Aquaexport marine shell project

Le Mer Marketing and Consultancy Pty Ltd

Report and recommendations
of the Environmental Protection Authority

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Summary and recommendations

Le Mer Marketing and Consultancy Pty Ltd proposes to establish a land-based marine shell breeding facility at Downes Island near Port Hedland. This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment on the environmental factors and conditions relevant to the proposal.

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

Relevant environmental factors

Although a number of environmental factors were considered by the EPA in the assessment, it is the EPA's opinion that the following are the environmental factors relevant to the proposal, which require detailed evaluation in the report:

a) Coastal processes - Impacts on intertidal areas

b) Regional conservation values - Impact on recommended Class B reserve

c) Marine water quality - Discharge of effluent; and

d) Recreational use - Public access to island and foreshores.

Conclusion

The EPA has concluded that the proposal by Le Mer Marketing and Consultancy Pty Ltd to establish a land-based marine shell breeding facility to be located at Downes Island can be managed in an environmentally acceptable manner, provided that there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 3.

The EPA recognises the industry of specimen marine shell farming is in its early development and hence there is a lack of information on precise culture and feeding techniques. Therefore the EPA considers it appropriate that approval for the development of stage 1 be given initially and the development of stage 2 should only proceed after the proponent has demonstrated compliance with the water quality criteria detailed in the Water Quality Monitoring and Management Plan and developed an appropriate discharge water contingency plan if required.

The EPA advises that approval for this proposal does not imply other islands in the Pilbara area would be found suitable for aquaculture or other activities of a commercial nature.

Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister considers the report on the relevant environmental factors of regional conservation values, marine water quality, recreational use, and coastal processes as set out in Section 3.

2. That the Minister notes that the EPA has concluded that the proposal can be managed in an environmentally acceptable manner, provided the proponent can demonstrate compliance with the water quality criteria during stage 1, prior to the development of stage 2, and there is satisfactory implementation by the proponent of the recommended conditions set out in Section 4.

3. That the Minister imposes the conditions and procedures recommended in Appendix 3.

Conditions

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions which the EPA recommends be imposed if the proposal by Le Mer Marketing and Consultancy Pty Ltd to construct and operate a land-based marine shell breeding facility and residence on Downes Island, is approved for implementation. These conditions are presented in Appendix 3. Matters addressed in the conditions include the following:

(a) the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 3; and

(b) in order to manage the relevant factors and EPA objectives contained in this bulletin, and subsequent conditions and procedures authorised by the Minister for the Environment, the proponent shall demonstrate that there is in place an environmental management system which includes the following elements:

- environmental policy and commitment;
- planning of environmental requirements;
- implementation and operation of environmental requirements;
- measurement and evaluation of environmental performance; and
- review and improvement of environmental outcomes.

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1. Introduction and background

Le Mer Marketing and Consultancy Pty Ltd proposes to construct a land-based marine shell breeding and growout facility to be located at Downes Island near Port Hedland.

The proposal was referred to the EPA in November 1995 and the level of assessment was set at Informal Review with Public Advice. The level of assessment was upgraded to Consultative Environmental Review by the Minister for the Environment on appeal on 15 May 1996.

The Consultative Environmental Review document "Aquaexport Marine Shell Project, Port Hedland" (Le Mer Marketing and Consultancy Pty Ltd, 1997), hereafter referred to as the CER, was made available for public review for four weeks between 17 November 1997 and 15 December 1997. A copy of this document can be viewed at the DEP library.

Further details of the proposal are presented in Section 2 of this Report. Section 3 discusses environmental factors relevant to the proposal. Conditions and procedures to which the proposal should be subject if the Minister determines that it may be implemented are set out in Section 4. Other advice relevant to the proposal is in Section 5. Section 6 presents the EPA's conclusion and Section 7 the EPA's recommendations.

A list of people and organisations that made submissions is included in Appendix 1. References are listed in Appendix 2, recommended conditions and procedures and proponent's commitments are provided in Appendix 3 and the shell species to be used are listed in Appendix 4.

The DEP's summary of submissions and the proponent's response to those submissions has been published separately and is available in conjunction with this report.

2. The proposal

Le Mer Marketing and Consultancy Pty Ltd proposes to develop a land-based marine shell breeding facility and residence on Downes Island approximately seven kilometres west of Port Hedland (Figure 1). Trochus shells (*Trochus niloticu*), Pearl oysters (*Pteria penguin, Pinctada margaritifera, P. albina*) and a range of other native Australian shells will be bred at the facility (see Appendix 4). Trochus and pearl oysters will be grown-out off-site.

The project will be developed over six years commencing with fifteen 250 litre breeding tanks, a desalinator, residence for up to seven people, four raceway tanks, a reservoir tank, a rainwater tank, intake and discharge pipes and a generator or solar power unit. Figure 1 indicates the layout of the facility. Years 1 to 3 will involve the initial research period. The commercial scale hatchery and grow-out will be progressively developed through years 3 to 6.

The stock will be raised on naturally occurring algae in the tanks, small fish and shellfish species and sponges.

Seawater will be supplied to the tanks at a rate of approximately 2000 kL per day and will be filtered and passed through a settling tank prior to discharge to the ocean.

The main characteristics of the proposal are summarised in Table 1 below.

Table 1. Summary of key proposal characteristics

Element	Description
Life of project	On-going
Proposed lease area	6.5 ha
Area of disturbance: Stage 1- Research Stage 2- Commercial	 0.5 hectares 5.0 hectares
List of major components: Stage 1 • growing tanks • seawater intake system • discharge system • buildings Stage 2 • raceway tanks • growing tanks • specimen shell tanks	 15 x 250 L tanks 60 mm pipe extending 1 km offshore 60 mm pipe extending 200 m offshore Residence, laboratory, breeding house, desalinator / solar / wind generating units. 3 tanks, continuous flow through 6 x 250 L tanks 30 x 200 L aquarium tanks
Water requirements • fresh • seawater	 2000 L per day 2000 kL per day
Feed requirements	Algae 250 kg per year Sponge 100 kg per year
Chemicals	1 x 250 L maximum diesel fuel stored on site 100 kg per year chlorine

Since release of the CER the only modification to the proposal by the proponent is to extend the discharge pipe from 50 m to 200m offshore.

3. Environmental factors

3.1 Relevant environmental factors

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

The potential impacts of the proposal and identification of relevant environmental factors are summarised in Table 2.

It is the EPA's opinion that the following are the environmental factors relevant to the proposal, which require detailed evaluation in this report:

a) coastal processes - impacts on intertidal areas;

b) regional conservation values - impact on recommended Class B reserve;

c) marine water quality - discharge of effluent; and

d) recreational use - public access to island and foreshores.

The above relevant factors were identified from the EPA's consideration and review of all environmental factors (preliminary factors) generated from the CER document and the submissions received, in conjunction with the proposal characteristics (including significance of the potential impacts), the adequacy of the proponent's response and commitments, the effectiveness of current management and alternative approval processes which ensure that the factors will be appropriately managed. On this basis, the EPA considers that cyclone/flood management, marine fauna and vegetation, terrestrial fauna, terrestrial vegetation, declared rare flora, non-endemic species, translocation of non-endemic species, fuel and chemical storage, noise and dust control, solid and liquid waste management, heritage issues, decommissioning factors and other issues raised in the submissions do not require further evaluation by the EPA. The identification of relevant environmental factors is summarised in Table 2, and a summary of their assessment is set out in Table 3.

The relevant environmental factors are discussed in Sections 3.2 to 3.5 of this report.

