Breakwater extension, Northern Harbour Precinct, Jervoise Bay

Department of Commerce and Trade

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Bulletin 836
December 1996

ISBN. 0 7309 8006 5
ISSN. 1030 - 0120
Assessment No. 1046

Summary

This report provides Environmental Protection Authority (EPA) advice to the Minister for the Environment on the proposal by the Department of Commerce and Trade to extend the existing breakwater in the northern precinct of Jervoise Bay, as set out in the proponent's Consultative Environmental Review (Halpern Glick Maunsell, 1996).

In the EPA's opinion, the following are the environmental factors relevant to the proposal:

(a) marine water (in harbour);

(b) seagrass;

(c) dust; and

(d) noise.

The conditions and procedures, in the EPA's opinion, to which the proposal should be subject if implemented are in summary:

(a) the proponent's commitments should be made enforceable; and

(b) the proponent should be required to prepare a contingency plan, within 12 months of the commencement of construction, to identify a proposed course of action in the event that water quality in the harbour becomes unacceptable, and be required to implement the plan if determined by the Minister for the Environment on advice from the EPA.

The EPA submits the following recommendations:

Recommendation 1

That the Minister for the Environment notes the relevant environmental factors and EPA objective for each factor, as set out in Section 3 of the report.

Recommendation 2

That subject to the satisfactory implementation of the EPA's recommended conditions and procedures of Section 4 of the report, including the proponent's environmental management commitments, the proposal can be managed to meet the EPA's objectives.

Recommendation 3

That the Minister for the Environment imposes the conditions and procedures set out in Section 4 of this report, if the proposal is implemented.

Recommendation 4

That the Minister for the Environment notes:

(a) current and future proposals for harbour and port construction on the eastern margin of Cockburn Sound would, if implemented, effectively change the coastline and bathymetry of the Sound; and

(b) the EPA considers that proponents for further development of harbours and ports on the eastern margin of Cockburn Sound should determine if any changes will have a significant effect on the circulation, flushing rates and water quality throughout Cockburn Sound.

Contents

Table

Appendices

1. Introduction

This report is to provide Environmental Protection Authority (EPA) advice to the Minister for the Environment on the proposal by the Department of Commerce and Trade to extend the existing breakwater in the northern precinct of Jervoise Bay, as set out in the proponent's Consultative Environmental Review (CER) (Halpern Glick Maunsell, 1996).

Further details of the proposed 700 metre limestone rubble breakwater are given in Section 2 of this report.

Section 3 discusses the environmental factors relevant to the proposal.

Section 4 sets out the conditions and procedures to which the proposal should be subject if the Minister determines that it may be implemented, and Section 5 presents the recommendations to the Minister.

Appendix 1 provides maps relating to the proposal. A list of State and local government authorities, organisations and individuals who made submissions is included in Appendix 2, and published information is listed in Appendix 3.

2. The proposal

The Department of Commerce and Trade proposes to extend the existing breakwater in the northern precinct of Jervoise Bay as discussed in the CER document. In summary, the breakwater extension will:

(a) commence immediately west of the Cockburn Power Boat Association facility, be 700 metres (m) long, approximately 40m wide, and cover 2.8 hectares (ha) of seabed;

(b) be constructed of limestone rubble mound, as used in the existing breakwater and has an expected construction period of 40 weeks; and

(c) form a harbour with an entrance width of 120m at mean sea level.

Location and development plans are shown in Appendix 1: Figures 1 and 2.

The proponent considers the breakwater extension is necessary to provide protection from wave action for shipping vessel users of the harbour, and to allow for greater protection of ship building facilities. The breakwater extension will reduce the risk of exposure of shipping vessels to the west-northwest ocean swells, and the consequent disruption of delivery schedules that occurred in 1995-1996. It will also improve vessel launch, retrieval and maintenance availability, and allow for future expansion of the ship building industry into the northern sector of the harbour.

This proposal does not consider in any way the expansion of the ship building industry into the northern sector of the harbour. Such development would be subject to assessment under Part IV (Environmental Impact Assessment) or licensing under Part V (Control of Pollution), of the Environmental Protection Act [1986] as appropriate in the future.

