

**Expansion of Reserve 41076 (quarry - shell grit)  
L'Haridon Bight, Shark Bay**

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**Shire of Shark Bay**

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

**Environmental Protection Authority  
Perth, Western Australia  
Bulletin 667  
December 1992**

#### THE PURPOSE OF THIS 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 report.

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

#### APPEALS

If you disagree with any of the contents of the assessment report or 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  
12th floor, Dumas House  
2 Havelock Street  
WEST PERTH WA 6000

#### CLOSING DATE

Your appeal (with the \$10 fee) must reach the Minister's office no later than 5.00 pm 29 December, 1992.

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COVER.*

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## Summary and recommendations

Shire of Shark Bay proposes to extend existing shell grit Reserve No. 41076 northwards to a total of 13.4 kilometres along the beach on the east side of L'Haridon Bight. The extended reserve would be about 197 hectares, more than 7 times its current size. The proposal includes a change in extraction method from digging pits to "harvesting" the top 0.3-1.6 metres of shell grit.

Reserve No. 41076 is vested in the Shire of Shark Bay for the purpose of "Quarry (Shell Grit)" and is situated approximately 50 kilometres south-east from Denham (see Figure 1). The reserve is located on vacant Crown land which is under the control of the Department of Land Administration and the subject of a pastoral lease.

Much of the Shark Bay area has World Heritage listing. The coquinites (sedimentary deposits with high concentrations of shell) are of a size and grandeur unequalled in Australia and occur at only one other location in the World – in South America. The picturesque beaches of the area are one of the significant values for which the Shark Bay area has gained international recognition by being included in the World Heritage Register. Also, the proposal is adjacent to the recently gazetted Shark Bay Marine Reserve which includes the full area of L'Haridon Bight up to the high water mark.

Following suggestions in the Shark Bay Region Plan (1988) to make the reserve less obtrusive, the Shire of Shark Bay considered three alternatives:

- 1) extend the boundary of the existing reserve northward approximately 7.3 kilometres to an existing shell bank spit;
- 2) extend the boundary of the existing reserve northward approximately 13.4 kilometres to the start of another large shell bank spit; or
- 3) open a new area on the western side of L'Haridon Bight.

The Shire proposed Option 2 due to the perceived long term advantages over Option 1 and the advantages of the continuation of the existing pit over Option 3.

The quarry extension proposal would provide shell grit to be used locally and also for sale outside the Shire. The end uses of the shell grit would include:

- using it locally as a dust suppressant on footpaths and parking areas and also for landscaping the surrounds of buildings;
- selling it for use in poultry farms outside the Shire to provide minerals for hardening egg shells; and
- making the shell into plant holders and pottery.

The quarry extension proposal was referred to the Environmental Protection Authority on 2 February, 1992. A Consultative Environmental Review (CER) level of assessment was set

The CER was released for public review from 4 August to 11 September, 1992. Seven submissions were made, none of which supported the proposed extension.

There were four main issues (with a number of sub-issues) of significance identified in the public submissions and by the Authority during the assessment of the proposal:

- potential impacts on hydrology, bathymetry and water quality;
- need for the expanded reserve;
- success of 'natural' rehabilitation; and
- potential compromise of World Heritage values.

