

**Port Bouvard urban and canal development
Stage 2, Northport and Eastport**

Wannunup Development Nominees Pty Ltd

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

**Environmental Protection Authority
Perth, Western Australia
Bulletin 671
January 1993**

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 6005

CLOSING DATE

Your appeal (with the \$10 fee) must reach the Minister's office no later than 5.00 pm on 29 January, 1993.

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Summary and recommendations

In 1988 a decision was made by the Western Australian State Government to proceed with the construction of a channel between the Peel-Harvey estuarine system and the ocean in the vicinity of Dawesville, south of Mandurah, to improve water quality within the estuary. This channel has become known as the 'Dawesville Channel'. The channel is presently under construction, under the supervision of the Department of Marine and Harbours and is expected to be completed in early January 1994.

In 1991 the Environmental Protection Authority reviewed a 'Strategy Plan' for the development of land adjacent to the Dawesville Channel. This strategy plan was prepared jointly by the Department of Marine and Harbours and Wannunup Development Nominees Pty Ltd, in accordance with a formal rezoning requirement of the Department of Planning and Urban Development, and formed the basis for Amendment No. 176 to the City of Mandurah Town Planning Scheme No. 1A. This amendment proposed the creation of the 'Dawesville Channel Development Zone', which outlined the general planning objectives for future development within the zone.

In view of the Authority's previous assessment of the 'Peel Inlet and Harvey Estuary Management Strategy Stage 2 Environmental Review and Management Programme' in 1988 which acknowledged the fact that land adjacent to the channel would be likely to be the subject of future urban development, the Authority determined that the plan would not be subject to formal assessment. However, the Authority's informal advice on the strategy plan identified aspects of the development proposed as part of the plan which would require further assessment by the Authority.

In April 1992 Feilman Planning Consultants on behalf of Wannunup Development Nominees Pty Ltd referred to the Environmental Protection Authority a proposal to develop three urban and canal estates on the land immediately north and south of the Dawesville Channel alignment, in Mandurah. This proposal is known as 'Port Bouvard Urban and Canal Development', and involves the construction of three nodes of urban development, referred to as 'Northport', 'Southport' and 'Eastport'.

This proposal was assessed by the Environmental Protection Authority as a 'Public Environmental Review' (PER) in view of the likely potential environmental impacts associated with it. The eight week public review period for the PER ended on 16 November 1992.

On 24 November 1992 the Minister for the Environment directed the Environmental Protection Authority to report immediately on the development known as Southport, as described within the Port Bouvard PER. In view of this direction, the Authority determined that the Port Bouvard PER should be reported on in two stages.

The assessment for 'Port Bouvard urban and canal development - Stage 1 Southport' (Bulletin 663) was released by the Minister for the Environment on 4 December 1992. This assessment report forms Stage 2 of the Port Bouvard Development, relating to the Northport and Eastport proposals as described within the PER.

The development known as 'Northport' refers to land north of the Dawesville Channel and west of Old Coast Road. The proposal for the land includes development of a canal estate, shopping centre, community facilities, residential lots, and group housing sites. The 'Eastport' development proposal refers to land north of the Dawesville Channel and east of Old Coast Road, and proposes a canal estate and residential lots. The filling of an area of estuary additional to the area of reclamation proposed by the Department of Marine and Harbours in July 1992 and which was the subject of a separate assessment report by the Authority (Bulletin 640) is also proposed.

Following assessment of the Northport and Eastport proposals as described within the PER document, and consideration of issues raised within the public submissions and the proponent's response to these issues, the Environmental Protection Authority has concluded the following:

- the Northport canal proposal and associated urban development is environmentally acceptable, subject to a number of management recommendations in relation to waterway management, protection of the coastal dune system, and dewatering activities; and
- the Eastport canal development is environmentally acceptable subject to management recommendations in relation to waterway management and dewatering activities, **provided** that it does not involve more reclaimed land than the 5ha agreed to with the State Government in January 1992 as a consequence of construction of the Dawesville Channel.

As previously stated by the Authority in Bulletin 640 'Extension of estuary foreshore reclamation associated with construction of the Dawesville Channel' (August 1992), the Environmental Protection Authority has concluded that any additional filling of the estuary beyond the perimeter of the 25ha area, as proposed by the Department of Marine and Harbours in July 1992, is environmentally unacceptable. The Authority considers that land created as a result of the proposed reclamation, with the exception of the 5ha subject to the land exchange agreement between the State Government and Wannunup Development Nominees Pty Ltd, should be retained in public ownership for the purposes of public recreation.

Recommendation 1

The Environmental Protection Authority has concluded that

- the Northport development proposal as described within the Public Environmental Review is environmentally acceptable; and
- the private component of the Eastport development proposal is environmentally acceptable provided that it does not include more than 5ha of reclaimed public land from the Harvey Estuary agreed to with the State Government in January 1992 as a consequence of construction of the Dawesville Channel.

In reaching this conclusion, the Environmental Protection Authority identified the main environmental issues as :

- estuary reclamation;
- impact on coastal dunes;
- protection of groundwater resources;
- maintenance of existing viewshed; and
- water quality within the proposed artificial waterway.

Accordingly, the Environmental Protection Authority recommends that the Northport and Eastport proposals could proceed subject to the proponent's environmental commitments listed as Appendix 2 and the recommendations in this report.

Recommendation 2

The Environmental Protection Authority recommends that detailed design and rehabilitation measures to protect the dune system during and post construction of Northport development be undertaken by the proponent in consultation with the Department of Planning and Urban Development, to achieve the following objectives:

- minimise impact on native dune vegetation;
- restore degraded dune areas;
- provide public and vehicle access paths and car parks; and
- minimise modification of the existing dune landform.

The methods by which these objectives will be achieved should be included within the proposed 'Foreshore Management Plan' for Northport, and be completed prior to construction of the canal estate, in consultation with the Department of Planning and Urban Development.

Recommendation 3

The Environmental Protection Authority recommends that during the construction of the Northport development, final contour levels should be determined to ensure that they do not exclude the viewshed for existing residents of Buckingham Drive, on advice from the City of Mandurah.

Recommendation 4

The Environmental Protection Authority recommends that an agreement for the long term management of the canal waterways (i.e. post five years) proposed at Northport and Eastport should be finalised by the proponent prior to the waterways becoming operational.

Recommendation 5

The Environmental Protection Authority recommends that the proponent liaise with the Water Authority of Western Australia and the Department of Marine and Harbours to determine any detrimental impacts that dewatering, as a result of construction of the canals, may have on existing users in the vicinity of Northport and Eastport prior to construction of the canals.

Further, the proponent should make provision for the protection and continued availability of groundwater to existing users in the vicinity of the canals in the event that monitoring results indicate that dewatering has had an adverse impact on groundwater during and following construction of the canals.

Contents

	Page
Summary and recommendations	i
1. Introduction.....	1
2. The proposal.....	2
2.1 Northport.....	2
2.2 Eastport.....	2
3. Public Review	5
4. Environmental impacts and their management.....	10
4.1 Estuary reclamation.....	10
4.2 Impact on coastal dunes.....	11
4.3 Spoil disposal	11
4.4 Waterway management.....	12
4.5 Dewatering.....	12
5. Conclusion.....	13
6. References	13

Figures

1. Northport and Eastport development proposal].....	3
2. Proposed reclamation associated with Eastport.....	4

Appendices

1. Proponent's response to issues raised in public submissions
2. List of proponent's commitments

1. Introduction

1.1 Background

In 1991 the Environmental Protection Authority reviewed a 'Strategy Plan' for the development of land adjacent to the Dawesville Channel. This Strategy Plan was prepared jointly by the Department of Marine and Harbours and Wannunup Development Nominees Pty Ltd, in accordance with a formal rezoning requirement of the Department of Planning and Urban Development, and formed the basis for Amendment No. 176 to the City of Mandurah Town Planning Scheme No. 1A. This amendment proposed the creation of the 'Dawesville Channel Development Zone', which outlined the general planning objectives for future development within the zone.

In view of the Authority's previous assessment of the 'Peel Inlet and Harvey Estuary Management Strategy Stage 2 Environmental Review and Management Programme' in 1988 which acknowledged the fact that land adjacent to the channel would be likely to be the subject of future urban development, the Authority determined that the Plan would not be subject to formal assessment. The Authority's informal advice on the Strategy Plan identified aspects of the development proposed as part of the Plan which would require further assessment by the Authority.

