Long term development of Maddington quarry

Boral Resources (WA) Limited

Report and recommendations of the
Environmental Protection Authority

Environmental Protection Authority
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Contents

Appendices

Figures

Table

Summary and recommendations

Boral Resources (W.A) Limited has submitted a proposal for an extension to its existing hard rock quarrying operation on the foothills of the Darling Scarp at Maddington. The proposal is for an expansion of the quarry area between and to the east of the present quarry workings. This will give the operation a total projected life of a further 90 years based upon current extraction rates.

Part of the land to which the proposal relates is reserved land vested in the City of Gosnells for the purpose of Parks and Recreation. A land exchange is proposed whereby, land to the north of the existing quarry owned by the proponent is exchanged for portions of the reserved land. The land owned by the proponent is of similar quality, for the vested purpose, to the reserved land.

The proposal was referred to the Environmental Protection Authority in 1989 and the level of assessment was set at Public Environmental Review (PER), recognising the location of the quarry within the boundaries of System 6 Recommendation M80, which encompasses the Darling Scarp. Recommendation M80.4 states: "That the operators of quarries be required to produce assessments of the environmental implications of existing and future quarries and plans for their rehabilitation and restoration."

The draft Basic Raw Materials Resource Protection Strategy, formulated by the State Planning Commission in 1988 to prevent the sterilisation of basic raw materials, recommended that the Maddington Quarry be designated a "Key Area", which means it is regarded as an area of regional importance from where the future supplies of raw materials will be sourced.

The Darling Scarp is the most prominent landform in the metropolitan area. It consists of granite outcrops, ridges, valleys supporting winter-flowing creeks, dolerite dykes, laterite screes and a lateritic crust on the western edge. Vegetation of the area of the proposed expansion varies widely owing to changing soil type and depth. Vegetation types represented include heaths, woodlands of marri and wandoo, and open forests of jarrah and marri. The area contains populations of a significant proportion of the Darling Scarp flora.

Owing to the good condition of much of the vegetation, the area of the proposed expansion has a high conservation value for flora and fauna, particularly as much of the Darling Scarp outside the metropolitan area has been heavily modified through human activity.

The long term development of the quarry is intended to allow rehabilitation of all exposed slopes visible from the coastal plain. Rehabilitation will include backfilling of mining benches to reduce the slope, establishing a vegetative cover on these slopes, and ensuring drainage is managed to prevent erosion.

Impacts from dust, noise and vibration from the proposed expansion will be required to conform to the parameters as specified in licences issued under the Environmental Protection Act.

A number of environmental issues were identified by the Environmental Protection Authority from its own assessment and as a result of submissions. This report makes recommendations for the mitigation of impacts and the adequate environmental management of the project.

Recommendation 1

The Environmental Protection Authority concludes that the proposal to expand the hard rock quarrying operation at the Maddington quarry is environmentally acceptable.

In reaching this conclusion, the Environmental Protection Authority identified the main environmental factors requiring detailed consideration as:

- **conservation value of the area of the proposed expansion;**
- **visual impact from the coastal plain;**
- **rehabilitation of the entire quarrying operation, including old and existing quarries;**
- **impacts associated with dust and noise; and**
- **drainage management to prevent sedimentation of streams.**

The Environmental Protection Authority concludes that the environmental factors mentioned above have been addressed adequately by either environmental management commitments given by the proponent or by the Environmental Protection Authority's recommendations in this report.

Accordingly, the Environmental Protection Authority recommends that the proposal as described in the Public Environmental Review could proceed subject to:

- **the Environmental Protection Authority's recommendations in this assessment Report; and**
- **the proponent's commitments to environmental management (Appendix 1).**

The Authority notes that during the detailed implementation of proposals, it is often necessary or desirable to make minor and non-substantial changes to the designs and specifications which have been examined as part of the Authority's assessment. The Authority believes that subsequent statutory approvals for this proposal could make provision for such changes, where it can be shown that the changes are not likely to have a significant effect on the environment.

The conservation value of the area of the proposed expansion needs to be taken into account during the planning of the proposed development. Therefore, in order to minimise the impact of the quarrying operation on local fauna, habitats of special significance such as the stream zones on the northern and southern sides of the proposed expansion need to be conserved.

Recommendation 2

The Environmental Protection Authority recommends that the proponent ensure there be no unacceptable detrimental effects from the operation on the streamline on the southern side and the easterly portion of the streamline on the northern side of the proposed expansion. Accordingly, prior to the commencement of the expansion development, the proponent should prepare and subsequently implement an environmental management programme for the protection of these zones and their exclusion from the effects of quarrying to the satisfaction of the Environmental Protection Authority in consultation with the City of Gosnells.

Recommendation 3

The Environmental Protection Authority recommends that within six months of the date of any environmental approval issued by the Minister for the Environment, the proponent submit and subsequently implement detailed ongoing rehabilitation plans for the whole quarrying operation to the satisfaction of the Environmental Protection Authority in consultation with the City of Gosnells. These plans should be reviewed on an annual basis.

Recommendation 4

The Environmental Protection Authority recommends that the proponent should be responsible for final decommissioning and removal of the plant and installations and rehabilitating the site and its environs. Accordingly, at least 12 months prior to final decommissioning the proponent should prepare and subsequently implement, a decommissioning and rehabilitation plan to the satisfaction of the Environmental Protection Authority in consultation with the City of Gosnells.

The Authority considers that any approval for the proposal based on this assessment should be limited to five years. Accordingly, if the proposal has not been substantially commenced within five years of the date of this report, then such approval should lapse. After that time, further consideration of the proposal should only occur following a new referral to the Authority.

1. Introduction

The Environmental Protection Authority has assessed a proposal by Boral Resources (WA) Limited to extend its existing Maddington quarry to include a third operational area between and to the east of the present quarry workings. This expansion would allow the quarry to have sufficient reserves for a further 90 years based upon current annual production.

The proposal was referred to the Environmental Protection Authority in August 1989. The level of assessment was set at Public Environmental Review owing to a number of factors including the location of the proposal within a System 6 area and the potential for visual impact from the proposed extension.

2. Project description

The Maddington quarry is located approximately 18km south-east of the Perth city centre in the foothills of the Darling Scarp (Figures 1 & 2). Similar quarry operations carried out by other companies are located to the north and south of the Maddington quarry on the Darling Scarp, which is the principal location for supplying hard rock to the metropolitan area.

Quarrying has been carried out at the Maddington location since 1962. The existing quarry operations consist of the following general procedures.