3.2 Coastal processes

Description

Five species of migratory birds protected under the "Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment" (JAMBA) and "Agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment" (CAMBA) have been identified on Downes Island. Of these species, only one is known to favour the use of rocky reef habitat for feeding.

The installation of intake and discharge pipes across this intertidal area could potentially affect the use of this habitat by protected bird species.

The potential impact of the intake and discharge pipes on the intertidal and benthic communities was raised as a concern by CALM.

Assessment

The area considered for assessment of this factor is the intertidal areas in the vicinity of the intake and discharge pipes (refer to Figure 1).

The EPA's objective in regard to this environmental factor is to ensure that the construction of the pipeline does not adversely impact on important wildlife habitat of the intertidal area.

The Ruddy Turnstone (*Arenia interpres*) favours the use of tidal reefs, pools and weed covered rocks as feeding grounds (Pizzey, 1980). This facility will require the installation of two polypipes (63 mm and 100 mm) across the intertidal zone out to 200 m and 1000 m. The proponent has committed to burying the intake pipe to minimise the operational impacts on the intertidal area. The discharge pipe will follow the "low" ground (rocky pools and ridges) along the intertidal reef and will be secured at 10 m intervals, as shown on page 71 of the CER (Le Mer Marketing and Consultancy Pty Ltd, 1997). Approximately 3 km of similar rocky intertidal habitat occurs along the northern side of the island. It is unlikely that the installation of the pipes will significantly impact on the use of this habitat by the Ruddy Turnstone.

Having particular regard to:

(a) the small size of the intake and discharge pipes; and

(b) the extent of similar habitat on or around Downes Island,

it is the EPA's opinion that the proposal can meet the EPA's objective for costal processes.

3.3 Regional conservation values

Description

Downes Island along with a number of other islands between Cape Keraudren and Dixon Island have been recommended as Class B reserves in the EPA's "Conservation Reserves for Western Australia" (EPA, 1975) for the purpose of conservation of flora.

The island comprises vegetated coastal sand dunes with mangroves in an embayment on the southern side of the island and rocky intertidal area on the northern side. Department of Conservation and Land Management (CALM) has advised that weeds are present on the island and the proposed site is a sand hill habitat that is already degraded.

The proposal will require clearing of up to 5 ha of degraded dune vegetation with commitments for soil stabilisation of cleared areas and rehabilitation on decommissioning of the project.

The submission from CALM states that the island does have some conservation value but the reservation of the island for conservation/recreation and limited use for aquaculture are not mutually exclusive.

Assessment

The area considered for assessment of this factor is considered to be Downes Island and adjoining intertidal area.

The EPA's objective in regard to this environmental factor is to protect the environmental values of areas identified as having significant conservation value.

The land to be cleared consists primarily of degraded dune vegetation. Weeds and feral animals were recorded on the island during a survey by CALM in 1994. Despite the presence of feral animals, the survey revealed the island was relatively rich in reptile fauna in comparison to other Pilbara islands. The EPA is of the opinion that the loss of 5 ha of degraded dune vegetation from the (approximately) 310 ha island is unlikely to significantly impact on reptile populations.

The mangrove community, which occurs along the south-eastern side of the island, has been identified as an important faunal habitat and will not be disturbed by this project.

CALM has stated that in general it has no objection to the facility on Downes Island because the island is accessible to the mainland at low tide and hence quarantine is not a major issue. CALM does, however, stress that Downes Island is different to other Pilbara islands, where similar facilities would be opposed.

Five species of migratory birds protected under the "Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment" (JAMBA) or the "Agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment" (CAMBA) have been identified on the island. However these species primarily use mud flats, sand bars or rocky intertidal areas which are (with the exception of rocky intertidal areas) outside the area likely to be affected. Impact on intertidal areas was discussed in Section 3.2.

Having particular regard to the:

(a) degraded nature of the vegetation to be cleared;

(b) avoidance of disturbance to the significant mangrove communities;

(c) minor impact on migratory bird habitat; and

(d) commitments by the proponent for stabilisation or rehabilitation of disturbed areas,

it is the EPA's opinion that the impact of the proposal is not significant.

3.4 Marine water quality

Description

The proposal will require approximately 2000 kL of seawater per day. The water will pass through raceway tanks, growing tanks containing the shells and the hatchery tanks then settlement tanks and filtered through a micro-mesh screen prior to discharge to the ocean through the discharge pipes on the northern side of the island.

The species to be cultured will predominantly be fed on algae occurring naturally in the tanks. Therefore there will be no nett increase in nutrients from this source. Other feed will include small fish and shellfish for carnivorous shell species and small quantities of sea sponges.

The potential impact on water quality was raised as an issue in two public submissions.

Assessment

The area considered for assessment of this factor is considered to be the marine water within a 100 m radius of the end of the discharge pipe.

The EPA's objective in regard to this environmental factor is to maintain water quality consistent with the criteria specified for the protection of aquatic ecosystems in EPA Bulletin 711.

In assessing the potential impacts on discharge water quality the EPA recognised the formative stage of this type of industry in Western Australia and the lack of information on the feeding habits of many molluscs (Wilson and Gillett, 1971). The proponent has estimated the feed requirements of the stock at 250 kg of algae per year and 100 kg of sponges per year. The 'feed' concentrations within a 100 m radius 'mixing zone', assuming no feed conversion by stock, will be approximately 0.15 µg/L. This is well within indicative concentration values for the protection of aquatic ecosystems for coastal waters for nitrogen and phosphorus of 10 - 60 µg/L and 1 - 10 µg/L, as detailed in the draft Western Australian Water Quality Guidelines for Fresh and Marine Waters (EPA, 1993). Therefore nutrients and/or organic matter is unlikely to compromise the water quality criteria for the protection of aquatic ecosystems outside of the 100 m radius mixing zone of the discharge pipe.

The proponent will be required to undertake water quality monitoring with respect to the water quality criteria for the protection of aquatic ecosystems (as specified in EPA Bulletin 711) during stage 1 as the minimum acceptable criteria. Provided compliance with the required water quality criteria can be demonstrated, development of stage 2 can proceed with on-going monitoring for compliance with water quality criteria.

Having particular regard to the:

(a) the type of feed and estimated feeding requirements of shell species;

(b) the commitment to comply with water quality criteria specified in EPA Bulletin 711;

(c) the water quality monitoring of stage 1 to confirm compliance with water quality criteria; and

(d) the staged development of the proposal,

it is the EPA's opinion that the proposal can be managed to meet the EPA's objective for marine water quality.

3.5 Recreational use

Description

Downes Island has been identified by CALM as an important recreational area for the residents of Port Hedland. On the eastern side of the island, the combination of sandy beaches, no mangroves and little intertidal reef area, as occurs on the north east side of the island, provides recreational opportunities for Port Hedland residents that are uncommon in the region. A small number of shacks occur on the north eastern side of the island, refer to Figure 2 for location of the shacks.

The use of the island for commercial activities may be perceived as restricting access around or onto the island.

The construction and use of a consolidated sand access way from the shore to the facility was raised as a concern in the public submissions.

Assessment

The area considered for assessment of this factor is Downes Island and the public access routes to the island.

The EPA's objective in regard to this environmental factor is to ensure that the proposed aquaculture development does not have an adverse impact on the existing recreational use of the island for fishing, camping, swimming and access to the beach.

The proponent has provided a commitment to maintain uninterrupted public access along the foreshore.

The project site, approximately 6.5 ha, will have restricted access to prevent damage or theft of property and equipment. Given that this area is away from the popular recreational areas of the island and access along the foreshore will not be restricted, the existing recreational use of the island is unlikely to be affected.