In April 1992 Feilman Planning Consultants on behalf of Wannunup Development Nominees Pty Ltd referred to the Environmental Protection Authority a proposal to develop three urban and canal estates on the land immediately north and south of the Dawesville Channel alignment, in Mandurah. This proposal is known as 'Port Bouvard Urban and Canal Development', and involves the construction of three nodes of urban development, referred to as:

- 'Northport' (land north of the Dawesville Channel alignment and west of Old Coast Road);
- 'Eastport' (land north of the Dawesville Channel alignment and east of Old Coast Road); and
- 'Southport' (land south of the Dawesville Channel and west of Old Coast Road).

The Authority determined that this proposal should be assessed as a 'Public Environmental Review' (PER) in view of the likely potential environmental impacts associated with it. This document was subsequently prepared in accordance with guidelines issued by the Authority.

During the preparation of the PER, in August 1992, the EPA undertook an environmental assessment and subsequently reported on a proposal by the Department of Marine and Harbours (DMH) to fill an area of estuary adjacent to the eastern end of the Dawesville Channel (Bulletin 640).

Following assessment of this reclamation proposal, the Authority concluded that :

- the total area of estuary to be filled as part of the reclamation proposal should not exceed 25ha, and should be reduced if possible by increasing the height of the spoil consistent with recreational use of the reclaimed land;
- foreshore vegetation should be retained where possible; and
- total intrusion into the estuary should be minimised.

The final PER document for Port Bouvard was received by the Authority in September 1992 and was subsequently released for an eight week public review period, ending on 16 November 1992.

In November 1992 the Minister for the Environment directed the Environmental Protection Authority to report immediately on the development known as Southport. In view of this direction, the Authority proposed to report on the Port Bouvard PER in two stages. The assessment report for 'Port Bouvard urban and canal development Stage 1, Southport', Bulletin 663, was released by the Minister for the Environment on 4 December 1992. This assessment report forms Stage 2 of the Port Bouvard Development, relating to the Northport and Eastport proposals as described within the PER.

2. The proposal

The land proposed to be developed as part of the Northport and Eastport proposals involves land currently in the ownership of the proponent and land currently under the ownership of State Government authorities which is to be transferred to the proponent under an existing land exchange agreement. The proposal also involves the creation of an additional 11ha of land, proposed to be reclaimed from the Harvey Estuary.

2.1 Northport

Northport refers to the land north of the Dawesville Channel alignment and west of Old Coast Road, and includes the development of a canal estate, shopping centre, community facilities, residential lots and group housing sites (see Figure 1). This land is currently in the ownership of the proponent.

2.2 Eastport

Eastport refers to land north of the Dawesville Channel alignment and east of Old Coast Road, and proposes a canal estate and residential lots (see Figure 1).

The proponent proposes to extend the area of filled estuary proposed by the Department of Marine and Harbours in July 1992 by 11ha, to enable the construction of a canal estate on the reclaimed land, and to create public swimming beaches along the estuary foreshore.

Land use proposed for the Eastport development includes a 9ha canal waterway, 5.5ha public marina (proposed by the Department of Marine and Harbours and which will be subject to a separate assessment by the Authority), 15.5ha of public foreshore, 3.2ha of private land development, and modification of the estuary shoreline to create 'headlands' to orient the estuary beaches to face the south east (see Figure 2).

The land proposed for development is currently partly in the ownership of the proponent, and partly by State Government authorities. Under an existing land exchange agreement between the State Government and Wannunup Development Nominees Pty Ltd (January 1992), there is provision for 5ha of land to be transferred from the State to the proponent in the vicinity of Eastport. It is likely that this 5ha will include an area of land reclaimed from part of the estuary by the Department of Marine and Harbours. The PER states that this 5ha would be developed as part of the Eastport proposal.