Prior to excavation the overburden is stripped and stockpiled. Rock is excavated by drilling and blasting along a series of benches generally 12m to 13m in height. The rock is then loaded into dump trucks and delivered via the quarry access road to the primary crusher.

Three crushing stages are available: primary, secondary, and tertiary corresponding to the increasing degrees of product fineness required. Crushed material is elevated to the screening plant where material is separated by size and gravity fed to aggregate storage bays at ground level. An aggregate washing plant is available for treating aggregate where customer specifications require this. Stored aggregate is loaded onto trucks from storage bays and deposited at the stockpile area ready for road transport delivery to concrete and asphalt production plants.

Fines from the crushing and screening stages are either used directly for construction and maintenance of internal roads within the site or sold as road base.

Water required for aggregate washing, the wet-mix operation and in dust suppression is obtained from intercepted surface water stored in the main storage dam and the reservoir in the base of the old quarry; and via a deep bore which pumps water into the storage dam.

The proposal for the quarry extension will be operated in the same manner as the existing operations.

The long term development proposal for the Maddington quarry centres on the establishment of a third operational area between and to the east of the present quarries. The proponent has specified the following advantages associated with the proposal:

- the work will be carried out such that a large proportion of the activity is shielded visually from the coastal plain;
- all excavated slopes that are ultimately visible from the coastal plain will be rehabilitated;
- the existing exposed rock faces of the old quarry workings that are presently visible from the coastal plain will eventually be removed exposing the rehabilitated slopes of the expanded workings; and
- in the future the existing crushing plant will be relocated into the base of the present quarry workings to further reduce visual impact and noise and dust emissions.

To allow implementation of the proposal it will be necessary for the proponent to gain access to land outside its existing ownership and leaseholding. The old quarry is on Location 677 owned by the City of Gosnells and leased to the proponent. The present quarry site is on land owned by the proponent and partly on Location 677 (Figure 2). The proponent intends to apply for a land exchange of Crown

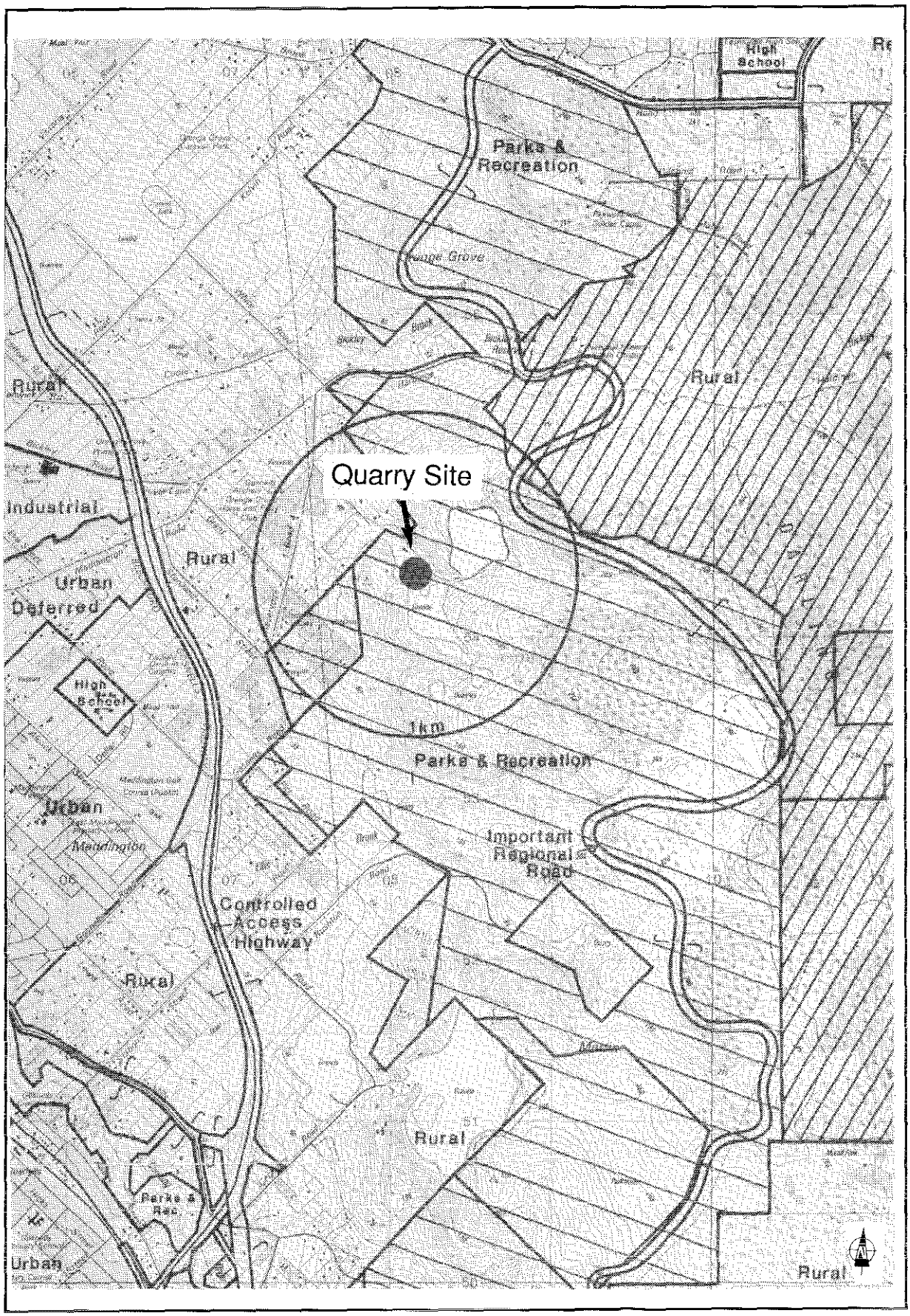

Figure 1: Location plan.

