

**FLORA AND FAUNA COMPONENT OF THE  
2016 GERROA INDEPENDENT ENVIRONMENTAL AUDIT**

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**GERROA SAND QUARRY  
MUNICIPALITY OF KIAMA**

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**December 2016**  
16/16

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## **Document Reference**

Kevin Mills & Associates (2016). Flora and Fauna component of the 2016 Gerroa Independent Environmental Audit, Gerroa Sand Quarry, Municipality of Kiama. Report prepared for Cleary Bros (Bombo) Pty Ltd, December.

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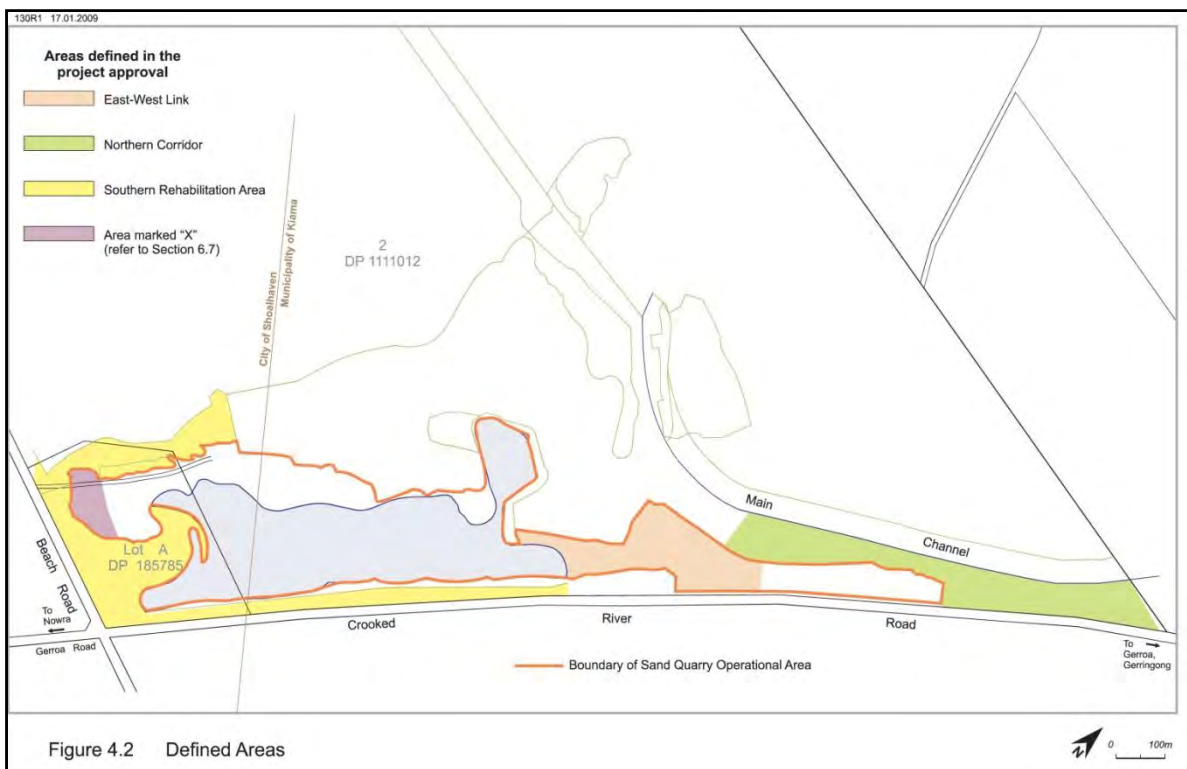
# 1. INTRODUCTION

The Land and Environment Court granted approval to Application 05/0099 for sand extraction and processing operations on land comprising Lot A DP 185785 and part of the Certificate of Title Vol. 5841 Folio 139 on 2 September 2008. The Consolidated Conditions of Approval are dated 25 August 2008. A Landscape and Rehabilitation Management Plan dated 20 August 2008 is attached to, and forms an integral part of, the approval conditions.

The approval concerns the expansion of sand quarrying operations at the Gerroa Sand Resource, operated by Cleary Bros (Bombo) Pty Limited of Port Kembla. The proposal and the particulars of the approval were set out in the document prepared by Perram & Partners (2009), titled "Gerroa Sand Resource, Quarry Environmental Management Plan." That document was updated and approved by the Department in August 2016 (Cleary Bros (Bombo) Pty Limited 2016) and includes the approved Landscape and Rehabilitation Management Plan.

The purpose of this report is to assess certain conditions of approval for the expansion of the sand quarry granted in 2008. In particular, those conditions relating to the creation of native habitat in the northern corridor are addressed in detail. Since approval in 2008, various flora and fauna annual monitoring surveys have been completed in the area, beginning in October-November 2009. Additionally, quarterly inspections and reports have been prepared to ensure that the aims and objectives of the Landscape and Rehabilitation Management Plan are being achieved.

The area in the vicinity of the dredge pond is divided into defined areas in the approval and the Landscape and Rehabilitation Management Plan. The defined areas on the Gerroa site referred to in these documents are shown on **Figures 1 and 2**.



