ALBANY PORT AUTHORITY

ALBANY PORT DEVELOPMENTS
CONSULTATIVE ENVIRONMENTAL REVIEW

ALAN TINGAY & ASSOCIATES

APRIL 1996

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REPORT NO: 95/54

AN INVITATION TO COMMENT ON THIS CONSULTATIVE ENVIRONMENTAL REVIEW

This Consultative Environmental Review (CER) describes a proposal for expansion of the Port of Albany. The proposal will involve reclamation and dredging in Princess Royal Harbour in order to create two new berths and landbacking for storage and shiploading facilities.

The CER describes the proposal and its likely effect on the environment in accordance with the requirements of the Environmental Protection Act, 1986.

The Environmental Protection Authority (EPA) invites people to make a submission on this proposal during the four week period from 1 April 1996 to 29 April 1996 when the CER is available for public review.

After receipt of comments from Government agencies and from the public, the EPA will prepare an Assessment Report with recommendations to the Government, taking into account issues raised in public submissions.

Why write a submission?

A submission is a way to provide information, express your opinion and put forward your suggested course of action - including any alternative approach.

It is useful if you indicate any suggestions you have to improve the proposal.

All submissions received by the EPA will be acknowledged. Submissions will be treated as public documents and may be quoted in full or in part in each report unless specifically marked confidential.

Submissions may be fully or partially utilised in compiling a summary of the issues raised or where complex or technical issues are raised, a confidential copy of the submission (or part of it) may be sent to the proponent.

A summary of issues is normally included in the EPA's Assessment Report.

Why not join a group?

If you prefer not to write your own comments, it may be worthwhile joining a group interested in making a submission on similar issues.

Joint submissions may help to reduce the work for an individual or group, while increasing the pool of ideas and information.

If you form a small group (up to ten people) please indicate all the names of the participants. If your group is larger, please indicate how many people your submission represents.

Developing a submission

You may agree or disagree with, or comment on, the general issues discussed in the CER or the specific proposals. It helps if you give reasons for your conclusions, supported by relevant data. You may make an important contribution by suggesting ways to make the proposal environmentally more acceptable.

When making comments on specific items in the review document:

- clearly state your point of view;
- indicate the source of your information or argument if this is applicable; and
- suggest recommendations, safeguards or alternatives.

Points to keep in mind

By keeping the following points in mind, you will make it easier for your submission to be analysed:

- Attempt to list points so that the issues raised are clear. A summary of your submission is helpful.

- Refer each point to the appropriate section, chapter or recommendation in the CER.

- If you discuss different sections of the CER, keep them distinct and separate, so there is no confusion as to which section you are considering.

- Attach any factual information you wish to provide and give details of the source. Make sure your information is accurate.

Remember to include:

- your name,
- your address,
- the date, and
- whether you want your submission to be confidential.

The closing date for submissions is:

Monday, 29 April 1996.

Submissions should be addressed to:

Environmental Protection Authority
8th Floor, Westralia Square
141 St George's Tce
PERTH WA 6000

Attention: Ms Juliet Cole

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1. Proposal

This Consultative Environmental Review (CER) describes a proposal to expand the Port of Albany by:

- Constructing a new berth at the eastern end of the port,
- Reclaiming 5.5ha of Princess Royal Harbour to provide landbacking to the new berth, and
- Dredging a basin 6.0ha in extent for ships adjacent to the new berth.

Existing infrastructure including the railway and roads will be extended to the reclamation area but these works will be minor and confined to the eastern end of the port.

The area of Princess Royal Harbour which will be impacted by this proposal is relatively small and most of it has been dredged previously. It also does not support any seagrass communities. The impact therefore is considered to be negligible.

The proposal does not include the construction of any major storage or loading structures on or adjacent to the reclaimed area as the design of such structures is not known at this stage and will depend on specific port user requirements.

The proposal also does not include transport considerations as again these cannot be specified at the present time. However, analysis of potential traffic levels is included for information purposes. This analysis also emphasises the importance of maintaining adequate separation distances between houses and the railway and Princess Royal Drive which are the main port transport routes.

2. Rationale

During the past 100 years the Port of Albany has been expanded at regular intervals in order to handle increasingly larger ships and to meet expanding trade opportunities for the Great Southern Region. This expansion has involved very extensive dredging of the north-east sector of Princess Royal Harbour during 1893, 1901-1902 (100ha), 1922-1923 (22ha), 1951-1952 (39ha), and 1978-1979 (50ha). Reclamation of large areas of foreshore also occurred in 1951-1952 and 1978-1979 to provide land for storage of trade commodities and for other port infrastructure.

There are now strong indications that exports from the Great Southern Region will again increase substantially in the next 5 to 10 years. Grain exports are expected to double in this period, exports of silica sand have commenced recently, and inevitably there will be large scale exports of woodchips derived from Blue Gum plantations. There is also the possibility of frozen meat exports from the proposed Narrikup Export Abattoir.

In all, trade through the Port of Albany is expected to increase from the present 1.5Mtpa to at least 2.9Mtpa and possibly more than 4Mtpa.

As a result of these increases, the existing berths at the Port of Albany will be fully utilised very quickly, there will be a need for one and possibly two new berths (depending on the level of woodchip exports), and additional land will be required in order to provide sufficient area for storage requirements.

3. Environmental Implications

Summary

A table of the key environmental issues is provided on Pages (v) and (vi) of this Summary.

Marine Environment

The dispersion and settlement of suspended sediments from dredging works has the potential to cause impacts on sensitive marine communities. Therefore, all dredging operations for the proposed port expansion will be managed and monitored in accordance with a Dredging and Dredge Spoil Disposal Management Plan (DDSDMP) prepared in accordance with Guidelines of the Waterways Commission (1995). The management plan will be prepared in consultation with the Albany Waterways Management Authority (AWMA) and the Department of Environmental Protection (DEP) following the granting of environmental approval. The plan will incorporate measures to limit the dispersion of suspended material during dredging and to maximise the retention of spoil in the containment bunds of the reclamation area. It will also specify a comprehensive monitoring program.

The proposed dredging and reclamation works will involve a relatively small area of Princess Royal Harbour (totalling about 11.5ha) particularly in comparison with previous dredging and reclamation works. These previous works are not known to have caused any significant environmental impacts on Princess Royal Harbour and therefore it is considered reasonable to conclude that the proposed developments will not have any significant implications either, especially as a DDSDMP will be in place. In fact, it appears that the creation of the entrance channel to the port by dredging may have increased the rate of water exchange between King George Sound and Princess Royal Harbour and that this may have limited the extent of nutrient enrichment and loss of seagrass in the Harbour. The entrance channel will not be affected or modified by the proposed developments.

The area in Princess Royal Harbour which will be affected by dredging and reclamation comprises bare sand, much of which has been dredged previously, and is at least 500m from the nearest seagrass communities. Water circulation patterns in Princess Royal Harbour indicate that sediments suspended in the water during dredging operations will be transported by tidal action over a relatively limited area before being transported out through the entrance channel into King George Sound. The area of Princess Royal Harbour where

suspended sediment is most likely to settle to the bottom during tidal transport has been dredged in the past and does not support seagrass or macroalgae communities.

The levels of nitrogen and phosphorus in the area proposed to be dredged are also low according to information from previous studies of Princess Royal Harbour by the DEP and to data from analyses of samples from the existing stockpiled sediments. Therefore, it is unlikely that there will be a significant increase in nutrient levels in the water column as a result of the dredging.

There are also no records of introduced organisms resulting from discharge of ballast water from ships in the Port of Albany. Ballast discharges are now managed by the Australian Quarantine Inspection Service (AQIS) with procedures designed to minimise the potential for introduction of new organisms. The dredging is therefore unlikely to promote colonisation of any introduced species in the Harbour.

Finally, the area affected by the proposal is surrounded by existing port facilities and does not have any significant fisheries, recreation, tourist or other social values.

Onshore Environment

The proposed development area is more than 750m from the nearest house and the intervening space comprises port land occupied by large storage facilities, Princess Royal Drive and the port railway. Additional structures including bunker fuel storage tanks also will be constructed in this area in the near future.

Therefore, there is very little potential that construction or operation of the new berths and associated facilities will cause significant noise, dust or other disturbance for residents who live close to the Port of Albany.

The onshore area which will be affected by the works comprises reclaimed land and the large stockpile of sediment from the 1978-1979 dredging works. The development therefore will not have any significant impact on the onshore natural environment.

4. Environmental Monitoring Program

The APA will implement a Dredging and Dredge Spoil Disposal and Management Plan (DDSDMP). This plan will include an Environmental Monitoring Program (EMP) in order to provide baseline and ongoing information during the construction and operation of the proposed new berths and reclamation area. The EMP will comprise the following:

- Assessment of water quality in the dredge area and adjacent locations, before, during and for a period after dredging.

- Assessment of heavy metal and nutrients in sediments in the dredged area before, during and for a period after dredging.

- Further assessment of heavy metals and nutrient levels in stockpiled sediments which will be used for reclamation.

- Assessment of sediments in the dredged area for the presence of introduced toxic organisms.

5. Commitments

The APA makes a series of commitments in this CER which specify actions it will take to protect the environment and to monitor the effects of constructing the port developments. In summary, these commitments comprise:

- Preparation of Dredging and Dredge Spoil Management Plan in compliance with Guidelines recently published by the Waterways Commission.

- Provision of the results of a survey for introduced organisms in the Port of Albany to the Department of Environmental Protection and the Albany Waterways Management Authority.

- Compliance with noise regulations of the Environmental Protection Act, 1986.

- Preparation of a Drainage Plan designed to reduce the potential for pollution of Princess Royal Harbour due to runoff and spills.

- Control dust through specific requirements on contractors involved in earthmoving.

These commitments are expected to become conditions imposed by the Minister for the Environment as part of the environmental approval for the proposed developments.

A summary of commitments in Table format is also provided on Page (vii).

6. Conclusions

The CER concludes that the proposed developments at the Port of Albany will have no significant environmental impacts.

ALBANY PORT DEVELOPMENTS
SUMMARY OF KEY ISSUES

Topic	Objective	Proposal Characteristics	Impact	Comment on Impact	Proponent Commitment
Biophysical					
Impact on nearshore marine habitat	Minimise effects of dredging and reclamation on sea bed and water quality	Involves reclamation & dredging in Princess Royal Harbour	Total area of dredging and reclamation about 11.5ha Localised temporary impact on water quality	The area which will be affected by dredging and reclamation has largely been dredged in the past and does not support a diverse marine community	The APA will develop and implement a Dredging & Dredge Spoil Disposal Management Plan (DDSDMP) in consultation with the AWMA and DEP
Impact on seagrass	Avoid direct impact on seagrass, minimise indirect impacts due to sediment drift	Involves reclamation & dredging in Princess Royal Harbour	No direct impact. Sediment drift will be managed but there may be local temporary effects	There are no seagrass communities in the area which will be directly affected by the works. Offsite effects due to dispersion of suspended sediments will be avoided through implementation of a Management & Monitoring Plan	The APA will develop and implement a DDSDMP (see commitment relating to nearshore marine habitat)
Water Circulation in Princess Royal Harbour	Avoid any change to major circulation patterns through channel entrance	Reclamation area extends into Princess Royal Harbour	No change in water circulation pattern	The reclamation area has been designed and oriented so as to minimise any change to water circulation patterns near the entrance to Princess Royal Harbour. The channel entrance which is the primary topographical determinant of water circulation, will not be modified.	Not applicable
Pollution					
Turbidity	Restrict to previously dredged area in Princess	Reclamation and dredging works	Minor, restricted and temporary	Management and monitoring required	The APA will develop and implement a DDSDMP (see commitment

	Royal Harbour				relating to nearshore marine habitat)
Water Quality	Restrict any changes to previously dredged area in Princess Royal Harbour	Reclamation and dredging works are liable to cause changes in water quality	Minor, restricted and temporary	Management and monitoring required	The APA will develop & implement a DDSDMP (see commitment relating to nearshore marine habitat)
Drainage	Control discharges to Princess Royal Harbour	Drainage from reclamation area will discharge to Harbour	Minor and restricted	Design measures required to minimise potential for ongoing and spill discharges	The APA will develop a Drainage Plan incorporating pollution control features in consultation with AWMA
Dust	Minimise dust during construction works	Dust may be generated during earthmoving operations	Construction site only, temporary	Requires manage-ment	The APA will require contractors to implement dust control measures as recommende d by EPA guidelines
Noise	Comply with regulations	Construction noise	Certain construc-tion activities are likely to be audible in residential areas next to the port	Management required	The APA will require contractors to restrict noise generating construction operations to between 7am and 7pm weekdays and to comply with the noise regulations of the Environmental Protection Act, 1986
Social Surroundings					
Visual Impact	Minimise change to visual environment	New berth will form part of existing port structures	Minor	Area already developed for port purposes and visible and/or distant from houses and vantage points	Not applicable

ALBANY PORT DEVELOPMENTS
SUMMARY OF COMMITMENTS

Issue	Objective	Commitment	Timing	To Whose Requirements	Performance Indicator
Protection of water quality and seagrass communities in Princess Royal Harbour	Manage and monitor dredging and reclamation works to protect the marine environment	APA will prepare and implement a Dredging & Dredge Spoil Disposal Management Plan	Before, during and after construction	Department of Environmental Protection (DEP), Albany Waterways Management Authority (AWMA), Water & Rivers Commission (formerly Waterways Commission)	Compliance with relevant environmental criteria
Possible presence of introduced organisms	Survey dredged area	APA will report and publish results of survey by AQIS and CSIRO	Before construction	DEP, AWMA, Water & Rivers Commission	Presence of organisms may require control/ eradication program by relevant agencies
Construction Noise	Minimise noise emissions. Compliance with noise regulations	APA will ensure compliance with noise regulations of the Environmental Protection Act, 1986	During construction	DEP	Statutory regulations
Drainage - protection of Princess Royal Harbour from pollution in runoff and spills	Reduce potential for pollution by drainage design measures	APA will prepare a Drainage Plan incorporating pollution control features	Before construction	DEP, AWMA, Water & Rivers Commission	Not applicable
Dust	Prevent nuisance dust during construction earthworks	APA will ensure that contractors control dust	During construction	DEP	No obvious dust beyond construction area

1. INTRODUCTION

1.1 Proposal

The proposal discussed in this Consultative Environmental Review (CER) involves:

- Construction of a new berth at the eastern end of the Port of Albany,
- Reclamation of 5.5ha in Princess Royal Harbour to provide landbacking to the new berth, and
- Dredging a basin 6.0ha in extent for ships adjacent to the berth.

The proposal does not include any structures which may be constructed on or adjacent to the new berth nor specific proposals for the transport of commodities to or from the new berth. These features can only be determined in the future when specific requirements of port users are known. However, information on possible storage, loading, and transport requirements is provided, particularly for woodchips. The Albany Port Authority (APA) considers that export of woodchips is likely to constitute the primary use of the new port area and berth.

In December 1994, the APA referred the proposal for the expansion of the port to the Environmental Protection Authority (EPA) as required under the provisions of the Environmental Protection Act, 1986. The referral included a Notice of Intent (NOI) prepared by Halpern Glick Maunsell (1994) which provided details of the port development plan including infrastructure and related matters, timing, and different options which had been considered by the APA prior to selecting the proposed plan.

After considering the NOI, the EPA determined that the proposed port developments should be formally assessed and requested the APA to prepare this Consultative Environmental Review (CER) for assessment purposes. The EPA also issued Guidelines which specify the required content of the CER. These Guidelines are provided in Appendix 1.

1.2 Structure of the Consultative Environmental Review

This CER is intended to provide a description and an analysis of the environmental and social implications of the proposed expansion of the Port of Albany. The information provided in this CER has been prepared in accordance with Guidelines issued by the EPA of Western Australia and includes the following sections:

- An introduction which provides background information to the proposal, details of the proponent, a description of the environmental impact assessment process in Western Australia, and details of the consultation program which has been implemented to inform the public of the proposal.

- A detailed description of the proposal, the need for the development, and other options considered by the Albany Port Authority.
- A description of the existing environment of Princess Royal Harbour and of the actual area which will be affected by the proposed works.
- An analysis of the environmental implications of the proposed development, and particularly direct and indirect effects on Princess Royal Harbour.
- Information on potential port traffic levels (road and rail) associated with projected growth in trade, and on the management of ballast water and emergencies.
- A description of the Environmental Monitoring Program (EMP) which will be implemented by the APA in order to record and appropriately manage the effects of the dredging and reclamation works.
- A list of commitments by the APA relating to the construction of the new port area.