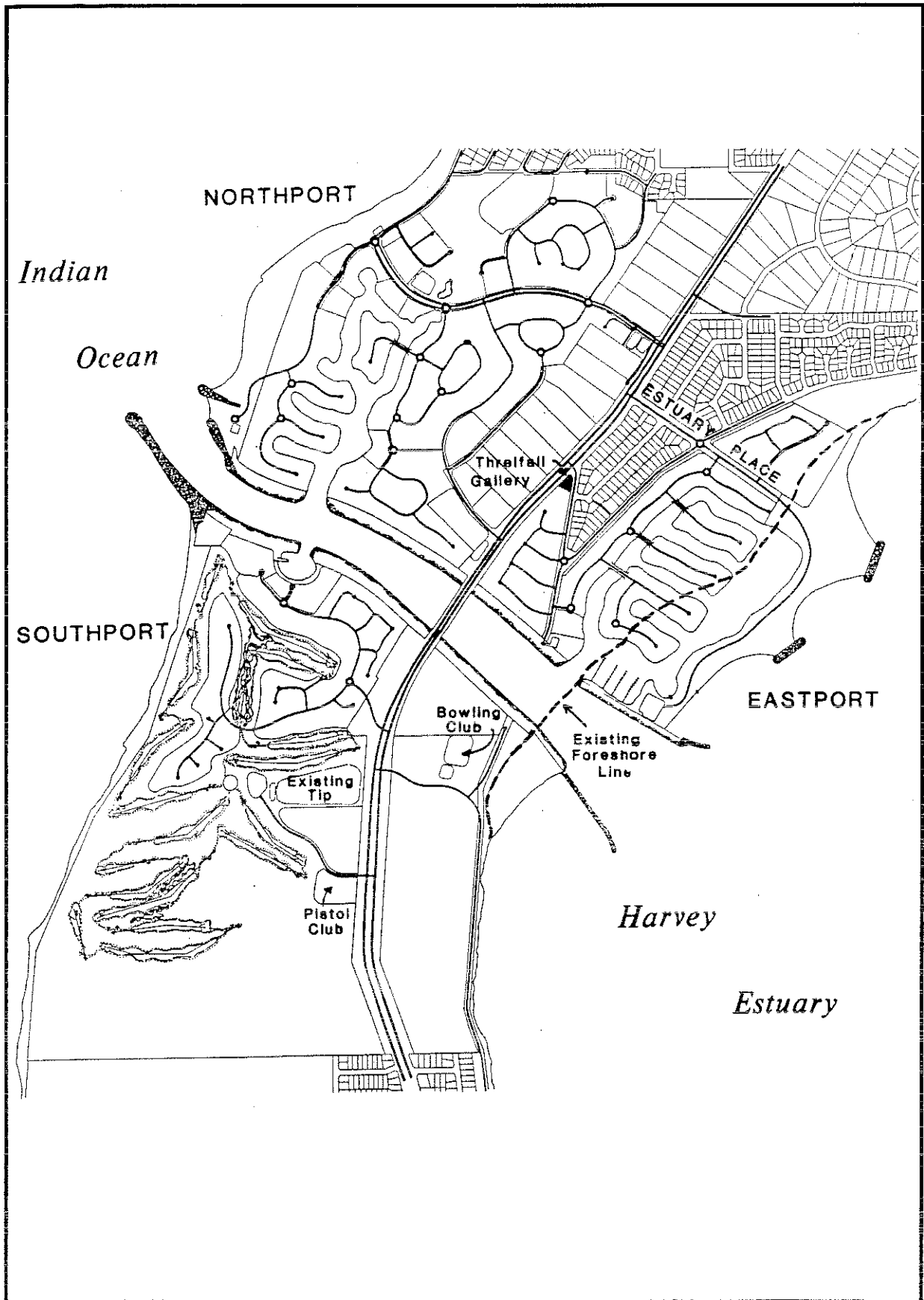


Figure 1: Northport and Eastport development proposal

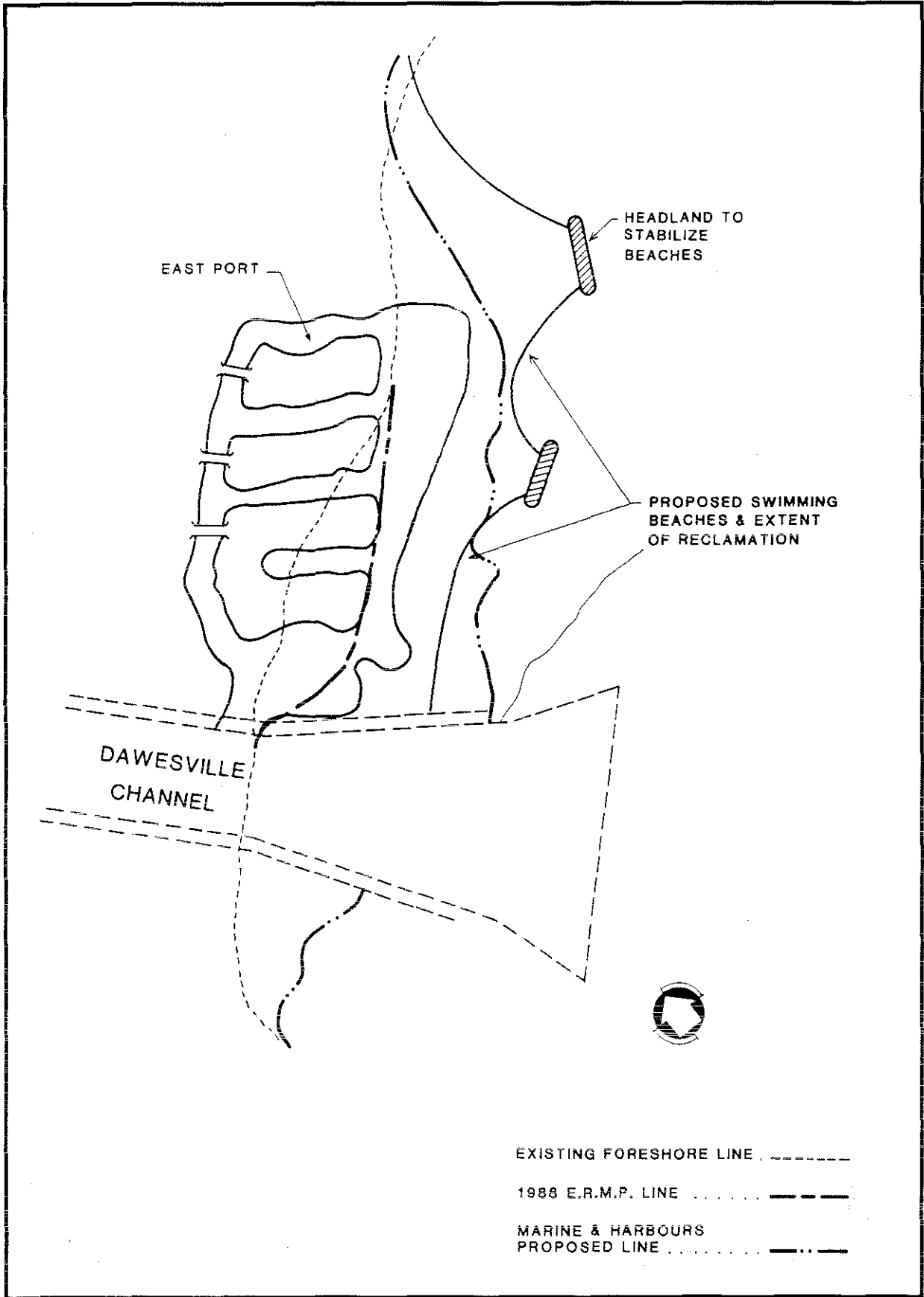


Figure 2: Proposed reclamation associated with Eastport

The additional land created through filling of the estuary by the Department of Marine and Harbours as part of construction of the Dawesville Channel (25ha), and the proposed 11ha of additional reclamation proposed by Wannunup Development Nominees Pty Ltd as part of the Eastport development would automatically become Crown Land. The land would then require appropriate reservation and vesting or zoning under the local town planning scheme prior to development taking place.

3. Public review

A total number of 326 submissions were received in relation to the Port Bouvard proposal. These included 12 individual submissions from members of the public and conservation groups which raised specific questions in relation to the Northport and Eastport proposals, and 308 'form' submissions which expressed support for the Port Bouvard proposal. Of these 'form letters', 220 were one line letters supporting the proposal in principle. Another 88 form letters expressed more specific support for the proposal for a variety of reasons, including economic, public amenity and employment reasons.

Submissions were also received from the Water Authority of Western Australia, Agriculture Department, Department of Marine and Harbours, Department of Planning and Urban Development, the City of Mandurah and the Peel Inlet Management Authority.

The following specific issues were raised.

Issues relating to Northport

Loss of coastal dune vegetation

Several submissions expressed concern that there was not enough information on the coastal dune vegetation presented within the PER to make an accurate assessment of the potential impact of the development on the area. In view of the potential impact on vegetation vulnerable to disturbance, it was suggested that the proponent should be required to observe a minimum setback development line of 150 metres from high water mark. It was suggested that no development should impact on the primary or secondary dune system.

It was considered that the proposed Foreshore Management Plan should be finalised before any development took place to ensure foreshore was protected. This plan should require the proponent to identify areas of dune to be fenced off for protection, public access ways, and car parking areas. Further, it was considered that the proponent should be required to take responsibility for the area for 10 years following construction, and undertake rehabilitation measures accordingly. The plan should also address control of wind blown sand where disturbances such as construction of car parks causes damage to existing vegetation, and revegetation programmes for the frontal dunes.

Public access to the beach

One submission expressed the view that the beach newly formed and created by construction of the two northern breakwaters was not protected, and as it was a proposed receiving point for 'by passing' sand, it may not always be available for public recreational use. In view of this fact, the submission suggested that the claim for the use of the beach by members of the public should be clarified by the proponent.

Foreshore reserve adjacent to the Channel

One submission expressed the view that it was unacceptable for the proposed canal estate (at Northport) to back on to the channel foreshore, as this may limit/restrict vehicle and public access to the foreshore. A strong view was expressed by several submissions that maximum public access should be retained adjacent to the channel, due to the significance of the waterway for recreational and aesthetic purposes.

Spoil disposal

Concern was expressed in several submissions that the land adjacent to Buckingham Drive should not be excessively filled by spoil originating from the channel excavation, and so impact on the views of existing residents. It was also claimed in some submissions that the proposed reclamation height (16 - 22 AHD) would be higher than the existing coastal dune height (12 - 19.6 AHD). Submissions considered this to be too high. The present natural landforms were considered attractive, and it was claimed that the alteration of the natural skyline to this extent would destroy its present aesthetic value.

Another submission expressed the view that there was not enough information included within the PER on how all the spoil generated through construction of the canal estates would be disposed of. For example, there is no specific detail on final contour lines included within the PER. The submission considered that it was impossible to make an objective assessment of the implications of spoil disposal until these details are forthcoming.

Impact on existing residents

One submission expressed concern that Windsor Drive did not appear on the proposed development plans presented in the PER. In view of the fact that the residents' access may be interrupted through the development of Northport, more information was required of the future plans for Windsor Drive.

Aesthetic impact

Several submissions claimed that the proposal would have an unacceptable impact on the natural aesthetic value of the landscape. It was considered that the proposed filling of areas (see spoil disposal sub-heading above) would detract from the existing landforms which characterised the area and gave it a special, unique regional value and would create a 'big brother effect' on existing residences. It was suggested that final fill levels should not exceed the existing height of Buckingham Drive.

Issues relating to Eastport

Loss of estuary bed through estuary reclamation

Concern was expressed in some submissions in relation to loss of estuary bed through the construction of the marina and canals. It is considered that the estuary beach proposed to be formed by the additional reclamation proposed will only replicate existing conditions (i.e. beaches proposed will provide access to shallow areas of estuary which already exist at present).

One submission stated that the actual area of land proposed to be reclaimed as part of the Eastport development was unclear within the PER, particularly in reference to the EPA's assessment of the additional area of estuary proposed to be reclaimed by the Department of Marine and Harbours in July 1992 (Bulletin 640). Some submissions also claim that the area proposed to be reclaimed as described within the PER (over 39ha) was contrary to recommendation made by the Environmental Protection Authority in Bulletin 640 that 'the area of estuary to be filled and reclaimed, including any artificial waterways should not exceed 25ha'.

Opposition in principle to the proposal to reclaim an area of estuary for urban and canal estate use was expressed in several submissions.

One submission expressed the view that discussion in the PER in relation to the justification of an additional area of estuary reclamation is misleading (Section 4.4. PER). The PER claims that 'an additional area of reclamation is required to provide suitable public access to the marina proposed by the Department of Marine and Harbours'. This claim was not considered by the submission to be valid, as other access routes were likely to be used by members of the public in reaching the marina.