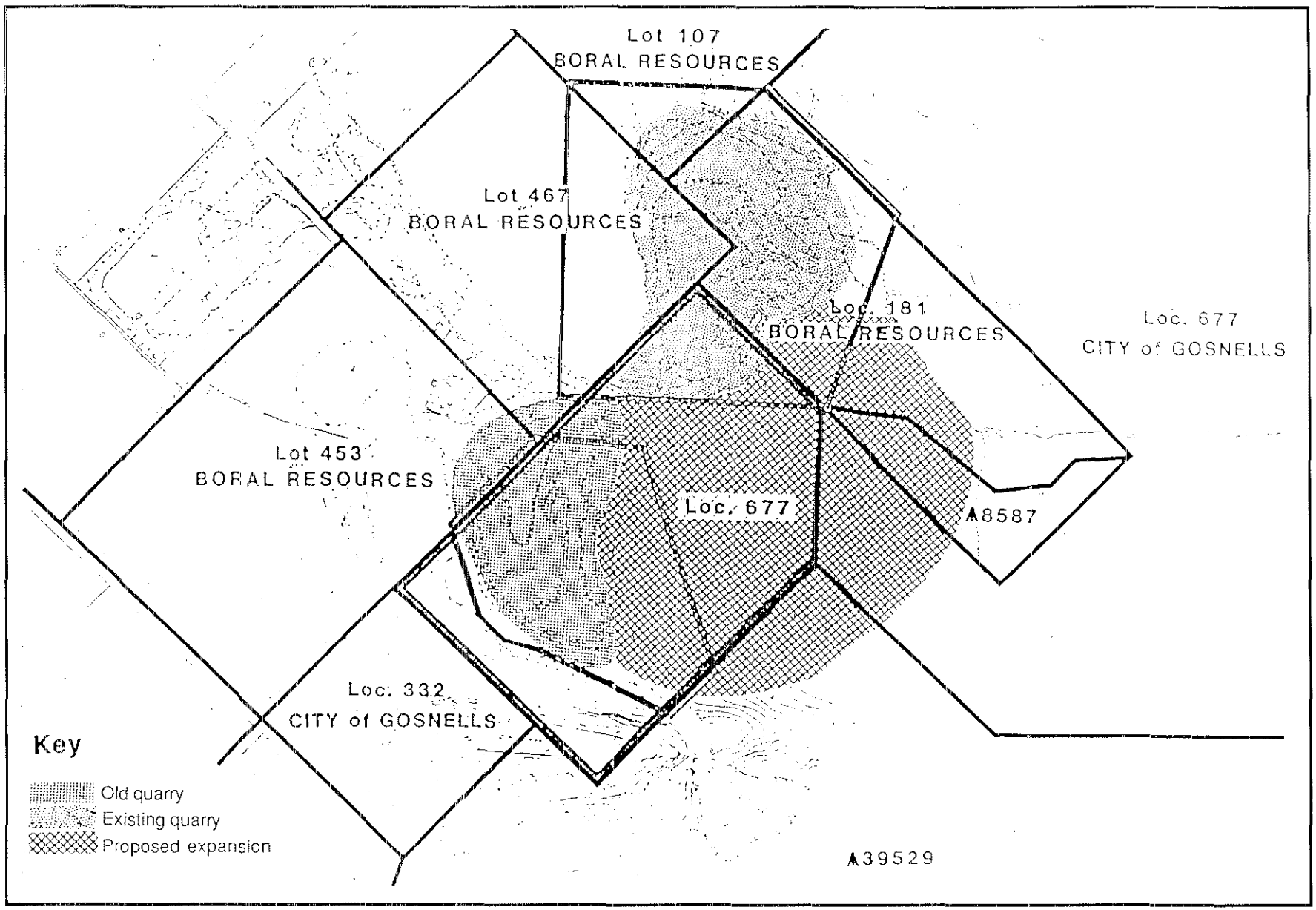

Figure 2: Land ownership

Reserve land for land owned by the proponent. The land exchange relates to portions of the following land:

i) Portions of Reserve 39529 (B class) which is vested in the City of Gosnells for Parks and Recreation; and

ii) Portions of Reserve 8587 (C class) vested in the City of Gosnells as Parklands; are to be exchanged for

iii) Portion of Lot 107 Hardinge Road owned by the proponent.

The proposed land exchange is included in the recommendations of the draft management plan for the proposed Ellis Brook Valley Reserve. This reserve is a proposed conservation and recreation reserve to be managed by the City of Gosnells.

Land exchanges concerning B class reserves are subject to approval by the Governor, whilst those concerning C class reserves require the approval of the Minister for Lands.

The site of the Maddington quarry is designated as a "Key Area" in the draft Basic Raw Materials Resource Protection Strategy. This strategy was formulated by the State Planning Commission in 1988 as a means of identifying important sources of basic raw materials in the metropolitan area to allow their protection from encroaching development. A "Key Area" is defined as a site of regional importance from where future supplies of raw materials will be extracted.

3. Existing environment

The Maddington quarry is situated in the foothills of the Darling Scarp which consists of granitic rocks with veins of quartz and dolerite. The surface of the Scarp consists of a cover of weathered rock with ferruginous and bauxite horizons in the upper zone forming a lateritic crust.

The valleys in the Scarp are deeply incised. The valley slopes are occupied by shallow red and yellow soils, and rock outcrop. The undulating uplands are dominated by sands with laterite on the ridges and gravels in shallow depressions. Wetlands and soaks are associated with the drainage lines which follow the steep valleys.

Soils covering the area of proposed expansion are sandy loams, eroded laterite profiles and clays derived from granite. The soil profile is shallow, overlying outcropping granite. Thicker soil profiles occur on slopes near drainage lines.

Shallow bores in the area supply small amounts of groundwater of variable but acceptable salinity. Deep bores yield moderate quantities of low salinity groundwater. The Maddington quarry sources saline water (1500mg/l) from a very deep bore. The base of the old quarry fills with runoff from the quarry and surrounds. This water seeps out the fractured base to recharge regional aquifers.

Surface water occurs in seasonal streamlines in valleys around the quarry. The area of proposed extension is bounded to the north and south by two streamlines which flow freely during winter. The northern streamline is intercepted by the present quarry, its flow maintained by roadside drains, which direct it into silt-traps then into the main storage dam, or the old quarry reservoir. Water flows from the dam into the natural drainage system. Its quality is comparable to that of the fresh water runoff entering the quarry workings.

The vegetation of the area of proposed quarry expansion is varied reflecting the variety of soil types and soil depths. It is quite complex with two groups of heaths, woodlands and open forest, various vegetation types associated with granitic outcrops and a herbfield associated with a seasonal damp/wet area. The vegetation is in good condition despite fires, grazing and quarrying. There are few weed species present.

The area contains viable populations of a significant proportion of the Darling Scarp flora. It is valuable to restricted species with limited distributions. The area has particular conservation value for those vegetation types developed on it, in addition to its value as a percentage of the remaining Darling Scarp vegetation complex.