**Figure 1. Defined Areas on the Gerroa Site.**

The key components of the Gerroa sand quarry are:

- I. The Northern Corridor, which is divided into three sections, namely the Establishing Corridor, the Adjacent Corridor and the remainder of the Northern Corridor;
- II. The East-West Link, i.e. that area of forest on the approved sand quarry and which has now been cleared of vegetation, the dredge pond having moved northwards;
- III. Retained littoral rainforest, a stand of rainforest that was retained as the dredge pond moved northwards.

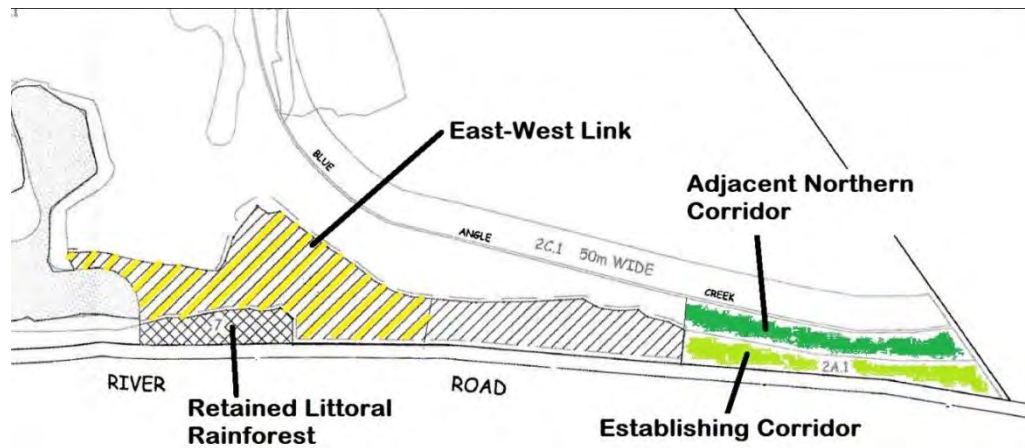


Figure 2. Detailed map showing relevant areas near quarry.

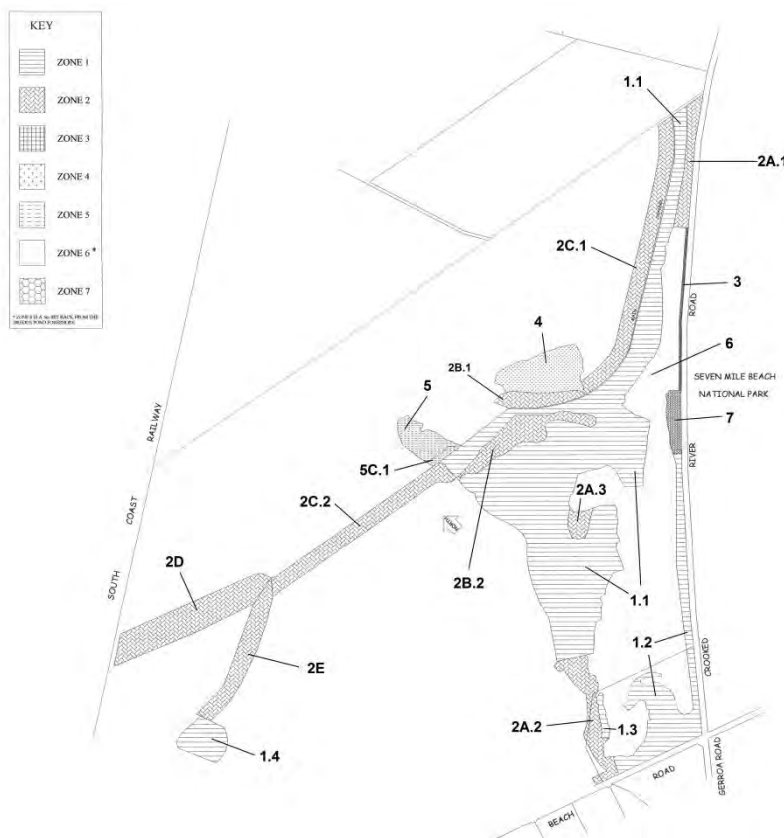


Figure 3. The wider Gerroa site.

Numbered rehabilitation areas as in the Landscape and Rehabilitation Management Plan.

## **2. REVIEW OF THE CONDITIONS OF APPROVAL**

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### **The Conditions**

One key objective of the conditions of consent aims to ensure that the habitat creation and enhancement measures set out in the Landscape and Rehabilitation Management Plan are successfully completed. These measures refer to the rehabilitation zones shown in the Plan and on **Figure 3** here. **Figure 3** shows the wider Gerroa site and the extent and numbering of the various rehabilitation zones. The primary numbering system (1 to 6) is roughly the sequence that the rehabilitation/revegetation works have been undertaken. All areas have now been planted and are now in a maintenance phase.

The conditions specify that the habitat within the Northern Corridor must be successfully established and is operating as a fauna movement corridor before the East-West Link is severed. The prerequisites for severing the East-West Link are specified in the conditions of consent, as set out below.