Impact on flora and fauna

One submission claims that the PER contains insufficient quantitative data on flora and fauna in the area to allow a 'balanced' assessment of the proposal in terms of biotic losses. The view was expressed that additional floral and faunal information obtained since the area was first reviewed as part of the 'Peel Inlet Harvey Estuary Management Strategy Stage 2 ERMP' in 1988 should be incorporated as part of the assessment for this area. It was claimed that information presented within the PER, which states that 'the area affected by dredge spoil has no more or less environmental value to estuarine shallows than any other shallows in the estuary' is unsubstantiated and misleading.

Water quality within the canal estate

One submission expressed concern that the Eastport canals would be likely to experience poor water quality because of the macroalgae and phytoplankton blooms currently experienced within the estuary, particularly during ebb tides.

Further, concern was expressed in a submission that the sewage service facilities for boats using the canal estate should not be dependent upon the provision of boat sewage pump out facilities within the proposed marina, which is not being assessed as part of this proposal. It was considered that the proponent should make independent provision for facilities in the absence of specific information on the marina.

Foreshore vegetation

One submission suggested that the proponent should be required to incorporate vegetation buffer strips along areas of the foreshore to reduce the impact of increased use of the adjacent area and also minimise phosphate discharge from the area.

Issues relating to both Northport and Eastport

Most 'form' submissions expressed general support for the Eastport and Northport proposals as described within the PER, and stated that in general, the Port Bouvard development would 'provide an innovative and integrated approach to the development of the area, which will result in benefits to the entire community'. The view was expressed that the concept of canal estates at the locations proposed will provide the opportunity for an 'alternative' water oriented lifestyle.

Support was also expressed for the development in view of the employment opportunities it is likely to generate, improvement to existing public amenities in the vicinity (including accessible waterways and public beach areas), and its assistance in helping to accelerate the construction of the Dawesville Channel.

Lack of public consultation

Several submissions expressed concern regarding the lack of public consultation and participation by the proponent in preparing the PER. While the PER implies that extensive consultation was carried out within the area, it was considered that this claim was misleading and untrue.

Revegetation

One submission expressed the view that the proponent should be required to re-establish land cleared as a result of the development proposal (which is not proposed to be developed for houses or canals) with native vegetation. This should be required of the developer particularly where areas of estuary and ocean foreshore had been cleared or disturbed.

Groundwater

Concern was expressed that water abstraction proposed as part of the urban subdivision would have an impact on native vegetation within the area. It was suggested that a contingency plan to ensure the vegetation was protected be prepared by the proponent.

Concern was also expressed that there was no detail presented within the PER to address how materials such as oil and noxious chemicals were proposed to be managed to prevent them from contaminating local groundwater sources.

Dewatering

Concern was raised in one submission regarding the impact of construction of the proposed canal estates at Northport and Eastport on the groundwater levels in nearby unlicensed domestic bores, and potential impact on the fresh/salt water interface movement in the short term.

Foreshore reserve adjacent to the Channel

The proposed 20 metre wide foreshore reserve on either side of the channel was considered to be too narrow by some submissions. One submission expressed the view that the reserve should have a minimum width of 50 metres. Further, it was suggested that public access be encouraged by providing a road or dual use path within the reserve.

Canal construction

One submission stated that the PER did not include enough detail on the proposed canal construction techniques. Concern was expressed regarding canal water quality impact on the channel during construction and the suggestion made that canals should be kept separate from the channel until the required dredging was completed. There was also considered to be inadequate detail on dewatering techniques.

Canal water quality and management

One submission expressed the view that it was unclear how many sites would be monitored within the proposed canal estates, or where the proposed monitoring would be undertaken within the estuary. Further, it was claimed that parameters additional to those listed within the PER need to be included within the proposed water quality monitoring programme.

In view of the historical waterway management problem experienced within the Mandurah area, several submissions expressed the view that long term waterway management, (i.e. who would be responsible for managing the waterway beyond the first 5 years after construction) should be clarified now before anything was built.

One submission raised the issue of macroalgal accumulation within the channel and adjacent canals, and suggested that the proponent be required to harvest and distribute any accumulation, possibly as fertiliser for the golf course.

Several submissions expressed concern that there was not enough information presented within the PER to indicate whether an acceptable standard of water quality could be maintained within the canal waterways, (for example, it was not made clear how wind driven and density driven currents would replenish water at the 'top' end of any of the proposed canals).

One submission stated that mosquito management should be included as part of the water quality monitoring and management programmes.

Public facilities

Several submissions suggested that the proponent be required to provide recreational facilities such as fishing platforms, barbeques, picnic tables, playground equipment and public conveniences as soon as development within the area commences.

Public access

Several submissions claimed that the proposed development considerably reduced the public access to the ocean and estuary. It was considered that more effort should be given by the proponent towards providing unrestricted access to various points within the development, for example access to proposed Eastport Marina from the west rather than from the north east and access for pedestrians and cyclists over the proposed Northport canals (along alignment of the channel). The provision of dual use paths was also considered to be inadequate.

Need for development

One submission claimed that the intensity of development proposed within the PER was unjustified, and inappropriate at this location.

Suitability of development

Several submissions stated that the proposed development was inappropriate at this location as canal estates were spatially and economically inefficient; there was not enough land to construct everything proposed by the proponent; the proposal would incorporate all the undesirable features of a typical suburban housing estate; and there was no 'sense of place' or continuity in the development. In view of these concerns, the design did not justify the very large amount of public money spent in the area, through construction of the channel.

4. Environmental impacts and their management

Recommendation 1

The Environmental Protection Authority has concluded that

- the Northport development proposal as described within the Public Environmental Review is environmentally acceptable; and
- the private component of the Eastport development proposal is environmentally acceptable provided it does not include more than 5ha of reclaimed public land from the Harvey Estuary agreed to with the State Government in January 1992 as a consequence of construction of the Dawesville Channel.

In reaching this conclusion, the Environmental Protection Authority identified the main environmental issues as:

- estuary reclamation;
- impact on coastal dunes;
- protection of groundwater resources;
- maintenance of existing viewshed; and
- water quality within the proposed artificial waterway.

Accordingly, the Environmental Protection Authority recommends that the Northport and Eastport proposals could proceed subject to the proponent's environmental commitments listed as Appendix 2 and the recommendations in this report.

4.1 Estuary reclamation

The current proposal for Eastport as described within the PER is dependent upon the reclamation of an additional 11ha of estuary beyond that found environmentally acceptable by the Environmental Protection Authority following an assessment of an 'Extension of estuary foreshore reclamation associated with the construction of the Dawesville Channel' by the Department of Marine and Harbours in July 1992 (Bulletin 640).

The Authority notes that as the reclamation actually involves the filling of a portion of the estuary, it will therefore remove part of a public resource, i.e part of the Peel Inlet-Harvey Estuary estuarine system. Implementation of the Eastport development as proposed would necessitate reclamation of an area of estuary and utilise an area of reclaimed land for a private canal estate.

The Authority has accepted that some reclamation associated with the construction of the Dawesville Channel is necessary to maintain acceptable water quality within the estuary. However, the Authority considers that land created as a result of the minimum necessary reclamation (25ha) has the potential to become an important regional recreational focus and should be maintained for full public use and access.

As previously stated by the Authority in Bulletin 640 'Extension of estuary foreshore reclamation associated with construction of the Dawesville Channel' (August 1992), the Environmental Protection Authority has concluded that any additional filling of the estuary beyond the perimeter of the 25ha area, as proposed by the Department of Marine and Harbours in July 1992, is environmentally unacceptable.

Further, the Authority considers that land created as a result of this reclamation, with the exception of the 5ha subject to the land exchange agreement between the State Government and Wannunup Development Nominees Pty Ltd, should be retained in public ownership for the purposes of public recreation, with retention of full public access where the reclamation area fronts the estuary.

In stating this view, the Authority recognises that 8ha of the reclamation area is proposed to be used for a public marina which will be the subject of a separate assessment by the Authority. Land use proposed as part of the Eastport development, which would involve the privatisation of an area of reclaimed land for the construction of a canal estate, is not consistent with the objective of retaining the land in public ownership.

4.2 Impact on coastal dunes

As documented within the PER (Appendix 'B'), the coastal dunes in the vicinity of Northport are vulnerable to erosion through pedestrian and vehicle impact and will experience increased pressure if the Northport development proceeds. Issues including the potential impact of the development on the coastal dunes and impact as a result of increased access to the dunes by members of the public were raised in several public submissions.