Apart from a few specialised animals, the area of quarry expansion is a continuum with very little faunal definition between vegetation associations except where exposed granite or surface water favour certain species. No rare and endangered fauna were recorded, however some are potentially present.

The area of proposed quarry expansion has local and regional conservation significance as it acts as a refuge for species which have disappeared from the Swan Coastal Plain or which are under pressure in the Darling Range. The southern streamline is especially significant, being less exposed and more densely vegetated. Two species of specialised and threatened vertebrates occur in this area.

There are no significant ethnographic or archaeological Aboriginal sites located in the proposed area of expansion.

4. Environmental issues raised in submissions

There were 11 submissions made on the Public Environmental Review of the proposed extension to the Maddington quarry.

A summary of the issues raised is provided in Table 1.

The predominant issues of concern raised in the submissions were related to location of the quarry, visual impact, rehabilitation, dust and noise. The specific issues together with the proponent's responses are set out in Appendix 2 of this report.

Issue	Number of Submissions
Visual impact of the quarry	6
Rehabilitation of the quarry	5
Impact from dust and noise	5
Impacts on flora and fauna	4
Location of quarry	4
Traffic impacts	4
Land exchange	4
Dieback disease	1
Impact on water quality	2

Table 1: Summary of submissions

5. Environmental impacts and their management

5.1 General

Following consideration of the Public Environmental Review, submissions from the public and government agencies and the proponent's response to them, the Environmental Protection Authority has determined that the proponent has addressed the relevant issues associated with the proposed quarry expansion satisfactorily and that the consequent impacts can be managed. This environmental management can be achieved by a combination of the proponent's original and supplementary commitments and the Authority's recommendations.

Recommendation 1

The Environmental Protection Authority concludes that the proposal to expand the hard rock quarrying operation at the Maddington quarry is environmentally acceptable.

In reaching this conclusion, the Environmental Protection Authority identified the main environmental factors requiring detailed consideration as:

- **conservation value of the area of the proposed expansion;**
- **visual impact from the coastal plain;**
- **rehabilitation of the entire quarrying operation, including old and existing quarries;**
- **impacts associated with dust and noise; and**
- **drainage management to prevent sedimentation of streams.**

The Environmental Protection Authority concludes that the environmental factors mentioned above have been addressed adequately by either environmental management commitments given by the proponent or by the Environmental Protection Authority's recommendations in this report.

Accordingly, the Environmental Protection Authority recommends that the proposal as described in the Public Environmental Review could proceed subject to:

- **the Environmental Protection Authority's recommendations in this assessment report; and**
- **the proponent's commitments to environmental management (Appendix 1).**

The Authority notes that during the detailed implementation of proposals, it is often necessary or desirable to make minor and non-substantial changes to the designs and specifications which have been examined as part of the Authority's assessment. The Authority believes that subsequent statutory approvals for this proposal could make provision for such changes, where it can be shown that the changes are not likely to have a significant effect on the environment.

The Environmental Protection Authority considers that any approval for the proposal based on this assessment should be limited to five years. Accordingly, if the proposal has not been substantially commenced within five years of the date of this report, then such approval should lapse. After that time, further consideration of the proposal should only occur following a new referral to the Authority.

5.2 Conservation value

Maddington quarry is located on the Darling Scarp which is the subject of the Environmental Protection Authority's System 6 Recommendation M80. This recommendation, which proposes a Regional Park for the Darling Scarp, recognises the high conservation, recreation, and scenic values of the scarp. It also recognises the importance of the area as a source of hard rock supplies for the metropolitan region. However, existing quarries on the scarp are expected to operate in a manner that reflects the environmental values of the scarp especially conservation, recreation and scenic. This entails the need to limit the visual impact of quarrying and the rehabilitation of quarry sites after extraction is complete. Recommendation M80.4 states: "That the operators of quarries be required to produce assessments of the environmental implications of existing and future quarries and plans for their rehabilitation and restoration." The Public Environmental Review fulfills that recommendation.

The proposed quarry expansion is bounded to the north and south by two streamlines. The northern streamline is intercepted by the present quarry workings and will be further disturbed by the proposed expansion. The southern streamline will not be directly impacted but may suffer indirect effects on vegetation and fauna.

The streamlines are regarded as important areas to conserve because of the species diversity present both for flora and fauna and the specialised habitat they provide for faunal species. Such areas are poorly represented on the Darling Scarp, especially ones that have not been heavily modified.

Recommendation 2

The Environmental Protection Authority recommends that the proponent ensure there be no unacceptable detrimental effects from the operation on the streamline on the southern side and the easterly portion of the streamline on the northern side of the proposed expansion. Accordingly, prior to the commencement of the expansion development, the proponent should prepare and subsequently implement an environmental management programme for the protection of these zones and their exclusion from the effects of mining to the satisfaction of the Environmental Protection Authority in consultation with the City of Gosnells.

5.3 Rehabilitation and visual impact

An important aspect of the proposal is the progressive rehabilitation of the quarry to minimise the visual impact of the operation and to revegetate disturbed areas to provide stability and encourage the return of native fauna.

The existing exposed faces of the old quarry workings that are at present visible from the coastal plain will eventually be removed as the proposed development proceeds. For the bulk of the quarrying program the existing hillside will shield the new excavation from view. The removal of these faces will reveal the rehabilitated faces of the expanded workings.

The rehabilitation programme will incorporate the following methods:

- the excavation of rock faces that will be visible from the coastal plain with wide benches at approximately 13m vertical intervals;
- the backfilling of the benches with overburden material and topsoil to create a stable surface with 30^{o} slope (at 1 vertical to 1.7 horizontal) for rehabilitation purposes;
- the planting of seedlings or spraying of seed to give vegetation cover to the soil slopes using selected species that occur naturally in the vicinity of the quarry; and
- the control of drainage to ensure stable slopes are maintained and that natural drainage is catered for.

Rehabilitation of the quarry workings is regarded by the Environmental Protection Authority as an extremely important facet of the quarry operation and it is pleasing to note the proponent's commitment to rehabilitation (commitments in Appendix 1). The description of rehabilitation methods will need to be set out in greater detail by the proponent to allow constructive comment.

Recommendation 3

The Environmental Protection Authority recommends that within six months of the date of any environmental approval issued by the Minister for the Environment, the proponent submit and subsequently implement detailed ongoing rehabilitation plans for the whole quarrying operation to the satisfaction of the Environmental Protection Authority in consultation with the City of Gosnells. These plans should be reviewed on an annual basis.