A guide describing how to make a written submission on the CER to the EPA is also included together with a summary, a list of relevant references, and the Guidelines for the CER issued by the EPA.

1.3 The Environmental Assessment Process

The environmental impact assessment process in Western Australia is specified by the Environmental Protection Act, 1986 and is illustrated in the flow chart presented in Figure 1. The Act requires a proponent (in this case the Albany Port Authority) to notify the EPA of any proposal which may have significant environmental implications. The EPA then determines whether the proposal should be formally assessed. If a decision is made for a formal assessment, the EPA requires the proponent to prepare a detailed account of the environmental implications in a report such as the present CER.

After the CER has been prepared, it is reviewed by the Department of Environmental Protection (DEP) to ensure that it provides sufficient detail and a comprehensive coverage of issues. When this has been established, the CER is released for a public review period. During this period, any person may make a written submission to the DEP on any aspect of the project. At the end of the public review period, a summary of submissions is supplied to the proponent by the DEP and a response is sought.

The DEP then makes an assessment of the development proposal taking into account the CER, the public submissions, the response by the APA to the submissions, and any other relevant information.

The EPA then considers the advice of the DEP and publishes a final analysis of the proposal in the form of an Assessment Report. This Assessment Report will

include recommendations to the Minister for the Environment as to whether the proposed development is acceptable and what conditions should be imposed on the Albany Port Authority to safeguard the environment during the construction of the new berths. Ultimately, the Minister for the Environment will decide whether the project may proceed and will set legally binding conditions. Any person may appeal to the Minister about the content of the EPA Assessment Report or any of its recommendations during a specified 14 day appeal period.

The environmental assessment process in Western Australia is designed to enable members of the public to obtain details of the proposed port developments and to formally comment on any matters of interest to them. These inputs are required within a specified public review period, which for a CER is four weeks in duration, and are considered by the DEP/EPA together with technical assessments provided by expert staff of the DEP. The public is encouraged to provide written comments to the DEP/EPA as part of the environmental assessment process. Details of the public review period for the Albany Port Developments proposal and advice on how to make a submission are provided at the beginning of this CER.

The environmental assessment process also enables State Government Agencies to consider in detail the implications of the port developments proposal. These considerations will be based on technical assessments of the nature and extent of changes to the existing natural and social environments, on proposed management strategies designed to control or limit adverse changes, and on monitoring programs designed to document and analyse the effectiveness of such strategies.

1.4 The Proponent

The proponent for the Albany Port Developments is the Albany Port Authority, the address of which is:

85 Brunswick Road
(PO Box 175)
ALBANY WA 6330.

The APA was established by the Albany Port Authority Act, 1926 and its responsibilities are defined by that Act and by the Port (Functions) Act, 1993. The Authority comprises five members appointed by the Governor. Under the Acts, the APA has the exclusive control of the Port of Albany and has the duties of maintaining the Port and all facilities and infrastructure associated with the port, and of providing for necessary extensions of port works.

The area covered by the provisions of the Albany Port Authority Act, 1926 includes most of Princess Royal Harbour and King George Sound, as well as about half of the land based port areas. The area includes the proposed location of the new berths and all works associated with those berths.

1.5 Timing

The timing of construction of the new berths has still to be determined and is likely to be dictated by future demands for bulk materials handling and storage facilities. However, at this stage the works are tentatively scheduled for completion by the end of 1998 with reclamation works commencing in 1996, dredging during 1997, and berth construction in 1998.

1.6 Other Relevant Legislation

The Albany Port Authority must apply for a dredging licence from the Albany Waterways Management Authority (AWMA) under the provisions of the Waterways Conservation Act, 1976. This application will be made during 1996 after the proposed port developments have been approved by the Minister for the Environment.

1.7 Public Consultation

The APA implemented the following public consultation measures during the preparation of this CER:

- Meeting with residents of Brunswick Road to explain and discuss the proposal on 14 December 1995.
- Briefing for Albany Town Council on 27 February 1996 - preceded by meeting with the Town Planner.
- Press release advising of proposal and publication of the CER
- Provision of draft copies of the CER to the Albany Waterways Management Authority, Town of Albany and LandCorp.

The APA intends to further publicise the proposal through the media during the public review period and will respond to public enquiries either personally and through meetings as required.

2. THE ALBANY PORT DEVELOPMENTS PROPOSAL

2.1 Description of Works Required

The regional location of the Port of Albany and the extent of the works required for the proposed port developments are shown in Figures 2, 3 and 4. The works have three components as follows:

- Reclamation of an area of 5.5ha of seabed in front of the existing sea wall to provide land backing to the berths for bulk storage of export products.
- A new berth No. 5 in front of the reclamation area. The berth will comprise a concrete platform on piles driven into the seabed.
- Dredging by suction dredge of an area of about 6ha between the berths and the existing entrance channel to provide sufficient depth of water for ship handling purposes.

Existing stockpiled dredge spoil and new spoil from the proposed dredging works will be used to create the reclaimed area. The existing stockpile derives from previous Harbour maintenance dredging and is located near the proposed reclamation area. Approximately 300,000m^3 of material is available from this source. The proposed dredging works for the new berths will provide an estimated further 250,000m^3 of fill materials.

The volume of sediment which needs to be dredged to provide the ship handling basin adjacent to the new berths, together with the volume already stockpiled onshore from the 1978-1979 dredging operations, will provide a reclamation area approximately 5.5ha in extent. The APA wishes to maximise the area of reclamation in order to cater for the maximum potential demand for storage space and area for shiploading facilities. Therefore, all of the available dredged spoil will be used for reclamation purposes.

The present water depth in the area to be dredged ranges from 5m to 10m and the dredging operation will extend this to 12.2m. This is the same as the existing depth of the entrance channel and Harbour. It is estimated that the dredging operations will take three to four months to complete.

All ship handling will occur in the entrance channel and dredged sections of the port area.

2.2 Construction Details

The reclamation and dredging for the proposed port development will occur in stages. In the first stage the existing stockpile material will be placed into a cell formed by rock breakwaters extending out from the easternmost section of the existing sea wall.

Dredging may commence during the placement of existing stockpiled material or after this placement has been completed. The dredged spoil from the

Harbour will be pumped via surface floating pipes to create the final westernmost section of the reclamation area. The design of this cell and the containment of spoil are described in Section 4.4.2 of this CER.

The construction of berth No. 5 will commence as soon as practicable given the ongoing reclamation and dredging works, and finally the roads and other infrastructure will be constructed.

2.3 Need for the Proposed Developments

A number of new export oriented industries have been proposed recently or are being established in the Great Southern Region. These include a silica sands project by Tomen Pty Ltd, the possibility of up to three separate woodchip operations, and an export abattoir located at Narrikup proposed by Benale Pty Ltd. In addition, grain exports from the region are expected to increase and Co-operative Bulk Handlers have recently expanded their storage capacity at the Port of Albany to cater for this. Bulk bunker fuel storage facilities are also proposed and there is a possibility of additional general cargo and containers.

The APA considers that the existing berths at the Port of Albany will be fully utilised by 1998. Berths Nos. 1 and 2 are also old and have a limited load bearing capacity. New berths and related storage areas and infrastructure therefore need to be planned and approved so that the anticipated major increase in trade can be provided for as required.

In 1994, the APA commissioned Halpern Glick Maunsell to examine the existing facilities at the port and to prepare a Port Development Plan that could be progressively implemented to meet additional requirements. The Port Development Plan includes:

- An analysis of the most appropriate location for future berths.
- Specifications of dredging requirements.
- Designation of areas to provide for bulk material storage and handling.
- Description of potential bulk handling facilities.
- Recommended locations for known future port users and provisions for potential port users so that appropriate leases can be granted.
- Proposals for port and berth access by road, rail and conveyor services.

The reclamation area associated with the new berths will be allocated to the storage of woodchips and general and bulk cargoes, while the silica sands and meat exports will be accommodated in existing storage areas. Potential woodchip exporters have requested the APA to set aside at least 5ha for stockpile requirements. The bunker fuel storage will be located in the vicinity of the existing fuel storage area.

It is not envisaged that the new berths will be used for the export or import of hazardous or dangerous goods. If such a requirement eventuates however, application will be made for the necessary approvals from the appropriate authorities.

The existing Port of Albany does not have the capacity to accommodate additional large storage areas for woodchips and it would also be very difficult to provide the necessary ship loading facilities at the existing berths as these are allocated to other export commodities and are not suitable for woodchip carriers or loaders. The planning and approval of new storage areas and berths is essential so that the potential requirements of the woodchip industries can be met with the shortest possible lead time.

2.4 Other Options Considered by the APA

Various options for the provision of new berths were considered by Halpern Glick Maunsell during the preparation of the Port Development Plan. These included construction of new berths along the current shoreline to the east of existing No. 3 berth and variations of the preferred proposal presented in this CER.

Extensions from the existing berths were not favoured as this option would not provide additional land areas for the storage and handling of bulk materials. Further significant constraints are the greater area of dredging that would be required and the fact that areas of hard igneous rock would need to be removed as part of the dredge operations. This would lead to considerably higher costs.

In contrast, the preferred option avoids the need to dredge rock and also provides for additional land backing which is considered to be an essential requirement of the port development proposal.

The alignment of the new berths is also an important factor in the handling of ships loaded with woodchips. These ships will ride high in the water because of the relatively low weight to volume ratio of woodchips. As a result, they would tend to be pushed by south-westerly winds against a berth aligned along the present foreshore, and would be more difficult to handle. They will be less subject to windage with the berths in the proposed alignment.

The initial planning study also considered the construction of a new No. 4 berth at an angle to the south-east of No. 3 berth in a location which would reduce the need for dredging. This option also involved reclamation of about 4ha of land behind the berth using existing stockpiled dredge spoil. It was considered, however, that the alignment of this berth was less suitable for ship handling purposes and that it presented potential design difficulties for ship loading facilities.

3. THE EXISTING ENVIRONMENT

3.1 Introduction

The Port of Albany, including the proposed new berth, is located in the marine inlet known as Princess Royal Harbour. The environmental implications of the proposed port developments must therefore be considered in the context of the overall environment of Princess Royal Harbour and in particular in terms of the decline of seagrass communities and the related spread of macroalgae which has occurred there over the past 30 years.

The description of the existing environment provided in this section of the CER therefore includes a review of environmental conditions in Princess Royal Harbour followed by a description of the specific environment in the area which will be affected by reclamation and dredge works.

3.2 Princess Royal Harbour

3.2.1 General Description

Princess Royal Harbour is an embayment or marine inlet with a surface area of 28.7km^2 which is located immediately to the south of the town of Albany on the southern coast of Western Australia. The mouth of the Harbour is located at the north-east corner and is a relatively narrow connection to King George Sound. Water in the Harbour mainly originates from the Sound but there are also freshwater inflows through natural and man-made drainage channels from three land catchment areas. These inflows have included discharges from industry, agriculture, and urban sources which have variously contributed to a decline of seagrass and spread of macroalgae in the Harbour.

Princess Royal Harbour has been the subject of intensive study over many years due to concern over the general deterioration of the marine ecosystem there. As a result, several major publications on aspects of the environment are available, including general reviews by the Department of Conservation & Environment (1980), the EPA (1990) and AWMA (1992; 1995). The information presented below is based on these reports and other specific research publications which are referred to in relevant sections.

3.2.2 Bathymetry

The bathymetry of Princess Royal Harbour is shown in Figure 5. The depth of the Harbour is greatest close to the mouth in the north-east corner where it has been dredged to between 10m and 12.2m below mean sea level (MSL). From this point, the depth progressively decreases out to a wide sandy inter-tidal to sub-tidal shelf of less than 2m depth which fringes the shoreline particularly in the western and southern sectors.

3.2.3 Water Circulation

Wind Driven Circulation

Wind driven circulation of water in Princess Royal Harbour has been the subject of a specific study by Mills and Brady (1985) of the Department of Conservation & Environment (now Department of Environmental Protection). This study involved computer modelling of water circulation patterns under four different wind speed conditions and three wind directions (south-west, north-west and south-east). The wind conditions were selected after consideration of data collected at Albany Airport over a period of 19 years. These data indicate that moderate prevailing winds are south-easterlies in summer and north-westerlies (swinging to south-west) in winter. Wind roses for Albany Airport are shown in Figure 6. The average wind speed is about 7.5m/sec.

The modelling assumed that Princess Royal Harbour is a closed system (i.e. it is not connected to King George Sound) and therefore takes no account of the effect of tides on water circulation.

The study concluded that flow patterns in the Harbour are very similar for winds from the same direction regardless of wind speed. West to north-west winds generate predominantly anti-clockwise circulation whereas east to south winds generate predominantly clockwise circulation. Steady wind from each of these directions give rise to an overall circulation pattern which covers most of the area of the Harbour. However, when winds change directions significantly, the current directions may be reversed and nett circulation may be limited. In the case of winds from the north-east there are two major counter rotations of circulation.

Tidal Exchange

A more recent assessment of water circulation and flushing characteristics at Princess Royal Harbour by Mills & D'Adamo (1993) includes consideration of tidal exchange with King George Sound and is based on actual field measurements as well as computer modelling. This study concludes that up to 30,000,000m^3 of water may enter or leave Princess Royal Harbour within 8 to 16 hours of rising or falling tides respectively. Water movement is accelerated to current speeds of up top 0.5m/sec as it passes through the entrance channel at the Harbour mouth and this is an important factor in determining water exchange.

The circulation patterns are illustrated in Figure 7. In the absence of wind and during mean to spring flood tides, incoming water may move a distance of up to 2.5km directly across the Harbour and then undergoes clockwise circulation during the ebb tide. Also during the ebb tide, water converges towards the entrance channel from a distance of up to 1.8km and discharges to King George Sound. This discharge is initially over a wide area on both sides of the entrance channel but subsequently becomes a narrow stream before, and several hours after, low tide.

After low tide, water close to the Harbour mouth in King George Sound, but largely separate from the outgoing stream, converges into the entrance

channel. This means that only some of the water that flows out of the Harbour on the ebb tide re-enters on the subsequent flood tide.

The effect of wind on water circulation in the Harbour is superimposed on the tidal induced water exchange and very moderate winds are capable of modifying the purely tidal circulation pattern. Surface and shallow water generally moves downwind while deeper water moves upwind. West to north-west winds generate an overall anti-clockwise circulation while east to south winds generate clockwise circulation, as indicated in the earlier study. South-west winds generate clockwise circulation in the north-west half of Princess Royal Harbour and an anti-clockwise circulation in the south-east sector.

Also during north to north-west winds, the incoming tidal jet stream through the entrance channel is deflected to the right due to the wind driven anti-clockwise circulation. During the subsequent ebb tide, water leaving the Harbour mainly comes from the south side of the entrance channel. During east to south-east wind conditions, the water coming in to the Harbour is deflected south and, during the subsequent ebb tide, water flowing out of the Harbour is derived mainly from in front of the wharfs of the port.

3.2.4 Transport of Dissolved and Suspended Materials

Water circulation due to tidal exchange and wind is the principal factor in the dispersion of suspended sediments and dissolved materials in Princess Royal Harbour (Mills & D'Adamo, 1993). In winter during north-west to west winds, such materials tend to be transported in a predominantly anti-clockwise direction about the south-west side of the Harbour and then northwards towards the entrance channel. In summer during east to south-east winds the materials move in a clockwise direction towards the entrance channel, King George Sound during ebb tides, and southwards into the Harbour on the flood tide.

Mills and D'Adamo (1993) comment that widening or deepening of the entrance channel would not cause an increase in the flow rates through the Harbour mouth (because the tidal capacity of the Harbour would be unchanged) but the speed of water flowing through the channel would decrease and this would reduce water exchange between the Harbour and King George Sound.

3.2.5 Water Quality

A specific study by Hillman *et al.* (1991) has demonstrated that water quality in Princess Royal Harbour is similar to that in King George Sound. This is considered to be due to the significant water exchange between the Harbour and the sound and the minimal inflows of fresh water from the surrounding catchments. It has been estimated that this water exchange typically results in the flushing of 90% of the pollutants discharged into the Harbour over a period of about 20 days (Mills & D'Adamo, 1993).