In view of the proximity of the proposed development to the coast and the increased recreational pressure it will consequently experience, the Authority endorses the proponent's commitment to prepare a 'Foreshore Management Plan' prior to construction of the development (Commitment 1.1.1, Appendix 2). This should include details of the proposed pedestrian and vehicle access to the ocean foreshore and proposed measures to protect dune areas during construction of the proposed canal estate.

Recommendation 2

The Environmental Protection Authority recommends that detailed design and rehabilitation measures to protect the dune system during and post construction of Northport development be undertaken by the proponent in consultation with the Department of Planning and Urban Development to achieve the following objectives :

- minimise impact on native dune vegetation;
- restore degraded dune areas;
- provide public and vehicle access paths and car parks; and
- minimise modification of the existing dune landform.

The method by which these objectives will be achieved should be included within the proposed 'Foreshore Management Plan' for Northport and be completed prior to construction of the canal estate in consultation with the Department of Planning and Urban Development.

4.3 Spoil disposal

Concern was expressed in several public submissions that the final spoil height indicated on contour plans within the PER west of Buckingham Drive associated with the development of Northport may obstruct views from existing residences along Buckingham Drive.

The Authority considers that the viewshed from the existing residences along Buckingham Drive should be retained where possible so that existing residents along Buckingham Drive are not disadvantaged as a result of construction of the Northport development. Accordingly, the Authority recommends that in the course of constructing Northport, no land should be built up higher than existing contour levels to the extent that it obscures existing views along Buckingham Drive.

Recommendation 3

The Environmental Protection Authority recommends that during the construction of the Northport development, final contour levels should be determined to ensure that they do not exclude the viewshed for existing residents of Buckingham Drive, on advice from the City of Mandurah.

4.4 Waterway management

The Northport development includes construction of a canal estate. It is noted that the proponent has undertaken a commitment to prepare a 'Water Quality Management and Monitoring Plan' (Commitment 1.1.2, Appendix 2) following approval to rezone the land to 'Canal Zone' under the local Town Planning Scheme in consultation with officers of the Peel Inlet Management Authority and the Environmental Protection Authority for the first five years of operation. Results of this monitoring should be submitted on a regular basis to the Authority and a summary report prepared after the first five years of operation.

The Authority also notes that responsibility for the long term management (i.e. post five years following construction) of the canal estate has not been determined.

Recommendation 4

The Environmental Protection Authority recommends that an agreement for the long term management of the canal waterways (i.e. post five years) proposed at Northport and Eastport should be finalised by the proponent prior to the waterways becoming operational.

4.5 Dewatering

Further to advice received from the Water Authority of Western Australia, the Authority considers that it is likely that dewatering operations associated with construction of the canal estate will contribute to local effects on groundwater which may impact on existing groundwater users.

The Authority is aware of an existing groundwater monitoring programme currently being undertaken by the Water Authority on behalf of the Department of Marine and Harbours during the construction of the Dawesville Channel to ascertain the effect of dewatering activities on local groundwater levels. It is likely that dewatering activities associated with construction of the proposed canal estate may also contribute to local effects on groundwater which may impact on existing groundwater users. Accordingly, the Authority considers that the proponent should liaise with officers of the Water Authority and the Department of Marine and Harbours on this issue prior to construction of the boat haven to determine any likely detrimental impacts that dewatering associated with construction of the canals may have.

Recommendation 5

The Environmental Protection Authority recommends that the proponent liaise with the Water Authority of Western Australia and the Department of Marine and Harbours to determine any detrimental impacts that dewatering, as a result of construction of the canals, may have on existing users in the vicinity of Northport and Eastport prior to construction of the canals.

Further, the proponent should make provision for the protection and continued availability of groundwater to existing users in the vicinity of the canals in the event that monitoring results indicate that dewatering has had an adverse impact on groundwater during and following construction of the canals to the satisfaction of the Environmental Protection Authority.

5. Conclusion

Following assessment of the Northport and Eastport proposals as described within the PER document and consideration of issues raised within the public submissions and the proponent's response to these issues, the Environmental Protection Authority has concluded the following:

- the Northport canal proposal and associated urban development is environmentally acceptable, subject to a number of management recommendations in relation to waterway management, protection of the coastal dune system, and dewatering activities; and
- the Eastport canal development is environmentally acceptable subject to management recommendations in relation to waterway management and dewatering activities, **provided** that it does not involve more reclaimed land than the 5ha agreed to with the State Government in January 1992 as a consequence of construction of the Dawesville Channel.

6. References

Environmental Protection Authority (1992) Environmental Protection Authority advice on the Dawesville Channel Strategy Plan (unpublished report).

Feilman Planning Consultants (1992) Public Environmental Review - Port Bouvard Urban and Canal Development. Volumes 1 and 2. Perth, Western Australia.

Appendix 1

Proponents response to issues raised in public submissions

Feilman Planning Consultants

TOWN and REGIONAL PLANNERS and URBAN DESIGNERS

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14th December 1992

Our Ref: WDN/DVODP75.DOC

Environmental Protection Authority
Westralia Square Building
38 Mounts Bay Road
Perth WA 6000

Attention: Ms E Bunbury

Dear Sir

**RE: PORT BOUVARD URBAN & CANAL DEVELOPMENT
PUBLIC ENVIRONMENTAL REVIEW - STAGE 2:
NORTHPORT AND EASTPORT**

We refer to your letter dated 10th December 1992 requesting the proponents response to the public submissions received in regard to Northport and Eastport.

On behalf of the proponent, Wannunup Development Nominees Pty Ltd, we have prepared a response on the issues raised, a copy of which is attached. For ease of reference we have adopted the Authority's summary headings, identified the salient issues by paragraph and provided comment on each.

We trust the above is to your satisfaction and look forward to the Authority's early assessment. Should you require any further information or clarification of points raised in our submission please do not hesitate to contact Erwin Roberts of this Office on 322 3033.

Yours faithfully

Feilman Planning Consultants Pty Ltd

Feilman Planning Consultants Pty Ltd

*cc Bunbury
16/12/92*

TABLE OF CONTENTS

1.0	ISSUES RELATING TO EASTPORT.....	1
1.1	Loss of Estuary Bed through Estuary Reclamation.....	1
1.2	Impact on Flora and Fauna	2
1.3	Water Quality within the Canal Estate	2
1.4	Foreshore Vegetation.....	3
1.5	Location of Marina.....	3
2.0	ISSUES RELATING TO NORTHPORT.....	4
2.1	Loss of Coastal Dune Vegetation.....	4
2.2	Public Access to the Beach	5
2.3	Foreshore Reserve Adjacent to the Channel	6
2.4	Spoil Disposal.....	6
2.5	Impact on Existing Residents.....	7
2.6	Aesthetic Impact.....	7
3.0	ISSUES RELATING TO BOTH NORTHPORT AND EASTPORT.....	8
3.1	Lack of Public Consultation.....	8
3.2	Revegetation.....	9
3.3	Groundwater.....	9
3.4	Dewatering	9
3.5	Foreshore Reserve Adjacent to the Channel	9
3.6	Canal Construction	11
3.7	Canal Water Quality and Management.....	11
3.8	Public Facilities	13
3.9	Public Access	13
3.10/3.11	Need for, and Suitability of Development	13

1.0 ISSUES RELATING TO EASTPORT

1.1 Loss of Estuary Bed through Estuary Reclamation

- [i] The environmental implications of reclaiming 32ha of shallow sand flats to the north and south of the Dawesville Channel are described in Section 6.1.2 of the PER. The shallows that will be reclaimed have no intrinsic conservation value beyond that of other very extensive areas of shallows around the estuary's margins. The problems associated with algae accumulation within the shallows at Dawesville will also become worse following construction of the entrance to Dawesville Channel, unless these shallows are reclaimed.

The estuary foreshore proposed to be formed by the additional reclamation will, following alteration of the tidal regime that will result from construction of the Dawesville Channel, broadly reflect the foreshore that currently exists at Dawesville. This is a significant attribute in support of the proposed reclamation if consideration is given to the implications of the altered tidal regime in the event that the proposed reclamation did not proceed, as follows.

The existing foreshore below approximately mid-tidal level at Dawesville has a very gradual slope, resulting in broad flats of sand/mud being exposed during low tide each day. A representative transect across the foreshore within the vicinity of the Eastport development includes an intertidal area of sandflats of approximately 70m width. The gradual slope continues into the estuary, resulting in a water depth during low tide of only 0.3m approximately 180m from shore.