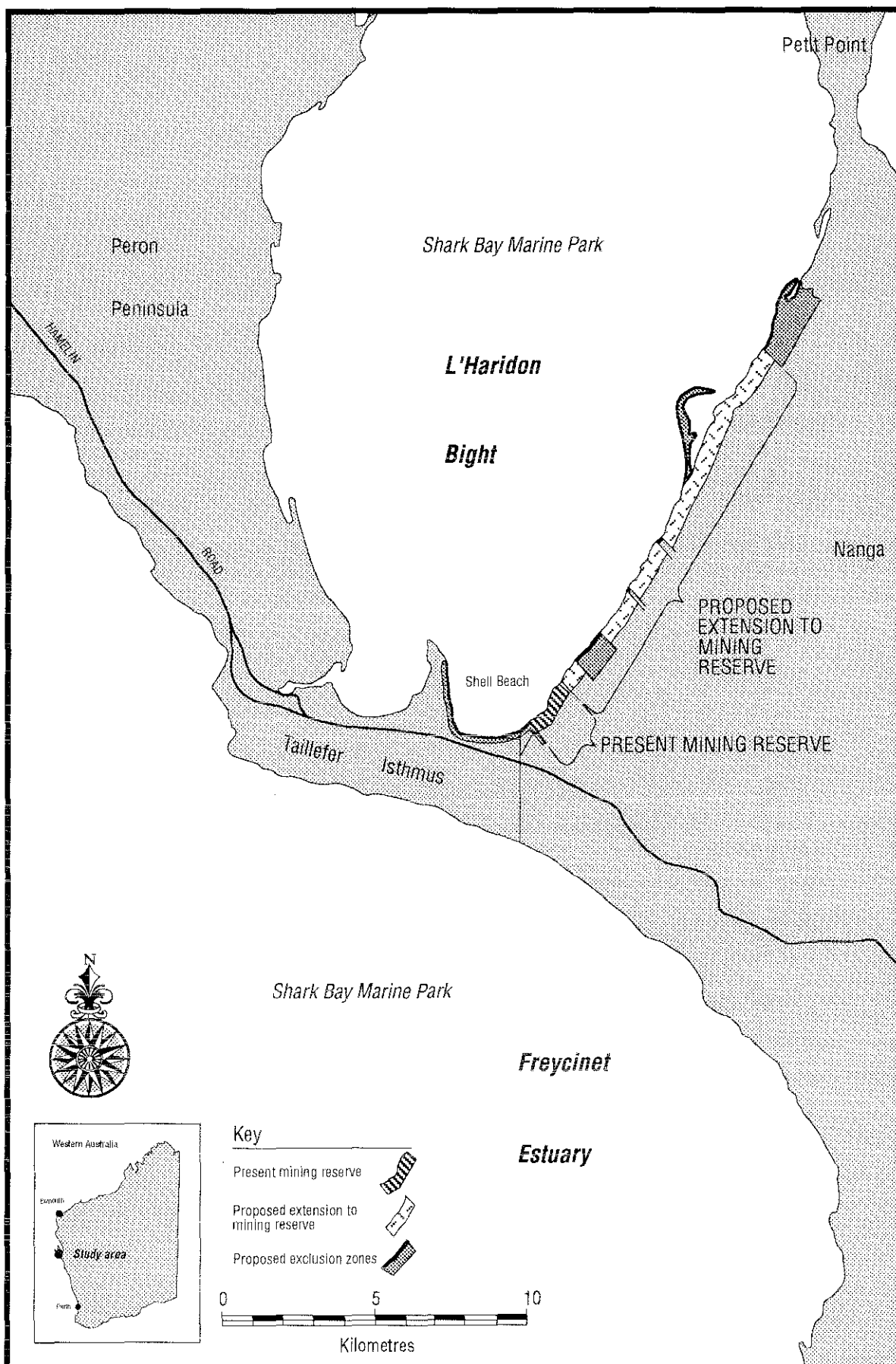


Figure 1: Location map.

The Environmental Protection Authority endorses the Shire of Shark Bay's proposal to implement the harvesting technique in place of the pit mining method and recognises that an increase in reserve area would facilitate the process. However, the justification for the whole area of the reserve extension and the shell replenishment rate have not been satisfactorily determined. The information provided in the CER is not adequate to support the document's contention that the whole area requested is needed to permit a change to the harvesting procedure.

The Environmental Protection Authority has recommended that the proposed expansion of Reserve No. 41076 should be considered in stages. At this time, 7.3 km of the proposed expansion of the reserve may be granted and the harvesting technique applied to the expanded reserve. If, following a review in five years time, the Environmental Protection Authority is satisfied that the quarry is being managed in an environmentally acceptable manner and the need for the reserve to be further extended is shown, then further expansion of the reserve could be considered.

Adherence to Environmental Management of Quarries: Development, Operation and Rehabilitation Guidelines (Department of Minerals and Energy, March 1991) would further ensure the quarry was managed in an environmentally responsible manner.

## **Recommendation 1**

**The Environmental Protection Authority concludes that the proposal to expand the reserve, as described in the Consultative Environmental Review, could be environmentally acceptable, in part (approximately 7.3 kilometres of the proposed extension).**

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

- ecosystem concerns;
- the need for the proposal; and
- rehabilitation.

**The Environmental Protection Authority considers that these and other issues have been addressed by either environmental management commitments given by the proponent or by the Environmental Protection Authority's recommendations in this report such that the proposal could be implemented in part.**

**Accordingly the Environmental Protection Authority recommends that the proposal could proceed in part, subject to:**

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

## **Recommendation 2**

**The Environmental Protection Authority recommends that in order to minimise impacts from the quarry, Reserve No. 41076 could be expanded northwards by approximately 7.3 kilometres to permit the harvesting technique to be implemented. Grant of any further expansion should be contingent on a successful review of mining operations, to meet the requirements of the Minister for the Environment, within five years of the grant of any additional reserve.**

### **Recommendation 3**

**The Environmental Protection Authority recommends that prior to mining, the proponent should design an environmental management programme to meet the requirements of the Environmental Protection Authority on advice from the Department of Conservation and Land Management. This programme should subsequently be implemented.**

### **Recommendation 4**

**The Environmental Protection Authority recommends that if more than 5000 tonnes of shell grit per year is proposed to be extracted from Reserve No. 41076, the extraction proposal should be referred to the Environmental Protection Authority.**

# 1. Project description and referral

The Shire of Shark Bay proposes to extend the existing shell grit Reserve No. 41076 northwards to extend to a total of 13.4 kilometres (km) along the beach on the east side of L'Haridon Bight. The average width of the extended reserve would be about 150 metres (m) and the total area about 197 hectares (ha), more than 7 times its current size. The proposal includes a change in extraction method from digging pits to "harvesting" the top 0.3-1.6m of shell grit.