Recommendation 4

The Environmental Protection Authority recommends that the proponent should be responsible for final decommissioning and removal of the plant and installations and rehabilitating the site and its environs. Accordingly, at least twelve months prior to final decommissioning the proponent should prepare and subsequently implement, a decommissioning and rehabilitation plan to the satisfaction of the Environmental Protection Authority in consultation with the City of Gosnells.

5.4 Dust and noise

As with all quarry operations dust and noise have the potential to adversely affect the lifestyle of the nearby residents. The measures described in the Public Environmental Review to minimise the impact of dust and noise are regarded as satisfactory and conform to the conditions generally specified in Environmental Protection Authority licences for control of emissions.

The relocation of the crushing plant into the base of the present quarry during stage 2 of the development (11 to 20 years time) will reduce the contribution of noise levels off-site from this source.

5.5 Traffic impact

The proposal to expand the quarry is not intended to result in any increase in production owing primarily to there being no increase in the anticipated level of demand for the product. Therefore, there will be no increase in truck traffic from that which presently exists.

5.6 Dieback

The vegetation and flora report that was carried out for the project found no evidence of dieback in the area of the quarry.

5.7 Impact on water quality

Owing to the increased area of disturbance the potential for an increase in the turbidity loading to the northern stream is likely. This stream flows only during winter when it is intercepted by the present quarry workings and directed via drains to the main storage dam. All internal drainage from the quarry flows into the storage dam. Overflow from the dam flows into the natural drainage system associated with Bickley Brook. At present water in the storage dam is of acceptable quality.

The need for water quality criteria to be specified for water being discharged from the site will be examined by the Water Authority. If controls are required they will be exercised through the Environmental Protection Authority licence for the quarry.

5.8 Land exchange

The land owned by Boral which is the subject of the proposed land exchange is undisturbed bushland situated to the north of the present quarry and fronting Hardinge Road. The location of this land will make it more accessible for the purpose of recreation than the two reserves which are the subject of the land exchange and managed by the City of Gosnells.

5.9 Social impact

The Boral Resources PER was prepared without specific requirements relating to social impact and public participation and consultation being issued. Guidelines were issued before the Social Impact Unit was fully operational. However, the proponent did revise its documentation following discussions with the Social Impact Unit. Potential social impacts, both positive and negative, have been investigated by the proponent ie dust, noise, traffic, hours of operation and adequate management measures have been proposed.

The proposed relocation of the crushing and screening plants should diminish (over time) existing nuisance effects on residents.

The proponent has in recent years undertaken consultation with local residents, and its commitments to extend consultation and monitoring are supported.

5.10 End use

A number of submissions from the public review were concerned at the potential use of the quarry as a waste disposal site at some time in the future. The Environmental Protection Authority is not prepared to make a judgement on the acceptability of such a proposal at this time— it would be subject to the normal environmental assessment process if it became a firm proposal.

6. Conclusion

Following assessment of the of the Boral Resources proposal for an extension of the Maddington quarry the Environmental Protection Authority has concluded that the proposal is environmentally acceptable subject to the operation being carried out in accordance with the commitments in the Public Environmental Review, the proponent's additional commitments and the recommendations of the Environmental Protection Authority.

Appendix 1

Summary of proponent's commitments

PROPONENT'S COMMITMENTS

The proponent undertakes to operate the proposed Maddington quarry according to the conditions of the licence to quarry to be issued by the Pollution Control Division of the Environmental Protection Authority as required by the Environmental Protection Act 1986 (see Appendix C).

The proponent will minimise all foreseeable impacts by modification of standard quarrying methods and implementation of ameliorative measures. Management programmes will be designed to fulfil this obligation by controlling impacts to within acceptable limits.

. **Clearing**

The proponent will minimise all clearing of native vegetation required for the proposed extension of the Maddington quarry.

The proponent is committed to recovering the maximum amount of topsoil possible from cleared areas prior to quarrying. This material and associated vegetative material will be stockpiled for later use in the rehabilitation programme.

. **Rehabilitation**

The proponent is committed to maintaining the current low profile of the Maddington quarry on the Darling Scarp. All quarry slopes visible from the coastal plain and local areas will be camouflaged as soon as practicable and fully rehabilitated in the long term.

The proponent is committed to development of revegetation techniques to provide vegetative cover and species diversity approaching that existing previously. This will involve further investigation into propagation, direct seeding, mulches, seed species mixes and application rates. Propagation of rare flora species which will be affected by the quarry expansion will also be included in these investigations. If feasible, these species will be included in the rehabilitation programme.

. **Noise and Dust**

The proponent will resrict noise and dust emissions to within the limits required by the conditions of the quarry licence issued by the EPA. As new technology becomes available the crushing and screening plants and quarrying equipment will be upgraded. Such improvements will reduce noise and dust emissions.

The crushing plant will be relocated into the base of the present quarry when it is both convenient and appropriate. This will occur during Stage 2 (11 to 20 years) of the proposed long term quarry development.

. **Drainage**

The proponent is committed to maintaining surface water regimes surrounding the quarry. Drainage will be carefully controlled to prevent erosion problems associated with operation of the quarry. Preventative measures will include drainage control structures, stabilisation by planting, and mulch treatments. Drainage will be controlled by diversion channels and roadside drainage systems.

The proponent will monitor the quality of water leaving the quarry and undertakes to maintain the quality to the requirements of the EPA quarry licence.

Measures to maintain water quality will be similar to those in current operation, ie roadside drainage controls, silt traps, settling ponds and a reservoir from which water is re-used for dust control.

If monitoring of water leaving the quarry indicates that water quality does not meet the EPA licence requirements, these structures will be upgraded or new measures introduced as necessary.

. **Management, Monitoring and Reporting**

The proponent is committed to preparation of an Environmental Management Programme for the Maddington quarry prior to commencement of preparatory activities and quarrying in the proposed area of extension. This document will be approved by the EPA and will detail management plans for rehabilitation, noise/dust emissions, fire control and the biological environs etc.

The proponent undertakes to conduct monitoring programmes of both physical and biological aspects of the quarry operations in order to assess their impact. Monitoring will facilitate review and refinement of the management techniques employed.

The proponent will submit annual reports to the EPA detailing the results of the monitoring programmes and progress of the Environmental Management Programme.