In the absence of the proposed reclamation, the increased tidal range following completion of the Dawesville Channel will significantly increase the width of the intertidal sand/mud flats at Dawesville. Based on the tidal predictions described in the Stage II ERMP for the Peel-Harvey Management Strategy, the width of mud/sand flats upon the representative foreshore transect that would be exposed during low tide would increase from 70m to approximately 150m. Shallow water depths [$<0.3\text{m}$ during low tide] would extend to approximately 280m offshore. As discussed in Section 6.2 of the PER, this very extensive intertidal and shallow subtidal flats would be prone to frequent incursions of accumulated algae, with associated public nuisance and adverse biological impact.

The proposed reclamation for the Eastport development will reduce the width of the intertidal flats to approximately 20m, even less than

presently exists. The adjacent shallows [0.3m during low tide] will extend to approximately 80m.

Therefore, the proposed reclamation for Eastport will, following changes to the tidal regime that will occur with opening of the Dawesville Channel, result in an estuarine foreshore that is essentially similar to the existing shoreline. If the reclamation did not proceed, the nearshore environment at this location would be prone to significantly increased accumulations of rotting algae, and the associated ecological and public nuisance concerns. The reclamation will also enable the development of a public beach on the western side of the proposed foreshore reserve ie within the Eastport waterway. This beach will be specifically developed for swimming. As an internal beach that is protected from a southerly fetch, it will provide a feature that is quite unique within the estuary.

1.2 Impact on Flora and Fauna

The information contained in Section 5.1.3 that describes the estuarine biota in the vicinity of the proposed Eastport development is based on unpublished data collected by Dr Tom Rose 1986-87. These data are the most detailed and the most recent quantitative information that is available describing the macrobenthic ecology of the Peel-Harvey estuarine system.

Section 5.1.3 describes the background supporting the conclusion that "the shallow nearshore sandflats at Dawesville have no greater intrinsic environmental significance than that of other areas of shallow sandflats that occur throughout the estuary's margins". The statement is based on statistical analysis of the extensive data acquired by Rose, so it is not unsubstantiated.

It is not clear how the restatement of this conclusion within Section 6.2 of the PER can be considered to be misleading. The shallows proposed to be reclaimed are not unique and comprise less than 0.6% of the estuary's shallows. Without discounting the conservation value of all estuarine areas, environmental and social benefits offered by the proposed Eastport reclamation are considered to justify the [relatively minor] loss of this biological amenity in the present instance.

1.3 Water Quality within the Canal Estate

- [i] The resultant water quality in a canal estate is limited by the quality of the source water. The source water for Eastport will be new ocean water during incoming flood tides and Harvey Estuary water for outgoing ebb tides and significant river flows. As outlined in the Stage 2 ERMP [Kinhill, 1988] the outgoing water in the Dawesville Channel will be a mix of ocean water from previous flood tides and residual

estuary water. It is clear that the source water for Eastport will be suitable for canals and can be expected to improve over time because of the longer term influences of the Dawesville Channel and the catchment management strategies being implemented by the State Government.

During ebb tides the current in the Dawesville Channel flows out from the estuary to the ocean at speeds of upto about 1ms^{-1} . At the same time water would flow out of Eastport albeit at lower speeds. Given this hydraulic regime, there will be little if any transport of macroalgae and phytoplankton blooms from the estuary into Eastport under the influence of ebb tides.

- [ii] Since it is proposed that a marina be constructed by the Department of Marine and Harbours, and the optimum location for a sewage pump out facility is at the marina, it is not proposed that a further facility be provided elsewhere within the canal estate. Similarly, no alternative fuelling facility is proposed as this also will be located at the marina.

1.4 Foreshore Vegetation

The proposed foreshore reserve that will be established upon the reclaimed land will be developed as a parkland for public recreation, interspersed with nodes of natural foreshore vegetation. As stated in the PER [page 36] the proponent is responsible for landform creation and initial stabilisation, "while vegetation and development of recreation facilities will be undertaken by the Department of Marine and Harbours". To this end the Department has commissioned landscape architecture consultants to prepare plans for the foreshore area which it is expected will address the appropriateness of incorporating vegetation buffer strips along areas of the foreshore.

1.5 Location of Marina

The location of the proposed public marina to be established by the Department of Marine and Harbours is the concern of that Department, not the proponent. Nevertheless, it is appropriate to point out that the State does not own land near Northport that could readily be developed as a marina, however does have rights to the proposed site near Eastport. Furthermore, in the preliminary planning stages the Department considered an ocean side location however due to the problems and potential costs involved discarded the option.

2.0 ISSUES RELATING TO NORTHPORT

2.1 Loss of Coastal Dune Vegetation

- [i] It is not clear what additional data is considered necessary beyond that already provided in Section 2.1.2 of Appendix B to the PER Volume 2. This provides a description of the vegetation, nominating the predominant species occurring within the foreshore dunes of the site, identifying the vegetation types according to the descriptions of Trudgen [1991] and commenting on the occurrence of these vegetation types elsewhere in the region as identified in Trudgen's 1991 report for the Department of Planning and Urban Development. That report is in turn cited as a comprehensive reference for coastal vegetation types in this part of the coastline.

A setback of 100 metres is consistent with the Department's Country Coastal Planning Policy [DC 6.1] which states in Section 3.6.1 that :

"A setback of 100 metres should be regarded as a guideline for a wind erosion buffer and for public recreation purposes where landforms are stable. Setbacks will be greater where there is evidence of coastal recession and where landforms are unstable."

Appendix B of the PER Volume 2 provides detail on the stratigraphy of the dunes and on coastal stability in the area, indicating that the shoreline here is stable and that the dunes are underlain by three pre-Holocene limestone units which, at least to the south of Avalon Point are a sound barrier to wave erosion.

At the same time it should be recognised that the dune landforms themselves are not intrinsically unstable, provided vegetation cover is retained on them. In this respect existing cover is protecting dunal stability and this stability has been lost only where the cover has been damaged - largely, it appears, by pedestrian and/or vehicular traffic, and possibly by some historic grazing by livestock compounded by foraging by rabbits.

As part of the proposed development, a foreshore stabilisation and revegetation programme will ensure that those areas which are presently bereft of vegetation will be reinstated under protective cover, while a foreshore management programme managed initially by the developer and ultimately by the Local Authority will ensure that this cover is retained in perpetuity.

On the above basis there is therefore no reason for demanding any more than the proposed 100 metre foreshore reserve. Indeed a case

could be argued in light of the size of the dunes, the vegetation cover upon them and the underlying limestone south of the Avalon Point that a lesser width would afford adequate protection to development behind these dunes.

- [ii] The preparation of a Foreshore Management Plan is currently being undertaken and is a commitment made by the proponent in the PER, as well as being a condition of the State Planning Commission's approval to the Outline Development Plan.

The Foreshore Management Plan cannot be finalised until the type of development which is finally approved is known, as the nature of that development and the degree to which it may impinge on the foreshore dunes will influence the area to be managed and the type of management proposed.

In the interim, Appendix B to the PER Volume 2 provides in Section 3.1.4 an outline of the range of issues to be considered and addressed in a future Foreshore Management Plan. These embrace all of the matters raised in the submission together with various other considerations such as the detail of rehabilitation earthworks, temporary stabilisation measures and revegetation species to be introduced into various micro-environments within eroding sectors of the dunes.

The capacity of the proponent's consultants to satisfactorily fulfil this requirement is demonstrated by a similar Foreshore Management Plan prepared and successfully implemented by these same consultants for the Warnbro Dunes development in the City of Rockingham.

2.2 Public Access to the Beach

Although the Department of Marine and Harbours has not released its final plans for sand bypassing, it is understood that all sand that is mechanically bypassed will be deposited north of the most northern breakwater, not between the two northern breakwaters.

The newly formed beach between the two northern breakwaters will receive some protection from waves approaching between southwest and west, the summer afternoon sea breeze waves being a common example.

As a minimum the public should have access to this area for fishing from the breakwaters and general passive recreation. It is possible that overtime the beach will be enhanced and made suitable for swimming.

2.3 Foreshore Reserve Adjacent to the Channel

Public access is maintained to the foreshore adjacent to the Channel through the provision of dual-use paths and car parks. A dual-use path network is proposed which links into a dual-use path on each side of the Channel. The Department of Marine and Harbours does not propose to permit general vehicle access onto the Channel berms, except for the requirements of maintenance vehicles.