Reserve No. 41076 is vested in the Shire of Shark Bay for the purpose of "Quarry (Shell Grit)" and is situated approximately 50 kilometres south-east from Denham (see Figure 1). The existing reserve of approximately 27 ha, is located on vacant Crown land which is under the control of the Department of Land Administration and the subject of a pastoral lease. It is situated on the Taillefer Isthmus on the north-west corner of the Nanga pastoral lease.

The shell is mined in two forms: shell grit and coquinite. Shell grit, the most common form, is loose shell. Shell grit is used for road building around Shark Bay and for manufacturing poultry food supplements. The less common form, coquinite, is consolidated shell material occurring in limited locations at the southern end of Hamelin Pool. Historically, coquinite was used as building construction material around Shark Bay. Coquinite mining is now strictly controlled and blocks can only be cut to repair existing shell block buildings. Reserve No. 41076 is for the purpose of shell grit extraction only.

The proposal indicated certain areas, such as vegetation zones and shell spits, would be excluded from mining activity. These exclusion zones would be clearly marked. Mining would extend to the high water mark. The proposed extension to Reserve No. 41076 would create an area of 139 ha available for mining. The Shire of Shark Bay would monitor the mining operations.

Currently, there are three local consumption cartage contractors and one contractor selling shell grit outside the Shire operating on the reserve. The local contractors are permitted to extract unlimited quantities of shell grit for use within the Shire. The shell is extracted using front end loaders and trucks. Records show that 671 tonnes (t) were extracted in this raw form by local contractors in 1991. The contractor permitted to sell the shell grit outside the Shire removed 437t in 1991. Before being transported to various destinations outside the Shire, the shell grit is extracted, sieved, graded and bagged on site. The Shire of Shark Bay stated there are no current intentions to alter the extraction quantity limitations but acknowledges that any significant operational change proposed (ie extraction greater than 5,000 t/yr) would require referral to the Environmental Protection Authority.

The proposal would provide shell grit to be used locally and also for sale outside the Shire. End uses of the shell grit would include:

- using it locally as a dust suppressant on footpaths and parking areas and also for landscaping the surrounds of buildings;
- selling it for use in poultry farms outside the Shire to provide minerals for hardening egg shells; and
- making the shell grit into plant holders and pottery.

The Department of Land Administration (DOLA) referred the quarry extension proposal to the Environmental Protection Authority on 2 February, 1992. A Consultative Environmental Review (CER) level of assessment was set.

## 2. Background to the assessment

Reserve No. 41076 was established in 1989 following a review in 1986 by the Environmental Protection Authority, the Department of Conservation and Land Management (CALM) and the Shire of Shark Bay into the operation of Reserve No. 36640 and its ultimate closure. The



reserve was originally established primarily to provide limited amounts of shell grit for use around the Shire as road construction material. The main concerns for the relocation were illegal, unsightly mining activities and the proximity of the original extraction operation to a popular tourist beach. It was relocated at that time away from the tourist beach.

Between 1981 and 1985 the Main Roads Department took considerable quantities of shell grit from Reserve 36640 for local road construction. The Main Roads Department stopped using the quarry in 1985 and reshaped the entire area before ceasing operations.

In 1983, a limestone quarry operator from Wanneroo applied to the Department of Minerals and Energy for a licence to extract large quantities of Coquina shell from the Hamelin Pool-Shark Bay area. The application was rejected by the Minister for Mines based on environmental concerns. Rare and sensitive stromatolites (algal bound sediments) grow on the Hamelin Pool side of the Taillefer Isthmus. Stromatolites are not found on the L'Haridon Bight side of the isthmus.

The current proposal is an attempt to minimise the visual impacts of the quarry. The proposal is made in response to the Shark Bay Region Plan (1988) strategies for mining and is based upon advice from the Department of Conservation and Land Management, the Department of Land Administration and the Environmental Protection Authority .

The proponent, the Shire of Shark Bay, considered three alternatives:

Option 1 Extend the boundary of the existing reserve northward approximately 7.3 kilometres to an existing shell bank spit.

Option 2 Extend the boundary of the existing reserve northward approximately 13.4 kilometres to the start of another large shell bank spit

Option 3 Open a new area on the western side of L'Haridon Bight.

The Shire of Shark Bay selected Option 2 due to the perceived long term advantages over Option 1 and the advantages of the continuation of the existing pit over Option 3.

## 3. Existing environment

### 3.1 Physical

The coquina deposits are a system of beach ridges and wind blown deposits of dead shells that lie over sedimentary deposits and occur around much of L'Haridon Bight and Hamelin Pool. The coquina deposits are up to 10 metres deep but generally are in the order of 3 metres. The main component of this coquina is the small, bivalve shellfish, *Fragum erugatum*. The abundance of the shell in these areas is a function of the animal's competitive advantage derived from its ability to survive and grow in the adjacent hypersaline waters.