Having particular regard to:

(a) the distance between the high recreational use areas of the island and the proposed facility; and

(b) the commitment to maintain uninterrupted public access along the foreshore,

it is the EPA's opinion that the proposal can meet the EPA's objective for recreational use.

4. Conditions

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

In developing recommended conditions for each project, the EPA's preferred course of action is to have the proponent provide an array of commitments to ameliorate the impacts of the proposal on the environment. The commitments are considered by the EPA as part of its assessment of the proposal, and following discussion with the proponent the EPA may seek additional commitments.

The EPA recognises that not all of the commitments are written in a form which makes them readily enforceable, but they do provide a clear statement of the action to be taken as part of the proponent's responsibility for and commitment to continuous improvement in environmental performance. The commitments, modified if necessary to ensure enforceability, then form part of the conditions to which the proposal should be subject if it is to be implemented.

The EPA may, of course, also recommend conditions additional to that relating to the proponent's commitments.

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions which the EPA recommends be imposed if the proposal by Le Mer Marketing and Consultancy Pty Ltd to construct and operate a land-based marine shell breeding facility and residence on Downes Island, is approved for implementation. These conditions are presented in Appendix 3. Matters addressed in the conditions include the following:

(a) the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 3; and

(b) in order to manage the relevant factors and EPA objectives contained in this bulletin, and subsequent conditions and procedures authorised by the Minister for the Environment, the proponent shall demonstrate that there is in place an environmental management system (EMS) which includes the following elements:

- environmental policy and commitment;
- planning of environmental requirements;
- implementation and operation of environmental requirements;
- measurement and evaluation of environmental performance; and
- review and improvement of environmental outcomes.

5. Other advice

On advice from CALM, the EPA further advises that, should this proposal be approved for implementation, this does not imply other islands in the Pilbara area would be found suitable for aquaculture or other activities of a commercial nature due to the high conservation value of the islands.

6. Conclusions

The EPA has concluded that the proposal by Le Mer Marketing and Consultancy Pty Ltd to establish a land-based marine shell breeding facility to be located at Downes Island can be managed in an environmentally acceptable manner, provided that there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 3.

The EPA recognises the industry of specimen marine shell farming is in its early development and hence there is a lack of information on precise culture and feeding techniques. Therefore the EPA considers it appropriate that approval for the development of stage 1 be given initially and the development of stage 2 should only proceed after the proponent has demonstrated compliance with the water quality criteria detailed in the Water Quality Monitoring and Management Plan and developed an appropriate discharge water contingency plan if required.

7. Recommendations

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister considers the report on the relevant environmental factors of regional conservation values, marine water quality, recreational use, and coastal processes as set out in Section 3.

2. That the Minister notes that the EPA has concluded that the proposal can be managed in an environmentally acceptable manner, provided the proponent can demonstrate compliance with the water quality criteria during stage 1, prior to the development of stage 2, and there is satisfactory implementation by the proponent of the recommended conditions set out in Section 4.

3. That the Minister imposes the conditions and procedures recommended in Appendix 3.

Table 2. Identification of relevant environmental factors

FACTOR	PROPOSAL COMPONENT WITH POSSIBLE IMPACT	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT ENVIRONMENTAL FACTORS
BIOPHYSICAL			
Coastal Processes	Seawater intake and discharge systems could potentially impact on dune system and intertidal zone.	CALM has previously provided approval for burying of pipes below the beach. CALM has however expressed concern at the potential impact on the intertidal area as it has been identified as an important bird habitat.	*Considered to be a relevant factor.*
Regional Conservation Values	Downes Island is a proposed reserve for Conservation, Recreation and Land Management, land clearing and operation of the facility could impact on the vegetation communities and fauna habitat of the proposed reserve.	The island was recommended as Class B reserve in EPA Red Book 8.6. CALM has previously reported that the island's conservation values should be protected through reservation. It was further reported that weeds are present but the island also has extensive areas of mangroves and supra-tidal flats. It was further reported that if the proposal were to proceed it would not significantly compromise the conservation values of the island as it would disturb a small area of already degraded sand hill habitat and would not impact on mangrove or other communities present.	*Considered to be a relevant factor.*
Cyclone / Flood Management	The construction of buildings and storage of fuel on site could result in damage to the marine environment if subject to flooding or storm surge.	The Town of Port Hedland advised all buildings are to be constructed to AS1170.2-1993 standards, a building application is required but no planning approval from the Town is needed.	All buildings required to be built in accordance with AS1170.2-1993 - Wind Loads for Region D Cyclonic areas. Fuel storage (about 200 l) will be in accordance with DME requirements. *Factor does not require EPA evaluation.*
Marine - Fauna and Vegetation	Construction and operation of the facility could impact on the extensive mangrove communities on the island.	CALM has identified the mangrove communities and intertidal areas as an important feeding grounds for migratory bird species.	Construction and operation of the aquaculture facility will be on the northwest corner of the island, the majority of mangrove communities occur along the southern side of the island. The proposal will not directly impact on mangrove communities. *Factor does not require EPA evaluation.*

Terrestrial - Fauna	Construction and operation of the facility could potentially impact on habitat, including the habitat of migratory bird species protected under international treaties.	CALM has recorded the presence of feral animals on the island. The clearing of 2.5 ha of degraded dune vegetation is unlikely to significantly impact on migratory bird habitat or feeding grounds. The loss of terrestrial habitat was not raised as a significant concern by CALM.	The degraded dune vegetation does not represent important feeding grounds or habitat for migratory birds. *Factor does not require EPA evaluation.*
Terrestrial - Vegetation	The clearing of up to 2.5 ha of vegetation will impact on the terrestrial vegetation.	CALM has previously reported that the island's conservation values should be protected through reservation. It was further reported that weeds are present but the island also has extensive areas of mangroves and supra-tidal flats. It was further reported that if the proposal were to proceed it would not significantly compromise the conservation values of the islands it would disturb a small area of already degraded sand hill habitat.	The vegetation to be cleared is well represented elsewhere in the Pilbara *Factor does not require EPA evaluation.*
Declared Rare Flora	The clearing of up to 2.5 ha of vegetation potentially could impact on DRF.	CALM has not identified the occurrence of any Declared Rare Flora on the island.	No Declared Rare Flora has been identified on the island. *Factor does not require EPA evaluation.*
Non-Endemic Species	The construction and operation of this facility could introduce non-endemic species to the island.	CALM has recorded the presence of feral animals and weeds and has not identified quarantine as an important issue as the island is accessible from the mainland during average low tides.	The feral animals and weeds have already established on the island. *Factor does not require EPA evaluation.*
Translocation of Non-Native Species	The escape of Zoila species could lead to their establishment in the wild.	Fisheries Western Australia manage the translocation of non-native species through the State.	Zoila tanks will be fitted with mesh filters. Zoila species are restricted to the cooler waters of southern Australia and can not tolerate the warmer waters around Port Hedland. *Factor does not require EPA evaluation.*
Disease management	The construction and operation of this facility could introduce or amplify disease to the natural environment.	Fisheries Western Australia require the preparation and implementation of a disease contingency plan.	The proponent has committed to the implementation of a disease contingency plan that includes daily monitoring for disease outbreak, tank isolation on disease detection, tank sterilisation and stock destruction if required. FWA monitor for compliance with disease contingency plan. *Factor does not require EPA evaluation.*

