

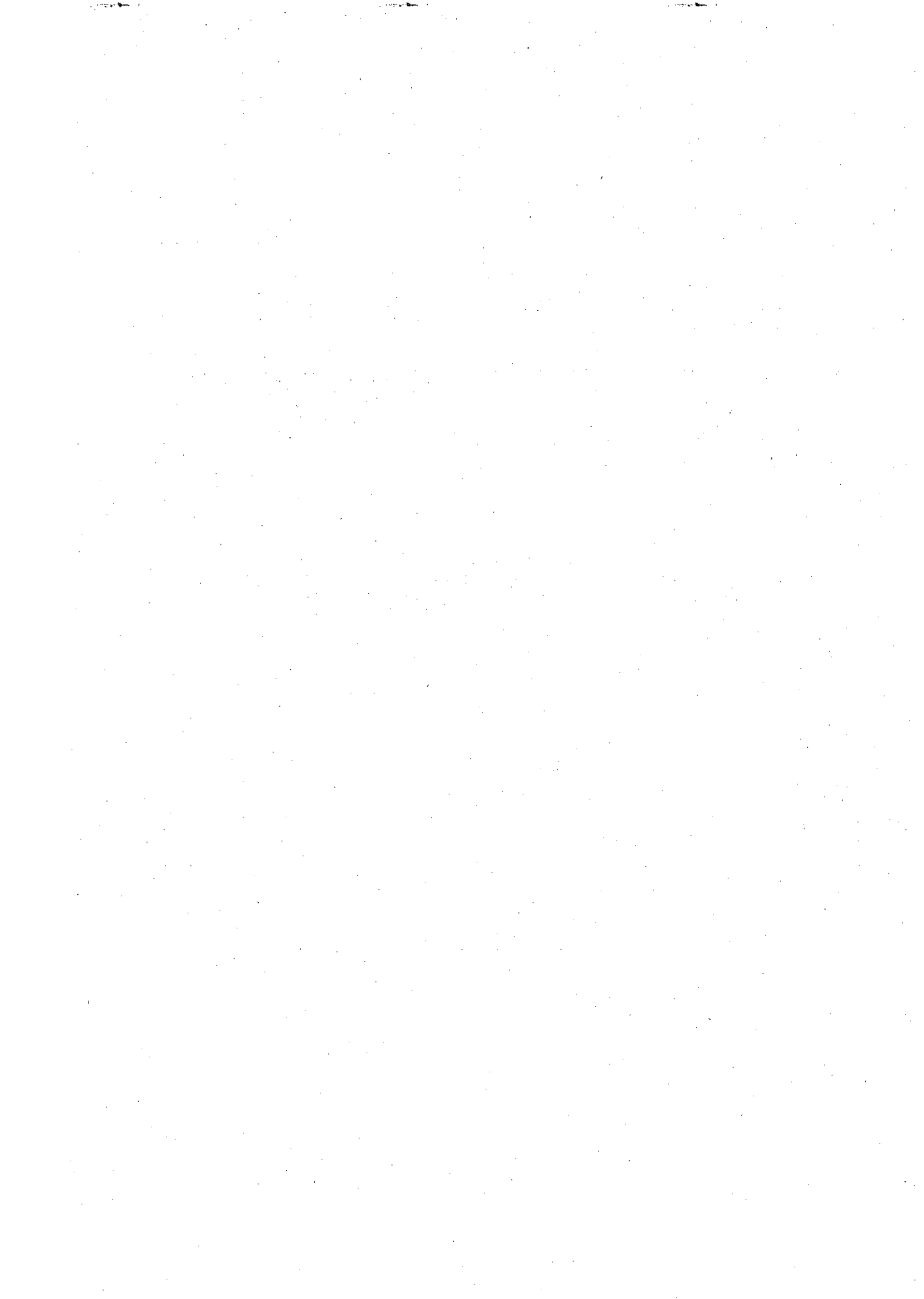
**Extension, cleanup and rehabilitation of  
mineral sands mine, Wonnerup (640)**

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**Cable Sands (WA) Pty Ltd**

**Report and recommendations  
of the Environmental Protection Authority**

**Environmental Protection Authority  
Perth, Western Australia  
Bulletin 594  
Assessment No 640  
November 1991**



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mineral sands mine, Wonnerup (640)**

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## **The purpose of the report**

This report contains the Environmental Protection Authority's environmental assessment and recommendations to the Minister for the Environment on the environmental acceptability of the proposal.

Immediately following the release of the report there is a 14-day period when anyone may appeal to the Minister against the Environmental Protection Authority's recommendations.

After the appeal period, and determination of any appeals, the Minister consults with the other relevant ministers and agencies and then decides whether the proposal may or may not proceed. The Minister also states the legally binding environmental conditions which might apply to any approval.

### **Appeals**

If you disagree with any of the assessment report recommendations you may appeal in writing to the Minister for the Environment outlining the environmental reasons for your concern and enclosing the appeal fee of \$10.

It is important that you clearly indicate the part of the report you disagree with and the reasons for your concern so that the grounds of your appeal can be properly considered by the Minister for the Environment.

### **Address**

Hon Minister for the Environment  
18th Floor, Allendale Square  
77 St George's Terrace  
PERTH WA 6000

### **Closing date**

Your appeal (with the \$10 fee) must reach the Minister's office no later than 5.00pm on the date indicated below.