3. Environmental factors

3.1 Relevant environmental factors

In the EPA's opinion, based on the submissions and material listed in Appendices 2 and 3, the following are the environmental factors relevant to the proposal:

(a) marine water (in harbour);

(b) seagrass;

(c) dust; and

(d) noise.

The EPA considers the quality of marine water in the harbour to be the most significant environmental factor relevant to this proposal.

3.2 Marine water (in harbour)

Aspects of marine water (in harbour)

Marine water of Cockburn Sound and the proposed harbour is an important element of the environment on which marine life and other beneficial uses depend. Studies of Cockburn Sound show a deterioration of water quality during the decades of the 1960s and 1970s (Department of Conservation and Environment, 1979).

As a result industry and government have changed their marine discharges to the Sound during the past 20 years. A recent study (Department of Environmental Protection, in press) shows the water quality remains nutrient rich, however it appears likely that some improvement in the water quality has occurred in recent times.

The proposal area is contained within Cockburn Sound (Appendix 1: Figure 1). The water quality of the present harbour is mainly determined by the general water quality of Cockburn Sound.

The present harbour is closed to the south by an existing breakwater. The water exchange between this harbour and Cockburn Sound takes place through the northern opening (Appendix 1: Figure 1). The proposed extension of the breakwater (Appendix 1: Figure 2) will significantly reduce the cross sectional area of the opening between the harbour and Cockburn Sound. This will decrease the flowrate through the opening and conversely increase the time taken to exchange the equivalent water volume of the harbour with Cockburn Sound water.

The proponent in the CER (Halpern Glick Maunsell, 1996) has estimated that the flushing time of the harbour with the breakwater extension will increase but not significantly more than that of the existing layout. The mean annual flushing time with the breakwater extension is estimated to be in the range of 3 to 5 days based on the contribution of astronomical tides, barometric tides, wind mixing and gravitational flows. Three days is estimated to be the most probable time, and 5 days the longest based on worst case assumptions. The existing mean flushing time is estimated to be 2.5 days.

The proponent considers that flushing time in the harbour would be largely independent of the orientation of the harbour entrance as it is based on the combined mechanisms of tides, winds and gravitational flow.

The water quality in the proposed harbour is likely to be mainly determined by the water quality of Cockburn Sound, provided that there are no other nutrient sources or loads within the area of the harbour. However, some uncertainty surrounds the exact volumes of, and chemical composition of future discharges into the proposed harbour from the Water Corporation emergency sewage outfall (Appendix 1: Figure 2), possible groundwater discharges through the seabed in the general area of the harbour or discharges from existing shipbuilding operations and future industry.

From the CER (Halpern Glick Maunsell, 1996):

(a) the Water Corporation's sewage outfall exists as an emergency outfall, and is required in the event of a power failure at the plant or a break in the Cape Peron outfall, combined with the plant experiencing flows greater than the existing bypass capacity of approximately 2000 litres per second;

(b) since the new emergency outfall was commissioned in 1991 there has only been one overflow, which was on 20 October 1995, when 1140 m^3 of effluent containing 57 kg of total nitrogen (TN) and 12.5 kg of total phosphorus (TP) was released;

(c) any discharge from the plant into the northern harbour through the outfall is done under DEP Licence conditions and as such must be immediately reported to the Department of Environmental Protection by the Water Corporation; and

(d) the likelihood of emergency sewage outfall use decreases as the plant approaches full treatment capacity.

The emergency sewage outfall discharge is controlled by Ministerial Conditions and DEP Licence Conditions (Ministerial Statement number 52 published on 21 December 1988, DEP Licence number 4201).

The Licence Conditions permit discharges at a higher frequency and greater volume than has occurred to date. These conditions are:

(a) reporting annually on usage of the emergency sewage outfall;

(b) initiating a contingency plan to chlorinate any discharge from the emergency sewage outfall, with the aim of achieving a faecal coliform count at the outlet point of less than 150/100mL within one hour of commencement of discharge;

(c) notifying the users of Jervoise Bay immediately if an unacceptable level of chlorination cannot be achieved in one hour;

(d) regarding as environmentally unacceptable, as a general indication, use of the outlet on more than 4 occasions in one year, or for a cumulative total of more than 12 hours in one year due to inadequate implementation of the contingency plans; and

(e) reviewing the use of the emergency sewage outfall in conjunction with the DEP after the first, third and tenth years of operation. If an excessive use of the outfall occurs, or if significant environmental problems develop as a consequence of use of this outfall, then the Water Corporation agreed to conduct additional current monitoring studies to determine the appropriate length for an extension of the outfall, and then undertake the extension.