A summary of water quality data from a study by Atkins *et al.* (1980) and the more recent data of Hillman *et al.* (1991) is provided in Table 1. The data in this table indicate a significant difference in the water quality in Princess Royal

Harbour in 1979 and 1988 with lower levels of nitrogen and phosphorus, chlorophyll "a", and better water clarity as indicated by the visibility of the Secchi disc through the water column. It is possible that the poorer water quality in 1979 was a result of dredging operations in that year.

TABLE 1

WATER QUALITY IN PRINCESS ROYAL HARBOUR[1]
(from Atkins et al., 1980; and Hillman et al., 1990)

	1979 Averages (n = 19)	1988 Averages (n = 16)
Orthophosphate - phosphorus	9	1
Organic phosphorus	47	28
Total phosphorus	56	29
Ammonia - nitrogen	26	2
Nitrate - nitrogen	4	2
Organic nitrogen	~250	113
Total nitrogen	~280	117
Chlorophyll "a"	2.5	0.4
Attenuation coefficient (m^{-1})	0.85	0.21
Secchi depth (m)	2.0	5.5 (n=2)

[1] - All averages are µg/L except Attenuation coefficient and Secchi depth.

The discharge of nitrogen and phosphorus into Princess Royal Harbour and the circulation of these nutrients in the Harbour is generally considered to be the main factor responsible for the growth of macroalgae and the decline of seagrass communities there. Mills and D'Adamo (1993) suggest that the rate of water exchange between Princess Royal Harbour and King George Sound is not sufficient to prevent uptake of nutrients by algae and that wind action vertically mixes suspended and dissolved material in the water column and brings nutrients into contact with the plant communities on the Harbour bed.

3.2.6 Sediments

The level of nutrients in sediments in Princess Royal Harbour is documented in Hillman *et al.* (1990). The distribution of total nitrogen and total phosphorus is shown in Figure 8. The highest concentrations of both were found in the dredged channel near the Town Jetty and in the southern section of Princess Royal Harbour. The sediments in the central part of the Harbour where the water is more than 2m deep had the lowest concentrations.

The high concentrations of nitrogen and phosphorus recorded in the dredged channel were tentatively attributed to the accumulation of organic material and possibly because fine sediments with high organic and nutrient content tend to accumulate in deeper waters.

The higher nutrient levels recorded in the southern section of Princess Royal Harbour were also attributed to the accumulation of detrital material at this location which is relatively well protected from wave action.

3.2.7 Seagrass and Macroalgae Communities

The distribution of seagrass communities in Princess Royal Harbour in 1992 has been documented by AWMA and is shown in Figure 9. The seagrass communities in the Harbour were extensive in 1962 (EPA, 1990) but declined significantly by 1981 and continued to decline further until 1984 (Hillman *et al.*, 1990).

Since 1984 there has been an increase in the area covered by seagrass of approximately 60% (or about 500ha) principally comprising low density communities (2% to 15% cover) in the central part of the Harbour where the water depth is more than 2m. There has however, been continuing loss of seagrass communities in shallow waters and a thinning of the remaining dense stands with the overall result that the aboveground seagrass biomass decreased by 60% between 1984 and 1988 (Hillman *et al.*, 1990). These authors conclude that "if the present rate of loss of seagrass is maintained, there will be no seagrass canopies of greater than 50% cover left in Princess Royal Harbour within three years... the longevity of the sparser beds (less than 50% cover) cannot be predicted accurately, but may be up to an order of magnitude greater."

The aerial extent of loss of seagrass in Princess Royal Harbour was first documented by Bastyan (1986) who estimated that there was a 66% reduction in cover between 1962 and 1984. He suggested that this loss was caused by excessive nutrient loading to the Harbour which promoted the growth of macroalgae and epiphytes which smothered the seagrass and reduced their light supply. The extent and abundance of macroalgae in 1992 is shown in Figure 9. Hillman *et al.* (1990) comment that this conclusion was also reached by Kirkman (1987) and that similar scenarios have been documented in other Western Australian bays and estuaries including Cockburn Sound (Cambridge, 1979; Cambridge & McComb, 1984) and the Peel-Harvey Estuarine System (Hodgkin *et al.*, 1985).

3.3 The Port Extension Area

3.3.1 General Description

The Port of Albany has been created through dredging and reclamation works in the north-east sector of Princess Royal Harbour. The extent of these works has been described by Garden (1978) and by Johnson (in prep.) and is illustrated in Figure 10. Up to the latter part of the last century, the port works comprised the Town Jetty and the former Port Jetty which extended out from the shoreline at the foot of Mt Clarence and Mt Adelaide in front of Brunswick Road. However, in 1893, 1901-1903 and 1922-1923, major dredging works occurred particularly in the vicinity and to the south of the Port Jetty in order to allow for the entry and berthing of larger ships. These dredging works were considerably more extensive

(but to a shallower depth) than the present dredged shipping basin. The dates and nature of the works were as follows:

- 1893:

  i) Entrance channel dredged to 8.5m;

  ii) Basin dredged over an area of 60ha to a depth of more than 8m including anchoring ground of 1.6ha dredged to nearly 11m.

  iii) More than 1.3 million tonnes of sediment deposited in Middleton Bay.

- 1901-1903:

  i) Entrance channel extended to a depth of 10.6m together with a basin to the south of Port Jetty;

  ii) Large basin extended to the west dredged to a depth of 9.1m;

  iii) Entrance channel to Town Jetty deepened to 7.0m; and

  iv) Minor dredging adjacent to Port Jetty.

- 1922-1923:

  A rectangular area 22ha in extent immediately surrounding Port Jetty was dredged from 9.1m and 10.06m to an overall depth of 10.4m.

In 1951-1952, 1967 and in 1978-1979, the dredged areas were again extended and modified as follows:

- 1951-1952:

  An area of 39ha to the west of Port Jetty was dredged to a depth of 10.1m and the spoil was used to reclaim an area of 29ha in front of the town.

- 1967:

  Relatively limited works extending the reclaimed land to provide backing to a new berth, dredging in front of the berth to a depth of 11.0m, and extending the total dredged area. On this occasion some dredged spoil was deposited within Princess Royal Harbour in the location shown in Figure 10.

- 1978-1979:

  The entrance channel to berth No. 3 was extended to a depth of 12.2m, and the depth in front Berth No's 1 and 2 was increased. The total area dredged was more than 50ha. There was also a large extension of the

reclamation area to the east. Surplus dredge spoil was stockpiled on land adjacent to the area of the new works proposed in this CER.

The history of the development of the Port of Albany is particularly relevant to the present proposal for extension of the port and for the present environmental assessment. In particular, the history indicates the following:

- The proposed dredging and reclamation works represent a continuation of the pattern of development of the port to cater for expansion of trade and the related need to accommodate larger ships.

- About 70% of the area proposed to be dredged in front of the new berths has previously been dredged on at least three occasions in 1901-1903, 1922-1923 and 1951-1952.

- The large scale dredging and reclamation works were carried out apparently with no recorded effects on the seagrass communities or other components of the marine ecosystem of Princess Royal Harbour. This does not mean that such works do not have the potential to cause impacts on the marine ecosystem or that they do not require specific environmental management procedures. It does however, suggest that the potential for impacts may be limited.

3.3.2 Bathymetry

The bathymetry of the port extension area is illustrated in Figure 11. The reclamation area comprises a shelf which extends from a depth of about 2m adjacent to the existing sea wall and slopes to a depth of 5m about 100m from the shore and to a depth of about 10m in the south-west sector adjacent to proposed berth No. 5. The latter area was previously dredged in 1901-1903 and in 1922-1923. The western sector of the reclamation area was dredged to its present depth of 8.8m in 1978-1979.

The area proposed to be dredged adjacent to the new berth has an existing depth between 5m and 10m^{+}. About 70% of this area has been dredged previously as described in Section 3.3.1.

3.3.3 Water Circulation

The proposed port extension works are located immediately to north of the entrance channel and about 1km at the closest point from the mouth of Princess Royal Harbour. In this area, as described in Section 3.2.3, water circulation in winter during flood tides and predominant north-west to west winds, tends to be to the north-west in front of the existing port area and past the Town Jetty and then in an anti-clockwise direction about the Harbour (Figure 12). This pattern has been recorded in field measurements by Mills & D'Adamo (1993).

In summer during flood and ebb tides and the typical easterly winds, the water circulation pattern tends to be clockwise to the south of the port area as illustrated in Figure 12. Again this pattern was recorded in actual field measurements by Mills & D'Adamo (1993).

3.3.4 Water Quality

Information on general water quality in the proposed works area in 1988 is provided in Hillman *et al.*, (1990). At that time phosphorus levels between 35.5µg/L and 42.9µg/L were recorded in the area. Site specific data on the past level of nitrogen in waters in the port area are not available in the literature. Since 1988 several sources of significant nutrient inflows to waters in the Port area have ceased operations. These include the Albany Woollen Mills, the Kailis and France Fish Processing Works, and the Metro Meats Abattoir. Present levels of phosphorus are therefore expected to be lower than those recorded in 1988.

There has also been a significant reduction in nutrient inflows to other parts of Princess Royal Harbour particularly as a result of improvements to the CSBP Farmers operations and associated discharges into the Robinson Street Drain.

3.3.5 Sediments

Information on the general level of phosphorus and nitrogen in sediments in the proposed works area during 1988 are provided in Hillman *et al* (1990) as shown in Figure 8. At that time, the levels of phosphorus ranged between 0.05µg/g and 0.26µg/g and the levels of nitrogen ranged between 1.06mg/g and 2.22mg/g. These levels are within the lowest ranges recorded in the Harbour and may be taken as indicative of existing conditions.

3.3.6 Seagrass and Macroalgae Communities

No seagrass and macroalgae communities have been recorded in the proposed works area by any of the research programs co-ordinated by the EPA and the Waters and Rivers Commission (see Figure 9 for the most recent information on distribution). These studies involved extensive diving surveys throughout Princess Royal Harbour.

Similarly, no evidence of living seagrass was recorded during intensive core sampling which was conducted as part of the planning for the proposed port extension works. The extensive dredging of the port area in the past also is not likely to have been conducive to seagrass colonisation.

3.4 Existing Port Facilities and Surrounds

3.4.1 Existing Port Facilities

The Port of Albany is undergoing a period of rapid expansion in terms of the types and quantities of cargoes being exported and associated increase in the capacity of storage facilities. The existing facilities are shown in Figure 13 and comprise:

- Grain 500,000 tonnes
- Silica Sand 50,000 tonnes
- Fuel 30,000 tonnes
- Fertiliser 12,000 tonnes

- Cold Store 2,500 tonnes

3.4.2 Surrounding Areas

The Port of Albany is located immediately south of, and adjacent to, parts of the Town of Albany. The port itself with its storage facilities, berths, and cargo handling structures is located in front and down slope of private houses on Brunswick and Burgoyne Roads which overlook the area.

The port transport infrastructure (rail and Princess Royal Drive) to the west of the main port area is adjacent to the southern part of the main shopping and commercial part of the town on York Street. The proposed Albany Foreshore Redevelopment project also extends over these transport corridors.

Marine Drive, which is a scenic route, extends around the mid slope of Mt Adelaide to the east of the port. Views of King George Sound and Princess Royal Harbour are available from carpark areas along this drive and parts of the port area are also visible from these locations.

3.5 Social Values

3.5.1 Local Fisheries and Aquaculture

The area of Princess Royal Harbour involved in the present proposal is not used for professional or amateur fisheries purposes. There also are no current aquaculture activities in Princess Royal Harbour. However, proposals for aquaculture in the eastern part of the Harbour are currently being considered by AWMA and there are also aquaculture sites in the vicinity of Mistaken Island. These sites will be protected during dredging operations for the port expansion by management procedures specified in a Dredging and Dredge Spoil Disposal Management Plan (DDSDMP) as described in Section 4.4 of this CER.

3.5.2 Tourism and Recreation

The area affected by the present proposal does not have any recognised major tourism or recreational values, although it is probably occasionally used for recreational fishing.

4. ENVIRONMENTAL IMPLICATIONS OF THE PROPOSED PORT DEVELOPMENTS

4.1 Introduction

In this section of the CER the environmental and social implications of the proposed port developments are considered in terms of potential impacts on Princess Royal Harbour and potential onshore impacts. The issues relevant to Princess Royal Harbour are:

- The extent of any direct impact on biological communities and particularly on seagrass.
- Whether any changes would occur to the entrance channel which could affect water circulation in Princess Royal Harbour and water exchange between the Harbour and King George Sound.
- The dispersion of suspended sediments and nutrients from the dredging and reclamation operations and the implications that this may have for seagrass communities outside of the works area.

In summary, it is concluded that there will be no direct effect on seagrass communities as none are present in the works area and that there will be no effect on the entrance channel as the works area is distant from the mouth of Princess Royal Harbour. Sediments and nutrients will be suspended in the water column as a result of dredging operations and, to a much lesser extent, reclamation activities. The dispersion of sediments will be managed and monitored in accordance with a Dredging and Dredged Spoil Disposal Management Plan (DDSDMP) as described in Section 6 of this CER. However, the available data on water circulation patterns and nutrient levels in Princess Royal Harbour suggest that this dispersion will not be extensive and the levels of nutrients involved will not be substantial. Therefore, it is considered that the operations are not likely to affect seagrass communities.

The onshore environmental and social considerations involve:

- Whether there will be any direct impact on the natural environment.
- Drainage from the reclamation area into Princess Royal Harbour.
- The visibility of the new port area and associated woodchip stockpiles from houses and viewpoints on the slopes of Mt Clarence and Mt Adelaide.

The analysis presented here concludes that the proposed works will have no direct impact on the natural environment onshore. Other social implications are considered to be negligible as the proposed port development is distant from residential and commercial sectors of the town of Albany. Drainage from the reclamation area into the Harbour will be designed and managed to restrict the potential for pollution.

Operational considerations are not part of the present proposal for EPA assessment purposes as those cannot be specified in detail at this stage. However, information which is relevant to the consideration of the present proposal also is presented in the present section as follows:

- The potential increase in road and rail transport of commodities to the port.
- Noise levels associated with transport and loading of export commodities into ships.

The number of trains and heavy road vehicles entering and leaving the port is likely to increase significantly due to the anticipated increase in various types of export.

4.2 Direct Impact on Marine Communities

The proposed port developments will have no direct impacts on seagrass communities as none occur in the works area. The existing seabed environment comprises bare sand and it can be expected that the fauna living in the sand will be limited in terms of species diversity as most of the area has previously been dredged. The direct impact of the proposal on marine biological communities therefore is considered to be negligible.

4.3 Effects on the Entrance channel

Mills & D'Adamo (1993) consider that the depth and width of the entrance channel are important factors in tidal exchange between Princess Royal Harbour and King George Sound and that changes in these dimension could be detrimental to water circulation in, and flushing of, the Harbour.

The proposed port development however, is located in an area which is 1km at the nearest point to the mouth of Princess Royal Harbour. The entrance channel through the mouth of the Harbour and westwards for a distance of 1km therefore will not be affected by the proposed works.

The alignment of the reclamation area also tapers eastwards to the existing shoreline and is at an angle to the shore in the west. These features and the small size of the reclamation area will limit any disruption to water circulation.

There is therefore, very little potential that the proposed development will significantly affect water circulation in Princess Royal Harbour or water exchange between the Harbour and King George Sound.

4.4 Indirect Impacts on Marine Communities

4.4.1 Suspended Sediments

Potential Effects

ERM Mitchell McCotter Pty Ltd *et al.* (1990), on the basis of comments from Bastyan suggest that a major dredging program at the Port of Albany between January 1978 and August 1979; which involved the removal of 1.2 million tonnes of sediment, may have contributed to the reduction in seagrass communities in Princess Royal Harbour. They suggest that the low water clarity recorded in 1979 may have been due to the dredging and that this in turn may have reduced light penetration to seagrass beds and caused smothering and obstruction on the surface of the plant material.

The AWMA also has advised that plumes of suspended sediment extended over large areas of Princess Royal Harbour during the 1978-1979 dredge operations.