6. December, 1991





## Summary and recommendations

The Environmental Protection Authority has assessed a proposal by Cable Sands (WA) Pty Ltd to further mine a deposit of mineral sands at Wonnerup, approximately 7 kilometres north east of Busselton. The proposal seeks to continue current mining of the orebody at Wonnerup that contains heavy mineral sands and to mine tailings remaining from a previous mining operation (Figure 1).

The proposal was referred to the Environmental Protection Authority in July 1991 and assessed at the Consultative Environmental Review level, recognising the environmentally significant issues of the proposal and public interest in mineral sands mining.

The Consultative Environmental Review document was submitted for the proposal and has undergone a four week public review period, which finished 4 October, 1991.

Work underway at the current minesite is to clean up some of the tailings remaining from a 1960's mining operation. This work began in 1989 and will be completed by March 1992. The proposal being assessed is adjacent to the existing cleanup operation. The proposal to mine the site adjacent to the existing operations would extend the mine life up to 12 months, with land stabilisation and revegetation of the site being completed by September/October 1993.

Mining methods will be identical to those employed on the existing Wonnerup mine site. The ore would be removed using a front-end loader, processed in an onsite primary processing plant, stockpiled, then trucked to Bunbury for secondary treatment. Transport would be via the existing approved route.

The proposed mine site is on private agricultural land used primarily for grazing purposes. All of the land has been cleared and there is no remnant vegetation.

The proponent undertook a public consultation program to inform nearby residents and landowners of the proposed extension. In general, the residents and landowners accepted the proposed extension subject to a number of conditions which could be met by the proponent.

The major environmental issues considered during the assessment of the proposal were generally related to:

- hydrological impacts – groundwater and surface water, especially on the Vasse Channel;
- impacts of noise and transport on nearby residents; and
- rehabilitation.

In its assessment of the proposal the Authority carefully considered these potential impacts with respect to long and short term effects and final stability at the proposed minesite.

The proponent's commitments and the Environmental Protection Authority's recommendations address the major environmental issues. They are summarised as follows:

- a 10m wide stand-off strip will be retained between mining operations and the Vasse Channel;
- surface water and groundwater will be monitored and managed accordingly;
- noise levels will be monitored and they will not exceed the maximum recommended noise level for residential premises surrounding the proposed mine to the satisfaction of the Environmental Protection Authority;
- trucking activities will normally occur on weekdays and be confined to the hours of 0700 and 1900;
- in the event that trucking occurs on weekends it will be confined from 0700 to 1200 on Saturdays;
- rehabilitation will continue progressively behind the mine face;
- pasture and peppermint trees will be reestablished; and
- the dragline pond will be rehabilitated to a wetland complete with fringing vegetation.

This report addresses the various environmental issues raised during the assessment of the proposal as well as a number of other recommendations that have been made to ensure that an adequate environmental management program is adopted for the project.