### **Condition 16**

*Within 3 months of the date of this approval, the Proponent shall*

*(a) enter into a planning agreement with the Minister under section 93F of the EP&A Act. This Agreement must be generally consistent with commitments in terms of the offer made by the Proponent to the Minister on 1 May 2007, and must specifically provide for the:*

- (i) implementation of the Compensatory Planting shown in the plan in Appendix 3;*
- (ii) protection of the vegetation in the area shown in Appendix 4 (Conservation Area);*
- (iii) identification by survey plan of the Conservation Area shown in the plan titled Vegetation Conservation Area (shown conceptually in Appendix 4);*
- (iv) implementation of the Landscape and Rehabilitation Management Plan for the site; and*
- (v) insurance of the Conservation Area against the impact of fire or vandalism.*

*(b) register the planning Agreement on the title of the land in accordance with the Real Property Act 1900.*

The Planning Agreement is yet to be finalised; the Company is pursuing this with the Department.

### **Condition 17**

*The Proponent shall:*

*(a) progressively rehabilitate the site in a manner that is generally consistent with the rehabilitation objectives in Chapter 3.8 of the EA (see Appendix 5).;*

*(b) ensure that within 4 years of the date of this approval, the additional plantings in the Northern Corridor and Southern Rehabilitation Area are comprised of at least 60% of the plant species recorded for the representative plant communities in the quarry extension area, such as Bangalay Sand Forest and Littoral Rainforest.*

*(c) implement the Compensatory Planting in a manner that is consistent with the Landscape and Rehabilitation Management Plan referred to in Condition 21, including the:*

- establishment, conservation and maintenance of approximately 23.99 hectares of native vegetation;*
- enhance 5.25 hectares of the vegetation in Areas 4 and 5; and*
- conservation and maintenance of approximately 45.25 hectares of the remnant vegetation on the site (shown conceptually in Appendix 3); and the best practice guidelines set out in*
  - Bringing the bush back to Western Sydney, Best Practice Guidelines for bush regeneration on the Cumberland plain. Department of Infrastructure, Planning and Natural Resources (2003) (DIPNR 2003); and*
  - Recovering bushland on the Cumberland Plain: Best practice guidelines for the management and restoration of bushland. Department of Environment and Conservation (2005) (DEC 2005).*

*to the satisfaction of the Director-General.*

Monitoring on the Northern Corridor up to 2012 found that over 60 percent of the number of species found in the forest to be removed in the East-West Link are found in the Northern Corridor. This is acknowledged in the letter from the then Department of Planning and Infrastructure in 28 November 2012.

The Compensatory Planting program for all rehabilitation zones is completed and is now in a maintenance phase. The planting is in accordance with the Landscape and Rehabilitation Management Plan and there have been regular inspections and reports on each zone since project inception.

**Condition 18**

*Within 12 months of the date of this approval, the Proponent shall densely plant Banksia integrifolia along the 5 metre setback zones to the Littoral Rainforest vegetation and these areas shall thereafter be planted with species as may be specified in the Landscape and Rehabilitation Management Plan.*

The above plantings were carried out in the manner indicated and in the time frame required. Other plantings and self colonisation has occurred on the adjacent pond foreshore.

**Condition 19**

*The Proponent shall:*

- (a) clearly identify the boundary of the vegetation area in consultation with a suitably qualified ecologist prior to the commencement of any conservation works to ensure that an adequate buffer distance is maintained from the dredging activities/quarry operations to the Conservation Area and SSF [BSF].*
- (b) ensure that the dredging activities and associated quarry operations remain within the defined boundary of the Project Area (shown on the plan in Appendix 1);*
- (c) develop a monitoring program and document it in the EMP to demonstrate that the defined boundary of the quarry extension area is maintained and not compromised during operations; and*
- (d) revegetate the buffer area with appropriate native species and be subject to the Landscape and Rehabilitation Management Plan for inclusion in the EMP for its long term restoration and maintenance and be not less than 5 metres wide.*

The rehabilitation zones were identified and fenced where necessary within 12 months of the date of approval (2008). The quarry – rehabilitation zone boundary was pegged, from which a five metre set back from the habitat edge could be established. Regular inspections have ensured that the dredging activities are kept within the defined quarry boundary.

Colonisation by native plants in the buffer areas has progressed well in most areas. Mostly, self colonisation is found to be more successful than plantings and control of Lantana in these areas is most important.

**Condition 20**

*The Proponent shall:*

- (a) commence the Compensatory Planting and the vegetation screen along the Crooked River Road frontage north of the east-west link (as shown conceptually in Appendix 3), within 12 months of the date of this approval or when sufficient propagation material has been collected;*
  - (b) not sever the east-west link until it can be demonstrated to the satisfaction of the Director-general that the established communities represented in the Northern Corridor comprise at least 60% of the native flora species as set out in Appendix 6 and the Northern Corridor is successful according to the criteria in Condition 25;*
- to the satisfaction of the Director-General.*

*In this Condition, „not sever“ means that no works of clearing, tree removal or other habitat removal shall take place which will reduce or impede the function of the East-West Corridor to provide connectivity to the National park from Zone 1.1 as measured by Condition 25(b).*

The plantings in all rehabilitation zones were completed by mid-2014.

The screen planting was planted early in the project. Problems with trees growing and surviving due to site conditions led to approval from the DoP in 2014 to construct a bund wall of local sand along the edge of the site. Almost all existing trees were retained during the construction of the bund and vegetation has now covered and stabilised this bund. The resulting screen is now successful in screening the quarry works from the road.

The matter of severing the east-west link is also dealt with in detail under Condition 25, below. Note that the letter from the DoP and dated 28 November 2012 approved the severing of the East-West Link.