Although the exact area of the groundwater discharge remains poorly defined, either all or part of the groundwater and its accompanying nutrient loading may discharge within the proposed harbour. There is uncertainty regarding the rates of discharge and nutrient concentrations of groundwater which may enter the harbour in the future. Process nutrient rich water from Love Starches operation in Russell Road, South Coogee, some 2.3km east of the harbour may be transported westward in the near surface aquifer which discharges in Cockburn Sound in the vicinity of the harbour (Appleyard, 1994).

The proponent has estimated in the CER (Halpern Glick Maunsell, 1996) that if all groundwater flow normal to the coast of the Northern Harbour Precinct entered the harbour, then:

(a) based on a doubling of the mean annual flushing time gap (ie 5 days), the total nitrogen concentration in the harbour would increase in the order of 23% under the worst estimated loading conditions; and

(b) based on the most probable mean annual flushing time gap (ie 3 days), the total nitrogen concentration would increase in the order of 2 to 5%.

The proponent does not consider that these increases will result in unacceptable water quality in the harbour.

The water quality modelling described in the CER ((Halpern Glick Maunsell, 1996) assumed no reduction in groundwater nutrient inputs from levels reported in 1994. It is thought that this is a conservative assumption (Halpern Glick Maunsell, 1996), in that improved groundwater management and changes in land use in the region over time (for example, extensive horticulture is reducing due to rezoning of rural areas to residential), will result in better quality groundwater entering Cockburn Sound over time. The discharge of contaminated water to Cockburn Sound could, however, continue for many years (Appleyard, 1994).

Assessment

The area considered for assessment of this relevant factor marine water and its quality is the area of the proposed harbour itself (Appendix 1: Figure 2). This is the area over which the proposal may affect on marine water quality.

The objectives in regard to this environmental factor are:

(a) to ensure that the harbour water quality meets the Western Australian Quality Guidelines for Fresh and Marine Waters (EPA Bulletin 711, 1993); and

(b) in particular, ensures that there is no public or occupational health risk and the water quality does not result in phytoplankton problems.

It is the opinion of the EPA that the harbour itself will not cause any change to water quality in the longer term. It is anticipated that the water quality in the harbour is likely to be determined by the water quality of Cockburn Sound adjacent to the harbour. However two other potential sources of nutrients to the harbour have been identified as the Water Corporation emergency sewage outfall located in the harbour (Appendix 1: Figure 2) and groundwater which may discharge into the proposed harbour. There is uncertainty about the extent of nutrients entering the harbour from these sources.

The emergency sewage outfall has only been used once since it was commissioned in 1991 and only 1140m^3 of wastewater was released. This is an infrequent and relatively small volume event. However, the Ministerial Conditions and DEP Licence Conditions applying to the emergency outfall (Ministerial Statement number 52 published on 21 December, 1988, DEP Licence Number 4201) permit more frequent discharges and greater volumes.

If discharges result in unacceptable water quality in the harbour, the licence conditions may need to be amended. Consideration may also need to be given to extending the pipe and relocating the outfall. The proponent has agreed to provide a culvert in the breakwater to enable extension of the outfall if required in the future.

Should the groundwater discharge into the harbour, then the reasonably consistent flow, provided there are nutrients present, may cause the water quality to deteriorate.

The predictions of the volume exchange through the harbour opening (Appendix 1: Figure 2) and the estimated flushing time have been determined (Halpern Glick Maunsell, 1996). These estimates show that equilibrium nutrient concentration is expected to increase in the order of only 5% (on average) and that the worst case maximum increase would be 23%. These estimates have been based on very rudimentary first order equilibrium models and the confidence or uncertainty in these results is considered accordingly.

In view of the uncertainty in both the exact nature of any nutrient source and exchange with Cockburn Sound, it is considered necessary to monitor the water quality pre and post commissioning and it is proposed that the monitoring continue for at least five years after construction is complete. The monitoring should address the ANZECC (1992) Water Quality Guidelines. The EPA considers that the monitoring should be in accordance with the Southern Metropolitan Control Waters Study (DEP, in press).

