) Swamp Water Fern (<i>Blachnium indicum</i>)	Slender Palm-lily (<i>Corydine stricta</i>) Spiky Mat-rush (<i>Lomandra longifolia</i>)
WETLAND FRINGES (SHALLOW WATERS)				Frogmouth (<i>Phyllidrum lanuginosum</i>) Lepironia (<i>Lepironia articulata</i>)	Frogmouth (<i>Phyllidrum lanuginosum</i>) Lepironia (<i>Lepironia articulata</i>)
WETLAND FRINGES (DEEPER WATER)				Common Reed (<i>Phragmites australis</i>) Lepironia (<i>Lepironia articulata</i>)	Common Reed (<i>Phragmites australis</i>) Lepironia (<i>Lepironia articulata</i>)

Source: Greencloning Biostudies Pty Ltd (1997)

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Annexure 5 Table 2.7 of the Broken Head Quarry EIS

TABLE 2.7



**Rehabilitation Species and Locations
Water Management Structures and/or Associated Bund Walls**

Species	Location
EASTERN SETTLING POND WALL/VISUAL BUND	
Blackbutt (<i>E. pilularis</i>) Wallum Banksia (<i>Banksia aemula</i>) Wattle species (<i>Acacia longifolia</i> , <i>A. longissima</i>) Spikey Mat-rush (<i>Lomandra longifolia</i>) Running Postman (<i>Kennedia rubicunda</i>) False Sarsparilla (<i>Hardenbergia violacea</i>)	Toe of batter; irregular spacing < 3 m apart Interspersed with Blackbutt (1 Banksia: 5 Blackbutt) and extending up batter As for Wallum Banksia; scattered clumps with individuals at 2 m centres (approximately) Interspersed with wattles at 0.5 m to 1.0 m centres over wall and batter toe Interspersed with tree and shrub species; 2 m centres on access way
Supplementary Species	
Trees Red Bloodwood (<i>Eucalyptus gummifera</i>) Turpentine (<i>Syncarpia glomulifera</i>) Tall Shrubs/Small Trees Red Ash (<i>Alphitonia excelsa</i>) Corkwood (<i>Duboisia myoporoides</i>) Pitiosporum (<i>Pitiosporum undulatum</i>) Understorey/Ground cover Midgen Berry (<i>Austromyrtus dulcis</i>) Grass Tree (<i>Xanthorrhoea macronema</i>)	
WESTERN SETTLING POND WALL	
Blackwood (<i>A. melanoxylon</i>) Black Wattle (<i>Callitriche serratifolia</i>) Guoia (<i>Guoia semiglaucua</i>) Lilly Pilly (<i>Acmena smithii</i>) Macaranga (<i>Macaranga tanarius</i>) Umbrella Cheese Tree (<i>Glochidion sumatranum</i>) Hopbush (<i>Dodonaea triquetra</i>) Midgen Berry (<i>Austromyrtus dulcis</i>) Rough Flax-illy (<i>Dianella caerulea</i>) Running Postman (<i>Kennedia rubicunda</i>) Muttonwood (<i>Rapanea variabilis</i>) Spikey Mat-rush (<i>Lomandra longifolia</i>)	Toe of batter; Random plantings In clumps; Individuals at 1.5 m to 2 m centres
Supplementary Species	
Tall Shrubs/Small Trees Cheese Tree (<i>Glochidion ferdinandii</i>) Native Peach (<i>Trema aspera</i>) Mock Olive (<i>Notolaea longifolia</i>) Plum Myrtle (<i>Phildostigma glabrum</i>) Understorey/Ground cover Sandfly Zieria (<i>Zieria smithii</i>) Aristolochia (<i>Aristolochia praevanosa</i>) Wonga Vine (<i>Pandorea pandorana</i>)	