FACTOR	PROPOSAL COMPONENT WITH POSSIBLE IMPACT	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT ENVIRONMENTAL FACTORS
POLLUTION			
Fuel and Chemical Storage	Discharge of fuels or chemicals could impact on the terrestrial or marine environment.	The Town of Port Hedland has advised that all buildings should be constructed AS1170.2 standards and will require approval of Building Application prior to construction.	Up to 100 kg of chlorine will be used per year. This will be transported and stored in compliance with manufacturer's recommendations and local government requirements. Up to 250 L of fuel and oil will be stored on site in accordance with DME requirements. The proponent's commitments in regard to building standards and the building requirements of the Town of Port Hedland are considered sufficient to manage the potential environmental risk. *Factor does not require EPA evaluation.*
Noise and Dust Control	Construction and operation of the facility may impact on the recreational and conservation values of the island.		Some generation of dust may occur during land clearing. This will be temporary. Power will be generated by solar or wind with diesel as a backup generator so noise generation will be minimal. The nearest residence is approximately 7 km away. *Factor does not require EPA evaluation.*
Solid and Liquid Waste Management	The facility will generate solid and liquid waste that could potentially impact on the environmental values of the island.	The Town of Port Hedland has advised that it would favour the use of a 'standard' septic system to treat sewage waste. This would be suitable for up to 7 people.	All solid waste generated (packaging, damaged equipment, settling tank sludge etc) will be transported off-site and disposed to a suitable refuse facility. The use of a septic system is unlikely to impact on the marine or terrestrial environment of the island. *Factor does not require EPA evaluation.*
Marine Water Quality	The operation of the facility could potentially impact on the water quality in the vicinity of the discharge pipe.	The DEP requires the proponent to comply with the requirements of EPA Bulletin 711 for the protection of aquatic ecosystems.	*Considered to be a relevant factor.*

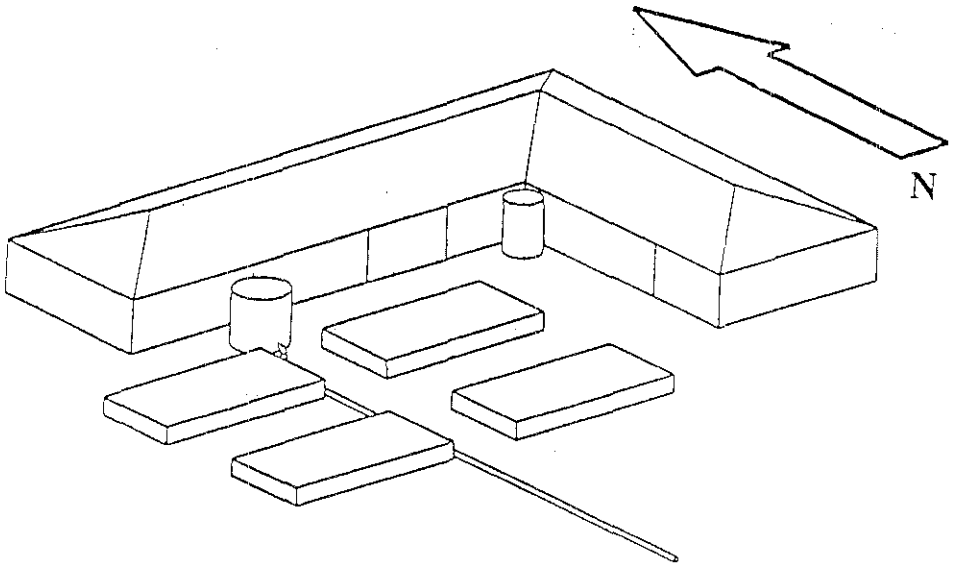
FACTOR	PROPOSAL COMPONENT WITH POSSIBLE IMPACT	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT ENVIRONMENTAL FACTORS
SOCIAL SURROUNDINGS			
Heritage Issues	The project could impact on Aboriginal heritage sites in the area.	The Aboriginal Affairs Department stated that a number of significant Aboriginal heritage sites occur on the mainland adjacent to the island. However they have stated that the heritage issues have been addressed.	This project will not impact on any identified Aboriginal heritage sites. *Factor does not require EPA evaluation.*
Recreational Use	The project could restrict access to the island or along the foreshore of the island.		*Considered to be a relevant factor.*
OTHER			
Decommissioning	If abandoned the infrastructure could pose a safety risk and have a visual impact on the island.		The proponent will be required to prepare and implement a decommissioning management plan prior to decommissioning operations. *Factor does not require EPA evaluation.*

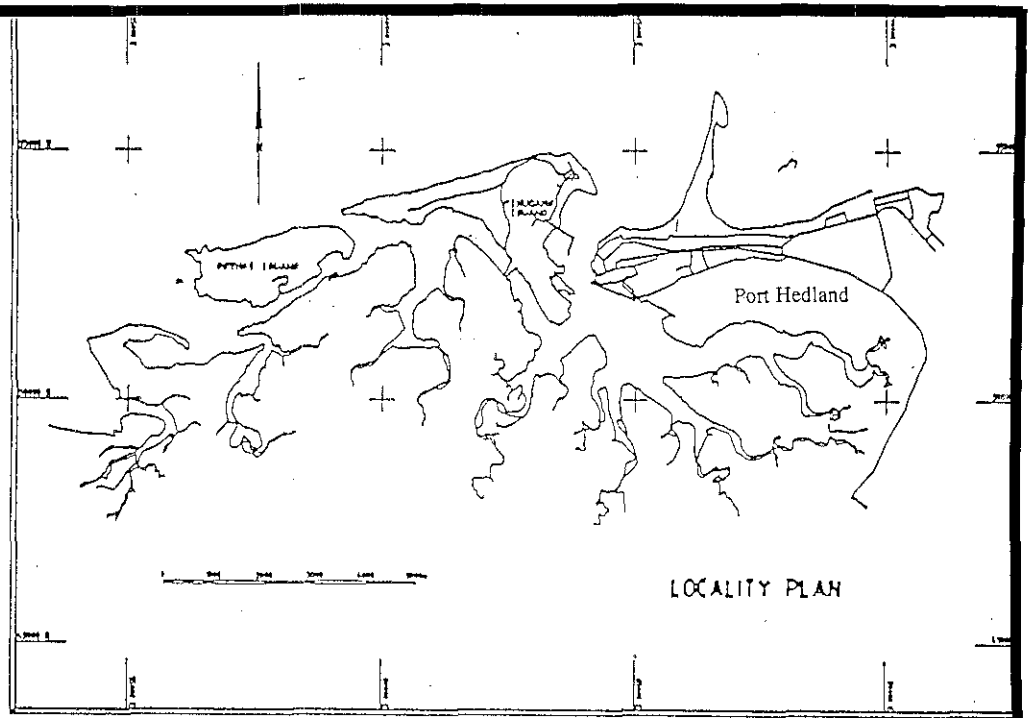
Table 3. Summary of assessment of relevant environmental factors