In the opinion of the EPA, should the water quality in the harbour be equal or better than that of Cockburn Sound, then it should be assumed that the water quality is acceptable. However, should the water quality in the harbour be worse than that of Cockburn Sound, and not reasonably comply with the Western Australian Water Quality Guidelines for Fresh and Marine Waters (EPA Bulletin 711, 1993), determined by agreed indicators and procedures, then it should be assumed that the water quality is unacceptable.

The proponent has made commitments to carry out water quality and sediment monitoring for a period of time to determine any unacceptable change in water quality within the harbour. In the opinion of the EPA, a contingency plan should be prepared where the water quality monitoring is routinely and periodically considered, and should the water quality within the harbour become unacceptable, then a contingency plan to make good the water, should be implemented. This plan should be developed within twelve months of the commencement of construction of the breakwater.

In the opinion of the EPA, the public and occupational health risks which may arise in the unlikely event of a discharge from the Water Corporation emergency outfall should be addressed in the harbour day-to-day management plan.

The proponent has committed to prepare and coordinate implementation of an ongoing management plan in collaboration with other relevant government agencies, to manage day-to-day harbour operations. The plan is to encompass "clean-up and containment procedures for spills and noxious substances, (and) management of stormwater".

Having particular regard to:

(a) the configuration of the harbour layout and the resultant water exchange with the waters of Cockburn Sound adjacent to the harbour and the estimated flushing times;

(b) the Water Corporation sewage outfall located within the harbour and the possible sea bed discharge of groundwater within the harbour and the infrequent nature of the sewage outfall discharge, and the uncertain nature of the exact amount of nutrient likely to enter the harbour from these two sources;

(c) the proponent's commitment to monitor the water quality and prepare a contingency plan and coordinate the implementation of that plan to address any unacceptable changes in the water quality within the harbour; and

(d) the Ministerial Conditions and DEP Licence Conditions applying the Water Corporation sewage outfall (Ministerial Statement number 52 dated 21 December 1988, DEP Licence Number 4201);

it is the opinion of the EPA that the proposal can be managed to meet its objectives for marine water quality.

The contingency plan should be implemented if water quality in the harbour becomes unacceptable to the requirements of the Minister for the Environment, on the advice of the EPA.

A number of submissions raised concerns about the potential cumulative impacts of development on the eastern margin of Cockburn Sound. In particular concerns were raised that changing the bathymetric distribution of the Sound may decrease flow over the eastern margin. This may affect circulation patterns, flushing rates and residence times throughout the whole of the Sound. Coastal stability may also be affected. The EPA considers that research should continue into the cumulative impacts through future proposals.

3.3 Seagrass

Aspects of seagrass

Seagrass meadows are a very important element of the environment as a habitat for a diversity of fauna and flora and for their role in maintaining the stability of marine beaches.

Seagrass meadows, composed mainly of species of the genera *Posidonia* and *Amphibolis*, characterise a vast, shallow neritic, temperate marine biome (large natural area) that extends from Eucla on the south coast and along 700km of the west coast to the northern end of Shark Bay. There is about two million hectares of such seagrass meadows within the biome (SMEC, 1996)

Construction of the breakwater will cover 2.8 ha of the seafloor and could affect seagrass cover.

The dominant species of seagrasses in the proposal area and immediate environs are of the genus *Posidonia*. The occurrence of this species being restricted to a scatter of occasional individual plants. *Posidonia sinuosa* was recorded as isolated single plants and single occurrences of *Halophila ovalis* and *Heterozostera tasmanica* were recorded from transects surveyed by Halpern Glick Maunsell in May, 1996. In all cases, the seagrasses present were in poor condition, carrying a moderate to high load of epiphytic growth which, in combination with the high sediment load in the water, accounted for their level of debilitation.

No seagrass meadows were observed on any of the transects surveyed. The occurrence of seagrass was restricted to scattered individual plants at very low percentage cover (0-5%) and there were extensive stretches of sediment bare of any seagrass. There was no evidence of viable rhizome material in sediment investigated, indicating that the seagrass community has been at its current sparse density for a significant period of time.

The observations from the project area confirm the results of other seagrass mapping exercises in Cockburn Sound which show no significant seagrass in the Jervoise Bay northern harbour area (Hillman, 1986; Lukatelich et al., 1987; Paling, pers. comm., 1996).