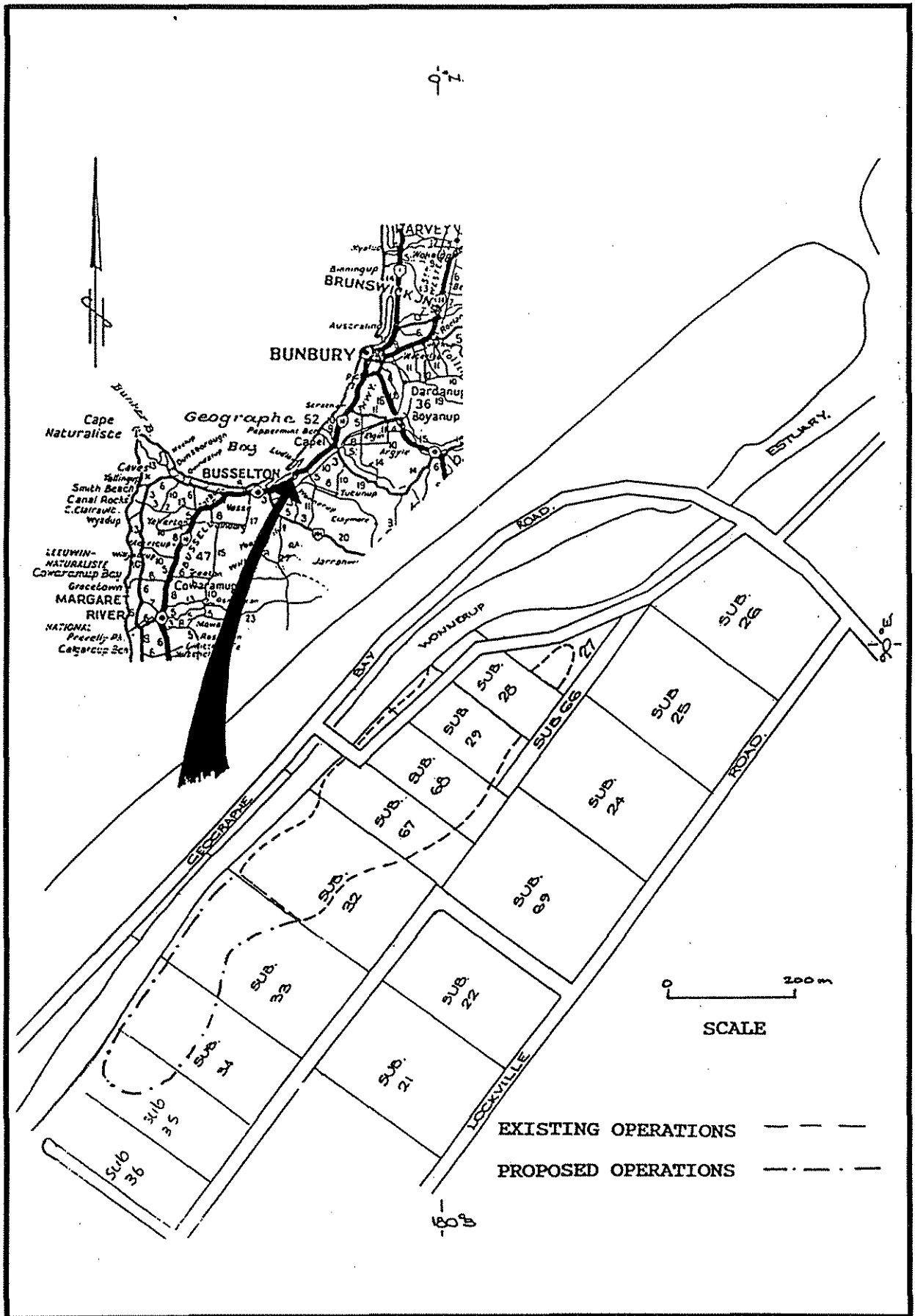


Figure 1. Location of existing and proposed Wonnerup mineral sands mine

Upon consideration of the Consultative Environmental Review document, the issues raised in submissions and the proponent's response to those issues the Environmental Protection Authority has concluded that the proposal would be environmentally acceptable subject to the following recommendations:

#### **Recommendation 1**

The Environmental Protection Authority concludes that the proposal described in the Consultative Environmental Review is environmentally acceptable and recommends that it could proceed subject to:

- the proponent's commitments; and
- the Environmental Protection Authority's recommendations in this report.

#### **Recommendation 2**

The Environmental Protection Authority recommends that prior to mining the proponent should prepare a plan to monitor and manage surface water and groundwater quality in the mining area to the satisfaction of the Environmental Protection Authority, on the advice of the Water Authority of Western Australia. The plan should include but not necessarily be limited to the proponent's commitments for monitoring and reporting and strategies to be implemented in the event of a deterioration of water quality in the monitored areas.

#### **Recommendation 3**

The Environmental Protection Authority recommends that the proponent be required to ensure that the introduced noise from the project does not cause the noise in the surrounding residential areas to exceed:

- 50dB(A) from 7am to 7pm Monday to Saturday;
- 45dB(A) on Sunday and from 7pm to 10pm Monday to Saturday; and
- 40dB(A) from 10pm to 7am every day.

These levels should not be viewed as normal operating levels for the project. They are the upper limits above which action will be taken by the Environmental Protection Authority. The Environmental Protection Authority considers that noise below these levels is not unreasonable provided it does not include tonal components, impulses or other intrusive characteristics.

#### **Recommendation 4**

The Environmental Protection Authority recommends that prior to commencing mining, the proponent should develop a rehabilitation plan in consultation with the Department of Agriculture, in order to rehabilitate the land to an environmentally stable condition. This should be done to the satisfaction of the Environmental Protection Authority on advice of the Department of Agriculture.



## **1. Introduction**

The Environmental Protection Authority has assessed a proposal by Cable Sands (WA) Pty Ltd to further mine a deposit of mineral sands at Wonnerup, approximately 7 kilometres north east of Busselton. The proposal seeks to continue current mining of the orebody at Wonnerup that contains heavy mineral sands and tailings remaining from a previous mining operation. (Figure 1)

The Consultative Environmental Review was submitted for the proposal and has undergone a four week public review period, which finished 4 October 1991.

## **2. The proposal**

Cable Sands (WA) Pty Ltd proposes to continue current mining of the orebody at Wonnerup, south of the mouth of the Wonnerup Inlet. The orebody contains heavy mineral sands and tailings remaining from mining done by another company in the 1960's. Cleanup work on the tailings remaining from the previous mining operation, began in 1989 and is expected to be completed by March 1992. The proposal to mine adjacent to the existing operations would extend the mine life up to 12 months, with land restoration and revegetation of the site being completed by September/October 1993.

The proponent seeks to continue mining of the orebody by relocating the plant, machinery and associated access roads and power supply to land adjacent to the existing operation. The size of the area proposed for mining is roughly equal to the area of the current operations.

Mining methods would be identical to those employed on the existing Wonnerup mine site. The ore would be extracted by front-end loader then placed in a rotary screening unit to separate the mineral sand particles from the oversized fraction.

The undersized portion would then be separated into tailings and heavy minerals concentrate in an onsite primary treatment plant. The primary treatment plant requires no chemicals or reagents. Water needed by the primary treatment plant would be obtained from the water holding dam supplied with water from an onsite bore.

The stockpiled heavy minerals concentrate would be trucked periodically to Bunbury for secondary treatment via the existing approved route.

Mining would normally occur weekdays, between the hours of 7am and 7pm. Weekend operations would be infrequent and would be determined by the Bunbury secondary treatment plant's requirements.

Mining and rehabilitation at Wonnerup is proposed to be integrated and carried out in a progressive manner. As mining proceeds, tailings from the primary separation plant would be used to fill the mine pit. Reshaping of the landforms to resemble their original contour levels would then commence and continue progressively behind the mine face. Establishing pastures and peppermint trees would stabilise the restored landforms into grazing pastures.