L'Haridon Bight is a virtually "closed" hydrological system as it is separated from the open ocean by outer peninsulas and islands and internal shallow banks, peninsulas and islands. Over geological time, the restricted circulation and high evaporation of L'Haridon Bight has caused the water to be hypersaline, up to twice as salty as the sea. It is estimated that the deposits have been formed and accumulated at a rate of 1-10 cm/year over the 4,000 years that the hypersaline conditions have developed.

The shoreline beach deposits of the proposed extension do not have a diversity of "shell dune formations" or interesting geographical formations. Principally the beaches have consistent, level profiles with minor undulations except for the minor rocky headlands and shell spits. The reserve area is mostly unvegetated ridges of shell grit backed by coastal dunes supporting scattered tall acacia shrublands. The entrance road to the shell grit deposits is mainly confined to the shoreline areas, however, there are small sections that enter the fringe of the vegetation zone.

## **3.2 Biological**

The rich deposits of shell grit limit the diversity of habitat and are described in the CER as “a niche of low priority for animal habitats as well as flora representation”. There is no vegetation on the proposed mining area; however, shell grit deposits extend into the low dunes sloping toward the shoreline. These zones would be excluded from extraction activities. The beach ridges can be expected to play a role in the storage of rainwater and in controlling the nature of the coastal ecosystem. The ridges are believed to store fresh water which seeps out and mixes with the seawater in the intertidal zone.

## **3.3 Social**

### **3.3.1 Human use**

The main human use of the L’Haridon Bight area is tourism at Shell Beach. This is a popular stopping point on the only road access to Denham and Monkey Mia. The quarry entrance road is part of the station access and access is restricted to the site by a padlocked gate. Only the quarry contractors and the owner of the station have access to the site.

Commercial and recreational fishing do not usually occur along the shorelines of the proposal. The nearest habitation is 12 km to the south and on the other side of the Taillefer Isthmus from the Reserve.

### **3.3.2 Ethnographical/archaeological**

The site is not known to have any Aboriginal or European cultural significance.

## **3.4 Land use policies**

### **3.4.1 Shark Bay Region Plan**

The Shark Bay Region Plan, jointly published by the State Planning Commission (SPC) and the Department of Conservation and Land Management (June 1988), suggests that a less obtrusive approach to excavation should be undertaken. In response, the Shire of Shark Bay has proposed to replace the current “pit” extraction method with the “harvesting” method.

The Shark Bay Region Plan (1988) defined proposals for conservation areas. The recommendations relevant to this proposal are the Shark Bay Marine Reserve and the proposed Petit Point Nature Reserve. The recently gazetted Shark Bay Marine Reserve includes the full area of L’Haridon Bight up to the high water mark. The proposed quarry extension would abut the marine reserve which is managed by the Department of Conservation and Land Management. The Department of Conservation and Land Management has also indicated that management of the marine reserve includes a sanctuary zone which is adjacent to the proposed extension. The northern end of Petit Point has been recommended as a nature reserve, Nicolas Petit Nature Reserve. The proposed nature reserve would lie approximately 10 kilometres to the north of the proposed extended quarry reserve.

### **3.4.2 World Heritage Register**

The site of Reserve No. 41076 and the proposed extension, form part of a place entered in the Register of the National Estate as ‘Peron-Nanga Area’. This place essentially comprises Peron and Faure Stations and the northern part of Nanga Station, down to low water mark.

The national estate values of the area include the picturesque coquinite beaches of the Shark Bay area. These coquinites are of a size and grandeur unequalled in Australia and occur only at one other location in the World – in South America.

In its submission, the Australian Heritage Commission (AHC) stated:

“...given the Shark Bay is acknowledged as being of outstanding universal significance the Commission’s strong view is that disturbance should only be permitted where there is an established need for the development in question and it is possible to state with confidence that the proposed development would not have an adverse environmental impact.”

Ordinarily a management issue such as this in World Heritage areas would be considered by World Heritage management and consultative processes, however the agreed management structure and Commonwealth-State legislation are not yet in place in the Shark Bay World Heritage property. The existing Federal-State agreement would permit the mining activity on Reserve No. 41076 to occur in accordance with State legislation.

## **4. Public review**

The CER was released for public review from 4 August to 11 September, 1992. Seven submissions were received during the public review period, none of which supported the proposed extraction as described in the CER.

Submissions raised concerns about the impacts of the proposal on the hydrology, bathymetry and water quality of the area. L’Haridon Bight is a largely “closed” hydrological system and over geological time its waters have become unusually salty. This special ecosystem is potentially highly reactive to change. In order to minimise any adverse impacts of the proposal on the unique ecosystem, the rate of shell replenishment must be determined and the method of shell grit extraction managed properly.