. **Community Liaison**

Boral Resources staff will be available to respond to queries and problems raised by the local community. Every effort will be made to resolve any issues which may arise and records will be kept of all enquiries and complaints to facilitate this. The quarry staff will be available for consultation and site inspections by council staff at any time. Past practice of inviting City of Gosnells Councillors to inspect the quarry and rehabilitation areas on an annual basis will be continued and extended to include residents in the vicinity of the quarry.

Appendix 2

Proponent's response to submissions

PUBLIC ENVIRONMENTAL REVIEW
LONG TERM DEVELOPMENT OF
MADDINGTON QUARRY - JUNE 1990

PROPONENT'S RESPONSES
TO GOVERNMENT AND PUBLIC SUBMISSIONS

OCTOBER 1990

1. RESPONSES TO GOVERNMENT SUBMISSIONS

WATER AUTHORITY OF WESTERN AUSTRALIA

Question 1.

The report contains no detailed information with regard to the treatment and management of wastewater discharge from the mechanical workshops and laboratories.

Response 1.

The current quarrying activity is a controlled and licensed operation. Wastewater is not treated prior to discharge, although this discharge is controlled by way of baffles, silt-traps and storage dams. These controls serve to regulate the discharge, ensuring the wastewater has adequate retention time to clear prior to discharge to the storage dam.

The discharge from the storage dam is minimal as the wastewater is recycled for dust control. This control is efficient and adequate and no changes are proposed.

The proponent is currently revising management of liquid wastes discharged from the mechanical workshops. Matters being considered are design of grease traps for disposal of waste oil and bunding for storage areas, particularly oil tanks. This is an ongoing quarry management issue and will not be affected by this proposal.

Question 2.

The proponent undertakes to maintain the quality of water leaving the quarry to the requirements of the EPA quarry licence. However, the current EPA licence does not contain water quality criteria. Therefore the matter of an expanded EPA licence with additional conditions on the quality of water leaving the quarry and wastewater management should be addressed by the EPA.

Response 2.

The quarry is not currently required to maintain the quality of water leaving the quarry in accordance with water quality criteria.

WAWA assesses the operational performance of hard rock quarries in respect to discharge water quality through requiring appropriate site engineering rather than by monitoring water quality against regulatory standards (refer Section 5.2.2).

The quality of water prior to leaving the quarry does compare favourably with that of water entering the quarry (refer Table 6.1), indicating that the water quality controls currently operating at the quarry are adequate. Therefore the existing management procedures and wastewater quality controls will be continued for the proposed development (refer Section 10.4).

Question 3.

Abstraction of groundwater could require a licence from WAWA as the site may fall within the Perth Groundwater Area.

Response 3.

As far as the proponent is aware, the site does not fall within the Perth Groundwater Area. The need for a Groundwater Extraction Licence will be determined by the proponent should further abstraction of groundwater supplies be deemed necessary in the future.

WESTERN AUSTRALIAN MUSEUM

Question 4.

Page xi indicates that the extreme diversity and conservation value of the area will be lost if the project goes ahead. Therefore the project should be relocated to alternative sites that are not of such biological significance.

Response 4.

The PER addresses the options of alternative sites and explains the reasons for adopting the proposed option (refer Section 3).

Although the vegetation to be cleared is extremely variable it is only a part of the considerable variation along the Darling Scarp. The area to be disturbed is of conservation value due to the variety of particular vegetation types developed on it, rather than the value as simply a percentage of the available remaining resource.

Question 5.

Approval for the proposal should not be granted until recommendations for the region are finalised.

Response 5.

Recommendations contained in the Ellis Brook Valley Regional Park report were framed around the proposal in the PER. Members of the Ellis Brook Committee have been given a presentation and explanation of this proposal and has accepted its contents.

Question 6.

Two minor errors appear on p38 and p77. The Southern Brown Bandicoot is misspelt and recent studies indicate that this species is not habitat specific but common on the Darling Scarp.

Response 6.

These errors have been noted. The correct spelling of the species name is Isoodon obesulus.

DEPARTMENT OF PLANNING AND URBAN DEVELOPMENT

Question 7.

The department may support the proposed land exchanges and would recommend that they be negotiated in detail. The details and agreement should form part of the approval process.

Response 7.

The PER contains a number of options for resolving current land ownership boundaries. The final arrangements will be the subject of negotiations between the proponent and the City of Gosnells.

Question 8.

The department is concerned with the visual impact of the proposal and the successful rehabilitation of the old quarry areas. Some initial screening would be essential on the western slopes well in advance of the quarry extension.

Response 8.

The visual aesthetics of the quarry expansion formed a major part of the proposal and its development planning. The operation of the current quarry and the proposed initial excavations have all been planned to minimise visual impact. Development of the quarry extensions will be accompanied by detailed planning of visual barriers similar to the present operations and designed to at all times minimise their aesthetic impact.

Question 9.

Rehabilitation techniques and initial plantings need to be monitored by the appropriate authorities to assess the success of rehabilitation and enable review of rehabilitation techniques.

Response 9.

Monitoring and review of the rehabilitation programme by Mr Malcolm Trudgen is already under way with annual reports made available to the City of Gosnells. Plant survival is closely monitored and planting density and species diversity are being progressively extended as the programme develops.

CITY OF GOSNELLS

Question 10.

The quarry is located in Orange Grove and not Maddington as advertised.

Response 10.

This error is accepted. The proposal was readvertised to the public under the heading "Long Term Development of Orange Grove Quarry".

Question 11.

The council would be desirous of seeing controls relating to the rehabilitation of the quarry incorporated into its extractive industry licence that must be issued on an annual basis.

Response 11.

It is envisaged that the commitments in the PER will form the basis of controls to be incorporated into the extractive industry licence.

Question 12.

The council suggests that operational and planning issues will require a management plan that addresses staged development tied to a rolling rehabilitation programme which will be tied to an extractive industry licence.

Response 12.

The proponent is already operating under a 21 year management plan for the existing quarry and would be amenable to the adoption of a similar approach for the proposed quarry extension using the PER commitments as a basis for that plan.

SOCIAL IMPACT UNIT

Question 13.

When will local residents start to experience the "benefits" associated with reduced noise and dust levels (Section 2.2)?

Response 13.

The reference concerns the proposed relocation of the crushing and screening plants. The timing of the relocation is dependent on the introduction of new equipment and availability of a suitable area in the base of the existing quarry. The proponent will implement the relocation as soon as practicable.

Question 14.

Who were the local Aboriginal people consulted and on what issues was advice sought (Section 6.10)?

Response 14.