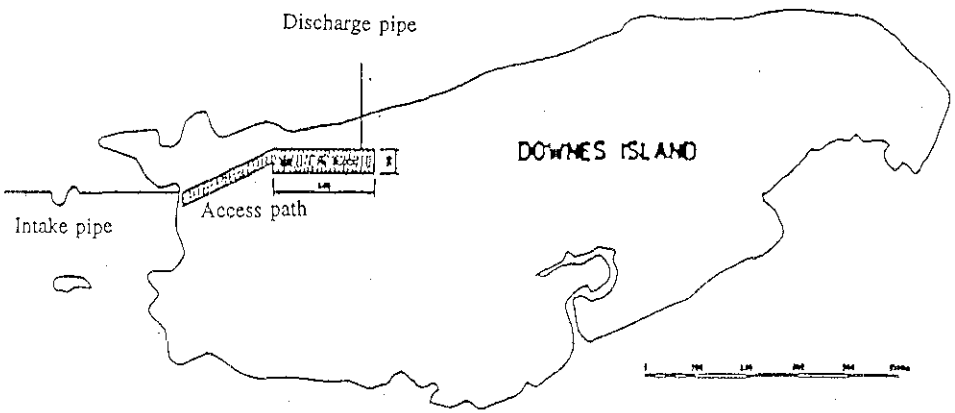
RELEVANT FACTOR	RELEVANT AREA	EPA OBJECTIVES	EPA ASSESSMENT	EPA ADVICE
Regional Conservation Values - Impact on recommended Class B reserve	The relevant area for this factor is considered to be Downes Island and the adjoining intertidal area.	Protect the environmental values of areas identified as having significant conservation value.	• The area was recommended as a B Class reserve by the EPA in 1975. Preliminary survey work carried out by CALM indicates areas of high flora and fauna diversity, primarily the mangrove communities and supra-tidal flats. However CALM has stated that the proposal would not significantly compromise the environmental values of the island. • The proponent has committed to stabilisation and revegetation of disturbed areas.	Having particular regard to: • degraded nature of the vegetation to be cleared; • avoidance of disturbance to the significant mangrove communities; • minor impact on migratory bird habitat; and • commitments by the proponent for stabilisation or rehabilitation of disturbed areas, it is the EPA's opinion that the proposal can be managed to meet the EPA's objective.
Marine Water Quality - Discharge of effluent	The relevant area for this factor is considered to be the marine water within a 100 m radius of the end of the discharge pipe.	Maintain water quality consistent with the criteria specified for the protection of aquatic ecosystems in EPA Bulletin 711.	• The shell species to be farmed will be fed on algae, small fish, pearl oysters and sponges. It is unlikely to significantly impact on water quality in the area. However as this type of facility is new to the State a water quality monitoring and management program will be required. Water quality will be required to meet the criteria for the protection of aquatic ecosystems in EPA Bulletin 711. • The discharge pipe will need to extend at least 200 m offshore so that at the edge of the 100 m mixing zone the water quality will be suitable for direct contact recreation.	Having particular regard to: • the type of feed and estimated feeding requirements of shell species; • the commitment to comply with water quality criteria specified in EPA Bulletin 711; • the water quality monitoring of stage 1 to confirm compliance with water quality criteria; and • the staged development of the proposal, it is the EPA's opinion that the proposal can be managed to meet the EPA's objective provided that the proponent prepare a water quality monitoring and management program and compliance with water quality criteria is demonstrated prior to development of stage 2.
Coastal Processes - Impact on intertidal areas.	The relevant area for this factor is considered to be the intertidal area in the vicinity of the intake and discharge pipes.	To ensure construction of the pipeline does not significantly impact on important wildlife habitat of the intertidal area.	• CALM has identified the intertidal area as an important habitat for migratory birds. CALM have also expressed concerned with the lack of protection of similar mangrove and supra-tidal habitat in the Pilbara.	Having particular regard to: • the small size of the intake and discharge pipes; and • the extent of similar habitat on or around Downes Island, it is the EPA's opinion that the proposal can be managed to meet the EPA's objective.

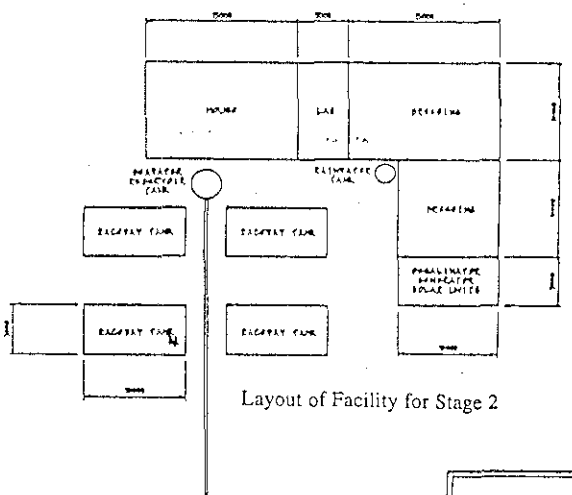
RELEVANT FACTOR	RELEVANT AREA	EPA OBJECTIVES	EPA ASSESSMENT	EPA ADVICE
Recreational Use - Public access to island and foreshores	The relevant area for this factor is considered to include all of Downes Island.	Ensure that the proposed aquaculture development does not have an adverse impact on the existing recreational use of the island for fishing, camping, swimming and access to beach.	• The main recreational area of the island is on the eastern side of the island. This is approximately 2 km from the aquaculture facility. • The intake and discharge pipes will be buried under the foreshore so will not restrict access along the beach.	Having particular regard to: • the distance between the high recreational use areas of the island and the proposed facility; and • the commitment to maintain uninterrupted public access along the foreshore, it is the EPA's opinion that the proposal can be managed to meet the EPA's objective.

Figure 1. Locality plan and layout of facility.