Submissions questioned the need for an expansion of the reserve. The data provided in the CER stated that the current reserve resource is approximately 180,000t and the replenishment rate is 11,500 tonnes/year (t/yr) . If the proposed depth of harvesting (0.3-1.6m) was applied to the existing reserve and extraction continued at the current rate (1108 t/yr), the life of the current quarry without replenishment is likely to be in the vicinity of 100-20 years. If the shell grit was mined to depths of 0.3-1.6m at the rate of 5000 t/yr the existing quarry could last between 23 and 4 years.

Submissions stated that the shell replenishment rate is uncertain and that mining could have significant effects on the sensitive marine environment if the extraction rate significantly exceeded the replenishment rate. The CER indicated the proposed method of rehabilitation would be left to a natural reshaping of the beach as the shell is re-deposited over time. There is no data on the growth rate of *Fragum*, their breeding location, age or activity (CER Statement, February 1992, p.12). It cannot be stated with certainty that the shell resource is “self-replenishing” at a significant rate. The few available data suggest low rates of replenishment. It has been estimated that the shell deposits have formed and accumulated at a rate of 1-10 cm/year over the 4,000 years that the hypersaline conditions have developed.

Submissions suggested that any expansion of mining should not compromise the World Heritage values. Furthermore, the Shark Bay Region Plan (1988) notes that shell extraction and coquinite mining may continue under EPA guidelines to ensure that shell extraction is not excessive.

## **5. Environmental impacts and management**

### **5.1 Ecosystem concerns**

The special conditions existing in the hypersaline waters of L’Haridon Bight are the result of processes operating almost entirely within the bay. Over geological time a largely closed hydrological system, which is possibly highly reactive to change, has evolved. There are

approximately 200 kilometres of coquina shell beach occurring adjacent to the hypersaline habitats of Shark Bay. The CER notes that the proposed quarry would affect some 15.15 km of the approximately 200 km of coquina shell beaches in the Shark Bay region, or about 7.5% of those beaches.

The beaches and ridges play a role in buffering and preventing sedimentation from adjacent terrestrial areas and in maintaining the hydrologic regime. Any quarrying operations that reduce the volume of the beach ridges could have some impact on the hydrologic system. The proposed extraction quantity is not likely to significantly affect the hypersaline L'Haridon Bight as the proposed harvesting extraction method would not reach the level where water is stored.

All spits would be excluded from mining activities as they play an important role in the hydrodynamics of the area and any disturbance could alter the system. Likewise, removal of overburden and flora communities would not occur during mining activities. The marking of these exclusion areas would need to be substantial, eg: star pickets and wire fence, and flagging.

In order to control marine pollution, any spillage or leaks of fuels from machinery involved in the process would need to be managed appropriately. As the proposal includes a screening works, it would require a works approval and licence under the provisions of the Environmental Protection Act (Part V). Through these approvals, provision would be made to ensure that refueling and lubrication of machinery occurred in a properly managed location.

## **5.2 Need for the proposal**

The CER stated the proposal is necessary in order to change extraction methods from a pit approach to a shallow harvesting method. The proposal is made in response to the Shark Bay Region Plan (1988) strategies for mining and is based upon advice from the Department of Conservation and Land Management, the Department of Land Administration and the Environmental Protection Authority.

Although estimates of the shell resource in the existing reserve and the replenishment rate indicate there may be sufficient resource to meet local use requirements, the change of extraction method is expected to minimise the adverse environmental impacts of the quarry at the nominated extraction rate of 5000 t/yr. An increase in reserve area would permit thinner layers of shell grit to be removed than would otherwise be required in order to extract the same volume in a smaller area. The Shire of Shark Bay selected the proposed expansion area to "ensure the change would be "once-off" and that the process would not have to be repeated in the envisaged future".

The Shark Bay Region Plan (1988) notes that shell extraction and coquinite mining may continue under EPA guidelines to ensure that shell extraction is not excessive. In its submission the Department of Conservation and Land Management stated that "the proponents should be applauded for recommending a shallow harvesting technique over the traditional deep pits although there are reservations as to the ultimate depth of extraction which is acceptable".

Reserve No. 41076 should be large enough to provide shell grit for continued local use and to implement the shallow harvesting method. Based upon the data provided in the CER, Option 1 of the alternatives considered by the Shire, would meet these objectives. Option 1 proposed extending the boundary of the existing reserve northward approximately 7.3 kilometres to an existing shell bank spit. As 1991 was the first year when extraction volumes were recorded, review of the mining operations would permit the extraction and replenishment rates of shell to be checked prior to any future expansion of the reserve.

## **5.3 Rehabilitation**

The Shire of Shark Bay has proposed to use a shallow harvesting method of shell grit extraction so that the remaining deposit would finish at an appropriate contour and more shell could be deposited naturally on the beach. Pit extraction, the extraction method previously used, has proven both unsightly and difficult to control with rehabilitation being difficult.

Thus, the proposed method of rehabilitation of the expanded reserve would be a natural reshaping of the beach as the shell is re-deposited over time by wind and wave action. Considerable local variation in the replenishment rate is to be expected and shell shorelines in Shark Bay change according to weather cycles and cyclones.