#### **Condition 20a**

*Within the area marked “A” on Appendix 1, a person shall not clear any of the land of vegetation or trees without the consent of the Director-General.*

Area ‘A’, at the far southern end of the old dredge pond, has not been affected by any of the quarry works and no trees have been removed or affected in any way. Some Lantana removal has occurred in the vicinity of this area as part of maintaining rehabilitation zone 1.

#### **Condition 21**

*The Proponent shall prepare and implement a Landscape and Rehabilitation Management Plan for the project to the satisfaction of the Director-General.*

*This plan must:*

- (a) be submitted to the Director-General for approval within 3 months of the date of this approval.*
- (b) be generally in accordance with the draft Landscape and Rehabilitation Management Plan, dated 20 August 2008 prepared by Kevin Mills & Associates and accepted by the Land and Environment Court as appropriate;*
- (c) be prepared in consultation with the DECC by suitably qualified expert/s approved by the Director-General;*
- (d) clearly identify the biological purpose of the linkage and describe how its design, dimensions and management will achieve this purpose.*
- (e) collect baseline data for the Project Area including flora species, fauna species and ecological function parameters;*
- (f) include a figure showing the location, extent and size of areas to be planted/regenerated for each community to be impacted;*
- (g) identify strategies to use the natural recourses of the impacted areas to their full potential, including:*
  - all plant material to be used as a primary source for restoration and rehabilitation should be collected and propagated from relevant communities prior to clearing;*
  - all areas proposed for replanting should be assessed initially for their regeneration potential appropriate restoration strategies should follow best practice guidelines as described in DIPNR (2003) and DEC (2005);*
- (h) describe in general the short, medium and long term measures that would be implemented to:*
  - rehabilitate the site;*
  - implement the Compensatory planting shown in Appendix 3;*
  - manage the remnant vegetation and habitat on the site, including the areas of Bangalay Sand Forest to be retained (shown conceptually in Appendix 3).;*
  - landscape the site (including the bunds) to mitigate visual impacts of the project; and*



- *upgrade and protect the remaining area of Littoral Rainforest on the eastern side of the pond extension.*
- (i) describe in detail the measures that would be implemented over the first 5 years and every subsequent 5 year period, to rehabilitate and manage the landscape and vegetation on the area, including*
- *Setting clear targets to the satisfaction of the Director-general to determine the level of success and make timely changes to management strategies, as necessary;*
  - *Monitoring each vegetation type separately.*
- (j) set completion criteria for the rehabilitation of the site (i.e. when plantings are self-sustaining;*
- (k) describe how the performance of these measures would be monitored over time; and*
- (l) include a Long Term Management Plan.*

The Landscape and Rehabilitation Management Plan was completed and approved by the then Department of Planning in their letter dated May 2009 and incorporated into the QEMP.

The matter of a Long Term Management Plan is dealt with under Condition 26, below.

**Condition 21a**

*The Proponent shall engage a qualified ecologist, bush regenerator or providence nursery group who will develop a program consistent with the objectives and procedures set out in the draft Landscape and Rehabilitation Management Plan and this program will address the following issues:*

- (a) soil testing;*
  - (b) on site collection of seed and other propagation material;*
  - (c) an assessment of the need to develop plants on the site;*
  - (d) a program of successional plantings and management that will achieve the agreed purposes of the planting;*
  - (e) targets for short term, medium and long term planting and management;*
  - (f) monitoring requirements;*
  - (g) reporting frequency and methodology;*
  - (h) consultation with the relevant government agencies;*
  - (i) water quality monitoring;*
  - (j) quantitative vegetation monitoring;*
- unless otherwise incorporated in the draft Landscape and Rehabilitation Management Plan.*

The project has since its inception been managed by a consultant ecologist, on-site and/or off site staff with horticultural qualifications and by an off-site specialist nursery engaged to collect seed from the site and nearby and propagate plants. This program has followed the approved Landscape and Rehabilitation Management Plan.

**Condition 22**

*The Landscape and Rehabilitation Management Plan must include:*

- (a) the objectives for the rehabilitation of the site and implementation of the Compensatory planting and the vegetation screen along Crooked River Road frontage north of the east-west link;*
- (b) a description of how the rehabilitation of the site and implementation of the Compensatory planting and the vegetation screen along Crooked River Road frontage would be integrated with the surrounding vegetation to provide a comprehensive strategic framework for the restoration and enhancement of the landscape over time;*
- (c) a description of the short, medium and long term measures that would be implemented to:*
  - *Rehabilitate the site;*
  - *Implement the Compensatory Planting;*
  - *Manage the remnant vegetation and habitat on the site; and*
  - *Landscape the site (including the bunds) to mitigate visual impacts of the project;*

(d) a detailed description of the performance and completion criteria for the rehabilitation of the site and implementation of the Compensatory Planting and the vegetation screen along Crooked River Road frontage;

(e) a detailed description of what measures would be implemented over the next 5 years to rehabilitate the site, and implement both the Compensatory Planting and the vegetation screen along Crooked River Road frontage, including the procedures for

- undertaking pre-clearance surveys;
- conserving and re-using topsoil
- collecting and propagating seed for rehabilitation works;
- salvaging and re-using material from the site for habitat enhancement, particularly tree hollows;
- controlling weeds and feral pests;
- controlling access;
- bushfire management;
- managing any potential conflicts between the proposed rehabilitation of the site and implementation of the Compensatory Planting and any Aboriginal cultural heritage values in those areas;
- progressively rehabilitate the areas disturbed by sand extraction;
- implementing revegetation and regeneration within the disturbed and compensatory plantings areas, including the establishment of canopy, sun-canopy (if relevant), understorey and ground cover vegetation;
- reducing the visual impacts of the project; and
- protecting areas outside the disturbance areas.