Post-mining ground levels and rehabilitation plans also involve rehabilitating the previous mining operation's dragline pond to a wetland. The wetland would have fringing wetland vegetation which is typical of the native vegetation of the region.

## **3. Existing environment**

The proposed mine extension is located toward the southern end of the Swan Coastal Plain between Busselton and Capel. An extensive series of wide lagoons and wetlands exists at the interface between the Plain and Geographe Bay.

The proposed mine extension is inland of the beach and its associated dune system and consists of wind blown sand that is typical of the coast of Geographe Bay. The site lies along the Vasse channel which connects the Vasse Estuary with the Wonnerup Inlet. A floodgate on the channel prevents tidal inflows and saltwater inundation of inland pastures.

South east of the floodgate is a waterhole which is a remnant of an earlier dragline operation. It is connected to the Vasse Channel.

Waters from the Vasse Estuary and the dam on the existing mine site have been monitored weekly. There have been no adverse effects detected as a result of the current mining operation.

Groundwater from the bore at the existing Wonnerup operation has been monitored on a monthly basis. The mining operation has had no adverse effect on groundwater quality and only a temporary lowering of the groundwater table has been detected.

The vegetation at the proposed mine site consists of pasture with six peppermint trees. The pasture is dominated by couch grasses with subterranean clovers and annual grasses also being common. The southern and eastern boundaries of the mine extension are delineated by an open woodland of peppermint trees with an understorey of pasture. All native understorey vegetation within this woodland has been cleared by earlier occupation and pastoral use. The site does not contain any gazetted rare or priority listed flora species.

The proposed mine extension has little habitat value for native fauna but the adjoining open woodland of peppermint trees has evidence of being inhabited by the Western Ringtail Possum.

The mineral sands present in the orebody give off higher radiation readings than areas where there is no orebody. In some places, the orebody is exposed and several readings in the proposed site exceed the maximum recommended level for public safety.

No Aboriginal or European heritage sites have been identified on the proposed mine site. A survey was conducted for unrecorded Aboriginal sites, however none was found.

In the 1880s the land was cleared and developed for grazing by European settlers and has been used for cattle and sheep grazing since then. The grazing value of the land is marginal because of the low fertility and moisture retention capacity of the sandy soils. In recent years the land has been rezoned from rural to rural-residential.

## **4. Environmental impacts and their management**

Following a review of the environmental aspects of the proposal and taking into account submissions from the public and government agencies, the Environmental Protection Authority concludes that the proposal would be environmentally acceptable, subject to a number of conditions as discussed in the following sections of this report.

### **Recommendation 1**

**The Environmental Protection Authority concludes that the proposal described in the Consultative Environmental Review is environmentally acceptable and recommends that it could proceed subject to:**

- the proponent's commitments; and
- the Environmental Protection Authority's recommendations in this report.

### **4.1 Surface water and groundwater**

Based on the data that exists from the current mining operation at Wonnerup, it is anticipated that there would be no adverse effects on the Vasse Estuary or the groundwater as a result of the proposed mining of the Wonnerup extension.

To ensure this continues, the proponent has made a number of commitments:

- a 10m wide stand-off strip will be retained between mining operations and the Vasse Channel;

- water from the Vasse Channel and the water holding dam will be monitored for electrical conductivity (salinity), pH (acidity) and total suspended solids on a weekly basis; and
- groundwater will be monitored monthly for pH and electrical conductivity.

## **Recommendation 2**

**The Environmental Protection Authority recommends that prior to mining the proponent should prepare a plan to monitor and manage surface water and groundwater quality in the mining area to the satisfaction of the Environmental Protection Authority, on the advice of the Water Authority of Western Australia. The plan should include but not necessarily be limited to the proponent's commitments for monitoring and reporting and strategies to be implemented in the event of a deterioration of water quality in the monitored areas.**

### **4.2 Noise**

Noise levels measured from the current operation are marginally above the expected noise levels of a typical rural environment and are within acceptable limits set by the Environmental Protection Authority. Noise would be generated from the plant and a front-end loader used in the dry mining process. The work force would be protected from operation noise by the wearing of appropriate protective equipment and by operating enclosed equipment where applicable.

The proponent has made several commitments to ensure that operational noise levels would continue to remain low and not cause annoyance to nearby residents. They include:

- no operations, apart from emergencies, will be undertaken on Sundays or between the hours of 1900 and 0700;
- weekend operations will occur on an infrequent basis, as directed by the ongoing requirements of the secondary treatment plant in Bunbury; and
- noise surveys will be regularly conducted.

## **Recommendation 3**

**The Environmental Protection Authority recommends that the proponent be required to ensure that the introduced noise from the project does not cause the noise in the surrounding residential areas to exceed:**

- 50dB(A) from 7am to 7pm Monday to Saturday;
- 45dB(A) on Sunday and from 7pm to 10pm Monday to Saturday; and
- 40dB(A) from 10pm to 7am every day.

**These levels should not be viewed as normal operating levels for the project. They are the upper limits above which action will be taken by the Environmental Protection Authority. The Environmental Protection Authority considers that noise below these levels is not unreasonable provided it does not include tonal components, impulses or other intrusive characteristics.**

### **4.3 Rehabilitation**

The Wonnerup deposit is located on private agricultural land used primarily for grazing purposes. All of the land has been cleared, no remnant vegetation exists although peppermint trees have grown since the previous mining activities. Once the proposed mining has ceased, site inspection would be undertaken at the end of the first winter and summer to monitor the establishment of pastures and peppermint trees. If required, additional plantings would be undertaken.