Consultants in Aboriginal Heritage liaised with key Aboriginal people in the area about the ethnographic (and archaeological) significance of the site. Four knowledgeable Aboriginal people were contacted about the ethnography of the area. One individual was available to inspect the area and to be interviewed. The identity of these individuals will remain confidential as required by the Aboriginal Heritage Act.

Question 15.

In what way does the blast monitoring programme affect the proponent's design and control procedures (Section 6.12.2)?

Response 15.

The monitoring results are used to compare performance against licence conditions. The data base is used to refine blast hole patterns, charge rates and delay timings to ensure a high degree of assurance regarding compliance with blast performance criteria.

Question 16.

What ongoing monitoring does the proponent undertake in relation to noise impacts (backing beepers and bouncing empty trucks) and what mitigation measures are used (Section 6.12.3)?

Response 16.

The backing beepers are safety equipment and therefore a necessity. Operating times are arranged to minimise noise problems. Quarry maintenance programmes are designed to provide good standard quarry roads to minimise vehicle-bouncing as far as possible.

Question 17.

What noise mitigation measures will be used in the expansion?

Response 17.

The measures detailed in the previous response will be used in the proposed quarry extension. The noise impact of the quarry extension will be significantly decreased due to the greater separation distances involved.

Question 18.

What consultation is undertaken with local residents prior to periods of extended daily activity? What future consultation will be undertaken?

Response 18.

At present, local residents are not consulted prior to periods of extended daily activity. However, the proponent is very sympathetic to any complaints and always responds personally whenever any are received. The need for periods of extended activity in the future are anticipated to be very rare. If, after the proposed extension, the quarry needs to operate for extended periods in the future local residents who might experience adverse impacts will be personally advised and consulted. The quarry manager has a contact list of nearby residents to enable ongoing communication.

Question 19.

What measures are used to ensure minimal conflict with other road users, eg residents' cars (Section 6.14.3)?

Response 19.

The traffic survey counts were all carried out on public roads. All quarry traffic complies with normal traffic regulations and therefore does not unnecessarily conflict with other users.

Question 20.

What consideration has been given to impacts, eg dust and noise on users of adjoining land and how will these be managed (Section 6.15)?

Response 20.

Reference to the Ellis Brook Regional Park report indicates that no activities currently occur close to the quarry boundary. The deeper excavations of the proposed extension will minimise the impact of noise and dust. As occurs at present, blasting will be restricted to one blast once a week. Great care will be taken to control noise and dust during the early stages of the development.

Question 21.

When will local residents experience the lessening of existing impacts due to increase in the attenuation of both vibration and air blast (Section 9.9)?

Response 21.

In Stage 1 (years 1 to 10) of the proposed quarry extension a reduction of airblast and noise emissions is expected because of greater separation distances.

Question 22.

Who will undertake the suggested road improvements in relation to pedestrian safety? When will they be undertaken? What commitment does the proponent make in regard to these matters (Section 9.10)?

Response 22.

Maintenance and upgrading of road access to the quarry is the subject of ongoing arrangements between the proponent and the City of Gosnells. This will continue as a normal component of the quarry operations.

Question 23.

Who will seal the new permanent roads and when will they be sealed (Section 10.6)?

Response 23.

All roads internal to the quarry will be sealed by the proponent as soon as they are established as permanent features. All haul roads will be sheeted and waterbound.

Question 24.

Will the proponent consult with potentially affected residents before blasting if wind conditions are unfavourable? In what ways will any consultation be undertaken? What measures will be used to manage/minimise impacts?

Response 24.

No, the proponent feels such consultation would be inappropriate. Blasting presently occurs once a week at 4 o'clock on Thursday to minimise inconvenience to local residents. The quarry extension would operate in a similar fashion with blasts at regular intervals. Nearby residents will be advised of blasting schedules. The monitoring of noise and vibration levels and the use of sophisticated blast hole tracking equipment forms the basis of the management process and results are used to minimise the risks of exceeding licensed conditions.

Question 25.

Who will be advised of the results of the noise and vibration monitoring, and when will they be advised?

Response 25.

The results of the noise and vibration monitoring are currently submitted to the EPA Pollution Control Division every six months to ensure continuing compliance by the quarry operations to the EPA licence conditions (refer Section 6.12.2). This will continue to be done when the quarry is extended.

Question 26.

Who will undertake to review and upgrade the road system used by trucks travelling to and from the quarry? When will the review be undertaken? What commitments does the proponent make in regard to this?

Response 26.

Refer to Response 21.

2. RESPONSE TO PUBLIC SUBMISSIONS

Question 1.1

Quarries on the foothills of the Darling Range close to the Metropolitan Area should be curtailed and moved to suitable resource areas in close proximity to the Armadale to Bunbury railway line. This would allow the quarried material to be transported to processing plants closer to Perth for concrete manufacture and other end products.

Response 1.1

Given current community opposition to further development on the Darling Range, relocating the quarry to a site further south on the Darling Range was not considered to be a favourable option. Furthermore future planning for the Metropolitan Area will be for a southern residential corridor extending towards Armadale (refer Sections 3 and 5).

Question 2.1

Part of the quarry extension proposal utilises Crown Land whose purpose is for parks and recreation. The Basic Raw Materials Protection Strategy states that "extraction on land reserved for other purposes should only be permitted when considered to be in the community interest or when supplies are otherwise unavailable". How can this proposal satisfy either of the above criteria?

Response 2.1

The draft Basic Raw Materials Protection Strategy designated the existing Maddington quarry as a key resource site. The area of proposed extension and the justification for its development fulfil all requirements for its designation as a key area.

The draft Basic Raw Materials Strategy recognises that where a resource has important attributes in relation to quality, quantity and location, priority should be given to its extraction. The proposal certainly satisfies the above criteria in that provision of raw materials for building purposes is purely in the interests of the community; and supplies of this resource proximal to existing markets are scarce and in the majority unavailable due to planning, conservation and land use constraints.

Question 2.2

In terms of the land exchange the aggregate resource contained in the reserved land is a public resource and should not be given away to a commercial operator in exchange for land of no determined value.

What benefit does the community gain from the land exchange?

Response 2.2

Reserve 8587 is an irregularly shaped small island reserve with no apparent conservation value, public use or benefit, while the conversion of a small part of Reserve 39529 would provide a more rational boundary for the regional park.