(i) a detailed program to monitor the performance of the rehabilitation of the site and implementation of the Compensatory Planting and the vegetation screen along the Crooked River Road frontage against the relevant objectives and performance and completion criteria (see above).

(j) a description of the potential risks to successful rehabilitation and/or revegetation and a description of the contingency measures that would be implemented to mitigate risks; and

(k) details of who is responsible to monitoring, reviewing and implementing the plan.

The above matters are included in the approved Landscape and Rehabilitation Management Plan.

### **Condition 23**

Successful establishment of the Northern Corridor shall be measured by the following criteria:

- (a) presence of native flora species;
- (b) a majority of the flora species recorded from the removed forest occur in the area; (e.g. 60% of flora species recorded in removed forest are present).
- (c) species from all four layers have been planted and at least 50% of the projected cover has been achieved for each of the shrub and ground cover layers.
- (d) self-sustaining native plant populations (e.g. regeneration of a second generation);
- (e) no dominance by single flora species (e.g. Bracken);
- (f) weeds are not significantly impacting on the native vegetation;
- (g) weeds do not represent a majority of the flora species or a higher percentage cover than the native flora species; and
- (h) impacts such as grazing are excluded from the area.

The above criteria were achieved for the Northern Corridor in 2012; this was accepted by the then Department of Planning and Infrastructure by letter dated 28 November 2012. Detailed flora and fauna surveys within the Northern Corridor were abandoned in 2013, although regular inspections and reporting have been maintained after that date as part of the wider monitoring of the rehabilitation zones.

### **Condition 24**

24. Successful establishment of fauna habitat in the Northern Corridor would be measured by:

- (a) presence of species;
- (b) a majority of the resident species recorded from the removed forest occur in the area;
- (c) fauna populations are resident in the area;
- (d) pest animals are controlled and not impacting upon the fauna or its habitat; and
- (e) impacts such as grazing are excluded from the area.

The above criteria were reported upon in the quarterly reports, the annual reports of survey results from 2008 to 2013 and in previous environmental audit reports. As noted above, the criteria were achieved for the Northern Corridor in 2012 and accepted by the Department in November 2012.

**Condition 25**

*25. Prior to the severance of the East-West Link the Proponent shall:*

- (a) determine the presence of species in both the east-west link and northern corridor by conducting standard animal survey techniques at least twice in the first year (e.g. Eliot trapping for small mammals, pitfall trapping for reptiles, observational surveys for frogs and birds, and spotlighting transects for arboreal animals);

Animal surveys were carried out in the East-West Link and Northern Corridor up to 2013. These surveys employed all of the above methods.

- (b) determine whether a majority of animal species (particularly those determined to be likely to be impacted by fragmentation) utilising the corridor in the east-west link are present in the conservation area and the northern corridor and the re-created link at the northern boundary; and

The above results showed that the same or more animal species were recorded in the corridor.

- (c) conduct genetic analysis for a number of key species for whom genetic markers have already been developed (e.g. Brown Antechinus, Bush Rat and at least two skink species) to establish that genetic relatedness exists between individuals within the two corridors, the Conservation Area and National Park).

Genetic testing was carried out and was approved by the Department in their letter dated 28 November 2012.

**Condition 26**

*The Long Term Management Strategy must be prepared in consultation with Shoalhaven City Council, Kiama Municipal Council, DECC, DPI-Fisheries and the CCC, and must:*

- (a) define the objectives and criteria for quarry closure and post-extraction management;
- (b) investigate options for the future use of the land;
- (c) describe the measures that would be implemented to minimize or manage the ongoing environmental effects of the development; and
- (d) describe how the performance of these measures would be monitored over time.

*Note. The Department accepts that the initial Long Term Management Strategy may not contain detailed information on post-extraction management.*

The Long Term Management Strategy for the Gerroa site is contained in the approved QEMP.

**Condition 27**

*Within 6 months of the date of this approval, the Proponent shall lodge a rehabilitation bond for the project with the Director-General. The sum of the bond shall be calculated at:*

- (a) \$2.50/m<sup>2</sup> for the total area to be disturbed by the proposed dredge pond as show in Appendix 1; and

(b) \$1.00/m<sup>2</sup> for the total area of land to be rehabilitated consisting of Zones 2A.1, 2A.2, 2A.3, 2B.1, 2B.2, 2C.1, 2C.2, 2D and 2E of Appendix 3.  
or as otherwise directed by the Director-General.

**Condition 28A**

*The rehabilitation bond shall continue to be retained after completion of the Compensatory Planting to ensure that there shall be a continuation of the Planning Agreement; and*

**Condition 28B**

*The Director-General may at his or her discretion and on advice from an independent environmental auditor release or vary the rehabilitation bond where conditions permit. If the rehabilitation is not completed to the satisfaction of the Director-General, the Director-General will call in all or part of the rehabilitation bond, and arrange for the satisfactory completion of the relevant works.*

**Condition 28C**

*The bond may be in the form of a Bank Guarantee or as directed by the Director-general.*

A rehabilitation bond was lodged with DoP on 5 March 2009 and approved on 15 May 2009 by letter from the Department.