The proposed mining operations would destroy six semi-mature to mature peppermint trees. This tree removal is unavoidable and would be kept to an absolute minimum. The rehabilitation program provides for planting substantially more trees than were removed for mining purposes. The open woodland on the southern and eastern boundaries of the mine extension would not be mined.

The sand bund separating the water holding dam from the Vasse Channel would be removed to allow for the development of a wetland. The floor of the wetland would be the same level as the floor of the Vasse Channel thus maintaining water circulation and preventing the buildup of anoxic water in the wetland basin. Batters surrounding the wetland would be shallow and they would be stabilised with wetland vegetation, including sedges, shrubs, thickets and trees which are typical and native to wetlands in the region.

#### **Recommendation 4**

**The Environmental Protection Authority recommends that prior to commencing mining, the proponent should develop a rehabilitation plan in consultation with the Department of Agriculture, in order to rehabilitate the land to an environmentally stable condition. This should be done to the satisfaction of the Environmental Protection Authority on advice of the Department of Agriculture.**

#### **4.4 Radiation**

On completion of mining, the radiation levels of the rehabilitated landforms would approximate the regional background levels which are well below the public safety level. On the basis of surveys conducted on the adjacent areas on which mining has been completed the radiation levels of the proposed mine site are predicted to be significantly below the maximum recommended level for public safety.

#### **4.5 Dust**

Dust has not been an issue of concern at the existing Wonnerup operation due to the small size of the operation, high rainfall, particularly during the winter months, and minimising the size of the actively exposed areas which are potential dust sources. The proposed Wonnerup extension would be a similarly small operation. Dust may be generated during the summer months from areas stripped of vegetation, but as these areas would be kept to a minimum, dust generated from the proposed operation is not expected to be a problem. Vegetation would be re-established on restored areas and this would assist in managing dust. Should the need arise, dust levels would be controlled through spraying the site with water or by other stabilisation methods such as hydromulching or haymulching.

#### **4.6 Flora and fauna**

The proposed mine site's lack of suitable native habitats means it is extremely unlikely that the area contains any rare and endangered species of fauna. A search of rare species has revealed that none are in the area. The Western Ringtail Possum's habitat would be retained as the existing woodlands of peppermint trees would not be destroyed. There are no rare or priority listed flora species on the site.

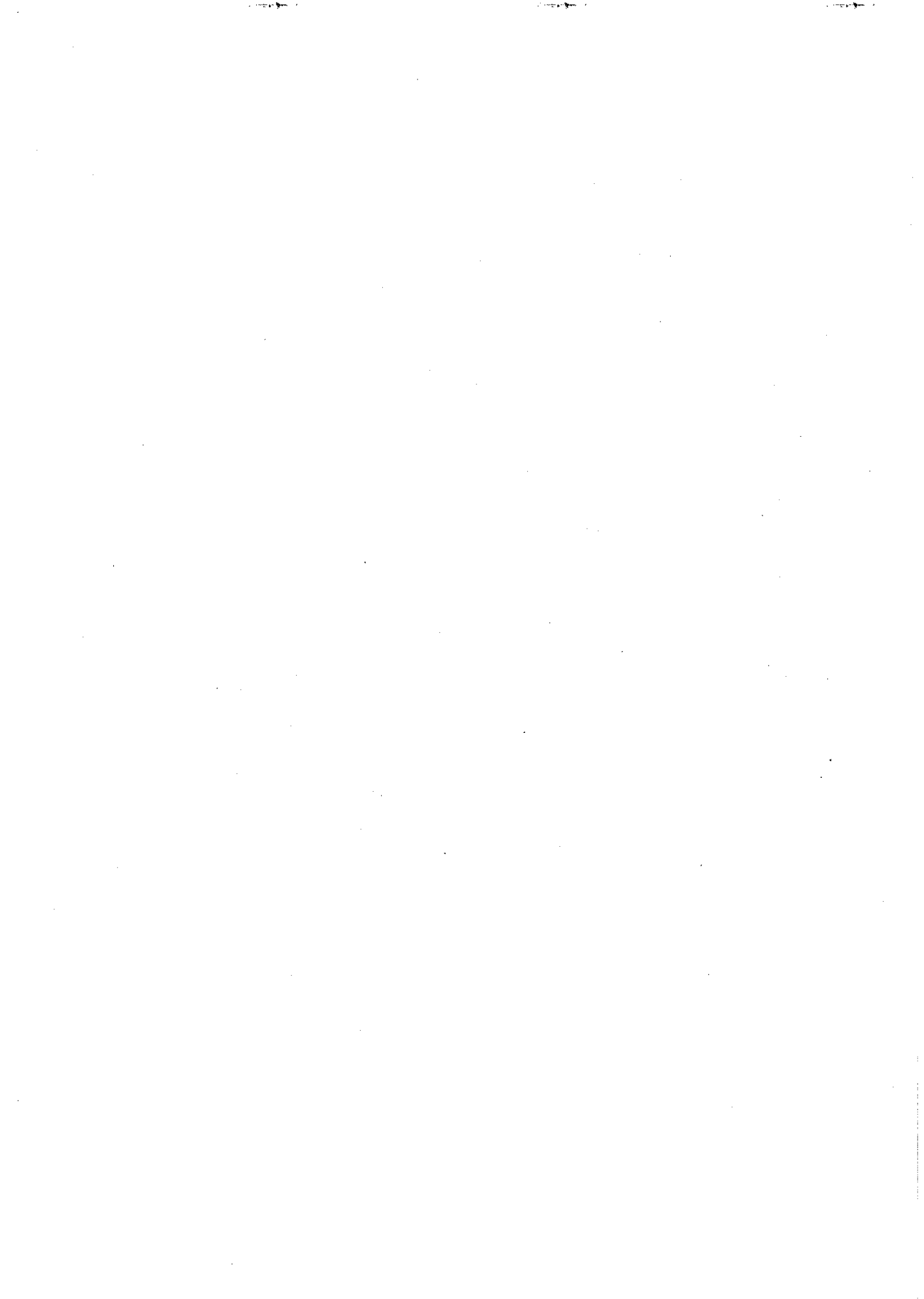
#### **4.7 Public consultation and submission**