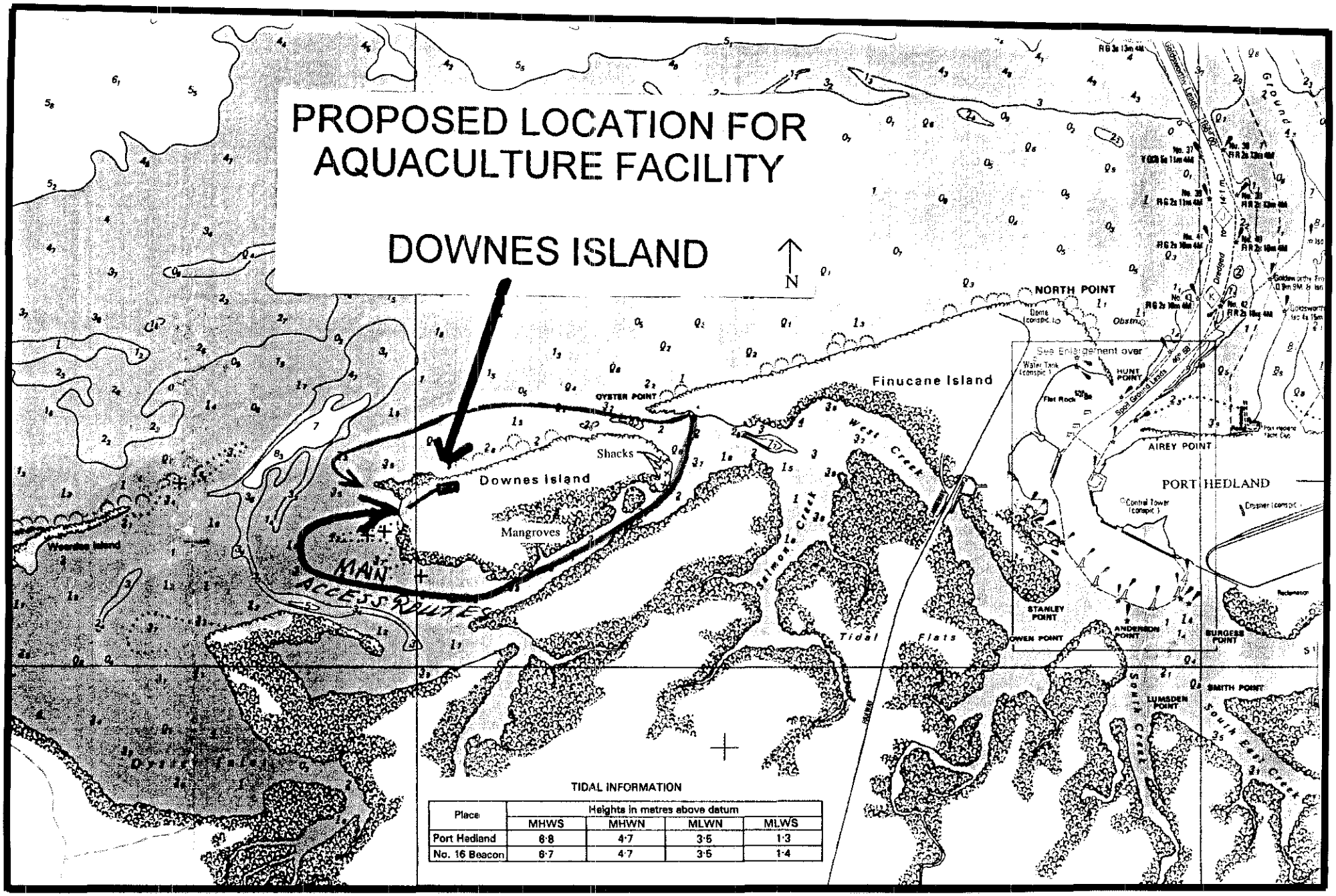






Layout of Facility for Stage 2

LE MER MARKETING & CONSULTANT LTD
MARRI CULTURE PROJECT
DOWNES ISLAND
PORT HEDLAND



TIDAL INFORMATION

Place	Heights in metres above datum			
	MHWS	MHWN	MLWN	MLWS
Port Hedland	6·8	4·7	3·5	1·3
No. 16 Beacon	6·7	4·7	3·5	1·4

Figure 2. Proposed location for aquaculture facility.

Appendix 1

List of submitters

List of organisations who made submissions

Organisations:

- Aboriginal Affairs Department
- Conservation Council of Western Australia Inc.
- Department of Conservation and Land Management
- Department of Land Administration
- Port Hedland Port Authority
- Town of Port Hedland

Appendix 2

References

EPA (1975) "Conservation Reserves for Western Australia: Systems 4,8,9,10,11,12" Environmental Protection Authority, Perth, Western Australia.

EPA (1993) "Western Australian Water Quality Guidelines for Fresh and Marine Waters", EPA Bulletin 711, October, 1993.

Le Mer Marketing and Consultancy Pty Ltd (1997) " Aquaexport Marine Shell Project, Port Hedland", Le Mer Marketing and Consultancy Pty Ltd, Port Hedland, WA.

Pizzey, G. (1980) "A Field Guide to the Birds of Australia", William Collins and Sons, Sydney.

Wilson B R and Gillett, K. (1971) "A Field Guide to Australian Shells, Prosobranch Gastropods", A.H. & A.W. Reed Pty Ltd, Sydney.

Appendix 3

List of recommended Ministerial Conditions and proponent's consolidated commitments

DRAFT

Statement No.

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

Title: AQUACULTURE FACILITY, DOWNES ISLAND, PORT HEDLAND.

Proposal: To construct a land-based marine shell breeding and grow-out facility and residence on a 6.5 hectare lease site at Downes Island, approximately 5 kilometres west of Port Hedland.

Proponent: Le Mer Marketing and Consultancy Pty Ltd.

Proponent Address: PO Box 418, Port Hedland WA 6721

Assessment Number: 1030

Report of the Environmental Protection Authority: Bulletin 886

The proposal to which the above report of the Environmental Protection Authority relates may be implemented subject to the following conditions and procedures:

1 Implementation

1-1 Subject to these conditions and procedures, the proponent shall implement the proposal as documented in schedule 1 of this statement.

2 Proponent Commitments

2-1 The proponent shall implement the consolidated environmental management commitments documented in schedule 2 of this statement.

2-2 The proponent shall implement subsequent environmental management commitments which the proponent makes as part of the fulfilment of conditions and procedures in this statement.

3 Environmental Management System

3-1 In order to manage the environmental impacts of the project, and to fulfil the requirements of the conditions and procedures in this statement, prior to construction, the proponent shall demonstrate that there is in place an environmental management system (EMS) which includes the following elements:

- environmental policy and commitment;
- planning of environmental requirements;
- implementation and operation of environmental requirements;

- measurement and evaluation of environmental performance; and
- review and improvement of environmental outcomes.

3-2 The proponent shall implement the Environmental Management System referred to in condition 3-1.

4 Water Quality Monitoring and Management Plan

4-1 Prior to commissioning the proponent shall prepare a Water Quality Monitoring and Management Plan to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection, the Department of Conservation and Land Management and Fisheries Western Australia.

This Plan shall address:

1. water quality criteria for the protection of aquatic ecosystems, as detailed in Environmental Protection Authority Bulletin 711 (1993);

2. monitoring program for water quality; and

3. management measures to be used if water quality does not meet the specified criteria including the development of a wastewater management contingency plan.

4-2 The proponent shall implement the Water Quality Monitoring and Management Plan required by condition 4-1.

4-3 The proponent shall demonstrate compliance with the water quality criteria specified in the Water Quality Monitoring and Management Plan, to the satisfaction of the Environmental Protection Authority, prior to the development of stage 2.

5 Decommissioning Management Plan

5-1 At least six months prior to decommissioning, the proponent shall prepare a Decommissioning Management Plan to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection.

This Plan shall address:

1. removal of plant and infrastructure; and

2. rehabilitation of all disturbed areas to agreed final land use(s).

5-2 The proponent shall implement the Decommissioning Management Plan required by condition 5-1.

5-3 The proponent shall make the Decommissioning Management Plan required by condition 5-1 publicly available, to the requirements of the Environmental Protection Authority.

6 Performance Review

6-1 Each six years following the commencement of construction, the proponent shall submit a Performance Review to evaluate the environmental performance relevant to:

1. environmental objectives reported on in Environmental Protection Authority Bulletin 88X;

2. proponent's consolidated environmental management commitments documented in schedule 2 of this statement and those arising from the fulfilment of conditions and procedures in this statement;

3. Environmental Management System environmental management targets;

4. Environmental Management Programs and Plans; and

5. environmental performance indicators;

to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection.

Note: The Environmental Protection Authority may recommend changes and actions to the Minister for the Environment following consideration of the Performance Review.

7 Changes to Implementation

7-1 Where, in the course of implementing the proposal, the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment determines, on advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

8 Proponent

8-1 The proponent for the time being nominated by the Minister for the Environment under section 38(6) or (7) of the Environmental Protection Act is responsible for the implementation of the proposal until such time as the Minister for the Environment has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person in respect of the proposal.

8-2 Any request for the exercise of that power of the Minister referred to in condition 8-1 shall be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the proposal in accordance with the conditions and procedures set out in the statement.

8-3 The proponent shall notify the Minister for the Environment of any change of proponent contact name and address within 30 days of such change.

9 Commencement

9-1 The proponent shall provide evidence to the Minister for the Environment within five years of the date of this statement that the proposal has been substantially commenced.

9-2 Where the proposal has not been substantially commenced within five years of the date of this statement, the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment will determine any question as to whether the proposal has been substantially commenced.

9-3 The proponent shall make application to the Minister for the Environment for any extension of approval for the substantial commencement of the proposal beyond five years from the date of this statement.