**Site Inspection**

As part of the preparation of this Environmental Audit, a site inspection was undertaken of the Gerroa site on 9 December 2016. Each of the rehabilitation zones was visited and assessed; the following conclusions have been reached with regard to each of the zones.

*Zone 1 - existing forest (three contiguous sub-zones)*

Ongoing Lantana control required, generally; focusing on the edges of the forest with the long term aim of working to decrease the total Lantana cover.

*Zone 1.1 – existing forest adjacent to establishing northern corridor*

The density of vegetation, shrubs and trees, along the edge with the establishing northern corridor has noticeably increased. Some minor lantana control required in this zone.

*Zone 1.4 - southern Swamp Oak stand*

This is a natural stand Swamp Oak. Management requires occasional inspections and to take action if weeds are detected.

*Zone 2A.1 - Establishing Northern Corridor*

This is the critical northern corridor which has been shown to be an effective movement corridor for fauna. Tree canopy cover and native ground cover is now well developed Some minor Lantana and general weed (perennial grasses) control required in this zone.

*Zone 2A.2 - Sothern Corridor*

This zone is mostly well treed. Problems with tree growth are ongoing in two places, where trees have been planted and lost several times. Ongoing attention is required here to ensure tree cover is achieved; this includes grass spraying and more plantings should the existing plantings fail.

*Zone 2A.3 - small forest clearing*

This has always been a difficult site; plantings either dying or growing very slowly. In recent times, the trees have begun to gain height and when fully grown will prove an almost continuous canopy.

*Zone 2B.1 - link to Zone 4*

The trees in this small area are now providing almost continuous canopy cover. Some minor Lantana control required this season in conjunction with the work in the adjacent zone 4.

#### *Zone 2B.2 - large forest clearing*

This zone has been very successful soon after the stock was removed. Self colonisation by *Casuarina glauca* has been very prolific and almost the whole zone is now a dense growth of that species. Attention to weeds along the drier edges is ongoing.

#### *Zone 2C.1 - Blue Angle Creek north*

This 50 metre wide planting area west of Blue Angle Creek is now well treed for most of its length. There are some issues with the most northern and most southern sections with tree death and wallaby browsing. The trees present should eventually be sufficient to provide the required canopy cover.

#### *Zone 2C.2 - Blue Angle Creek central*

There is now almost continuous tree cover throughout this zone.

#### *Zone 2D - Blue Angle Creek southwest*

This was the most recently planted zone. There have been issues with flooding and strong winds destroying plants. Trees are now showing signs of gaining height. Quarterly inspections will identify whether further plantings or weed control are required in the future.

#### *Zone 2E - Blue Angle Creek southeast*

There is now almost continuous tree cover throughout this zone.

#### *Zone 3 – quarry screen*

Bund mostly vegetated and stabilised and almost all existing trees survived and thrived following installation of the bund wall, adding to the screening effect.

#### *Zone 4 – Bangalay Stand*

This is a natural stand of Bangalay Forest. The only real issue is to control Lantana from time to time. Spraying of the Lantana is due this season and will be carried out in the near future.

#### *Zone 5 - northern Swamp Oak stand*

This is a natural stand Swamp Oak. Management requires occasional inspections and to take action if weeds are detected.

#### *Zone 5C.1 - link to Zone 5*

This small, narrow area has had issues with tree survival. Some trees are over two metres tall and others have died. While the dry conditions prevail, it is not appropriate to plant out any more trees. A review will be taken at the first quarterly inspection in 2017 to determine if plantings or other actions are required.

#### *Zone 6 - dredge pond foreshore*

Self colonisation has provided vegetation cover over most of the foreshore areas, along with plantings. Further forming of the foreshore walls is required in the north where dredging is still underway.

#### *Zone 7 - retained littoral rainforest*

There has been no damage to this area. As with zone 1 generally, Lantana control is ongoing.

### **3. CONCLUSION**

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This audit has investigated certain conditions associated with the approval for the Gerroa Sand Resource owned by Cleary Bros( Bombo) Pty Limited of Port Kembla. Each condition has been discussed above

and a summary of these conditions is provided in **Table 1**. Some of these conditions were met long ago but are retained in this documentation for completeness.

This three-yearly review follows a similar review in 2013 and in between there have been several annual reports on the Northern Corridor-East West Link areas, as well as quarterly reports dealing with each of the identified management zones. The consultant is regularly involved in monitoring the site and has been engaged for that purpose since the project began in 2008.

A key component of the consent and the Landscape and Rehabilitation Plan is the re-creation of a habitat link referred to as the Northern Corridor. The criteria set in the conditions as to the success of the habitat link were met in 2012, when a letter from the Department of Planning dated 28 November 2012 approved the severing of the East-West Link.

The project has not been without its setbacks, including flooding, drought, browsing by wallabies and unexplained problems with getting trees to grow. These problems were totally expected, as was their successful rectification over time. Some minor problems remain, and these are dealt with on an ongoing basis through appropriate site management actions.