Assessment

The area considered for assessment of this relevant environmental factor, seagrass, is the biome characterised by seagrass meadows extending from Eucla to Shark Bay.

The EPA's objective in regard to this environmental factor is "to maintain the abundance, species diversity and geographic distribution of seagrass".

In assessing the impact of the proposal on the abundance of seagrass, the seagrass loss which will result from the proposal will be very small as seagrass cover in the area is extremely sparse, and limited to a scatter of occasional plants. In comparative terms, losses from the proposed breakwater area will be very small.

Seagrass diversity is unlikely to be affected by this proposal because there are no identified rare or endangered species of seagrass within the proposal area. As there is no loss the seagrass distribution is unlikely to be unaffected.

Having particular regard to the fact that:

(a) there is no significant seagrass in the Jervoise Bay northern harbour; and

(b) no identified rare or endangered species of seagrass are present in the proposal area;

it is the EPA's opinion that the loss of seagrass within the proposed breakwater extension area is unlikely to compromise its objective to maintain the abundance, species diversity and geographic distribution of seagrass.

There is public concern about the loss of seagrass in the area of Cockburn Sound. It is the EPA's opinion that even if this was the relevant area for assessing the impact of this proposal, the proposal would still be unlikely to compromise the EPA's objective. Further, if the relevant area was that of the harbour, the proposal would still be unlikely to compromise the EPA's objective as there is virtually no seagrass there.

3.4 Dust

Aspects of dust

The welfare, amenity and health of surrounding land users could be affected by the adverse impact of dust from construction activities.

As the proposal site is located south of Woodman Point Recreation Reserve and to the north-west of the Henderson Industrial Estate, the proponent considers that dust will be of negligible impact on the nearest residents.

Assessment

The area considered for assessment of this relevant environmental factor, dust, is the construction area and the immediate environs near the Cockburn Power Boat Association facility, as this is where trucks will unload the limestone rubble for the proposal during the construction phase.

The EPA's objective in regard to this environmental factor is "to protect surrounding land users, such that the dust emissions will not adversely impact upon their welfare and amenity or cause health problems".

Concern was expressed in a local government authority submission regarding the trucking route for carting of the breakwater limestone. The EPA notes that the proponent has made a commitment that it will manage dust during construction through compliance with the Draft DEP Dust Control Guidelines, to the requirements of the DEP and on advice from the local government authorities.

Having particular regard to the:

(a) location of the proposal being remote from residences and the minimal likely effects of dust from construction activities; and

(b) proponent's commitment to manage dust to the requirements of the DEP

it is the EPA's opinion that construction of the breakwater is unlikely to compromise the EPA's objective to protect surrounding land users, such that the dust emissions will not adversely impact upon their welfare and amenity or cause health problems.

3.5 Noise

Aspects of noise

The amenity of surrounding land users could be affected by the adverse impacts of noise from the breakwater extension construction activities.

As the proposal site is located south of Woodman Point Recreation Reserve and to the north-west of the Henderson Industrial Estate, the proponent considers that noise levels will be of insignificant concern to the nearest residents.

Assessment

The area considered for assessment of this relevant environmental factor, noise, is the construction area and the immediate environs near the Cockburn Power Boat Association facility, as this is where trucks will unload the limestone rubble for the proposal during the construction phase.

The EPA's objective in regard to this environmental factor is "to protect the amenity of nearby residents from noise associated with the proposal by ensuring noise levels meet statutory requirements and acceptable levels".

Concern was expressed in a local government authority submission regarding the trucking route for carting of the breakwater limestone. The EPA notes that the proponent has made a commitment that it will manage noise during construction, through compliance with the existing and proposed EPA Noise Regulations, to the requirements of the DEP and on advice from the local government authorities.

Having particular regard to the:

(a) location of the proposal being remote from residences and the minimal likely effects of noise from construction activities; and

(b) proponent's commitment to manage noise in compliance with the existing and proposed EPA Noise Regulations;

it is the EPA's opinion that construction of the proposed breakwater is unlikely to compromise the EPA's objective to protect the amenity of nearby residents from noise associated with the proposal by ensuring noise levels meet statutory requirements and acceptable levels".