The reserve land targeted by the proposal has no particular conservation value with respect to unique vegetation, flora, fauna or landforms. This land would not be available for use by recreationers if it remained part of the regional park as it is extremely steep and dangerous, and leads down into the original quarry. In comparison, the land offered by the proponent in exchange for the reserve land is of considerable value, being undisturbed bushland. Furthermore its terrain and vegetation would be of far more value as part of a regional park being more amenable to recreation purposes (refer Section 7.2.2).

Details of the land exchange or other means of utilising the reserve land for quarry purposes will be subject to negotiations with the City of Gosnells.

Question 3.1

The proposed extension has the potential to interfere with water catchment. How does Boral intend to protect the integrity of nearby catchment areas?

Response 3.1

Refer to Section 6.7. The quarry is not situated within a defined catchment area.

All water runoff and drainage which enters the quarry extension will be directed into the quarry drainage control system as is done presently. All water discharged from the quarry will go through silt-traps and the storage dam and will be of comparable quality to that of water entering the quarry.

Question 4.1

The quarry is an eyesore from the Swan Coastal Plain. From the information provided the most prominent part of the exposed old quarry will not be masked from view until the final stages of the quarrying operation in 90 years time. Are the public expected to put up with this eyesore for the next 90 years?

Response 4.1

If the current proposal is not accepted, the proponent would have to relocate the quarry, leaving the exposed walls of the old quarry to be visible for evermore. Detailed investigations into the rehabilitation of the old quarry walls (refer Section 1.2.2) has indicated that their removal is the only feasible option for their rehabilitation within the economic confines of a commercial operation.

Question 4.2

The Darling Scarp is the most prominent natural feature of the metropolitan area, for this reason the rehabilitation of the quarry to protect this viewscape needs to be carried out in a professional manner. The methods described in the PER do not seem very systematic but give the impression that as long as the quarry is screened that is all that is required. In fact the conservation values of the area are also important.

Response 4.2

The major objective of the rehabilitation of the present quarry and the area of proposed extension is a vegetative cover to blend the quarried slopes into the surrounding natural bushland. The rehabilitation programme will also aim for an adequate representation of the native flora, in order to return some of the conservation values to the area (refer Section 8.4).

The proposed rehabilitation procedures will follow the quarry operations according to a very tight schedule. Benches quarried in one year will be rehabilitated and planted the following year. Very careful programming will be required to meet this commitment. It is accepted that revegetation requires a few years to become effective. Thus camouflage and screening techniques will be important interim measures to ensure the backfilled slopes are not an eyesore on the Darling Range.

The proponent aims to recreate a vegetative cover of adequate diversity and density which will in the long term attain the area's present flora conservation and habitat value to some extent.

Question 4.3

The area of the proposed quarry extension is part of System 6 conservation area, at the very least the quarry operators should ensure that the diversity and richness of flora and fauna is not reduced by their commercial activities on an area of special conservation value.

Response 4.3

The diversity and richness of flora and fauna surrounding the area of proposed quarry extension will not be reduced by the quarrying operations. The area of extension will be the subject of an exhaustive rehabilitation and revegetation programme with the long term objective of recreating a vegetative cover of adequate diversity that will return the flora conservation and habitat to some extent.

Question 5.1

Dust control measures, particularly during summer, have been insufficient to prevent dust from being a nuisance to nearby residents in the past. How does the company propose to solve this problem from the existing operation and the extension?

Response 5.1

Additional dust suppression measures will be utilised to maintain off-site dust levels to as low as is reasonably practicable (refer Section 10.6). New permanent roads will be sealed and all haul roads sheeted and water-bound. All areas of activity in the quarry will be watered during operating hours. Where practicable the proponent will programme preparatory activities (clearing of vegetation and stripping of soil material) to be conducted outside summer months to reduce dust production.

Future relocation of the crushing plant will result in reduced dust emission from the quarry operation due to the surrounding quarry walls. Wherever possible plant equipment will be upgraded and new technologies incorporated to reduce dust emissions.

If feasible stockpile areas in areas subject to wind disturbance will be provided with tree screens. Stabilising treatments will be applied to exposed overburden stockpiles and slopes undergoing rehabilitation to avoid dust lift-off during dry windy periods.

Question 5.2

Dust from the operation is often worse during the night. Are roads and stockpiles damped down during the night as well as during the day to minimise dust from these sources?

Response 5.2

Roads are not damped down during the night. Stockpiles are provided with automatic sprinkler systems which operate twenty-four hours a day. To date, the quarry has received no complaints concerning dust at night.

Question 5.3

Encroaching urbanisation has the potential to create more conflict between the quarry residents particularly with regard to dust and noise. How will the quarry operator deal with this problem? How can the quarry expect to be able to operate for the next 90 years in close proximity to residential development?

Response 5.3

The Department of Planning and Urban Development's Preferred Strategy favours a rural buffer strip between the proposed urban area and the Metropolitan Park System along the scarp. This is identified as being east of the Tonkin Highway. Despite pressure to urbanise, maintenance of the existing semi-rural environment is most likely adjacent to the quarry in order to provide a buffer between the urban area and the Darling Scarp.

Question 5.4

Page 81 of the PER states that "there is some concern over pedestrian safety which may warrant consideration in upgrading some areas of the road system which experience a large proportion of the traffic use. What does the company intend to do to remove the danger to pedestrians, especially as the situation can only get worse with the proposed extension?

Response 5.4

Maintenance and upgrading of road access to the quarry is the subject of ongoing arrangements between the proponent and the City of Gosnells. This will continue as a normal component of the quarry operations.

It should be pointed out that the above situation will not worsen as the extended quarry operations will continue at the same level as at present.

Question 6.1

The incidence of dieback disease has not been mentioned in the PER does this mean there has been no survey carried out for the disease? Also what measures are planned to ensure that, if the disease does exist in the area, it will not be spread by activities associated with the quarrying operation?

Response 6.1

The vegetation and flora survey did not indicate the presence of dieback disease in the areas surrounding the quarry.

Question 7.1

Concern is expressed at the possibility of using the quarry at some future date as a rubbish disposal site. Apart from the environmental implications of the generation of toxic leachates from such a facility, it would reduce the impetus for the Gosnells Council to seriously examine alternative, more environmentally friendly methods of rubbish disposal, such as recycling and composting.

Response 7.1

The potential life of the quarry is up to 90 years. Potential end uses which may be feasible at that time are difficult to predict. There are a number of options for the quarry's end use, which include recreation and landfill. The final end use will be subject to discussion with the City of Gosnells who is the major land-owner.