9-4 Where the proponent demonstrates to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority that the environmental parameters of the proposal have not changed significantly, then the Minister may grant an extension not exceeding five years for the substantial commencement of the proposal.

10 Compliance Auditing

10-1 The proponent shall submit periodic Performance and Compliance Reports, in accordance with an audit program prepared in consultation between the proponent and the Department of Environmental Protection.

10-2 Unless otherwise specified, the Department of Environmental Protection is responsible for assessing compliance with the conditions contained in this statement and for issuing formal clearance of conditions.

10-3 Where compliance with any condition is in dispute, the matter will be determined by the Minister for the Environment.

Schedule 1

The Proposal

Le Mer Marketing and Consultancy Pty Ltd proposes to establish a land-based marine shell breeding facility and residence on 6.5 hectares of leased vacant Crown land at Downes Island, approximately 5 kilometres west of Port Hedland.

The project will be developed over 6 years commencing with fifteen 250 litre breeding tanks, a desalinator, residence for up to seven people, four raceway tanks, a reservoir tank, a rainwater tank, intake and discharge pipes and a generator or solar power unit. Years 1 to 3 will involve the initial research period. The commercial scale hatchery and grow-out will continue through years 3 to 6.

Key Characteristics Table

Element	Description
Life of project	On-going
Proposed lease area	6.5 ha
Area of disturbance: Stage 1- Research Stage 2- Commercial	 0.5 hectares 5.0 hectares

List of major components: Stage 1	
• growing tanks	15 x 250 L tanks
• seawater intake system	60 mm pipe extending 1 km offshore
• discharge system	60 mm pipe extending 200 m offshore
• buildings	Residence, laboratory, breeding house, desalinator / solar / wind generating units.
Stage 2	
• raceway tanks	3 tanks, continuous flow through
• growing tanks	6 x 250 L tanks
• specimen shell tanks	30 x 200 L aquarium tanks
Water requirements	
• fresh	2000 L per day
• seawater	2000 kL per day
Feed requirements	Algae 250 kg per year Sponge 100 kg per year
Chemicals	1 x 250 L maximum diesel fuel stored on site 100 kg per year chlorine

Figure

A locality plan and layout of the facility is provided in Figure 1.

Staging of Implementation

The proposal will be developed in two stages. Stage 1, as outlined in Table 1 above, will be developed over years 1 to 3. Stage 2, as outlined in Table 1 above, will be developed over years 4 to 6. Proceeding with the development of Stage 2 will be dependent on the proponent demonstrating compliance with the water quality criteria for the protection of aquatic ecosystems detailed in the Water Quality Monitoring and Management Plan.

CHERYL EDWARDES (Mrs) MLA
MINISTER FOR THE ENVIRONMENT

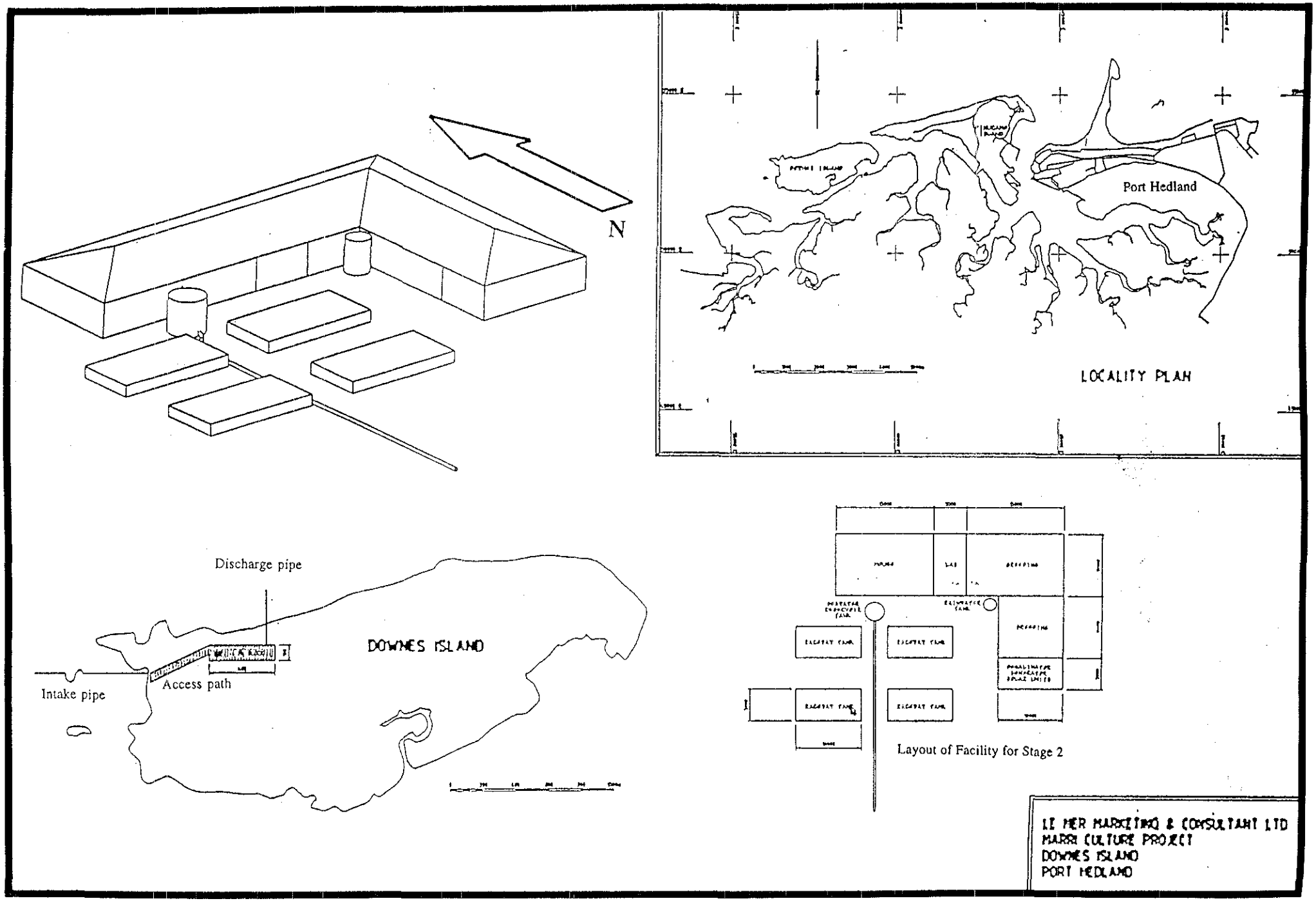
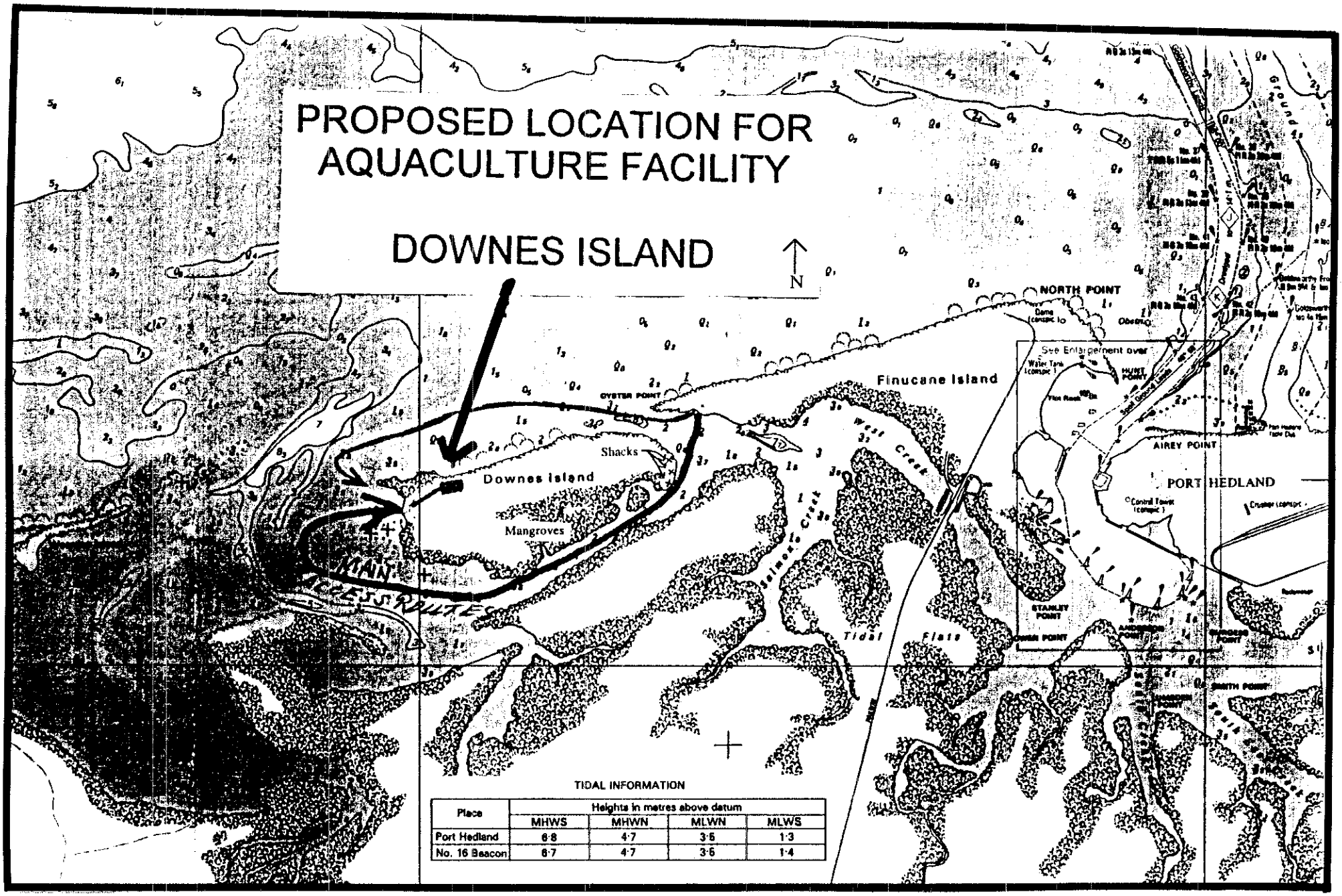