Mining may have effects on the sensitive marine environment if the extraction rate significantly exceeded the replenishment rate. Given the area's World Heritage status it is important not to overestimate shell grit replenishment rate. An initial depth limit and proposed mined profile would be required including proper survey controls to show profiles before and after mining. Monitoring would be required to measure shell accumulation. Tourism is also potentially impacted by the proposal and the possibility of visual intrusion would be minimised by the proposed shallow harvesting technique.

The CER refers to the draft model By-Laws relating to Extractive Industries. These by-laws are relevant for extractive operations on private land, not vacant Crown land as in the case of Reserve No.41076. However, adherence to Environmental Management of Quarries: Development, Operation and Rehabilitation Guidelines (Department of Minerals and Energy, March 1991) is appropriate and would further ensure the quarry was managed in an environmentally responsible manner.

## **6. Conclusion**

The Environmental Protection Authority endorses the Shire of Shark Bay's proposal to implement the harvesting technique in place of the pit mining method and recognises that an increase in reserve area would facilitate the process. However, the justification for the area of the reserve extension and the shell replenishment rate have not been satisfactorily determined. The information provided in the CER is not adequate to support the document's contention that the whole proposed 13.4km extension to the reserve is required to permit the harvesting procedure to proceed.

Any expansion of mining in the Shark Bay area need not compromise World Heritage values if it is properly managed and should be in keeping with the Shark Bay Region Plan (1988). Therefore, the Environmental Protection Authority recommends that the proposed expansion of Reserve No. 41076 should be considered in stages. At this time, 7.3 km of the proposed expansion of the reserve may be granted and the harvesting technique applied to the expanded reserve. If, following a review in five years time, the Environmental Protection Authority is satisfied that the quarry is being managed in an environmentally acceptable manner and the need for the reserve to be further extended is shown, then further expansion of the reserve could be considered.

Adherence to the Environmental Management of Quarries: Development, Operation and Rehabilitation Guidelines (Department of Minerals and Energy, March 1991) would further ensure the quarry was managed in an environmentally responsible manner.

### **Recommendation 1**

**The Environmental Protection Authority concludes that the proposal to expand the reserve, as described in the Consultative Environmental Review, could be environmentally acceptable, in part (approximately 7.5 kilometres of the proposed extension).**

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

- ecosystem concerns;
- the need for the proposal; and
- rehabilitation.

The Environmental Protection Authority considers that these and other issues have been addressed by either environmental management commitments given by the proponent or by the Environmental Protection Authority's recommendations in this report such that the proposal could be implemented in part.

Accordingly the Environmental Protection Authority recommends that the proposal could proceed in part, subject to:

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

## **Recommendation 2**

The Environmental Protection Authority recommends that in order to minimise impacts from the quarry, Reserve No. 41076 could be expanded northwards by approximately 7.3 kilometres to permit the harvesting technique to be implemented. Grant of any further expansion should be contingent on a successful review of mining operations, to meet the requirements of the Minister for the Environment, within five years of the grant of any additional reserve.

## **Recommendation 3**

The Environmental Protection Authority recommends that prior to mining, the proponent should design an environmental management programme to meet the requirements of the Environmental Protection Authority on advice from the Department of Conservation and Land Management. This programme should subsequently be implemented.

## **Recommendation 4**

The Environmental Protection Authority recommends that if more than 5000 tonnes of shell grit per year is proposed to be extracted from Reserve No. 41076, the extraction proposal should be referred to the Environmental Protection Authority.

## **7. References**

Shire of Shark Bay, August 1992. Consultative Environmental Review Statement, Expansion of Reserve No. 41076 (Quarry - Shell Grit), L'Haridon Bight, Shark Bay.

State Planning Commission & Department of Conservation and Land Management, June 1988. Shark Bay Region Plan.

Western Australia Department of Minerals and Energy, March 1991. Environmental Management of Quarries: Development, Operation and Rehabilitation Guidelines.

# **Appendix 1**

**Proponent's list of commitments**

# Appendix 1

## Shire of Shark Bay - List of commitments

The Shire of Shark Bay makes the following commitments in relation to the proposal:

Mining method will be changed from "pit excavation" to "layer harvesting";

No extraction will occur in the areas included in the exclusion list;

Exclusion sites will be clearly marked to restrict access and prevent extraction;

No overburden or flora communities will be removed;

Interesting deposit formations will not be disturbed;

No additional traffic will be generated as no increase in extraction quantities are proposed; and

No rehabilitation programme is detailed as the regeneration of the shell beach is expected to occur naturally according to wind and water action.