The proponent undertook a public consultation program to inform nearby residents and landowners of the proposed extension. In general, the residents and landowners accepted the proposed extension subject to a number of conditions which could be met by the proponent.



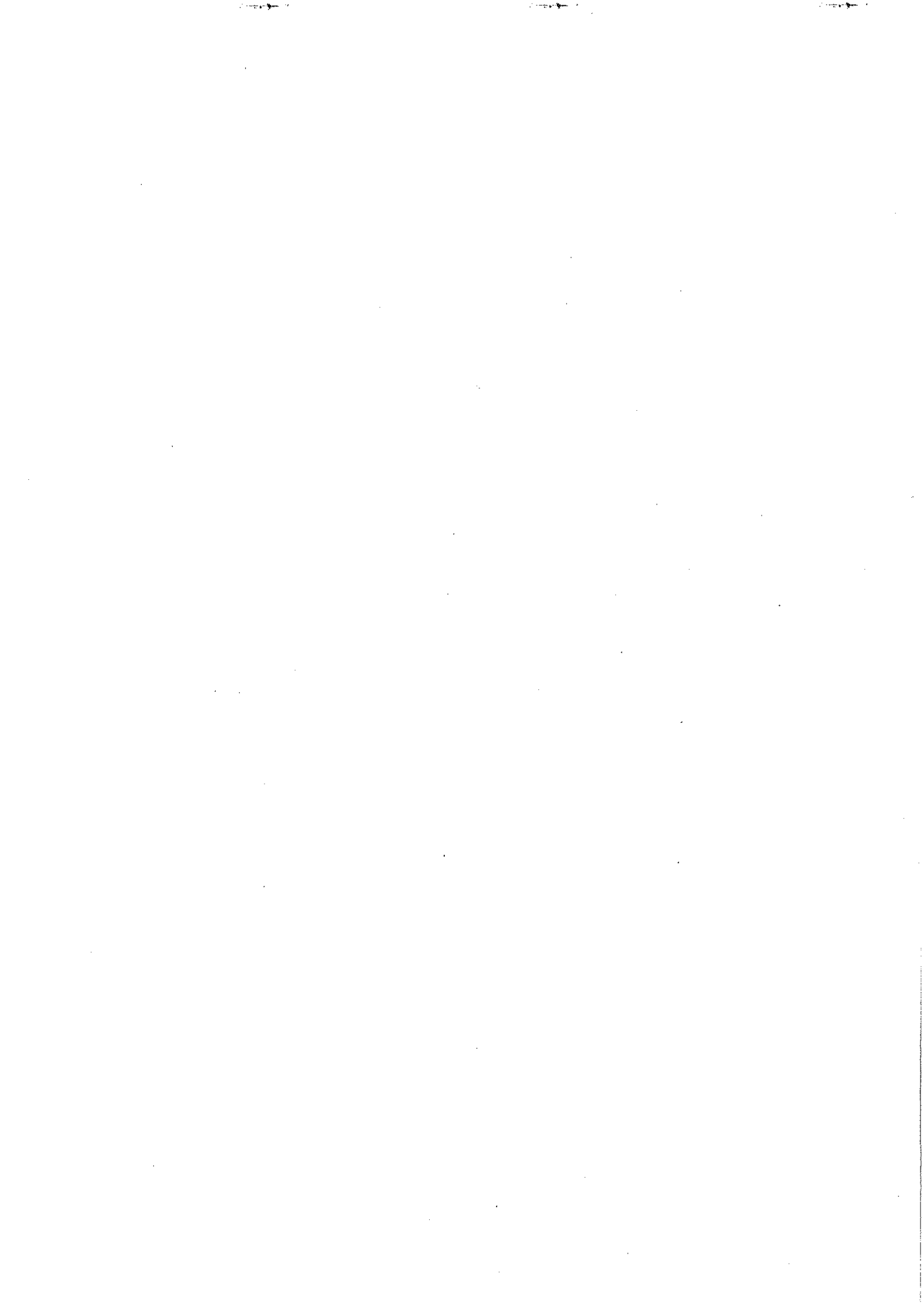
## **Conclusion**

Upon assessment of the Cable Sands (WA) Pty Ltd proposal, the Environmental Protection Authority has concluded that the proposed extension, clean up & rehabilitation of the Wonnerup mineral sands mine would be environmentally acceptable subject to the operation being carried out in accordance with the proposal detailed in the Consultative Environmental Review and the Environmental Protection Authority's recommendations in this Assessment Report.