4. Conditions and procedures

In the EPA's opinion, the proposal should be subject to the following conditions and procedures if implemented:

4.1 Proponent's commitments

The proponent's commitments set out in the CER (Halpern Glick Maunsell, 1996) and subsequently modified (letter of 2 December 1996), as summarised in Table 1, should be made enforceable conditions.

4.2 Contingency plan

The proponent should be required to prepare a contingency plan within 12 months of construction commencing, to identify a proposed course of action in the event that water quality in the harbour becomes unacceptable. This plan should be prepared to the requirements of the EPA, and the proponent should be required to implement the plan to the requirements of the Minister for the Environment, on advice from the EPA.

4.3 Environmental management system

The proponent should be required to prepare and implement an environmental management plan and environmental management procedures in order to implement the proposal and manage the relevant environmental factors to ensure the EPA's objectives (Section 3) are met. The plan should adopt quality assurance principles (such as those adopted in Australian Standards ISO 9000 series) and environmental management principles (such as those adopted in the voluntary Australian Standards ISO 14000 [draft] series), with appropriate monitoring and auditing to ensure compliance with this condition.

5. Recommendations

The EPA submits the following recommendations:

Recommendation 1

That the Minister for the Environment notes the relevant environmental factors and EPA objective for each factor as set out in Section 3 of the report.

Recommendation 2

That subject to the satisfactory implementation of the EPA's recommended conditions and procedures of Section 4 of the report, including the proponent's environmental management commitments, the proposal can be managed to meet the EPA's objectives.

Recommendation 3

That the Minister for the Environment imposes the conditions and procedures set out in Section 4 of this report.

Recommendation 4

That the Minister for the Environment notes:

(a) current and future proposals for harbour and port construction on the eastern margin of Cockburn Sound would, if implemented, effectively change the coastline and bathymetry of the Sound; and

(b) the EPA considers that proponents for further development of harbours and ports on the eastern margin of Cockburn Sound should determine if any changes will have a significant effect on the circulation, flushing rates and water quality throughout Cockburn Sound.

Relevant factors	Objective	Proponent's commitments	EPA opinion
1. Marine water quality • flushing characteristics of harbour being altered; • nutrient status and water quality; • emergency sewage outfall discharge; and • turbidity.	To ensure that the harbour water quality meets the Western Australian Water Quality Guidelines for Fresh and Marine Waters (EPA Bulletin 711, 1993) and does not result in phytoplankton problems, or pose any risk to people who may have contact with the harbour water.	Monitor water quality and sediments in the harbour and immediately adjacent area. Prepare and implement a contingency plan in the event that monitoring indicates significant change in quality. Prepare an on-going management plan for the harbour including clean-up and containment procedures for spills and noxious substances.	The flushing characteristics of the harbour, nutrient status and water quality in the harbour, emergency sewage outfall discharge, and turbidity with the proposed breakwater extension are unlikely to compromise the EPA's objective for marine water quality. However in view of uncertainties regarding water quality, the proponent should prepare a contingency plan within 12 months of construction commencing.
2. Seagrass	To maintain the abundance, species diversity and geographic distribution of seagrass.		Construction of the breakwater is unlikely to compromise the EPA's objective to protect seagrass.
3. Dust	To protect the surrounding land users such that dust emissions will not adversely impact upon their welfare and amenity or cause health problems.	Manage dust generated to DEP Dust Control Guidelines, to ensure public amenity .	The dust likely to be generated within the proposed breakwater extension construction area is unlikely to compromise the EPA's objective to protect surrounding land users, such that the dust emissions will not adversely impact upon their welfare and amenity or cause health problems.
4. Noise	To protect the amenity of nearby residents from noise associated with the proposal by ensuring noise levels meet statutory requirements and acceptable levels.	Manage noise and vibration generated to ensure public amenity as per DEP requirements.	The noise likely to be generated within the proposed breakwater extension construction area is unlikely to compromise the EPA's objective to protect the amenity of nearby residents from noise associated with the proposal by ensuring noise levels meet statutory requirements and acceptable levels.

Table 1. Relevant environmental factors, objectives, proponent's commitments and EPA's opinion.