However, the above conclusion does not appear to agree with other recent findings of Hillman *et al.* (1990) that seagrass communities in Princess Royal Harbour have continued to decline since 1984 (even though no dredging has occurred), and that the losses of seagrass have occurred mainly in shallow water distant from the Harbour works. These authors suggests that the losses may have been caused by the proliferation of seagrass epiphytes and macroalgae caused by an increase in nutrient loading from industrial, urban and rural sources in the last 25 to 30 years. The distribution of macroalgae in Princess Royal Harbour is shown in Figure 9. Other studies which support this hypothesis are referred to in Section 3.2.7.

The long history of major dredging works in the northern sector of Princess Royal Harbour also does not support the suggestion that dredging may have contributed significantly to the loss of seagrass communities. That history is summarised in Section 3.3.1 and included excavation of considerable quantities of sediments in 1893, 1901-1903 and further works in 1922-1923, 1951-1952 and 1967 as well as the extensive works in 1978-1979. The 1967 dredging operation involved placement of dredged spoil within Princess Royal Harbour and it appears that this may have also been the case also in 1901-1903 and 1922-1923 as no reclamation occurred at those times. These dredging works therefore almost certainly would have generated considerable dispersion of sediment as apparently occurred during 1978-1979. However, apparently no effects on seagrass communities in Princess Royal Harbour were recorded after these events, and the distribution of seagrass in 1962 apparently extended up to the edges of the dredged areas.

This suggests that the dredging and reclamation either had no effect on nearby seagrass communities or that the communities recovered rapidly from any impact which may have occurred. It may have been however, that impacts were not noticed or recorded at the time of these previous dredging operations. It is also recognised that there may now be a higher potential for impact than in the past as the seagrass communities are in relatively poor condition over large areas of Princess Royal Harbour.

The dredge operations therefore will be managed and monitored in accordance with a specific management plan prepared in consultation with AWMA and DEP as described below and in Section 6 of this CER. The management procedures will include measures designed to limit the dispersion of suspended sediments.

Management of Dredge Operations

Under the provisions of the Waterways Conservation Act, 1976 the Water and Rivers Commission, which includes AWMA, has the power to grant a licence for dredging within Princess Royal Harbour. The APA therefore must apply for a dredging licence for the work proposed in this CER. The application for a licence will be made following environmental approval of the proposal by the Minister for the Environment.

The dredging licence may include a condition requiring the preparation of a Dredging and Dredge Spoil Disposal Management Plan (DDSDMP) and it is expected that this will be the case for the present proposal. In addition, the APA has made a commitment in this PER to prepare a DDSDMP for the present proposal regardless of whether or not it is a requirement of the dredging licence.

The Water & Rivers Commission (formerly the Waterways Commission) has recently published guidelines for the preparation of a DDSDMP. These guidelines require the plan to specify:

- How the dredge operations will be conducted and what environmental management measures will be in place,
- Where the dredged spoil will be placed and how it will be contained to limit the dispersion of suspended sediment, and
- A monitoring program designed to measure a range of water quality parameters around the dredge and spoil placement areas before, during and after the dredging operations.

It is expected that the dispersion of suspended sediment will be limited by the use of silt curtains and through the timing of operations to coincide with months when sea conditions and water circulation conditions are favourable for management purposes. The precise measures however, will be determined in consultation with AWMA and DEP. It is also expected that specific boundaries will be defined for the dispersal of sediment in Princess Royal Harbour and that the operations will be modified or temporarily suspended if the sediment plumes disperse beyond these boundaries.

4.4.2 Dispersion of Suspended Sediments

Pattern of Dispersion

Although a Dredging Management Plan will be in place, the dredging operations and, to a much lesser extent, the placement of stockpiled materials and dredged spoil into the breakwater cells to form the reclamation, will

generate suspended sediment in Princess Royal Harbour. The transport of this suspended material in the Harbour is likely to be complex and will depend on daily wind and tide conditions during the dredging and construction operations and on the rate at which sediment settles onto the bottom. However, some generalisations regarding the pattern of dispersion of sediments can be made on the basis of the reports of previous scientific studies by Mills and Brady (1985) and Mills and D'Adamo (1993).

According to these studies, which are summarised in Sections 3.2.3 and 3.2.4, the suspended material is likely to drift in a clockwise direction over a relatively limited area to the south of the entrance channel during flood tides and easterly winds. These conditions may be considered as typical for summer. Then during the subsequent ebb tide, the material will be transported back through the general vicinity of the works area and out through the entrance channel. During this process the amount of sediment being transported will constantly reduce as material settles out.

The area covered by this clockwise pattern of water circulation and sediment transport mostly comprises sections of Princess Royal Harbour which have been dredged in the past and which do not support seagrass communities. On the fringes of the area, seagrass communities are present but these are of low density.

Also during this clockwise transport, the suspended material will be vertically mixed in the water column and will tend to progressively settle out onto the bottom of the Harbour.

During north-west to west winds which are typical of winter conditions, on the flood tide the suspended sediments will be transported to the west and then in an anticlockwise direction around Princess Royal Harbour. Again however, the available information suggests that the rate at which the sediments are likely to mix in the water column and settle onto the bottom of the Harbour will limit the overall extent of dispersion. Moreover, existing dredged sections of the Harbour extend for a distance of approximately 1km to the west of the proposed port development. The closest seagrass communities in this direction are at a distance of 1km. It is considered unlikely that significant quantities of suspended materials will be transported this distance particularly as dredging operations are not likely to occur in winter when this pattern of dispersion is likely to predominate.

In summary, it is considered that suspended sediment from the dredging operations and reclamation activities is likely to settle out predominantly in existing dredged areas of Princess Royal Harbour or to be transported out through the entrance channel into King George Sound. Therefore, there is not likely to be any effect on seagrass communities.

Management of Reclamation

The dredged sediments will be pumped via a surface floating pipeline to the reclamation area and discharged into cells.

Rock bunds will be constructed around the reclaim area to form the cells to contain the discharged dredge spoil. The bunds will be built by backtipping core material composed of locally available competent rock to create walls with a crest width of 3.5m to 4.0m at an elevation of approximately 2.5m AHD. The side slopes will be to the natural angle of repose of the rock. The inner (shoreward) face of the rock bund will be lined with a geotextile filter cloth (Bidim A24 or similar approved) which will be covered with sand to maintain it in position and protect it from ultra violet damage.

All dredged spoil will be pumped to the foreshore and discharged within this bunded reclamation area. Excess water will drain from the discharge basin through the rock bund back to the Harbour. The filter cloth, protective sand covering and bund will ensure that the returning waters have low suspended sediment concentrations with little discolouration.

In case the dredging exceeds the rate at which the excess water can pass through the bund, an overflow section will also be provided in the eastern part of the reclaimed area. This overflow section will comprise a discharge culvert set approximately 2m above high water to provide adequate retention in the discharge basin. The overflow section will include a separate bunded sedimentation basin to allow maximum sediment settling prior to overflow to the Harbour. Discharge from the eastern section of the reclamation area will ensure that any remaining sediment in suspension is discharged at the maximum distance from seagrass beds.

4.4.3 Dispersion of Nutrients

The dredging operations will remove sediments with relatively low phosphorus and nitrogen levels from Princess Royal Harbour and the dredged materials will be used for reclamation. Therefore, while a temporary increase in phosphorus and nitrogen levels in the water column may be expected in and close to the dredged areas due to an increase in suspended materials and some leaching of nutrients in the reclamation areas, the overall effect will be a reduction in the total quantity of phosphorus and nitrogen in the Harbour.

Sediments which were dredged from the Harbour in 1978 and 1979 and which are currently stockpiled also will be used in the development of the reclamation area. Heavy metal and nutrient levels in these stockpiled sediments has been analysed in a series of 3 samples collected in 1994 from various depths in the stockpile. The results of the analyses of these samples, which are listed in Table 2, indicate that the levels of heavy metals and phosphorus and nitrogen are low (phosphorus 0.02 to 0.05µg/g; nitrogen 0.01%) and are less than or within relevant ANZECC/NHRMC environmental soil quality guidelines (see also Section 6.3.2 - Table 4). This is consistent with the data on nutrients and sediments from this part of Princess Royal Harbour reported in Hillman *et al.*, (1990) (see Figure 8). Leaching of the nutrients from the existing stockpile or from the spoil when placed in the reclamation area, therefore is not likely to contribute any significant quantity of phosphorus or nitrogen to the waters in Princess Royal Harbour.

TABLE 2

LEVELS OF NUTRIENTS AND HEAVY METALS STOCKPILED SEDIMENTS

Analyte	Unit	Criterion	Level
Arsenic	mg/kg	0.2 - 30	1 - 2
Cadmium	mg/kg		<0.2
Chromium	mg/kg	0.5 - 110	0.5 - 1.1
Copper	mg/kg	1 - 190	<0.2 - 0.5
Lead	mg/kg	<2 - 200	1
Zinc	mg/kg	2 - 180	0.3
Nitrogen	%		0.01
Phosphorus	µg/g		0.02 - 0.05

The fate of phosphorus and nitrogen generated in the water column from dredging and reclamation works will be determined by prevailing water circulation patterns at the time when these operations occur. It can be expected that during typical summer conditions, much of the nutrients will be transported out of Princess Royal Harbour into King George Sound or will be dispersed in a relatively limited area to the south of the port due to the water circulation patterns described in Section 3.3.3. In typical winter conditions, the dispersion pattern will be to the west past Town Jetty.

The distance of seagrass communities from the proposed works area is such that the likelihood of significant increases in nutrient levels at these locations as a result of the proposed works is unlikely.

4.5 Impact on the Onshore Area

The onshore area affected by the proposed port developments comprises land reclaimed in 1978-1979 which will be used for storage of woodchips and possibly other commodities awaiting export (together with use of the proposed additional reclamation area). At present the existing onshore area is mostly covered with a large sediment stockpile from the 1978-1979 dredging operations or is bare land colonised by introduced plant species. Therefore, use of the existing onshore area for stockpiles and other purposes will have no impact on the natural environment.

4.6 Construction Noise and Dust

The proposed port development will involve dredging and the placement of spoil, pile driving, earthmoving, and other construction activities. These activities will all occur during daylight hours (7am to 7pm) and only from Monday to Friday inclusive. As the site is more than 750m from the nearest residence, there is not expected to be any disruption due to noise or other construction activities. Pile driving has not been a cause of complaints regarding noise during previous operations at the Port of Albany nor during the recent construction of a new berth at the Port of Geraldton where the distance to the nearest house is similar.

Routine noise management and dust management procedures will be implemented by the APA and will be required from all contractors working on the development. The increase in port-related traffic due to construction is not expected to be significant as there is no requirement to bring fill materials onto the site.

4.7 Drainage

All companies proposing to establish stockpiles or other storage facilities associated with the new berths will be required to ensure that the design of their operations includes containment of all drainage or to ensure that any potential discharge into Princess Royal Harbour complies with the requirements of AWMA and the DEP. It is expected that these requirements will include compliance with the Western Australian Water Quality Guidelines for Fresh and Marine Waters of the EPA.

The reclamation area will include a drainage system designed to facilitate management of discharges into Princess Royal Harbour. Design features are likely to include sumps and sediment traps. The existing drainage system in the works area will also be improved as part of the present proposal. Specific design details of the drainage plan will be developed in consultation with AWMA.

4.8 Visibility

The new berths, woodchip stockpiles and loading facilities will be partially or totally visible from four areas as follows:

- Mostly visible from within the port area itself.

- Totally visible from Princess Royal Harbour and some parts of Vancouver Peninsula. From these locations the new development will form an extension of the existing port structures and storage facilities. At present, the development area comprises the Summit Fertiliser storage shed, the dredged spoil stockpile from 1978-1979 and petroleum products storage tanks. The new facilities therefore will not change the industrial nature of the view from Princess Royal Harbour.

- Partially visible from parts of Marine Drive on the slopes of Mt Adelaide. From these locations the new development will be in the middle distance and will be an extension of existing structures. The new berths and adjacent areas however, will not be visible from the sealed carparks/lookout points along this road.

- Partially visible from some houses on Brunswick Road. The separation distance from these houses is more than 750m and additional intervening landscape plantings and new bunker fuel storage tanks will reduce the visibility from this sector. The existing view substantially comprises storage buildings and other port facilities.

The location of the proposed developments in views from Marine Drive and Brunswick Road is shown in photographs in Figure 14.

On the basis of the above, it is considered that the proposed port development will not intrude visually into the existing landscape except from locations where the present view substantially comprises existing port buildings and storage facilities. The proposed developments effectively will not be visible from established vantage points on Mt Adelaide.

The extent of visual intrusion will depend on the shape, height and extent of the woodchip stockpiles. These factors are not known at the present stage and will depend on the requirements of the individual companies involved. It is expected that the woodchips will be stacked by a travelling conveyor system and recovered for loading by a bucket reclaimer. Bulldozers or front-end loaders may also be used for working the stockpiles.

5. OPERATIONAL CONSIDERATIONS

5.1 Introduction

Information is presented in this Section on the level of rail and road traffic associated with the trade through the Port of Albany and on potential noise associated with operations at the new berth. It is emphasised, as in earlier Sections of this CER, that these matters are not part of the present formal proposal being assessed by the EPA as the details are not known and will depend on specific port user requirements. The APA, or companies proposing to use the new berth, will be required to refer major specific proposals to the EPA.

Information also is presented on the management of ballast water in ships in Australian waters and the management of emergencies at the Port of Albany as it is considered that these matters may be of interest to some members of the public.

5.2 Transport Corridors

The railway to the Port of Albany enters from the west in front of the town and terminates east of the CBH Grain Storage Facility. Various options are being considered for connecting the railway to the new reclamation area but any such works will be limited in extent and will be located entirely in the eastern section of the existing port area.

Road access to the port is provided by Princess Royal Drive which extends past the new reclamation area. This route was specifically designed as a bypass around the Town of Albany for heavy vehicle traffic as a result of recommendations of a special Government Committee established in 1969 (Albany Technical Committee, 1969). The Committee noted the various social problems including traffic noise and safety which had been generated by heavy haulage routes close to urban and commercial areas at Albany and that this had led to complaints and protests. It concluded that Princess Royal Drive should remove the causes for complaint and ensure that there should be no resurgence of the same problems later (see Appendix 2).

The routes of the railway and road are shown in Figure 13. Until recently these transport corridors have been reasonably separated from the residential and commercial districts of the town of Albany. A new residential estate however, is currently being developed to the east of the replica of the brig Amity and between the railway and Princess Royal Drive. The boundary of this estate is about 5m from the railway and 30m from the road. The Albany Foreshore Development proposal would also lead to the creation of residential, accommodation and commercial precincts immediately to the south of Princess Royal Drive. Road access to these precincts would also involve relatively large numbers of private vehicles crossing Princess Royal Drive.

In the planning of such developments consideration needs to be given to the level of transport which currently occurs and which may be associated in the future with the increased exports through the Port of Albany. Any constraints on

the use of these transport corridors for port-related purposes in the future may have major implications for economic growth and employment in the Albany region.

Information on road and rail transport is provided below.

5.3 Increases in Rail and Road Transport

5.3.1 Level of Trade Through Port

Present Trade

Trade through the Port of Albany for the year ended 30 June 1995 was as follows:

- Imports

Ammonium Sulphate	0
Bauxite	3,617
D.A.P.	2,624
Petroleum Product	85,595
Potash	8,995
Rock Phosphate	81,538
Sulphur	13,629
Triple Super	6,462
Urea	8,001
Other	163
Total Imports	210,624

- Exports

Barley	323,953
Canola	77,123
Meat (frozen)	0
Lupins	28,655
Oats	36,889
Wheat	909,643
Other	5
Total Exports	1,376,268
Bunkers	197
TOTAL PORT TRADE	1,587,089

- Vessels

  No. of Vessels Entered Port 100
  Gross Registered Tonnage 1,919,428

Potential Trade

The Albany Port Authority considers that there is the potential for significant increases in exports from the Great Southern Region in the relatively short term future. The main types and possible quantities of commodities involved are as follows:

- Grain - increase from the current 1.3Mtpa to 2Mtpa.
- Woodchips - between 200,000tpa and 1.5Mtpa depending on the number and scale of industries (all from plantation areas).
- Silica Sands - between 150,000tpa and 500,000tpa.
- Fertiliser (imports) - from the current 100,000tpa to 200,000tpa.