## **Appendix 1**

**Submission and proponent's response**





**W.G. MARTINICK & ASSOCIATES Pty Ltd**  
Environmental Consultants and Planners

4/114 Churchill Avenue  
Subiaco  
Western Australia 6008  
Australia

Telephone (09) 388 2123  
Facsimile (09) 381 7061

18 October 1991

Ms Jane Aberdeen  
Environmental Protection Authority  
Environment House  
1 Mount Street  
PERTH WA 6000

ENVIRONMENTAL PROTECTION AUTHORITY	
21 OCT 1991	
File No. 2/87/1	Initials JAB ✓

Dear Ms Aberdeen

RE: CABLE SANDS - WONNERUP CER

I refer to the letter from the Water Authority of 27 September 1991 to your Authority and which you forwarded on 15 October 1991 for comment.

I reply as follows to the comments listed by the Water Authority, and for convenience I list the Water Authority's comments and I use their numbering system (this is highlighted).

1. **Section 3.3 Mining Sequence - Water Control:**

1.1 The proponents need to ensure that the temporary bunding of the old dragline pond does not cause any local flooding and that no bunding material encroaches beyond the normal bank line of the Vasse Estuary.

Reply:

The bunding will be undertaken at the end of the dry season when the old dragline pond, on the basis of past experience, is likely to be empty and dry. The material used for the bund will be excavated from the pond. By constructing the bund during the dry season it will be possible to avoid bunding material from encroaching beyond the normal bank line of the Vasse Estuary. This bunding will result in no local flooding.

1.2 Measures need to be implemented to control silt runoff during mining and rehabilitation.

Reply:

The sandy soil of the orebody has a very low silt content (less than 5%) and a very high water infiltration rate. Consequently,

51202 INFC

no run off or movement of silt has to date been observed on the areas which have been rehabilitated to date. The same is anticipated for the proposed extension. A temporary contour bank will be constructed on the restored landforms so that in the event that some runoff does occur, this water has to flow through the contour bank before entering the Estuary. By this means silt will be trapped in the contour bank.

1.3 Dewatering of the site into the Vasse Estuary must not occur without the prior consent of the Water Authority.

Reply:

The proposed extension will be a dry mining operation with no dewatering requirement. In the event that minor dewatering is required, such water will be disposed of on the orebody or on the restored landforms.

1.4 The water storage dam must be designed to cope with extreme rainfall events without overtopping the banks, especially into the Vasse Estuary.

Reply:

The old dragline pond will be used as a storage dam following the construction of a bund to separate it from the Vasse Estuary. The water regime will be controlled by the pumping of groundwater into this dam. It is anticipated that the water levels in the dam and the Estuary will be approximately equal during the wet winter months, whilst during the summer it is anticipated that the level in the storage dam will be maintained at a level which is higher than that in the Estuary.

Run off into the storage dam will be minimal on account of the high infiltration capacity of the surrounding soils. Nevertheless, the storage dam will be bunded to avoid the inflow of any surface run-off.

2.1 All onsite materials including oils, lubricants and coolants must be stored in impervious holding areas prior to use or export offsite.

Reply:

Cable Sands will attend to the above as required by the Department of Mines and this will be inspected regularly by the Mines Inspector.

2.2 All fuel stored onsite shall be surrounded by impervious bunding, capable of retaining the entire tank contents.

Reply:

As for 2.1, Cable Sands will attend to the above as required by the Department of Mines and this will also be inspected regularly by the Mines Inspector.

Please do not hesitate to contact me if you have any further queries.

Yours faithfully

A handwritten signature in cursive script, appearing to read 'W. Martinick', with a long horizontal flourish extending to the right.

Dr WOLF MARTINICK  
Chairman

CC: Cable Sands, Attention:

Mr John Gee  
Mr Ken Bell

Water Authority, Bunbury:

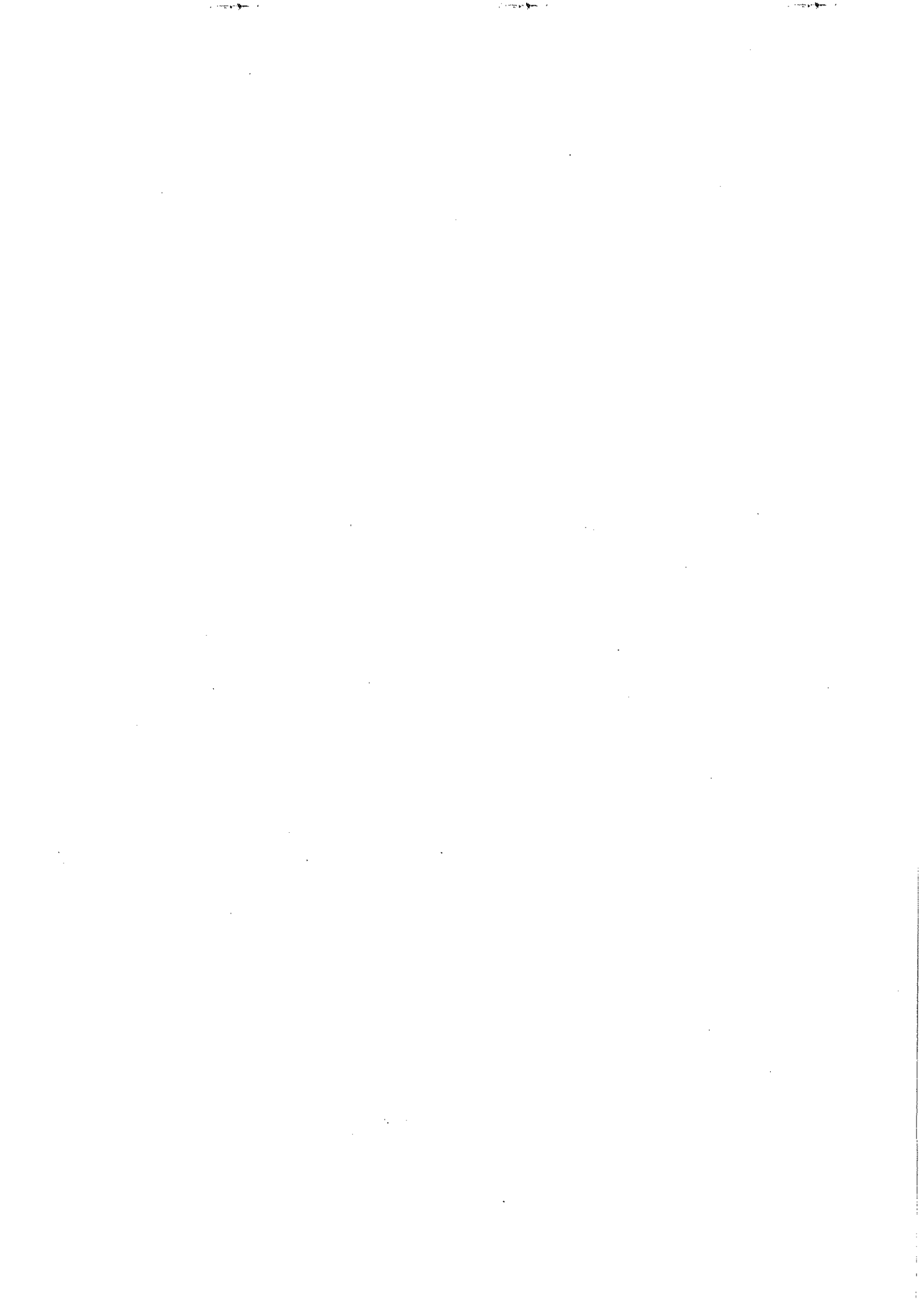
Mr B Halligan





## **Appendix 2**

### **Proponent's commitments**



## **PROPONENT'S COMMITMENTS**

### **EXTENSION, CLEAN UP & REHABILITATION, MINERAL SANDS MINE, WONNERUP (640)**

#### **CABLE SANDS (WA) PTY LTD**

The proponent has made the following environmental commitments:

#### **Mining**

1. no operations apart from emergencies, will be undertaken on Sundays or between the hours of 1900 and 0700;
2. a 10m wide stand-off strip will be retained between mining operations and the Vasse Channel in order to protect surface water quality;
3. the open woodland on the southern and eastern boundaries of the mine extension will not be mined thus retaining potential western ringtail possum habitat;
4. the bunding of the old dragline pond will be undertaken at the end of the dry season when the pond, on the basis of past experience, is likely to be empty and dry. The material used for the bund will be excavated from the pond in order to protect water quality in the Vasse Channel;
5. a temporary contour bank on the restored landforms will be designed and constructed to the satisfaction of the Water Authority of Western Australia, so that in the event that some runoff does occur, this water has to flow through the contour bank before entering the Estuary. By this means silt will be trapped in the contour bank;
6. in the event that minor dewatering is required within the open cut such water will be disposed of on the orebody or on the restored landforms.
7. the water storage dam will be designed and constructed, to the satisfaction of the Water Authority of Western Australia, to cope with extreme rainfall events without overtopping the banks;
8. all onsite materials including oils, lubricants and coolants will be stored in impervious holding areas prior to use or export offsite to the satisfaction of the Department of Mines;
9. the storage of fuel onsite will be to the satisfaction of the Department of Mines.

#### **Trucking**

10. trucking activities will be confined to the hours of 0700 and 1900 during weekdays and to 0700 to 1200 on Saturdays when trucking is required;
11. all trucks will have their loads covered with a tarpaulin.

#### **Decommissioning**

12. all materials, structures, foundations, machinery, stockpiles and wastes will be removed from the site following completion of mining operations as part of the decommissioning and final rehabilitation of the project and environs.
13. the replacement of agreed fences, gates, and access ways will be to the landowners' satisfaction.

## **Rehabilitation**

14. rehabilitation will continue progressively behind the mine face;
15. the planting of more peppermint trees than currently exist on the site will be undertaken during early winter 1993. Pasture will be established during autumn and winter and an appropriate fertilising programme will be initiated; and,
16. the water holding dam will be developed as a wetland complete with vegetation..

## **Monitoring**

17. noise surveys will be undertaken at six locations at three monthly intervals or as otherwise determined by the Pollution Control Division of the Environmental Protection Authority;
18. regular operational checks will be made on radiation levels to the satisfaction of the Department of Mines;
19. water from the Vasse Channel and the water holding dam will be monitored for electrical conductivity, pH and total suspended solids on a weekly basis;
20. groundwater will be monitored monthly for pH and electrical conductivity;
21. once mining has ceased, site inspections will be undertaken at the end of the first winter and summer to monitor the establishment of vegetation. If required, additional plantings will be undertaken; and,
22. all monitoring results will be included in the annual mine site report submitted to the Department of Mines.