Appendix 1

Figures

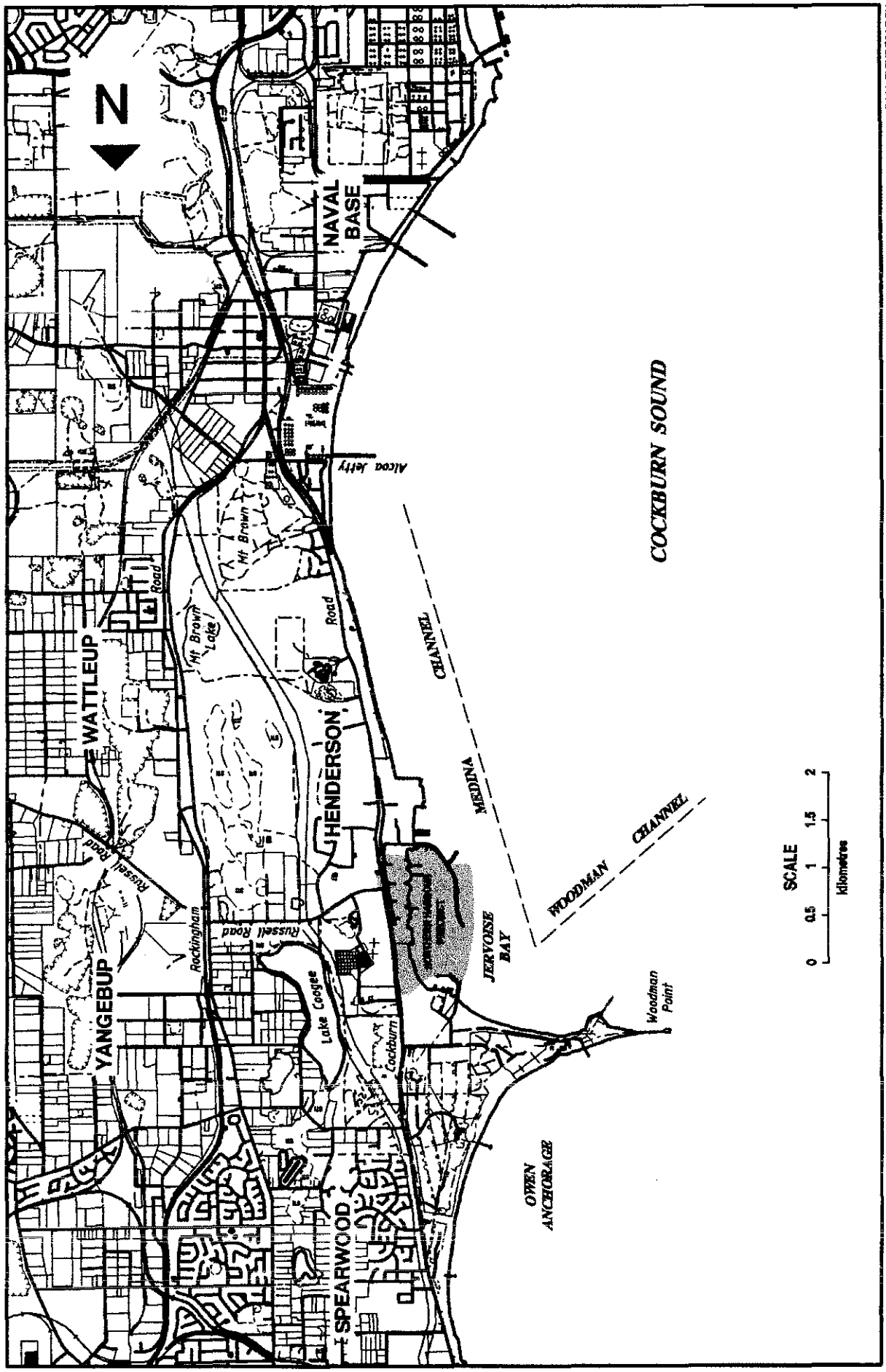

Figure 1. Location Plan — Breakwater extension, Northern Harbour Precinct, Jervoise Bay (Source: Halpern Glick Maunsell, 1996).