5.3.2 Potential Increases in Rail Transport

Rail is currently used only for the transport of grain to the Port of Albany. About 700,000 tonnes of total grain exports during 1995 were delivered to the port by train, with deliveries only occurring at night. This represents about 4 train movements each night (i.e. two arrivals and two departures).

In the future, it is expected that the level of grain exports could double and that between 150,000tpa and 450,000tpa of woodchips could also be delivered to the port by train. The number of train movements involved if these predicted increases occur would be in the order of 8 to 12 per day depending on the final amount of woodchip exports.

These figures are only approximations as the actual numbers of train movements will be determined by not only the level of exports but also commercial freight considerations. These considerations will include optimisation of the length and capacity of trains. If relatively long trains are used, the numbers required to haul the cargoes will be reduced substantially.

5.3.3 Increases in Road Transport

At present, truck movements to and from the Port of Albany are approximately as follows:

• Grain	200/day
• Fertiliser	76/day
• Petroleum Products	34/day
• Silica Sands	30/day
Total	340/day

Additional truck movements to the port as a result of predicted growth and exports are estimated to be:

• Grain		200/day
• Silica Sands		60/day
• Woodchips	up to	90/day
	Total	350/day

The total number of truck movements therefore could be in the order of 690/day or more than double the present level. It is emphasised that this estimate is an average and that the actual maximum number of vehicles per day during the grain season is likely to be significantly larger.

5.3.4 Implications of Increased Traffic

The existing rail and road system at the Port of Albany is capable of handling the potential increase in traffic summarised in the above sections. Transport corridors are also designed specifically for port access and are currently relatively separated from urban areas. The increase in transport therefore is not likely to cause any significant social impact or traffic disruption.

The amount of port related traffic also will be a factor in noise levels near the transport corridors. This issue is discussed in Section 5.3.5 below.

5.3.5 Noise from Trains and Road Traffic

Terminology

Sound or noise is caused by minute fluctuations in atmospheric pressure which are detected by the human ear. Sound pressure is dependent on the distance from the source of the noise, intervening obstacles and barriers to noise transmission, and other environmental factors. The level or loudness of noise or sound is usually described in terms of dB(A). This means decibels measured by a sound level meter which incorporates an "A-weighting" electronic filter which has a frequency response corresponding to the range of frequencies detected by human hearing. People's hearing is most sensitive to frequencies in the range 500Hz to 4,000Hz.

The level of most noise in urban and industrial environments varies over time and therefore is described in terms of percentage exceedence levels. For example, the level of noise which is exceeded for 10% of a sampling period is described as the LA_{10} level. This LA_{10} level is considered to represent the average maximum noise level.

Similarly, the LA_{90} level is the noise level which is exceeded for 90% of the time. This is considered to represent the average minimum noise level or background level.

Therefore, the LA_{90} and LA_{10} noise levels can be taken as representing the range of average noise levels during each sampling time.

Other terms commonly used to describe noise are $LA_{eq.24hr}$, $LA_{eq.8hr}$ and LA_{max}. These represent the continuous noise level (which is essentially the average level) over a 24 hour period and an 8 hour period, and the maximum noise level recorded respectively.

Finally, the descriptors $LA_{10,18h}$ and $LA_{10.1h}$ are used with reference to road traffic noise. These refer respectively to the level of noise which is exceeded for 10% of an 18 hour sampling period from 6am to midnight, and of a 1 hour sampling period.

Noise Criteria

Existing and proposed noise regulations for Western Australia do not provide guidelines for assessing noise associated with trains or road traffic. However, the EPA has indicated in advice of 2 February 1996 that the following planning criteria should apply:

Rail Traffic

- $LA_{eq.24hr}$ 55dB(A)
- LA_{max} 80dB(A)

Road Traffic

- $LA_{10.18hr}$ 56dB(A)
- LA_{max} 63dB(A)

The rail traffic criteria are derived from those applied by the EPA of New South Wales. The WAEPA has also stated that the maximum level (LA_{max}) between 10pm and 7am should be 65dB(A).

Predicted Train and Truck Noise Levels

The level of noise associated with potential future rail and road transport to and from the Port of Albany has been estimated by Herring Storer Acoustics.

Eleven train movements per day (the maximum predicted in the foreseeable future) would result in an $LA_{eq.24hr}$ of 53dB(A) and a maximum noise level (LA_{max}) of 88dB(A) at 15m from the track. At a distance of 40m the LA_{max} would be 80dB(A) which is the criterion suggested by the DEP.

The nearest existing residence to the railway line is at a distance of 75m and the nearest proposed residence in the Albany Foreshore Redevelopment Project would be more than 40m away.

At these distances the noise levels associated with train traffic to and from the Port of Albany will comply with both the 80dB(A) and the more stringent 65dB(A) criteria.

The estimated levels of noise ($LA_{10.18hr}$)associated with the predicted 340 truck movements per day and 700 truck movements during intensive ship loading at various distances from Princess Royal Drive are as follows:

Distance	340 truck movements/day	700 truck movements/day
10m	64dB(A)	67dB(A)
20m	61dB(A)	64dB(A)
40m	57dB(A)	60dB(A)
130m	50dB(A)	53dB(A)

The closest existing house to Princess Royal Drive is at a distance of about 130m while the closest proposed residence in the Foreshore Redevelopment Project is at a distance of 20m. The noise levels associated with the potential truck movements therefore will comply with the criteria suggested by the DEP at existing residences but will be exceeded at the nearest proposed residence in the Albany Foreshore Redevelopment Project. This exceedence would be in the order of 1dB(A) for 340 truck movements per day and 4dB(A) for 700 truck movements per day.

This result is equivalent to that in the CER for the Albany Foreshore Development Proposal (ERM Mitchell McCotter, 1995). The proponents of that project, LandCorp, acknowledge these potential noise levels and have stated an intention to include noise reduction features in the design of residential and other buildings within the project area. The EPA also has recommended that the incorporation of noise reduction features be a condition of environmental and planning approvals for this project (EPA Bulletin 800, 1996).

5.4. Noise from Operations at the New Berth

5.4.1 Criteria

The acceptability of noise levels at residences close to a noise source is determined by comparison with levels defined by existing and proposed Environmental Protection (Noise) Regulations of the Environmental Protection Act, 1986. In the existing regulations, the nearest houses adjacent to the Port of Albany along Brunswick Road best fit Category B2. The assigned outdoor neighbourhood noise criteria for this category are:

- Night time LA_{10} of 45dB(A)
- Evening LA_{10} of 50dB(A)
- Weekends & Public Holidays LA_{10} of 50dB(A)
- Daytime LA_{10} of 55dB(A)

The above levels are conditional in that no annoying characteristics are present such as tones, amplitude, frequency modulation or impulsiveness. The regulations also stipulate that these noise levels should not be exceeded by more than 5dB.

5.4.2 Potential Maximum Noise Levels

The major noise source at the new berths is likely to be a front-end loader or bulldozer operating on the woodchip stockpiles.

The nearest residences to the stockpiles are at a distance of between 750m and 800m. The maximum predicted noise level from bulldozer operations at this distance is 49dB(A). The operations are likely to be tonal and therefore an additional 5dB(A) must be added to this level to allow for an "annoyance potential". The resultant maximum noise level therefore is 54dB(A). This noise level complies with the assigned outdoor criteria for these houses during the daytime. Bulldozer operations are not likely to occur at night.

All other noise sources at the new berths including conveyors, forklifts, etc., can be designed to have considerably lower noise levels than a bulldozer and therefore would easily comply with the noise regulations.

5.5 Management of Ballast Water

Ships that are not fully loaded usually carry ballast so that they float more deeply in the water. Ballast is usually sea water and is discharged when a ship arrives to load cargo. As the water is discharged, any sediment or organisms which had been taken onto the ship in the ballast may also be discharged.

The Australian Government has treated the potential introduction of foreign organisms as a quarantine issue and in 1989, the Australian Quarantine and Inspection Service (AQIS) developed voluntary guidelines for the management of ballast water for ships entering Australian waters and a Draft Australian Ballast Water Management Strategy (1994). The emphasis in the guidelines is on minimising the discharge of water and sediment which may be contaminated with exotic organisms from ballast tanks and hulls used to carry ballast.

The guidelines include:

- Management of the ballast in port, including a certificate from a relevant authority that the water and bottom sediment are free from toxic organisms.

- Management en route to Australia including reballasting at sea, or in-hold water treatment, with the proposed treatments being cleared beforehand with AQIS.

- Management on arrival including a commitment not to discharge ballast unless it was taken up in mid ocean, onshore ballast water treatment subject to AQIS approval and discharge of sediment into approved areas.

In addition to these measures, AQIS requests ships' masters to make every effort to minimise sediment discharge when ballast is released by:

- Ensuring wherever possible that ballast taken on is free of sediment.
- Ensuring ballast tanks and any holds used for ballasting are kept clean.
- Avoiding or minimising ballasting in shallow water where sediment uptake is more likely.
- Avoiding ballasting when toxic dynoflagellates hatches are occurring.

The level of co-operation between AQIS and the shipping industry has been high, with approximately 80% of ships now entering Australian waters reporting compliance with these guidelines.

5.6 Management of Spills and Emergency Procedures

The APA has established emergency procedures which are designed to provide a co-ordinated and comprehensive response to oil pollution, fire and other accident events. These measures will be extended to apply to the new berths. Existing emergency response equipment includes fire hydrants at all wharfs and a containment boom and skimmer for treatment of oil spills.

6. ENVIRONMENTAL MONITORING

6.1 Environmental Monitoring Program

The APA proposes to implement an Environmental Monitoring Program (EMP) in order to provide baseline and ongoing information during the construction and operation of the proposed new berths and reclamation area. The EMP will comprise the following:

- Assessment of water quality in the dredge area and adjacent locations before, during, and after dredging.
- Assessment of heavy metal and nutrients in sediments in the dredged area before, during and for a period after dredging.
- Further assessment of heavy metals and nutrient levels in stockpiled sediments which will be used for reclamation.
- Assessment of sediments in the area proposed to be dredged for the presence of introduced toxic organisms.

Details of the proposed individual monitoring programs are provided below.

6.2 Water Quality

6.2.1 Objectives

The objectives of the Water Quality Monitoring Program are to:

- Establish a baseline for existing water quality within and adjacent to the proposed dredged area in the Port of Albany.
- Determine if the dredging and reclamation has an effect on water quality within and adjacent to the port area.
- Determine whether any changes in water quality, if they occur, are likely to have an adverse impact on the existing marine environment.
- Determine if any changes in water quality, if they occur, have any implications for beneficial uses of the surrounding area.

6.2.2 Parameters and Environmental Criteria

The water quality parameters and environmental criteria which will be used in the monitoring program will be in accordance with those described in Bulletin 711 of the EPA for the "Protection of Aquatic Ecosystems" and "Recreational Water Quality and Aesthetics" and those in the "Guidelines for the Preparation of a Dredging and Dredge Spoil Disposal Management Plan" of the Waterways Commission (1995). The parameters and criteria are listed in Table 3.

TABLE 3

WATER QUALITY MONITORING PROGRAM - PORT OF ALBANY
PARAMETERS AND CRITERIA

Parameter	Waterways Guidelines [1]	Environmental Criteria [2]
pH	Range 5-9; <1.0 unit change	<0.2 pH unit change
Dissolved Oxygen	>5.0mg/L or >60% saturation	>6 mg/L (>80-90% saturation)
Turbidity		<10% change seasonal mean concentration
Orthophosphate (PO4-P)		1-10 µg/L
Nitrate (NO3-N)		10-60 µg/L
Ammonium (NH4-N)		<5 µg/L
Chlorophyll-a		<1 µg/L
Copper		5 µg/L
Iron		NR
Nickel		15µg/L
Tin (Tributyltin)		0.002 µg/L
Zinc		20 µg/L
Total Hydrocarbons		10 µg/L*
Faecal Coliforms		150 organisms/100ml
Enterococci		35 organisms/100ml
Temperature	Return water discharges shall not cause the water temperature in the receiving waters to vary by more than 2°C from background temperatures in the receiving waters	
Nutrients	The concentration of nutrients in the return waters shall not exceed the background concentration in receiving waters	
Suspended Solids	The suspended solids concentration of the return water shall not exceed the higher of the background concentration in the receiving waters or 80mg/L	
Odours and Colours	Return water discharges shall not produce objectionable odours or colours in the receiving waters.	
Floatable Matter	Return water discharges shall not cause visible floating oil, foam, grease, scum, litter or other objectionable matter in the receiving waters.	
Settleable Matter	Return water discharges shall not cause the deposition of settleable matter which may adversely affect the visual, recreational and ecological values of the receiving waters.	
Salinity	The return water salinity shall not vary by more than 10% from the background salinity levels in the receiving water.	
Toxicants	The operator may be required to undertake toxicity analysis of the return water discharge. The level of toxicants shall not exceed the desirable concentrations in the ANZECC guidelines for the protection of aquatic ecosystems.	

1 - Waterways Commission Guidelines No 9, December 1995.
2 - Department of Conservation and Environment, Bulletin 103, 1981.
NR - No recommendations made at this time.
* - Interim guideline only. Bulletin 103, Department of Conservation & Environment (1981).

6.2.3 Timing

Water sampling to establish baseline conditions within the proposed dredged area and control locations will occur following approval of the port developments by the Minister for the Environment. It is expected that the first samples will be collected during autumn or winter of 1996. Additional samples will then be collected during the summer of 1996/97 and immediately prior to the commencement of dredging operations. If levels of any parameter are found to occur above the criteria during a sampling period, more frequent monitoring may occur in order to identify a possible cause for the elevated levels, and also to determine the duration of the levels over time.

Further sampling will occur at regular intervals during the dredging operations and for a period after the operations have been completed.

6.2.4 Location of Sites

The number and locations of sampling sites will be determined by the APA in consultation with the DEP and AWMA after the proposed port developments have been approved by the Minister for the Environment.

6.2.5 Reporting

Written reports on the results of the monitoring program will be provided to the DEP and AWMA within one month of the receipt of each set of analytical results. However, if any levels are found to exceed the environmental criteria, these results will be reported immediately to AWMA and the DEP. All monitoring results will be available to the public.

6.2.6 Contingency Measures

The DDSDMP prepared by the APA will specify boundaries for dispersal of sediments within Princess Royal Harbour. If the sediment plumes extend beyond these boundaries then the dredge operations will be modified or temporarily suspended until less favourable conditions for dispersion exist.

The DDSDMP will also include upper limits for specific water quality parameters at key monitoring locations. If these limits are exceeded, dredge operations will be suspended until water circulation and other conditions are deemed suitable by the APA and AWMA for recommencement of the works.

6.3 Sediments

6.3.1 Objective

The objective of the sediment monitoring program is to determine the levels of nutrients and heavy metals in the sediment which will be dredged and used for reclamation purposes. The monitoring program will also extend to existing stockpile dredged sediments which are located onshore adjacent to the proposed reclamation area.

6.3.2 Criteria

There are no criteria for the levels of nutrients in sediments but comparisons may be made with data from previous studies of Princess Royal Harbour.

The significance of levels of heavy metals within sediments in the dredged area will be assessed by comparison to the background criteria of the environmental soil quality guidelines defined in the "Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites" (ANZECC/NHMRC, 1992). The criteria for the metals proposed to be sampled in the monitoring program are listed in Table 4.

TABLE 4

PORT OF ALBANY SEDIMENT MONITORING PROGRAM
BACKGROUND CRITERIA LEVELS

Parameter	Environmental Soil Quality Guidelines mg/kg
Arsenic	0.2-30
Cobalt	2-170
Chromium	0.5-110
Copper	1-190
Iron	NR
Manganese	4-12,600
Nickel	2-400
Lead	<2-200
Tin	1-25
Titanium	NR
Vanadium	NR
Zinc	2-180

NR: No recommended criteria.

6.3.3 Timing

The sampling of sediments will occur during 1996. The need for further sampling of Harbour sediments during and after dredging operations will be determined on the basis of the data collected in 1996.

6.3.4 Sampling Sites

The sampling sites for the sediment monitoring program will be determined by the APA in consultation with AWMA and DEP after the proposed port developments have been approved by the Minister for the Environment.

6.3.5 Reporting

All results of sediment monitoring will be reported to AWMA and DEP within one month of receipt of the analytical data. However, if any levels are found to exceed the environmental criteria, these results will be reported immediately to AWMA and the DEP. All monitoring results will be available to the public.