## **Appendix 2**

### **Summary of submissions**

**PROPOSAL:** Expansion of Reserve 41076 (Quarry - Shell Grit) L'haridon Bight, Shark Bay (566)  
**PROPONENT:** Shire of Shark Bay  
**SUBJECT:** Summary of public submissions

## **1 ECOSYSTEM CONCERNS**

- 1.1 What evidence is there that the requested extraction rate would not affect erosion of the beach and subsequently the L'Haridon Bight/Hamelin Pool marine ecosystem?
- 1.2 Do the beach ridges play a significant role in the storage of rainwater and subsequently in the control of the plant ecosystem of the beach ridges?
- 1.3 Would the mining of coquina shell prevent the natural expansion of vegetation along and/or onto the beach.

## **2 MONITORING AND MANAGEMENT**

- 2.1 What is the life of the proposal?
- 2.2 How would the proposed method of extraction be monitored to ensure layers removed are between 0.3-1.6 metres deep?
- 2.3 Who would determine what "interesting deposit formations" would not be disturbed and when would they be determined?
- 2.4 How would the mining equipment and service vehicles reach the portions of the proposed reserve that are separated from the current quarry by exclusion zones?
- 2.5 What is the possibility of spills or leaks of fuels from machinery involved in the process and what measures might be implemented to prevent such an occurrence or mitigate the impact thereof?

## **3 REHABILITATION**

- 3.1 The CER states that there is no need for rehabilitation because it occurs naturally. Has this been the proven result of past activities?

## **4 METHODOLOGY AND JUSTIFICATION**

- 4.1 The shell accumulation rate of 11,500 tonnes and the method used to determine this are questioned. There are arithmetic errors in the data presented in the CER (see p.14 particularly with respect to sectors 5, 6 and 7 of the proposed reserve).

How was the CER estimate of shell deposition 11,500 tonnes per annum derived?

- 4.2 The expanded reserve would be very large (8 or 9 times the size of the current reserve). If the shell is accumulating at 11,500 tonnes/year then why is such a large reserve necessary?
- 4.3 The Shark Bay Region Plan allowed for the continuation of the quarry if extraction was not excessive. The proposed increases in extraction (2 500 - 5 000 tonnes) would appear to be excessive in contrast to the Shire's 1991 tonnage given as 671 tonnes.  
What is the justification for the requested increase?

- 4.4 In 1983, a coquina shell exploration licence in the Hamelin Bay area was rejected by the WA Minister for Mines. One of the reasons for the rejection was the potential environmental effects removing shell deposits might have in depleting the beach store of shell.

How does this current proposal differ from the previous proposal that was rejected?

## 5 SOCIAL AND ETHNOGRAPHIC/ARCHAEOLOGICAL

- 5.1 Studies in other parts of Western Australia have found that Aboriginal sites may commence at sea level, or even extend out to sea. It is not possible to assess Tindale and Bowdler's statements as they are not listed in the sources and reference for the CER.

What is the detailed information on whether systematic studies have been undertaken to identify sites, on the area to be mined, of significance to Aboriginal people?

- 5.2 The expansion of the quarry operations by 11.4km would increase the area impacted upon and would thus have a greater affect on the area's aesthetics for tourism.

How would the proponent mitigate the impact of the proposal on tourism?

## 6 OTHER

- 6.1 The Department of Minerals and Energy has advised that Shire quarries can not be utilised for commercial purposes. Are commercial uses intended and if so, how does the Shire propose to reconcile the proposal with the Mines Act requirements?

SOURCE OF SUBMISSION	NUMBER OF SUBMISSIONS
Individuals	1
Community Groups	1
Government Departments	4
Academic Institutions	1

Total 7

## **Appendix 3**

**Proponent's response to submissions**

FAXED

THE SHIRE OF SHARK BAY  
Hughes Street, Denham  
Western Australia



P.O. Box 126, W.A. 6537  
Telephone (099) 481 218  
Fax: (099) 481237  
All communication to the Shire clerk

Your Ref: 1/90/18 (58328)

Our Ref: SH110

Facsimile: 09 3221598

Ms J Aberdeen  
Environmental Protection Authority  
38 Mounts Bay Road  
PERTH WA 6000

Dear Jane

ENVIRONMENTAL PROTECTION AUTHORITY	
27 NOV 1992	
File No. 1/90/18	Initials JAB

Re: C.E.R. - Expansion of Reserve 41076 (566) ✓

I refer to your letter dated 12th November, 1992 concerning the above.

The point that must be remembered, throughout the following responses, is that Council seeks to expand the Reserve to allow alteration of the existing method of mining to reduce the chance of environmental impact. Currently, a reserve exists for the purpose of quarrying, without any limitations. Sufficient resources exist in this reserve to satisfy existing and foreseen demand, even without natural replenishment. However, by changing the extraction method, this will not be the case.

Your numbering system will be used for the answers to the questions raised.

- 1.1 Erosion is not regarded as an issue in L'Haridon Bight due to the shallow waters and limited currents. Winds tend to shape the surface of the shell dunes, resulting in the "interesting formations" however the effect is minimal. Cyclonic action, in history, has resulted in the majority of movement of the shell ... in and out of the water.
- 1.2 Average rainfall varies around 250 mm with the most reliable rain falling in winter between May and July and a smaller, but significant amount, in summer between January and March. Large variations in annual rainfall occur from year to year. Annual evaporation is high at approximately 2,000 mm.