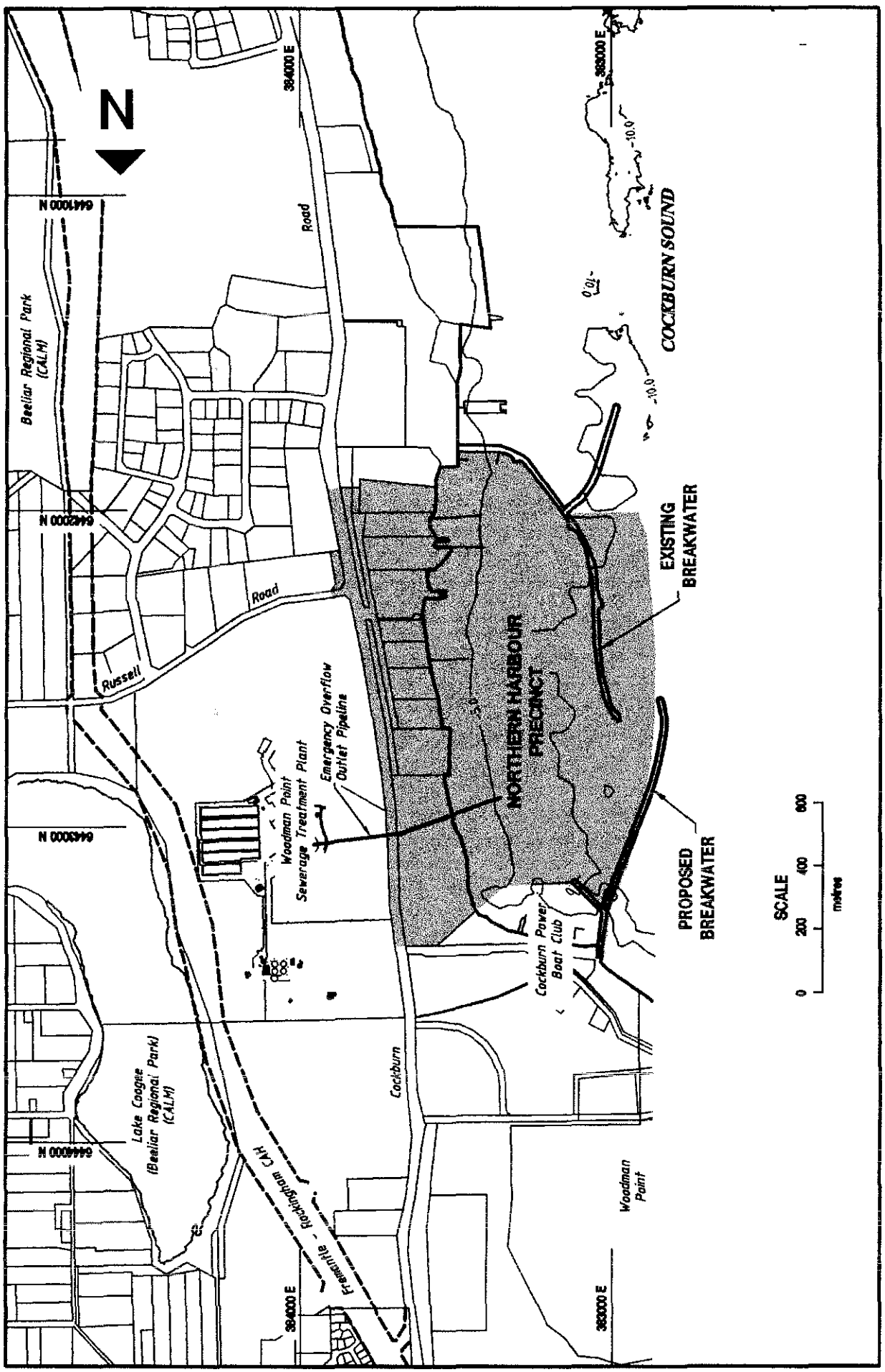

Figure 2. Development Plan — Breakwater extension, Northern Harbour Precinct, Jervoise Bay (Source: Halpern Glick Maunsell, 1996).

Appendix 2

Individuals and organisations that made submissions

Organisations:

- City of Cockburn
- Fremantle Port Authority
- Town of Kwinana
- Water Corporation
- Coastal Water's Alliance
- Cockburn Power Boats Association
- Conservation Council of Western Australia Inc.

Individuals

- Mr C Spencer
- Mr L Coonan
- Mr D Walsh
- Captain C Deans
- Mr W R Slight
- Mr D Sutton
- Mr R Crockett
- Mr R K Smillie

Appendix 3

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