6.3.6 Contingency Measures

If levels of any parameter are found to occur above the background criteria, repeat sampling and analysis for that parameter may be implemented if deemed necessary by AWMA and the DEP. This sampling will aim to define the extent of contaminated sediments so that this material may be disposed of according to requirements of the Waste Management Division of the DEP.

6.4 Introduced Organisms

There is a possibility in all Australian ports that dredging works may disperse organisms which have been accidentally introduced into marine sediments through ballast and other discharges from ships. The populations of any such introduced organisms may increase rapidly in suitable environmental conditions and in the absence of natural predators.

At the Port of Albany however, the potential for introduced organisms is considered to be limited given the extent of dredging which has occurred at periodic intervals throughout the past century including extensive dredging in 1978/79. The discharge of ballast water in Australian waters is also now controlled by AQIS as described in Section 5.5 of this CER.

Nevertheless, the APA has agreed to participate in a survey designed to detect any introduced organisms in Australian Ports. This survey was made by the Australian Quarantine and Inspection Service (AQIS) and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in February 1996.

The results of this survey will be reported to AWMA and the DEP within one month of receipt from AQIS or the CSIRO.

7. COMMITMENTS

The APA makes the following commitments regarding the proposed Albany port developments:

- The APA will manage and monitor all dredging and reclamation operations for the proposed port expansion in accordance with a DDSDMP. This Management Plan will be prepared in compliance with Waterways Guidelines No. 9 published by the Waterways Commission in December 1995 and will also be to the requirements of the DEP on advice of the Albany Waterways Management Authority (AWMA). The plan will include a monitoring program for water quality in and within a relevant distance of the works area, and of the levels of nutrients and heavy metals in sediments in both the dredged area and the existing stockpiled sediments which will be used for reclamation.

  The water quality parameters and environmental criteria which will be used in the monitoring program will be in accordance with those described in Bulletin 711 of the EPA for the "Protection of Aquatic Ecosystems" and "Recreational Water Quality and Aesthetics" and those in the "Guidelines for the Preparation of a Dredging and Dredge Spoil Disposal Management Plan" of the Waterways Commission (1995). The environmental criteria which will be used in the monitoring program of sediments will be the background criteria of the environmental soil quality guidelines defined in the "Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites" (ANZECC/NHMRC, 1992).

  The monitoring programs will commence following environmental approval of the port developments in order to establish existing baseline conditions in the dredge area, reclamation area, and the existing stockpiled sediments. Additional monitoring will occur during and following construction.

  The DDSDMP and all results of the monitoring programs will be made available to the general public.
  (Timing - prior to, during and following construction).

- The APA will report the results of the AQIS/CSIRO survey for introduced organisms in the sediments of the proposed dredged area to the DEP and AWMA prior to construction.

- The APA will ensure that the noise regulations of the Environmental Protection Act, 1986 are complied with in respect to the construction of the port developments.

- The APA will prepare a Drainage Plan for the reclaimed land and new berth which will include a drainage system designed to reduce the potential for pollution of Princess Royal Harbour due to runoff and spills. The drainage plan will be prepared prior to construction and to the requirements of the DEP on the advice of AWMA.

- The APA will require contractors to ensure that no nuisance dust is generated during earthworks associated with the reclamation activities and that any requirements of the DEP relating to dust control are met.

8. CONCLUSIONS

The APA proposes to dredge an area of about 6ha and to reclaim a further 5.5ha at the eastern end of the Port of Albany. The area which will be affected by these works has no significant identifiable environmental or social values. The substrate in the proposed dredge area comprises bare sand and the nearest seagrass communities in Princess Royal Harbour are at least 500m away.

Water circulation patterns in Princess Royal Harbour also indicate that suspended sediment resulting from the dredge operations will largely circulate and settle within previously dredged areas or will be discharged into King George Sound by tidal current flows. The entrance channel between Princess Royal Harbour and King George Sound will also not be altered by the proposed works and therefore the existing pattern of water exchange will not be disturbed.

The proposed dredge works also are very minor in comparison with previous dredging works for port purposes in Princess Royal Harbour. These previous works include 60ha in 1893, more than 100ha in 1901-1903, 22ha in 1922-1923, 39ha in 1951-1952, and more than 50ha in 1978-1979. None of these previous dredging operations are known to have had any significant environmental impact on Princess Royal Harbour.

The proposed port developments also are located more than 750m from the nearest house and port storage and other port facilities are located in between. This means that there is very little potential for noise or dust nuisance as a result of construction works or subsequent storage and loading activities at the new berths.

Therefore, it is concluded that the proposed developments at the Port of Albany have no significant environmental or social implications.

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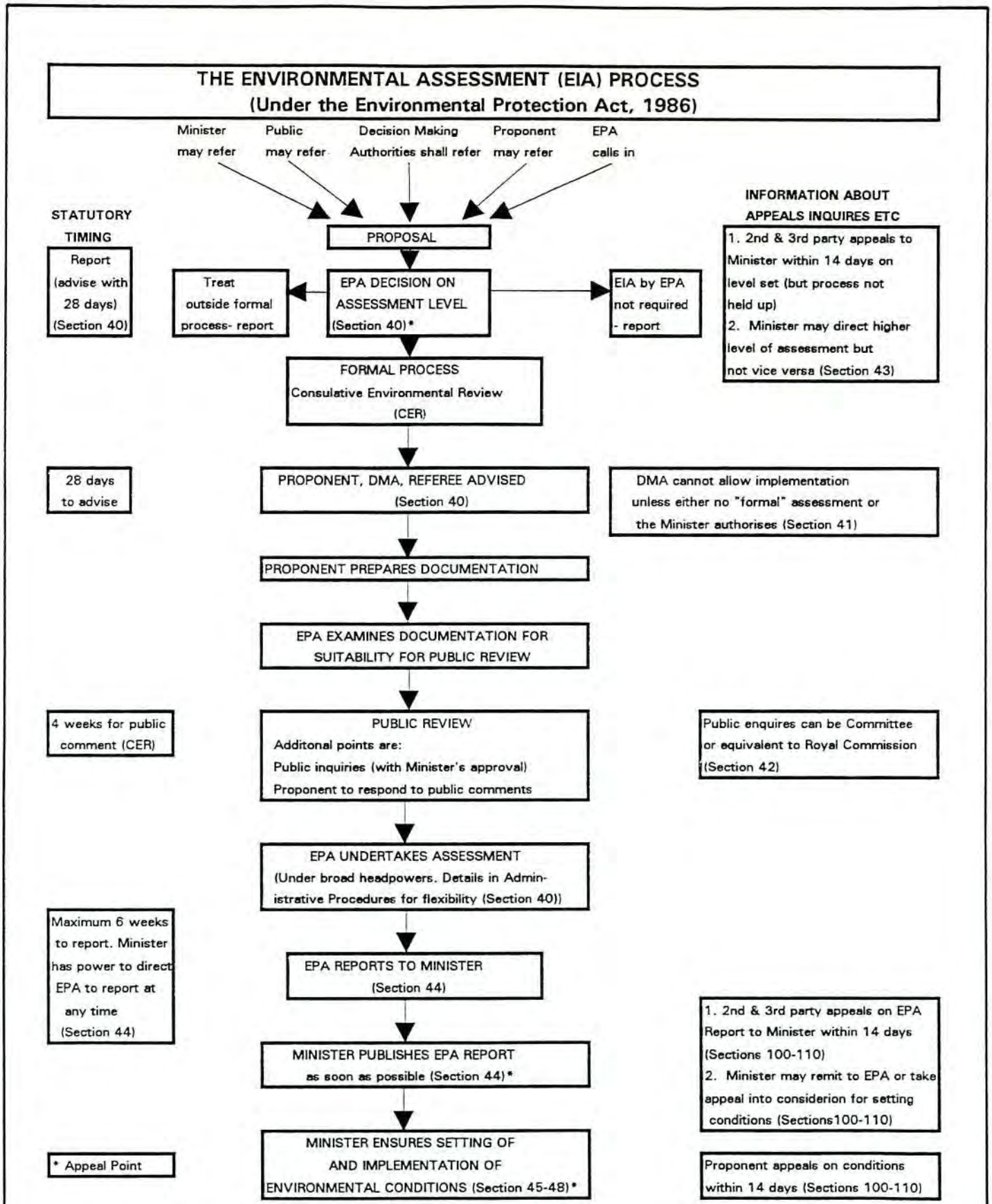
GLOSSARY

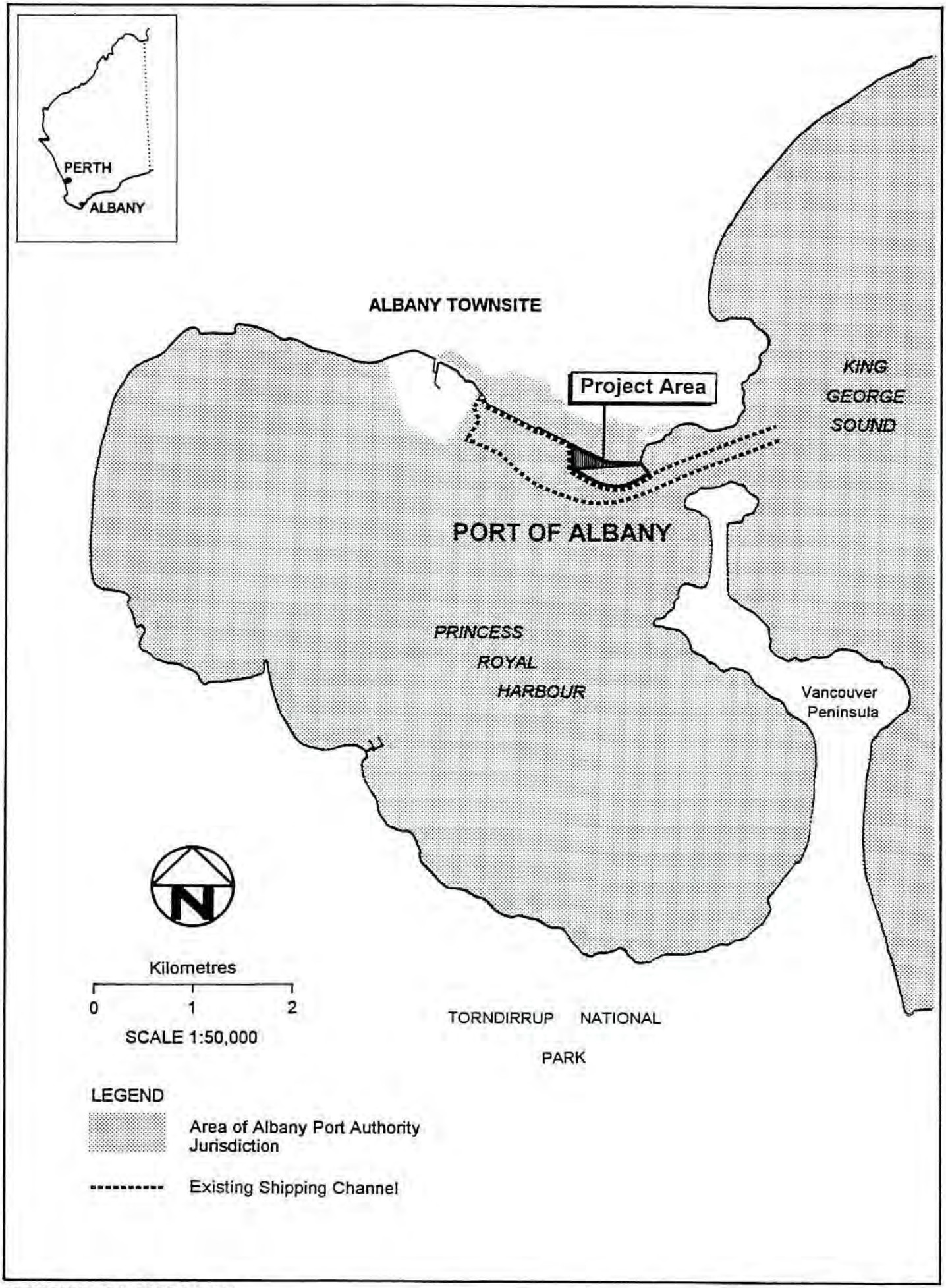
ANZECC	Australia and New Zealand Environment and Conservation Council
APA	Albany Port Authority
AQIS	Australian Quarantine and Inspection Service
AWMA	Albany Waterways Management Authority
CER	Consultative Environmental Review
CSIRO	Commonwealth Scientific and Industrial Research Organisation
dB(A)	Decibels "A" weighted
DEP	Department of Environmental Protection
DDSDMP	Dredge and Dredge Spoil Disposal Management {Plan
EMP	Environmental Management Plan
EPA	Environmental Protection Authority
GSDC	Great Southern Development Commission
ha	hectare(s)
km	kilometre
L_{10}	percentile level noise level exceeded for 10% of each hourly time interval
L_{90}	percentile level noise level exceeded for 90% of each hourly time interval
M	million
µg/g	micrograms per gram
µg/L	micrograms per litre
m	metre(s)
mg/kg	milligrams per kilogram
m^3	cubic metres

NOI	Notice of Intent
tpa	tonnes per annum
WAEPA	Western Australian Environmental Protection Authority