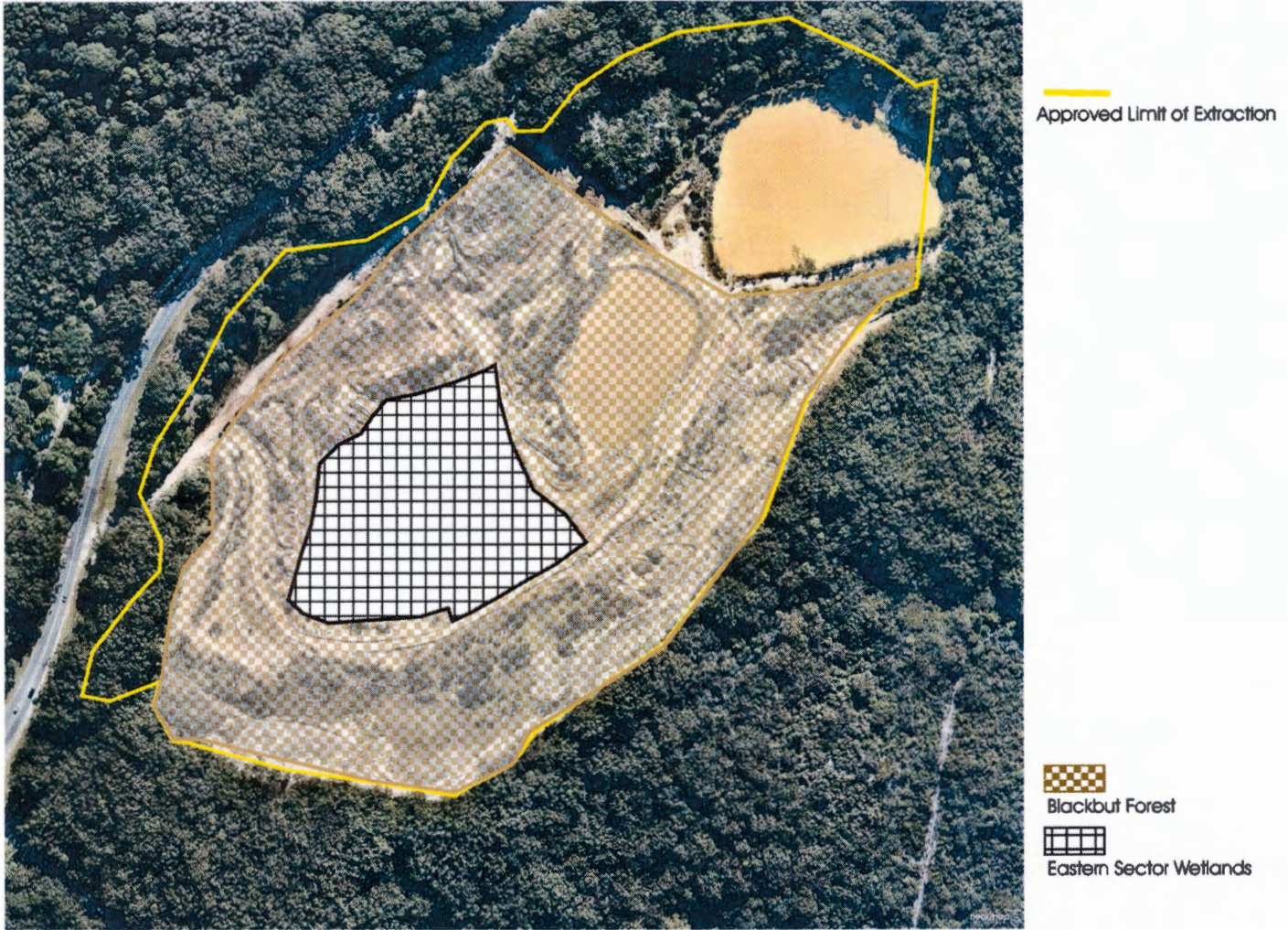
Annexure 6 – Vegetation Communities

Annexure 6.1 – Westside Vegetation Communities



-  Moist Forest/Rainforest/Brush Box Forest
-  Blackbutt Forest

Annexure 6.2 – Eastside Vegetation Communities



Annexure 7 – Schedule of Works

Completion Date	Action	Clause	Sub Clause
Commencement Date + 1 month.	Complete an inventory of existing plantings in area W3 of Annexure 3.1 as at the Commencement date.	4.1	f)
Commencement Date + 3 months.	Complete additional plantings in the area W3, to the Minister's satisfaction	4.1	g)
31 March 2019	Complete all landforming works in the Westside Land to comply with Annexure 1.	4.1	a)
	Undertake and complete stormwater drainage and management works on the Westside Land, in Accordance with the plans at Annexure 2.	4.1	b)
	Complete all landforming works in the Eastside Land to comply with Annexure 1.	4.2	a)
	To undertake and complete stormwater drainage and management works on the Eastside Land in accordance with the plans at Annexure 2.	4.2	b)
30 April 2019	To complete ground preparation and hand sowing of cover crop 'cover crop' of Shirohie Millet and/or sterile Ryegrass, together with pre-treated native seed collected from the desired vegetation community on the areas identified as W2 in Annexure 3.1, in accordance with paragraph 2.6.4 (iv) 'Final Rehabilitation Procedures –	4.1	c)