\* \* \* \* \*

**Table 1**  
**Summary of Schedule 3 conditions 16 to 28 and Schedule 5 condition 7**

Sch	Item	Requirement	Comments
3	16a	Enter into a Planning Agreement.	CB submitted a copy of the signed Planning Agreement to DoPI on 18 November 2013.
3	16b	Register the Planning Agreement.	Awaiting execution by the Minister before registering Agreement.
3	17a	Progressively rehabilitate the site in accordance with App 5.	KMA Annual Reports confirm rehabilitation in accordance with the Plan.
3	17b	Within 4 years that additional plantings are 60% of recommended species.	1st annual report states 2A.2 ready for planting, subsequent inspections confirm plantings. KMA 5th annual report verifies exceeds 60% cover in Northern Corridor.
3	17c	Implement compensatory planting.	KMA Annual Reports confirms Compensatory Planting is in accordance with the Plan.
3	18	Within 12 months, densely plant <i>Banksia Integrifolia</i> along 5 metre setback zone.	Completed. See KMA First Annual Report, Clause 4.1.
3	19a	Clearly identify the boundary of the extension area in consultation with ecologist.	Completed. KMA First Annual Report Clause 4.3.
3	19b	Ensure dredging is within boundaries.	Survey report from KFW confirming survey pegs installed as per plan.
3	19c	Develop a program and document in EMP to demonstrate defined boundary is maintained.	Quarterly reports and inspected on a quarterly basis and verified by checklist.

3	19d	Revegetate the buffer area and maintain.	Refer Zone 7 in LRMP and First Annual Report confirms plantings completed..
3	20a	Commence the Compensatory Planting and vegetation screen within 12 months.	Zone planting commenced in October 2008 and has continued annually. Bund wall complemented the plantings and now successfully provides required screen.
3	20b	Not sever the EW link until approved by DG.	Refer letter from DoPI dated 28 Nov. 2012; the EW link was not severed until receipt of this letter.
3	20A	No clearing in Area marked X.	No clearing has occurred in this area as confirmed by a site inspection in 2016. Some Lantana spraying has been undertaken.
3	21a	Prepare LRMP & submit within 3 months	Submitted as part of QEMP, Perram & Partners letter dated 5 Feb. 2009. It is acknowledge that this condition wasn't strictly complied with at the time, however no action is recommended as the LRMP was submitted no long after the due date and approved. The QEMP (incorporating the LRMP) has since been updated and approved by the Department (2016).
3	21b	Be generally in accordance with draft.	Plan in accordance with LRMP draft and approved by the Court.
3	21c	Be prepared in consultation with DECC (now OE&H) and by suitably qualified personnel.	The LRMP was approved by DoP on 29 May 2009. The letter to DoP dated 5 Feb. 2009 nominated Dr Kevin Mills of Kevin Mills and Associates as the expert nominated to prepare the LRMP. The QEMP was submitted to DECC for approval.
3	21d	Identify biological purpose of linkage and describe how it will achieve purpose.	The biological measures for the link are set out in the LRMP and in the Site Work Instruction for Landscape, Rehabilitation and Conservation Management WIGSR12 Section 3.4.
3	21e	Collect baseline data.	Baseline data included in Clause 2.2 & 2.3 of the LRMP.
3	21f	Include a figure showing areas.	KFW Plan 106198/308 Revision K is the figure approved for this use and is included in the Conditions of Consent.
3	21g	Identify strategies to use natural resources to full potential.	Plant material collection is included in the LRMP in Clause 6.6. Rehabilitation strategies are in accordance with best practice guidelines, referenced in LRMP, Section 10.



3	21h	Describe short, medium & long term measures.	Included in LRMP Table 7.
3	21i	Monitor first 5 years and each subsequent 5 years.	Monitoring has occurred since 2009. The targets for each area are included in LRMP Table 7. Work Instruction 12 Clause 3.1.5 states that the areas are to be inspected every 3 months.
3	21j	Set completion dates for when plants are self sustaining.	Included in LRMP Table 7.
3	21k	Describe how performance is measured.	Work Instruction 12 Clause 3.1.5 states that the areas are to be inspected every 3 months. The QEMP Clause 8.8 also states a qualified ecologist will monitor the entire area annually.
3	21l	Include long term management plan.	Included in LRMP Table 7.
3	21Aa	Soil testing.	Addressed in Clause 6.19 of LRMP.
3	21Ab	On site collection of seed and other propagation material.	Site collection of seed is addressed in Clause 6.6 of the LRMP. Site personnel have collected seed on site and attempted to re-seed with limited success to date. Seed collected was used to provide plants for the planting program (propagated by outside nursery).
3	21Ac	An assessment of the need to develop plants on site.	The LRMP Clause 6.8 identifies that plants species will be obtained from a local nursery (Jamberoo Native Nursery) that has propagated them from plant material obtained from the local area or from site.
3	21Ad	A program for successional planting.	QEMP Clause 6.9.1 and LRMP Table 7.
3	21Ae	Targets for short, medium and long term.	QEMP and Table 7.
3	21Af	Monitoring requirements.	LRMP page 32, Monitoring Regime.
3	21Ag	Reporting requirements & frequency.	LRMP Clause 6.20 refers to day to day monitoring by Cleary Bros staff and annual reporting by an ecologist.
3	21Ah	Consultation with relevant government authorities.	LRMP notes where consultation with DECC (now OE&H) is required e.g. trial plots (reference Monitoring Regime, page 32).