FIGURES



THE CONSULTATIVE ENVIRONMENTAL REVIEW (CER) PROCESS
FIGURE 1



ALAN TINGAY & ASSOCIATES

PORT OF ALBANY
REGIONAL LOCATION
FIGURE 2

Mt Clarence

Stirling Street

York Street

Frederick Street

Terrace

Railway

Princess Royal Drive

Burgoyne Street

Brunswick Road

Road

Apex Drive

Mt Adelaide

Forts Road

Marine Drive

Ellen Cove

Hanover Bay

TOWN JETTY

SLIPWAY

ALBANY PORT AUTHORITY OFFICE

BERTH 1

BERTH 2

BERTH 3

GRAIN STORAGE AREA

CONVEYOR

Dredged to 10.1 metres

Dredged to 12.2 metres

Dredged to 8.8 m

LAND RECLAMATION 6.0ha

GENERAL CARGO

BULK CARGO

WOODCHIP STOCKPILES

BERTH 5

BERTH 6

DREDGED TO 12.2m

Semaphore Point

King Point

Dredged to 12.5 metres

Dredged to 12.8 metres

Dredged to 12.2 metres

Possession Point

Bramble Point

PRINCESS ROYAL HARBOUR

N

metres

0 500

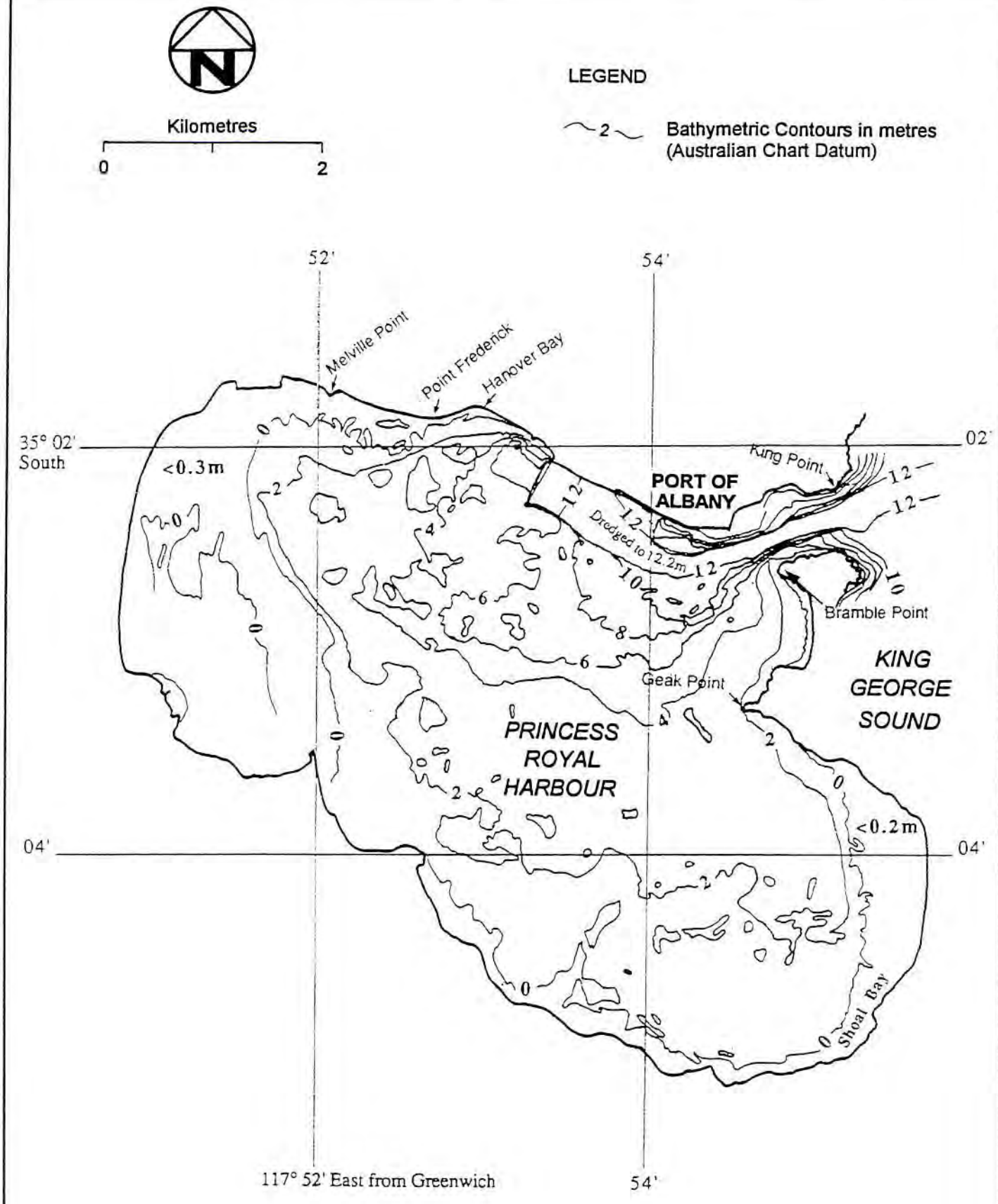
SCALE 1:10,000

5 Water Depth in metres (Australian Chart Datum)

PORT OF ALBANY DEVELOPMENT PLAN FIGURE 3

ALAN TINGAY & ASSOCIATES

PORT OF ALBANY
AERIAL VIEWS OF PROPOSED RECLAMATION
FIGURE 4

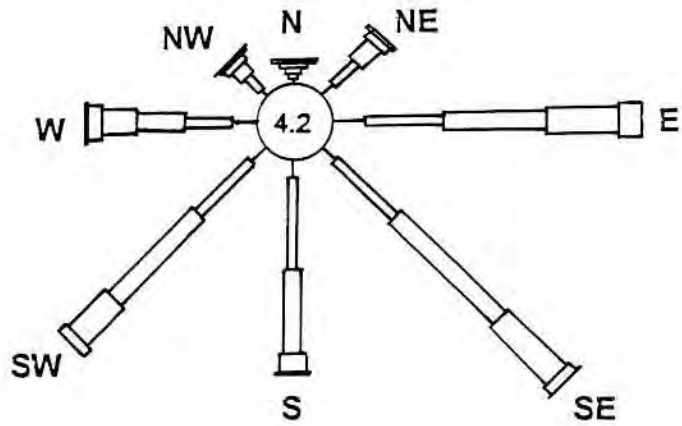


SOURCE: ENVIRONMENTAL PROTECTION AUTHORITY, TECHNICAL SERIES No. 51, 1993

ALAN TINGAY & ASSOCIATES

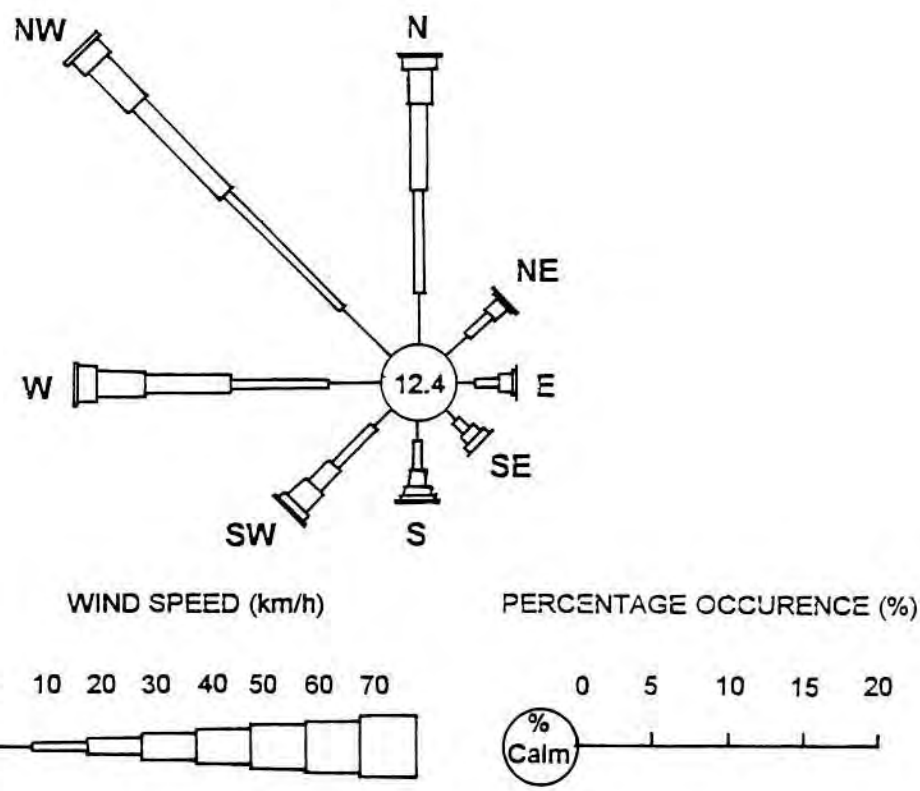
PRINCESS ROYAL HARBOUR
BATHYMETRIC CONTOURS
FIGURE 5

SUMMER



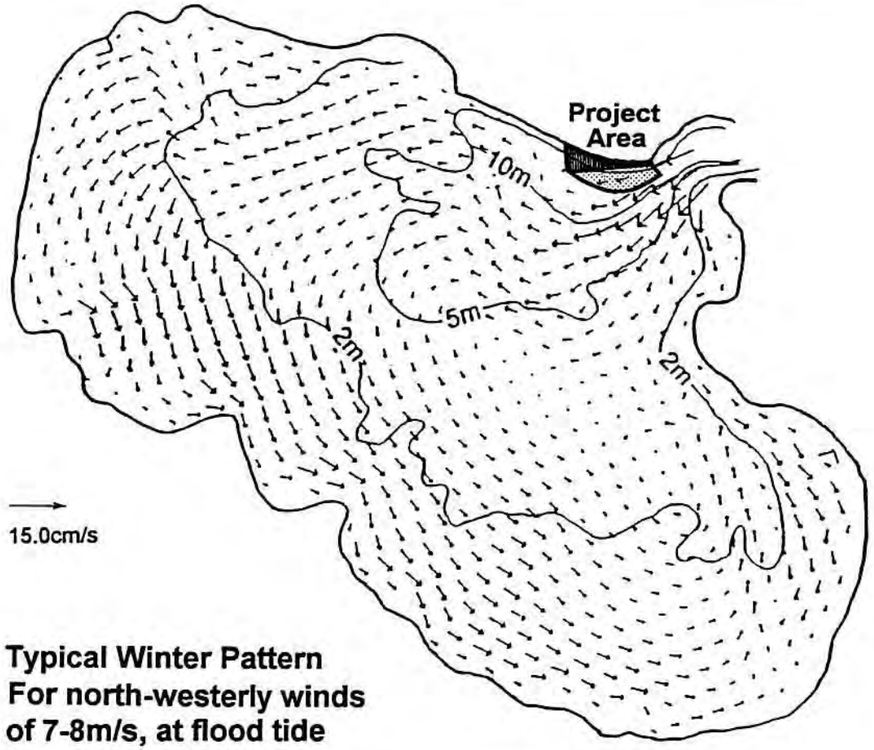
BASED ON 25 YEARS OF RECORDS (1965-1990)
FROM ALBANY AIRPORT METEOROLOGY STATION

WINTER

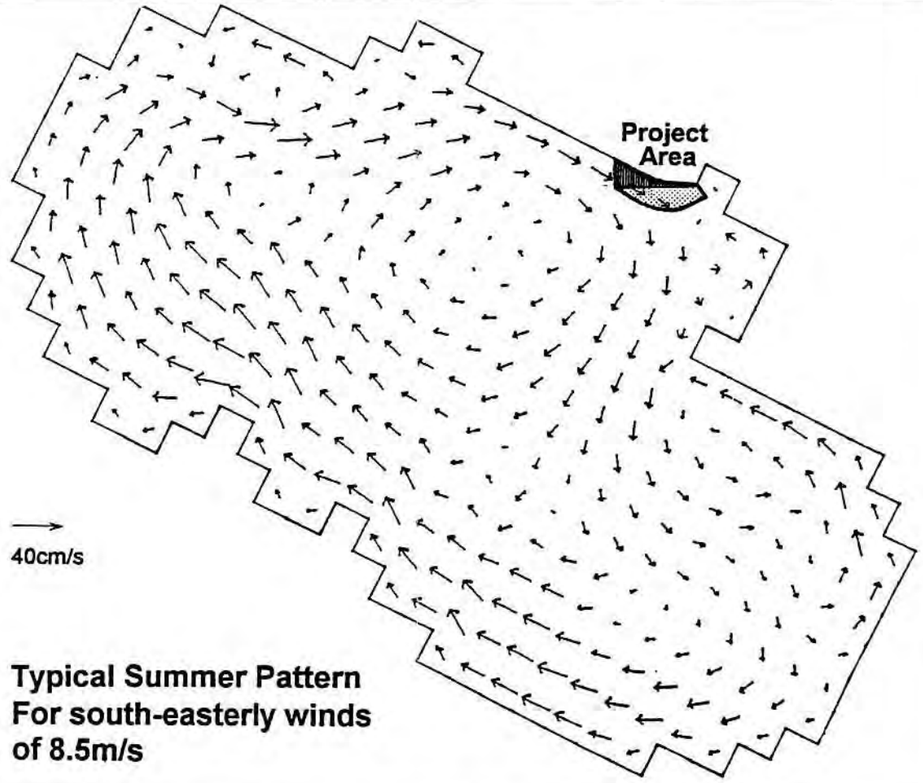


ALAN TINGAY & ASSOCIATES

WIND ROSES FOR ALBANY AIRPORT
FIGURE 6

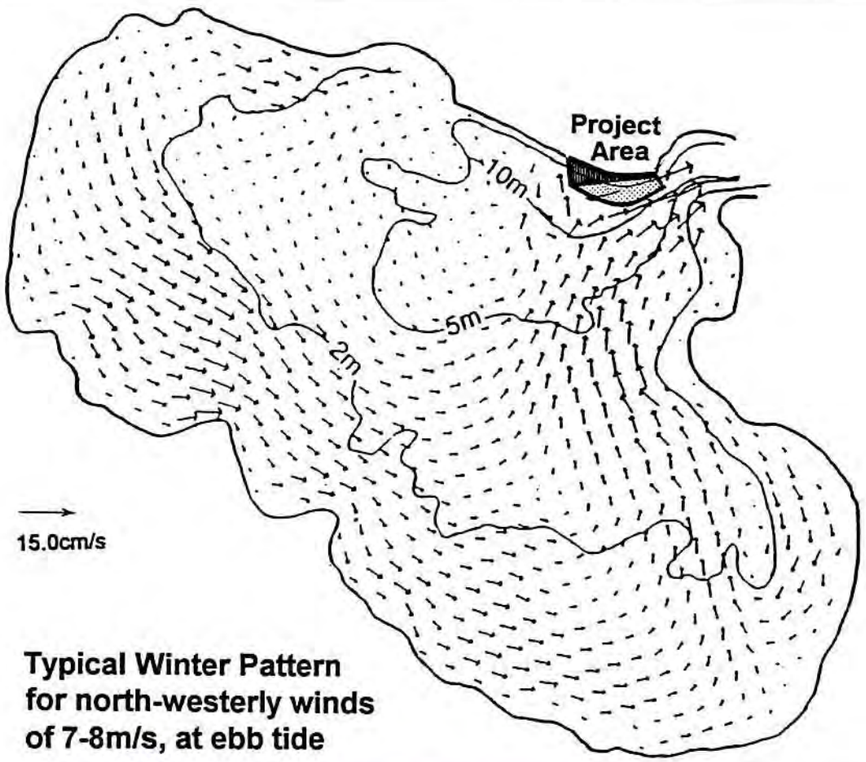


A Typical Winter Pattern For north-westerly winds of 7-8m/s, at flood tide



C Typical Summer Pattern For south-easterly winds of 8.5m/s

SOURCE: DEPARTMENT OF CONSERVATION & ENVIRONMENT WA, BULLETIN 229, 1985



B Typical Winter Pattern for north-westerly winds of 7-8m/s, at ebb tide

SOURCE: DEPARTMENT OF CONSERVATION & ENVIRONMENT, WA, BULLETIN 258, 1986

Kilometres

0 2

SCALE 1: 50,000

NOTES:

Water Depth in metres (Australian Chart Datum)

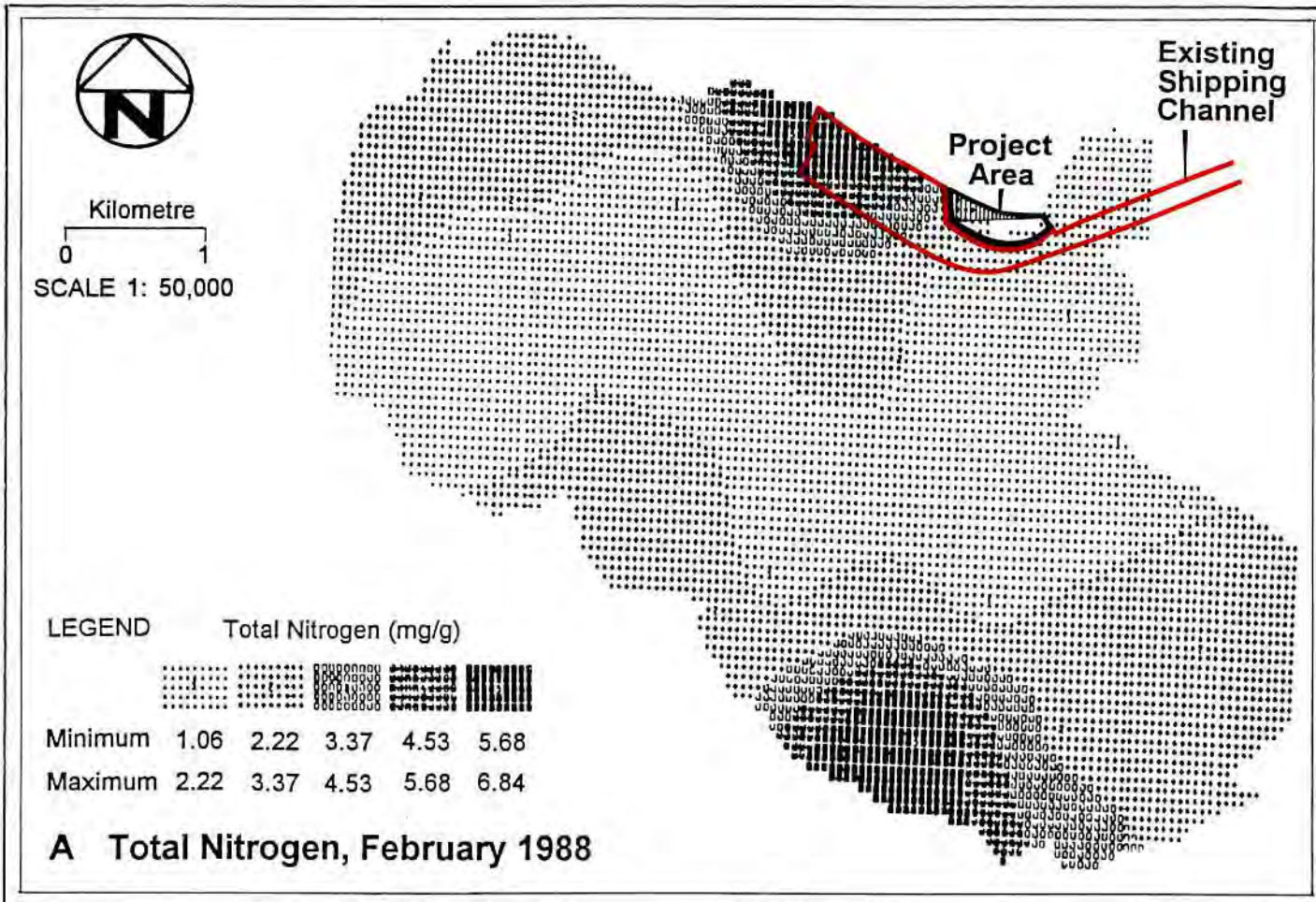
Computer Simulated Circulation Patterns

Water Current Speeds & Directions are shown by the lengths & directions of arrows