2.4 Spoil Disposal

The land adjacent to Buckingham Drive has been and will continue to be filled in accordance with the Spoil Disposal Management Plan prepared as required by the conditions of approval set in 1988 for the ERMP prepared for the Dawesville Channel.

The statement that spoil disposal will impact upon the views from Buckingham Drive residents to the estuary is ill founded. The proponents land subject to deposition of spoil lies to the west of Buckingham Drive and can not therefore impede views to the Estuary which lies to the east of Buckingham Drive.

In terms of views and general outlook from Buckingham Drive to the ocean the following points are relevant:

- Clearing of vegetation on the proponent's land, necessary for deposition of spoil, has only recently created limited ocean views which residents have now become aware of.
- The cleared and partially excavated Channel alignment, from the highway through the dunes to the ocean, has also laid open a view corridor which did not previously exist for the residents. As for the first point, any view thus created has only become available as a result of development at the Dawesville site.
- For the distance of approximately 700 metres to the north of the Channel centreline, the level of the natural dunal ridge attains a minimum ground height of AHD 17.5. Existing dune vegetation would add an approximate one metre to this view barrier. This ridge lies around 800m to the west of Buckingham Drive. The flat sight lines from the Buckingham Drive properties to the west and west-south-west for the majority of the landowners therefore represents a natural impediment to ocean views even without the addition of fill to the adjacent land.

- An existing knoll, situated at about 200m westwards of Buckingham Drive and approximately opposite the centroid of the Buckingham Drive allotments, rises to AHD 15.0 [16.0 with vegetation]. Ground level at the road for all but two of the Buckingham Drive allotments does not exceed AHD 18.5. Again, this natural feature acts as a barrier to ocean views for Buckingham Drive residents.
- Conventional residential development on the proponent's land immediately west of Buckingham Drive would largely eliminate any residual coastal view corridors even without any fill having been added to the proponent's land.
- Cross-sections, from Buckingham Drive westwards showing existing and proposed ground levels, provided by the proponent, demonstrate that grades chosen for the fill placement are relatively flat [typically less than 10%] and levels 100m west of Buckingham Drive are generally only two metres, or less, above the level of the road.
- Spoil from excavation of canals in Northport will be spread over the same designated spoil disposal area for material from the Channel. In this way further clearing of natural vegetation is avoided and the net average increase in final level as a result of placement of spoil from canals in Northport is only around 0.7m.

2.5 Impact on Existing Residents

Parts of Windsor Drive are retained as part of the development proposals, ensuring that no existing resident is left without vehicle access.

2.6 Aesthetic Impact

As stated in the PER [page 48] the Port Bouvard Project will have a minimal impact on the existing aesthetic appearance of the landscape. The construction of the Dawesville Channel and the associated works involved in the disposal of spoil from the Channel have had a dramatic impact upon the existing landscape through the clearance of vegetation and changes in the level of the landscape, the environmental acceptability and impact of which was subject of a separate environmental assessment and approval process completed in 1988. The proposals contained within the Port Bouvard project will only impact upon a landscape which has already been substantially modified to accommodate the construction of the Dawesville Channel.

3.0 ISSUES RELATING TO BOTH NORTHPORT AND EASTPORT

3.1 Lack of Public Consultation

Extensive public consultation has taken place in respect to the Port Bouvard project, both formally as a requirement of the planning and environmental approval process, and informally through public meetings, public workshops, presentations and media responses, as well as responding to written requests for information. The proposals contained within the Port Bouvard Project have been the subject of extensive advertising periods during which time the community will have had four separate occasions to comment, as provided by the following opportunities:

Amendment No 176:	December 1991-January 1992	42 days
Outline Development Plan:	August 1992	28 days
Public Environmental Review:	September 1992-November 1992	56 days
Amendment No 188:	December 1992	28 days

In addition to the formal advertising periods, consultation of the local community has involved the following:

19.2.92	Southern Estuary Progress Association	50 people
17.3.92	Falcon Progress Association	106 people
06.7.92	Community Workshop	15 people
07.7.92	Community Workshop	10 people
13.7.92	Mandurah Rotary Club	30 people
19.8.92	Mandurah Chamber of Commerce	35 people
06.9.92	Institute of Valuers [Mandurah]	80 people
21.9.92	University of the Third Age	35 people
12.10.92	Representative [Buckingham Drive Residents]	[8 people]
25.10.92	Combined Garden Club	120 people
26.10.92	Wannanup Residents	50 people
04.11.92	Channel Surf Riders Association	8 people
17.11.92	Institute of Engineers	42 people
18.11.92	Southern Estuary Progress Association	60 people
18.11.92	Estuary Ladies Probus Club	80 people

The above adequately demonstrates the extensive public consultation undertaken by the proponent over the past 12 months.

3.2 Revegetation

Areas within the ocean foreshore will be subject to the Foreshore Management Plan which will include proposals for rehabilitation, stabilisation and revegetation. In regard to the estuary foreshore as outlined in Section 1.4 above, the proponent will be responsible for the landform creation and initial stabilisation whilst revegetation will be undertaken as part of the proposals for estuary foreshore development to be undertaken by the Department of Marine and Harbours.

3.3 Groundwater

- [i] Abstraction of water supply within the development is currently proposed to be from the Leederville Formation aquifer from depths in excess of 200 metres. This abstraction would not affect water levels in the superficial formations aquifer. Consequently the native vegetation would not be affected as a result of the proposed abstraction.
- [ii] No handling or storage of oil and noxious chemicals is envisaged on the site beyond that typical of a residential/golf course development. Consequently no special measures beyond the normal requirements of Local and State Government authorities and safe management practices will be required.

3.4 Dewatering

Based on experience at the Waterside Mandurah development some inland migration of the salt-water interface will occur. The Water Authority of WA is understood to be managing a programme to monitor the effects of construction of the Dawesville Channel on the superficial aquifer. The effects of this structure are expected to be much more substantial than those of the proposed canal estates.

3.5 Foreshore Reserve Adjacent to the Channel

The Port Bouvard project proposes several nodes along the Channel edge where the recreational requirements of the community can be focused, without resorting to a standard foreshore reserve requirement. This position is based upon the following:

- The engineering drawings for the Dawesville Channel prepared by the Department of Marine and Harbours define the requirements of the actual Channel as well as a 20 metre wide strip on both sides. Within the 20 metre strip, a 15 metre wide berm is provided to facilitate future

maintenance requirements as well as to accommodate the community's requirement to access the Channel.

The engineering drawings incorporating the Channel and berm were used as the basis for preparing the Land Exchange Agreement between the Government and Wannunup Development Nominees signed on 6th January 1992. The Land Exchange Agreement proposes an exchange of land between both parties whereby the *total* land requirements for the Dawesville Channel are to be transferred to the Government. The intent and "spirit" of the Agreement was that all land required by the Government for the construction and operation of the Channel, including all associated uses, were to form part of the exchange with no further or future claims to be made upon the proponent. Given the fact that the 1988 ERMP prepared for the Dawesville Channel, highlighted the recreational opportunities resulting from the Channel construction, it was accepted that the Government, in assessing its total needs for its public work and the resultant attraction it would provide as a recreational resource, had allowed for sufficient area to meet this particular need. In conclusion, it is considered unreasonable for the adjacent landowner to provide the "space" to service the community's requirements for a Government sponsored project, when the Government was given the opportunity to assess and address these needs previously prior to negotiating the Land Exchange Agreement.

- In the interest of progressing the Land Exchange Agreement and due to the limited time available to both parties, Wannunup Development Nominees accepted the "breakout lines" for the Channel. The area affected is approximately four hectares. At the time of negotiation, the Department of Marine and Harbours were unable to define accurately the land required for batters - that is, the land that due to its topography required stabilisation as a result of the construction of the Dawesville Channel. The resultant impact and cost saving to the Government has been accepted and is borne by the proponent.
- In recognition of the recreational opportunities resulting from the Channel, the Department of Marine and Harbours has commissioned landscape consultants to prepare a plan to address the requirements along the area adjacent to the Channel. The plan proposes the understated use of the area, through the construction of a promenade to cater for the need for families etc, to stroll along the Channel and is supported by vegetation planting and provision of park furniture.

Part of the reason for this approach is due to the open nature of the area and its exposure to the prevailing winds, particularly the strong south westerlies. The purpose therefore of the 15 metre wide berm is

to provide public access to and along the Channel, with passive recreational pursuits being catered for in adjacent sheltered areas.