3	21Ai	Water quality monitoring.	LRMP Clause 5.4 addresses the requirement to maintain the existing level of groundwater flow to the Swamp Sclerophyll Forest. This is addressed in the QEMP Clause 8.6.
3	21Aj	Quantitative vegetation monitoring.	LRMP Clause 6.20 refers to day to day monitoring by Cleary Bros staff and annual reporting by an ecologist. In addition, Work Instruction 12 Clause 3.1.5 states that the areas are to be inspected every 3 months
3	22a	LRMP to include objectives of rehabilitation.	LRMP approval by DoP on 5 Feb. 2009. Objectives addressed in Clauses 3 and 4 of LRMP.
3	22b	Description of how planting is to be integrated.	Addressed in Clause 6 of LRMP.
3	22c	Include short, medium & long term.	Addressed in LRMP, Table 7.
3	22d	Detailed performance and completion criteria.	Addressed in LRMP, Table 7 and Clause 8.3.
3	22e	Pre-clearance surveys.	Addressed in LRMP, Clause 6.14.
3	22e	Conserving and reusing topsoil.	QEMP 5.1.2 and LRMP page 22.
3	22e	Collect and propagating seed.	LRMP Cause 6.6.
3	22e	Salvage & reuse materials e.g. tree hollows.	QEMP 5.1.1 & LRMP 6.11.
3	22e	Control Weeds and feral pests.	LRMP 6.7, 6.16 and page 30.
3	22e	Control access.	LRMP page 22 and Clause 6.10.
3	22e	Bushfire management.	LRMP page 22.
3	22e	Managing any potential conflicts between rehab and Aboriginal cultural values.	See QEMP & Aboriginal Management Plan, LRMP Clause 8.5.
3	22e	Progressively rehabilitate areas disturbed by sand mining.	LRMP, page 29, Zone 6.
3	22e	Implement revegetation.	LRMP, Section 7.
3	22e	Reduce visual impacts.	LRMP, page 8 Zone 3
3	22e	Protect areas outside disturbed areas.	pg 22 and 6.10 of LRMP
3	22i	Detailed program to monitor progress.	Clause 8 of LRMP.
3	22j	Potential risks and mitigation measures.	Clause 8.1 of LRMP.

3	22k	Who is responsible for managing plan?	Clause 1.3 of LRMP.
3	23	Successful establishment of the Northern Corridor – flora.	See KMA annual reports and KMA email dated 16 Dec. 2011 where each item is reviewed for compliance.
3	24	Successful establishment of the Northern Corridor – fauna.	See KMA annual reports and KMA email dated 16 Dec. 2011 where each item is reviewed for compliance
3	25a	Prior to severance of EW link, determine presence of species.	See KMA annual reports and KMA email dated 16 Dec. 2011 where each item is reviewed for compliance
3	25b	Prior to severance of EW link, determine whether a majority of species are present in conservation and northern corridor.	See KM annual reports and KM email dated 16 Dec. 2011 where each item is reviewed for compliance
3	25c	Prior to severance of EW link, conduct genetic analysis.	Refer letter from DoPI dated 28 Nov. 2012.
3	26	Long Term Management Strategy.	QEMP Section 6.10
3	27	Landscape and Rehabilitation Bond.	Lodged with DoP on 5 March 2009 and approved on 15 May 2009.
3	28	Rehabilitation bond shall continue to be retained.	There is no expiry date.

#### **4. REFERENCES**

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Kevin Mills & Associates (2008). Landscape and Rehabilitation Management Plan, Extension and Continuation of Gerroa Sand Quarry, Municipality of Kiama, City of Shoalhaven. Prepared for Cleary Bros (Bombo) Pty Limited, Port Kembla, August.

Kevin Mills & Associates (2009). Weed Survey. Cleary Bros (Bombo) Pty Ltd, Gerroa Sand Quarry, Municipality of Kiama/City of Shoalhaven. Prepared for Cleary Bros (Bombo) Pty Limited, Port Kembla, September.

Kevin Mills & Associates (2009). First Annual Survey. Flora and Fauna Monitoring Surveys, Gerroa Sand Quarry, Municipality of Kiama. Prepared for Cleary Bros (Bombo) Pty Limited, Port Kembla, December.

Kevin Mills & Associates (2010). Second Annual Survey. Flora and Fauna Monitoring Surveys, Gerroa Sand Quarry, Municipality of Kiama. Prepared for Cleary Bros (Bombo) Pty Limited, Port Kembla, March.

Kevin Mills & Associates (2011). Third Annual Survey. Flora and Fauna Monitoring Surveys, Gerroa Sand Quarry, Municipality of Kiama. Prepared for Cleary Bros (Bombo) Pty Limited, Port Kembla, February.

Kevin Mills & Associates (2012). Fourth Annual Survey. Flora and Fauna Monitoring Surveys, Gerroa Sand Quarry, Municipality of Kiama. Prepared for Cleary Bros (Bombo) Pty Limited, Port Kembla, February.

Kevin Mills & Associates (2013). Fifth Annual Report, Flora and Fauna Monitoring Surveys, Gerroa Sand Quarry, Municipality of Kiama. Report prepared for Cleary Bros. (Bombo) Pty Ltd, February.

Perram & Partners (2009). Gerroa Sand Resource, Quarry Environmental Management Plan. Prepared for Cleary Bros (Bombo) Pty Limited, Port Kembla, May.

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