Figure 1. Locality plan and layout of facility.



Place	Heights in metres above datum			
	MHWS	MHWN	MLWN	MLWS
Port Hedland	6·8	4·7	3·5	1·3
No. 16 Beacon	6·7	4·7	3·5	1·4

Figure 2. Proposed location for aquaculture facility.

Proponent's Consolidated Environmental Management Commitments

22 January 1998

AQUACULTURE FACILITY, DOWNES ISLAND, PORT HEDLAND (1030)

LE MER MARKETING AND CONSULTANCY PTY LTD

Commitments

1. To protect the conservation values of the island, clearing of vegetation for the site construction will be kept to a minimum. Initial site clearance will be 250 m^2 and total clearing will not exceed 5 ha. During construction no unnecessary removal of native vegetation within or adjacent to the site will occur.
2. Once construction is completed those areas not needed as part of operational requirements will be rehabilitated to their pre-construction state to the requirements of the DEP.
3. All rubbish presently on the site and produced during the project operations will be removed by the proponent and disposed to an authorised mainland rubbish tip.
4. No mangroves will be removed at any stage of the project in or adjacent to the project site. This will be confirmed to the requirements of the DEP by photographic monitoring before and after construction.
5. To prevent any escape of the subgenus Zoila into the wild, all holding tanks for this species will be constructed to Fisheries WA specifications and culture of the subgenus will be in accordance with the Fisheries WA translocation protocol.
6. In order to ensure that any outbreak of disease at the facility can not escape to the wild population, the proponent will implement a Disease Contingency Plan throughout the project operations to the requirements of Fisheries WA.
7. The proponent will develop and implement an environmental monitoring and management plan. The water quality criteria in the plan will be to the specifications for the protection of aquatic ecosystems as detailed in EPA Bulletin 711 and to the requirements of the DEP. The plan will also outline contingency measures to be implemented if water quality criteria are not being met.
8. Development of Stage 2 will not occur until compliance with water quality criteria during Stage 1 can be demonstrated to the requirements of the DEP.
9. Protection against storm surges, cyclones and flooding will be incorporated in all phases of the project from planning through to operation in accordance with "AS1170.2-1993 Wind Loads for region D Cyclonic areas" and the requirements of the Town of Port Hedland.
10. Should any Aboriginal sites be found during ground disturbing work, all activity will cease immediately and the Aboriginal Affairs Department will be contacted.
11. During construction the intake and outlet pipes will be buried through the crests of the dunes and the beach to a maximum depth of 300 mm to ensure that the pipes do not restrict access along the beach. This trench will be backfilled once the pipes have been laid and tested and any vegetation and topsoil removed will be redistributed over the disturbed area and rehabilitated in accordance with Commitment 2. During construction and operation the outlet pipe will extend at least 200 m offshore and both pipes will be anchored to ensure no movement or damage from the pipes.
12. During operation of this facility public access along the foreshore will not be interrupted from this facility to the satisfaction of the Town of Port Hedland.

Appendix 4

List of marine shell species to be used at the facility

LIST OF NATIVE AUSTRALIAN MARINE SHELLS FOR COLLECTORS PROPOSED TO BE PROPAGATED AT THE DOWNES ISLAND FACILITIES

SOURCE: "Australian Marine Shells" by Dr. Barry Wilson.

Tropical Species (Endemic to area)

Strombus vomer
Cypraea decipiens
Cypraea histrio
Cypraea eglantina
Cypraea moneta
Cypraea brevidentata
Cypraea caputserpentis
Cypraea miliaris
Cypraea subviridis
Cypraea saulae
Cypraea lutea
Cypraea eronus
Cypraea cylindrica
Cypraea erosa
Cypraea lynx
Cypraea cribraria
Murex acanthostephis
Murex brevispina
Chicoreus cervicornis
Chicoreus cornucervi
Pterynotus bednalli
Pterynotus acanthopterus
Pterynotus akation
Chicoreus rubiginosus
Chicoreus banksii
Hexaplex stainforthi
Homalocantha secunda
Cymbiola nivosa
Amoria grayi
Amoria damoni
Amoria eliotti
Amoria maccandravi
Amoria preatexta
Amoria jamrachi
Amoria dampiera
Volutoconus bednalli
Volutoconus coniformis
Amoria rinkensi
Volutoconus hargeavesi
Melo amphora
Livonia joerinkensi
Conus victoriae
Conus trigonus
Conus spectrum
Conus dampierensis
Conus reductaspiralis
Conus monachus
Conus novaehollandiae
Haliotis assinina

Temparate Species (Endemic to Southern Australia)

Cypraea freindii
Cypraea jeaniana
Cypraea freindii vercoi
Cypraea freindii thersites
Cypraea venusta
Cypraea eludens
Cypraea roselli
Cypraea marginata