- Provision is made for specific focal points for recreation adjacent to the Channel. Along the northern reaches of the Channel four nodes are proposed:
 - [a] at the beach created by the two northern breakwaters;
 - [b] at the permanent public car park adjacent to the bridge;
 - [c] at the proposed marina; and
 - [d] on the area of proposed reclaimed land adjacent to the Estuary

Along the southern reaches of the Channel two nodes are proposed:

- [a] at the public beach created behind the Channel wall; and
- [b] on the area of proposed reclaimed land adjacent to the Estuary.

3.6 Canal Construction

Canal construction in Southport and Eastport will, for the first stage of canal development, take place with the dewatering necessary for the excavation of the Channel. That is, advantage will be taken of the fact that Channel dewatering to depths up to AHD - 6.5 will also lower groundwater levels in canal areas adjacent the Channel. The first stages of canals will therefore be constructed in conjunction with the Channel excavation.

Second stage canal development will also employ dewatering techniques to enable excavation to be carried out in the dry by a conventional bulldozer/scrapper fleet. Dewatering discharge will be fed into the constructed canals.

The canal dewatering will be of a considerably reduced scale compared with that required for excavation of the Channel, which has far greater volume of earth to be removed and a depth upto three metres greater than the canal system.

3.7 Canal Water Quality and Management

- [i] As stated in the PER, it is intended that the final details of the water quality monitoring be determined in consultation with the appropriate Authorities.

- [ii] The issue of long term waterway management is currently being undertaken by the proponent together with the Mandurah City Council and is required to be completed prior to the finalisation of the Canal rezoning. An Agreement for the long term waterway management will therefore be in place prior to construction.
- [iii] In the Stage 2 ERMP [Kinhill, 1988] it was identified that in the short term after construction of the Dawesville Channel it was likely that there would be an increase in macroalgal production in the estuary. The State government has been preparing for this by significantly increasing its harvesting fleet over the last two years. The issue is a State responsibility.
- [iv] In Appendix C to the PER Volume 2 the issue of water quality in the canals was given extensive treatment. The conclusion was that the water quality would easily meet the requirements for canals because of
- the quality of the source water,
 - the management of nutrient and pollutant inflows, and
 - the excellent mixing and exchange characteristics.

The design of the canals was done to maximise the effects of wind driven currents and resultant water exchange. The main canals have been aligned to take full effect of the common southwest winds. Calculations were presented in Appendix C of the PER Volume 2 that indicate that a modest wind speed of only 10kph would cause the top one third of the water column to travel at an average of about 0.04ms^{-1} . Such a wind induced current would take about 5 to 6 hours to travel the length of the main canals and reach the "top" end of these canals. Many summer sea breezes would be significantly faster than 10kph and hence the wind induced currents would reach the "top" end of the canal even sooner. Calculations of the effect of density currents were also presented in the PER Volume 2. These showed that even modest differences in the densities of the canal water to the incoming water would cause significant density currents. A 10.7kg M^{-3} density difference would cause the front to advance at about 0.26ms^{-1} . At this speed the density current would take about 1 hour to reach the "top" end of the canals.

- [v] The Stage 2 ERMP [Kinhill, 1988] examined the likely changes in mosquito populations and nuisance that would result from the construction of the Dawesville Channel. The problems are related to the change in the hydraulic regime caused by the construction of the Dawesville Channel. The proposed canals will not affect the mosquito

population. The issue of mosquito management is clearly the responsibility of the State Government and the local authority. It is not appropriate that it be included in water quality monitoring and management programs being undertaken by the proponent.

3.8 Public Facilities

The provision of recreational facilities by the proponent is not an environmental issue, and not normally a statutory requirement of the planning approval process. It should be noted however that the proponent has agreed to make a substantial contribution [\$300,000] to the Mandurah City Council towards the contribution of community facilities [community hall, public library and day care centre].

3.9 Public Access

Access to the beaches within the Port Bouvard project has in the past been confined to a limestone track from Avalon Parade or via the use of off-road vehicles through the proponents landholdings. Rather than reducing the public's access, the proposed development will enhance the general public's access to the beaches through the proposed local road system and provision of car parks within easy access of the beach. The Foreshore Management Plan will reinforce the public's access through the provision of pedestrian access routes to the beach.

The statement that unrestricted access be provided along the Channel cannot be substantiated in the context of the total Dawesville Channel project. The proposed traffic bridge across the Channel is designed with a 19 metre clearance between the bridge and the water to facilitate ocean-going craft requiring access to the Marina. To require fixed structures for pedestrian access across the canal entrances would then prohibit the movement of large craft [for which the traffic bridge had been designed] to the marina and canal estates.

3.10/3.11 Need for, and Suitability of Development

The density of development proposed, the spatial and economic efficiencies of proposed landuses and the general structure of development are not environmental considerations but rather, matters which pertain to the planning approval process and will be addressed at the appropriate time.

Appendix 2

List of proponent's commitments

1.0 COMMITMENTS

The Proponent makes the following commitments:

1.1 Pre-Construction

The following management plans will be prepared prior to construction of the relevant components:

1.1.1 Foreshore Management Plan

A foreshore management plan will be prepared for the coastal dunes for the extent of the proponents land and will detail:

- areas to be managed and rehabilitated;
- the nature of rehabilitation including earthworks, temporary stabilisation including earthworks, temporary stabilisation measures, stockpiling of vegetation, revegetation species and techniques;
- location, design and management of accessways; and
- maintenance requirements;

The management plan would be prepared as a condition of subdivision approval for the land immediately adjoining the coast and would be prepared to the satisfaction of the EPA and the Coastal Planning Branch of the Department of Planning and Urban Development.

1.1.2 Water Quality Management and Monitoring Plan

A water quality management and monitoring programme will be prepared to confirm the predictions concerning water quality in the proposed canals. The programme will be prepared following the lands rezoning to "Canal Zone". The design of the programme will be undertaken in consultation with PIMA and the EPA and will include the following:

Summer and winter monitoring of the water quality at four sites in the canal estates and two reference stations. One reference station would be located in the ocean and the other in the estuary. The surface and bottom water at each site would be analysed for salinity, temperature pH, dissolved oxygen, total phosphorus phosphate, total nitrogen and copper.

The surface sediments from all six sites would be analysed for build up of total of phosphorous and copper. This would be undertaken two years after the completion of construction of the canal estates.

The plan will also include procedures for the investigation and introduction of appropriate measures if unacceptable water quality occurs.

The monitoring programme would span five years and the results submitted to PIMA and the EPA for review.

1.1.3 Waterway Management Plan

In accordance with the Department of Planning and Urban Development Policy for Canal Estates (Policy No. DC1.8) a management agreement will be prepared with the City of Mandurah to address responsibilities for a long term maintenance of the canal estates. This normally requires the proponent to attend to general maintenance for the first 5 years and the Local Authority thereafter. The Management Agreement would be prepared as part of the statutory documentation for the "Canal Zone" and would be prepared in consultation with the Mandurah City Council and the Department of Planning and Urban Development.

1.2 During Construction

1.2.1 Dune Protection

Where development enters the dunes the area of disturbance will be minimised to ensure that the majority of existing vegetation cover is retained. Vegetation which is cleared to facilitate roads, pathways, and residential development will be stockpiled to be used as stabilising brush cover on areas which are to be rehabilitated.

1.2.2 Estuary Foreshore Vegetation

Where the existing estuary foreshore vegetation is not affected by proposals for development it will be protected and included in the newly created foreshore reserve.

1.2.3 Noise, Traffic Management and Dust Control Measures

Work involved in the bulk earthworks and residential subdivision development will be undertaken in accordance with the Local Authority's standards and where required the Environmental Protection Authority's standards for noise, traffic management and dust control measures.

1.2.4 Community Awareness

The proponent will respond to local enquires or complaints regarding elements relevant to the construction of the canals and urban development.

1.3 Post Construction

- All development within the Port Bouvard project will be undertaken in accordance with the requirements and conditions of the Peel-Harvey Statement of Planning Policy 1992 and the Environmental Protection Policy (Peel-Harvey Estuarine System) 1992.

- The Water Quality Management and Monitoring Plan as referred to in Section 1.1.2 will be implemented to provide a management and monitoring programme for five years following construction of the respective canals.
- The Waterway Management Plan (Section 1.1.3) will be implemented in accordance with the requirements of the Department of Planning and Urban Development Policy Number DC 1.8 and to the satisfaction of the Mandurah City Council and the Department of Planning and Urban Development.