As indicated in the report, the beach ridges are devoid of vegetation probably due to the depth of the shell deposits and as such the limited ability for water to be stored. It is often possible to obtain very limited quantities at sea level in the shell. Extraction will not be taken to this level with the "harvesting" method.

- 1.3 Currently the beach is naturally devoid of vegetation. Mining will not interfere in any way with this. The bowgada scrub exists only on the red soil.
- 2.1 The proposal is not limited in any way in time. Shell mining has been occurring in the area since the early pastoral days. No restrictions apply to the existing Reserve. Nominal levels of extraction have been included in the C.E.R. indicating the level that, if exceeded, further evaluation would be required.

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- 2.2 The level of extraction layers is essentially restricted by the type of machinery used. However, monitoring would be done by the Shire of Shark Bay.
- 2.3 Once the Reserve was extended, the areas to be excluded from mining, including the "interesting deposit formations" would be pegged by the Shire of Shark Bay.
- 2.4 Currently, a station road exists just off the beach area. This road is visible in the bottom photograph on page 18. The road provides access to the full length of the proposed extension and onwards to Petit Point.
- 2.5 The photograph on page 20 indicates the full extent of machinery on site - tractor and generator. Trucks and loaders are bought in for extraction of shell for local consumption. The change of method of extraction will not effect the level of machinery.

Any fuel spills would be minimal in quantity and unlikely to be frequent. The affected shell would still be suitable for local use (but not for export for poultry farm).

- 3.1 History has shown that the beach rehabilitates naturally, particularly as a result of cyclonic action. The change to the "harvesting" style of extraction will assist this process as large open pits will not be left to refill.
- 4.1 The Extraction Plan on page 14 provides an indication of the available extraction quantities in the existing and proposed areas. The calculation errors noted in the insert are regretted. The correct figures for area 5 and 6 is 14,000 cubic metres or 9,500 tonnes. The correct totals (for the varying extraction depths) are 1,337,000 cubic meters or 893,100 tonnes. Similarly, the figure on page 2 is 571,500 tonnes (assuming extraction to 1.6 m). However, as these represent estimates, and the variation in the total is relatively insignificant, the errors take nothing away.

Of interest is that the area of the proposed expansion is approximately 535,000 m<sup>2</sup>. To achieve 18,500 cubic meters of shell, less than 4 cm would be required to be deposited overall. In practice, this obviously does not occur. From the photographs on page 19 the different profiles of the "before and after" shots reveal the true position. It was from this profile that the figure of 18,500 cubic metres or 11,500 tonnes (Item 4.1 page 7) was calculated.

- 4.2 The area proposed for expansion was selected to ensure the change would be "once-off" and that the process would not have to be repeated in the envisaged future. It is also noted the relocation of operations from (cancelled) Reserve 36640 within the last 3 years.
- 4.3 1991 was the first known recording of extraction volumes. Whilst it is not envisaged that the volumes would vary significantly from this figure, it must be noted that a contract exists allowing the export from the Shire of up to 2,500 tonnes per year.

Noting that no limitation currently exists on extraction volumes, it was appropriate that some measure be introduced. The figure of 5,000 tonnes chosen was seen as a level that, if exceeded, re-evaluation should take place.

- 4.4 The full details of the application (extraction areas and volume) and the reasons behind the rejection of the coquina shell exploration licence by the WA Minister for Mines in 1983 are not known. Certainly, little written information exists on the subject, a problem addressed to some degree in the C.E.R. report. This lack of information may have been the reason for the concern. It may also have been determined that one location (L'Haridon Bight) for this resource was sufficient. Similarly, the close proximity of the sea grass beds (dugong lap grounds) and the stromatolites may have been of concern. The Shire of Shark Bay did not support that application - possibly as their was to be no local benefit.
- 5.1 The information noted in the C.E.R. was obtained from C.A.L.M. You would be aware that the dissemination of this type of information is generally restricted. However, I am pleased to be able to provide details of two of the several reports existing on the subject. These are "Australian Archaeology" 30 (1990):46-57 and "P.F. Berry, S.D. Bradshaw and B.R. Wilson (Eds) 1990, Western Australian Museum, Perth.
- 5.2 The area proposed is virtually inaccessible to tourists. Whilst the coast can be seen from the "shell beach" tourist access point (cancelled Reserve 36640), any alteration to the landscape would be inconspicuous. Access to the site is through a locked gate.
- Any tourist approaching the area from the water would also have access to the rest of the coastline.
- 6.1 I understand that the Department of Minerals and Energy had concerns in relation to Shire quarries being used for commercial purposes but have since resolved their concerns internally.

I trust this further detail answers the questions raised.

Yours faithfully

  
M.G. Oliver  
SHIRE CLERK

25th November, 1992