	Blackbutt and Scribbly Gum Woodland Communities - Post Quarrying Activities' (i)-(vi) of the Western Quarry Sector FFMP and section 2.13.5.5 of Broken Head Quarry EIS.		
	To complete ground preparation and hand sowing of a 'cover crop' of Shirohie Millet and/or sterile Ryegrass, together with pre-treated native seed collected from the desired vegetation community on the areas identified as E2 in Annexure 3.2, in accordance with paragraph 2.6.4 (iv) 'Final Rehabilitation Procedures – Blackbutt and Scribbly Gum Woodland Communities - Post Quarrying Activities' (i)-(vi) of the Eastern Quarry Sector FFMP;	4.2	c)
30 April 2020	<p>Complete all plantings in Area W2 in Annexure 3.1, in accordance with the Western Quarry Sector FFMP, and section 2.13.5.5 of the Broken Head Quarry EIS, which require among other things:</p> <ul style="list-style-type: none"> i. Hand sow pre-treated native seed collected from the desired vegetation community and emphasis on planting of tube seedlings in relevant areas; ii. Supplementary planting of dominant/difficult to regenerate species; iii. Irrigation of the rehabilitated areas as necessary; iv. Rehabilitation progress monitoring; and v. Rehabilitation maintenance, if required. <p>Planted species to be selected from Table 2.6 of the Broken Head Quarry EIS (Annexure 4)</p>	4.1	d)
	<p>Complete all plantings on the Proposed Western Dam Wall, in accordance with the Western Quarry Sector FFMP, which relevantly requires, among other things:</p> <ul style="list-style-type: none"> i. Batter faces will be constructed with a slope of 1.3(V:H) and with an access way along the top sloped inwards towards the water body to reduce runoff down the outside batter; ii. 100mm of top soil will be spread over the batter surface followed by a cover of available ground litter, branches, brush and leaves. iii. A cover crop of Shirohie Millet and/or sterile Ryegrass will be sown at the rate of 2.5kg/ha over the entire surface to be re-vegetated to provide rapid surface stability without inhibiting development of Soil propagules. No fertiliser will be used; iv. Seedlings of tree and understory species will be planted during cover crop establishment. v. Re-vegetated surfaces will be irrigated during the first growing season to enhance vegetation establishment and development; vi. Regular inspection as for other rehabilitation areas to assess the progress of the cover crop and seedling and implementation of appropriate protective/ameliorative measures such as protection from grazing by macropods and supplementary plantings. 	4.1	e)

	<p>Species to be used for the Western Settling Pond wall and their planting locations on the structures are identified in Table 2.7 of the EIS (Annexure 4).</p>		
	<p>Complete all plantings in Area E2, at Annexure 3.2, in accordance with the Eastern Quarry Sector FFMP, which relevantly requires, among other things:</p> <ul style="list-style-type: none"> i. Hand sow pre-treated native seed collected from the desired vegetation community; ii. Supplementary planting of dominant/difficult to regenerate species; iii. Irrigation of the rehabilitated area as necessary; iv. Rehabilitation progress monitoring; and v. Rehabilitation maintenance, if required. <p>Planted species to be selected from Table 2.6 of the Broken Head Quarry EIS (Annexure 4).</p>	4.2	d)
	<p>Complete all plantings on the upper Eastern Dam Walls, in accordance with the Eastern Quarry Sector FFMP, which relevantly requires, among other things:</p> <ul style="list-style-type: none"> i. Batter faces will be constructed with a slope of 1.3(V:H) and with an access way along the top sloped inwards towards the water body to reduce runoff down the outside batter; ii. 100mm of topsoil will be spread over the batter surface followed by a cover of available ground litter, branches, brush and leaves. iii. A cover crop of Shirohie Millet and/or sterile Ryegrass will be sown at the rate of 2.5kg/ha over the entire surface to be re-vegetated to provide rapid surface stability without inhibiting development of Soil propagules. No fertiliser will be used; iv. Seedlings of tree and understory species will be planted during cover crop establishment. v. Re-vegetated surfaces will be irrigated during the first growing season to enhance vegetation establishment and development; vi. Regular inspection as for other rehabilitation areas to assess the progress of the cover crop and seedling and implementation of appropriate protective/ameliorative measures such as protection from grazing by macropods and supplementary plantings. <p>Species to be used for the Eastern Dam wall and their planting locations on the structures are identified in Table 2.7 of the Broken Head Quarry EIS (Annexure 4).</p>	4.2	e)
	<p>Supplement plantings in the area E3 in Annexure 3.2, to achieve to the minister's satisfaction, vegetation representative of the Blackbutt Forest vegetation community.</p>	4.2	f)

7 Days after the Department endorses the proposed independent auditor.	Leadshine to have commissioned and paid the full cost of an independent ecological audit in relation to Leadshine's compliance with the Enforceable Undertaking, and to make any recommendations as to works to be undertaken in compliance with the Undertaking.	4.4	b)
30 June 2020	Audit Report to be submitted to the Minister	4.4	b) (iv)
30 September 2020	Leadshine to respond to any recommendations made in audit report	4.4	c)
Ongoing	Maintenance of rehabilitation works to be undertaken in accordance with section 2.6.4 (v) of the Western Quarry Sector FFMP and the Eastern Quarry Sector FFMP	4.3	
Ongoing – until EU is agreed to have been complied with by both parties	Leadshine to provide ongoing monthly reports to the Minister within 7 days of the end of each calendar month	4.4	a)