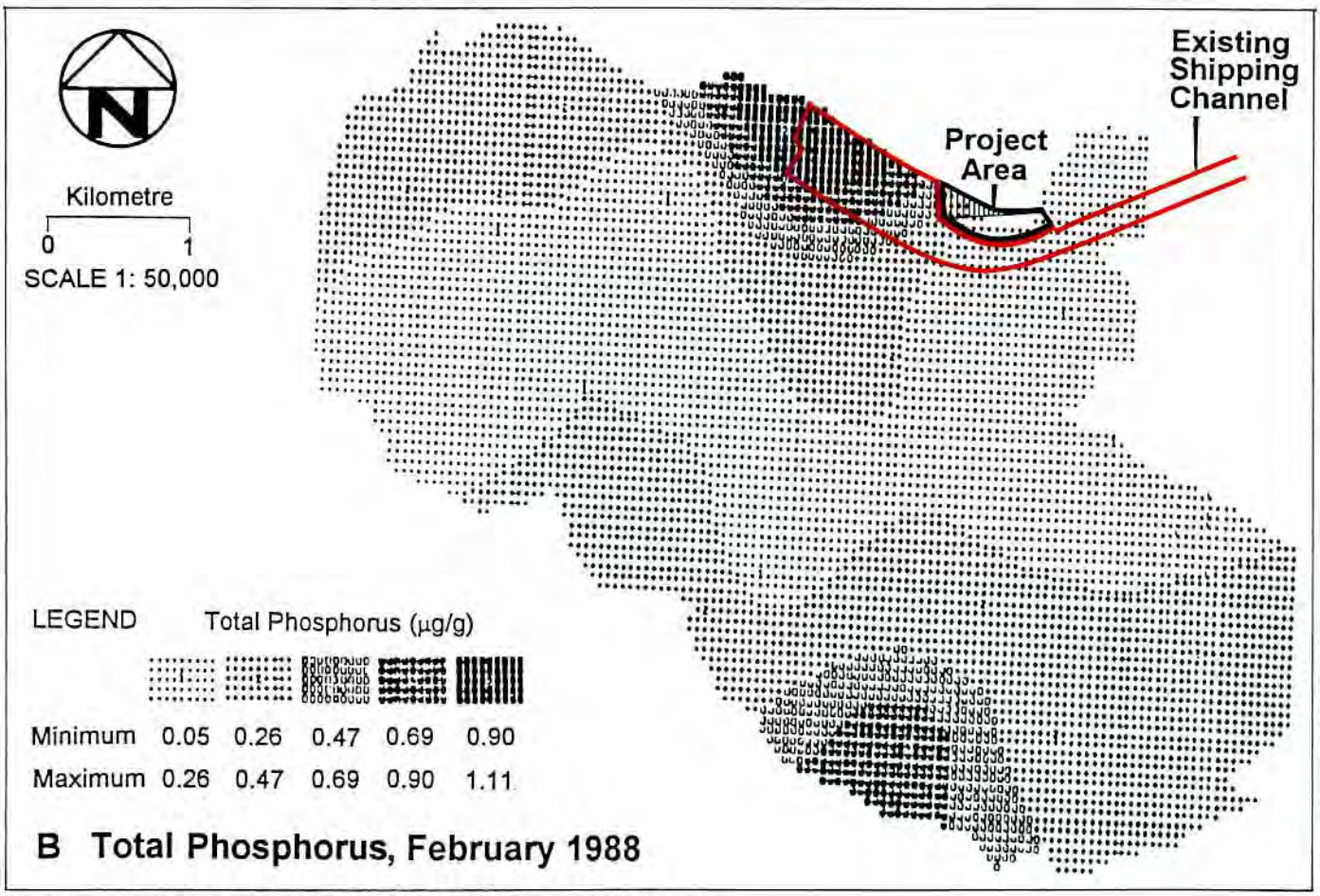
WATER CIRCULATION PATTERNS IN PRINCESS ROYAL HARBOUR

FIGURE 7

ALAN TINGAY & ASSOCIATES



A Total Nitrogen, February 1988



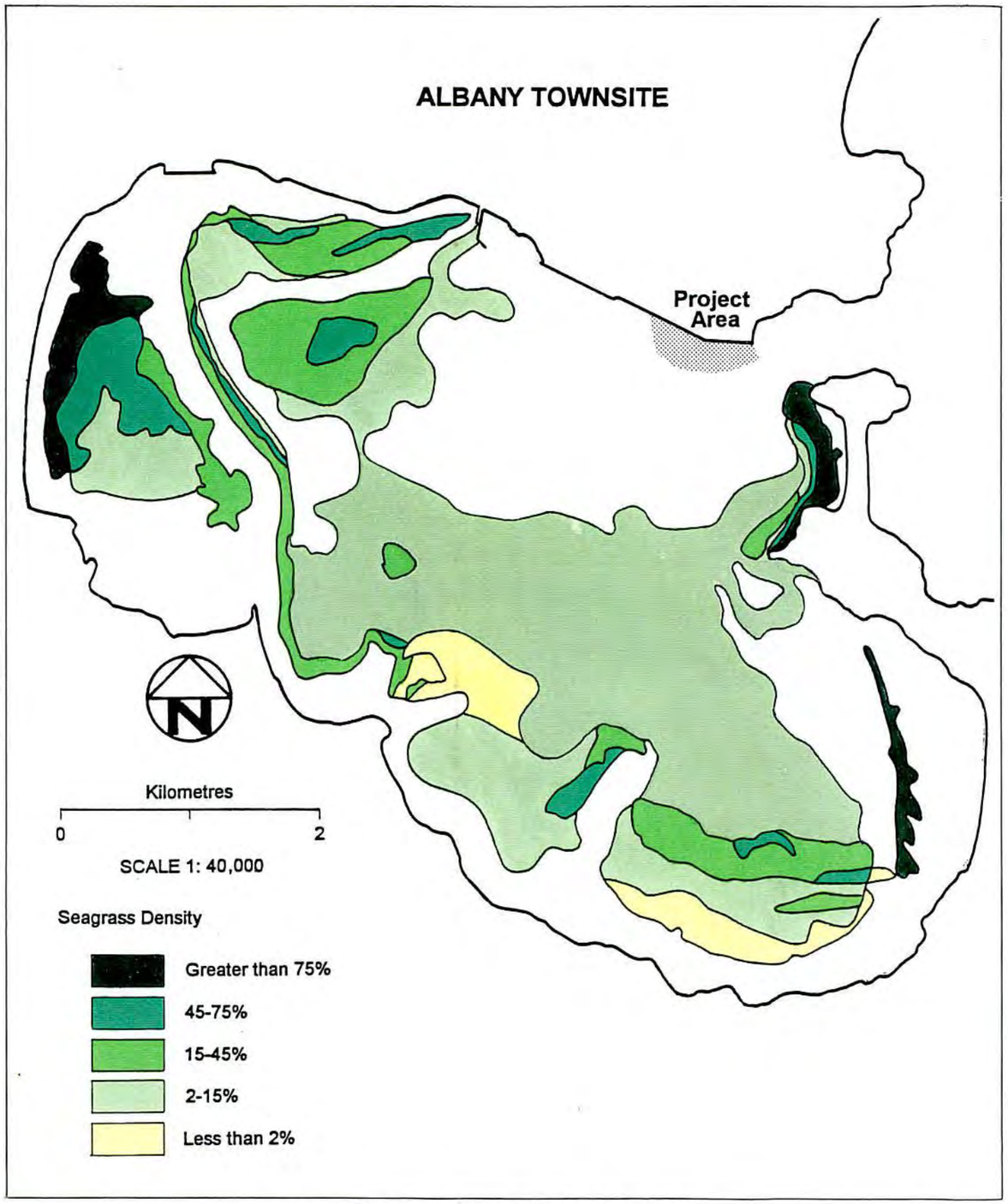
B Total Phosphorus, February 1988

SOURCE: ENVIRONMENTAL PROTECTION AUTHORITY, BULLETIN 40, 1990

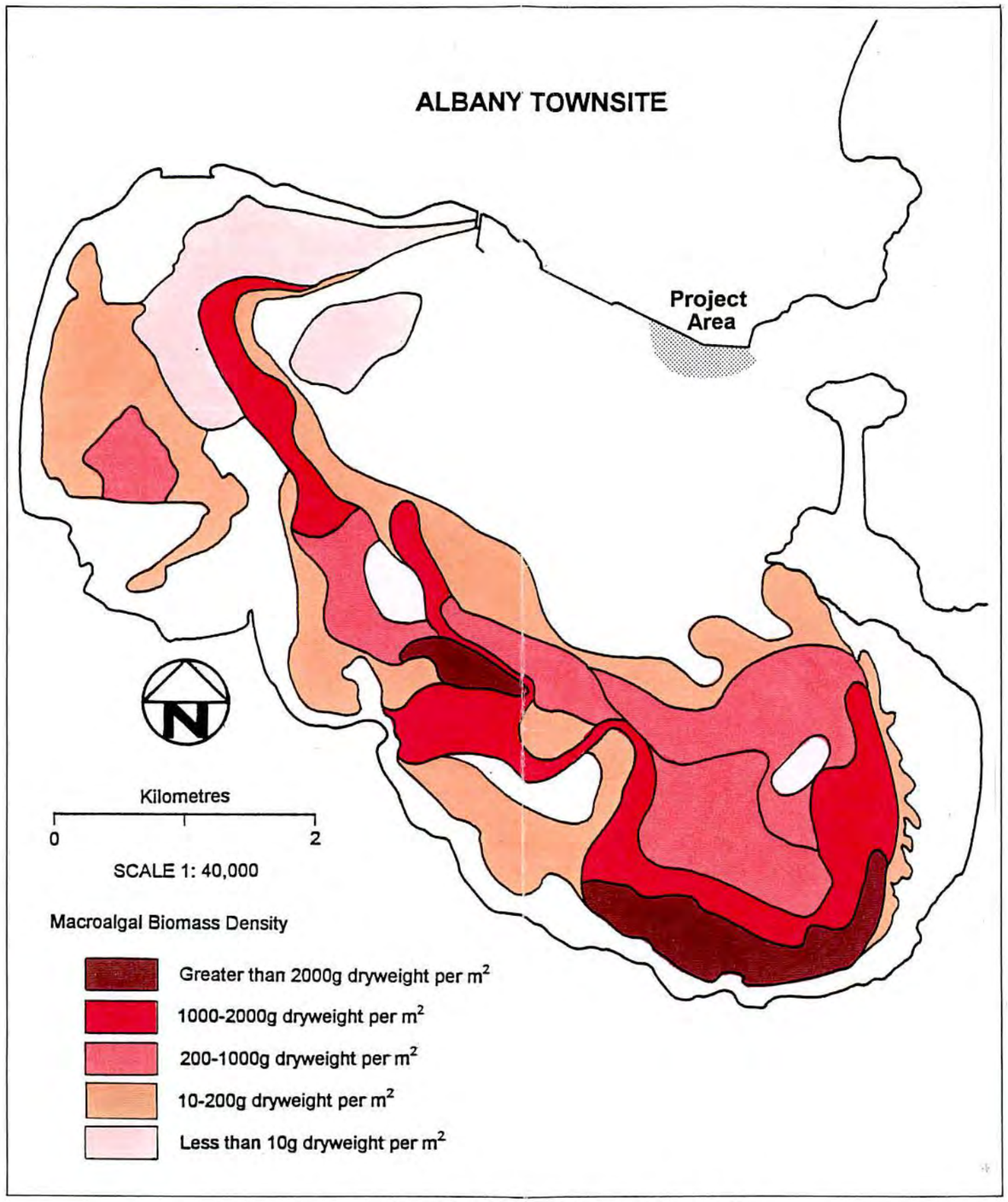
ALAN TINGAY & ASSOCIATES

DISTRIBUTION OF NITROGEN & PHOSPHORUS IN THE SEDIMENTS OF PRINCESS ROYAL HARBOUR

FIGURE 8



A Seagrass Distribution, 1992

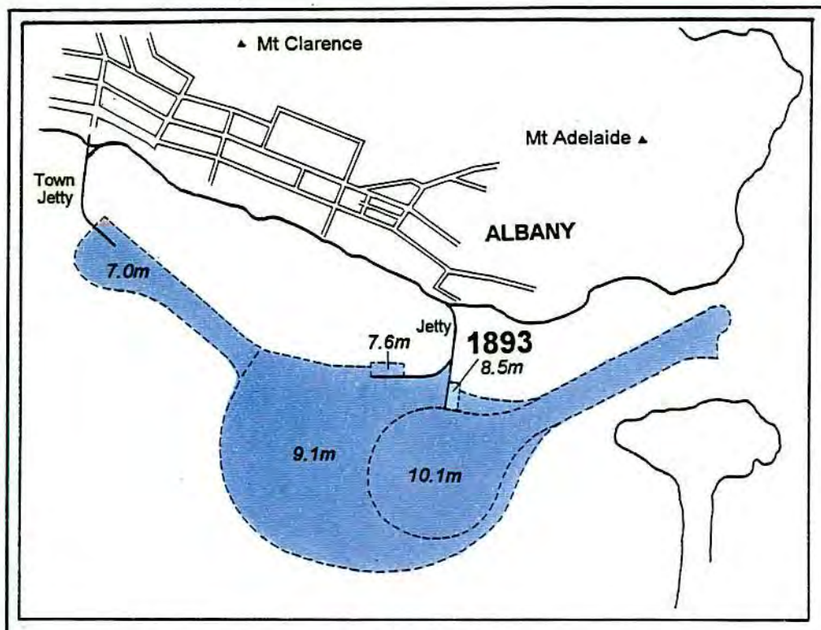


B Macroalgal Distribution, 1992

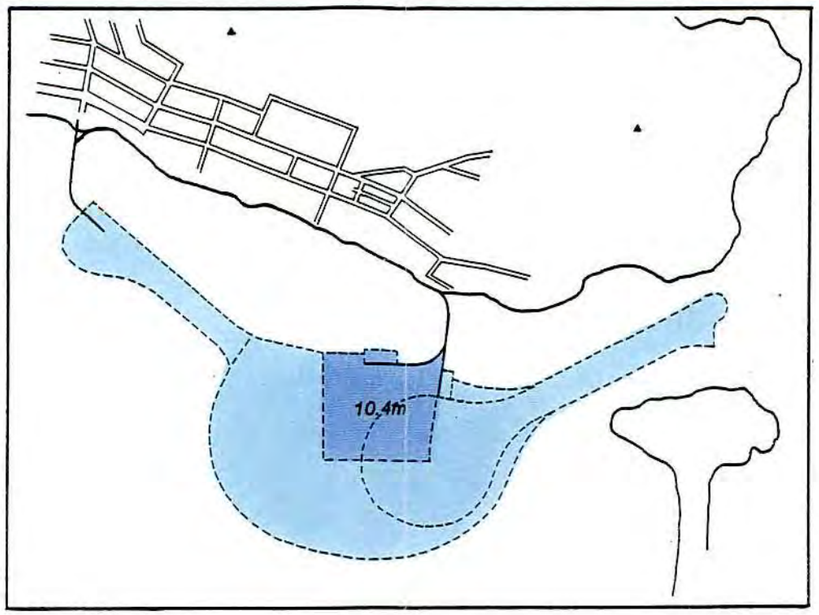
DISTRIBUTION & DENSITY OF SEAGRASS & MACROALGAE IN PRINCESS ROYAL HARBOUR FIGURE 9

SOURCE: WATERWAYS COMMISSION ET AL, 1992

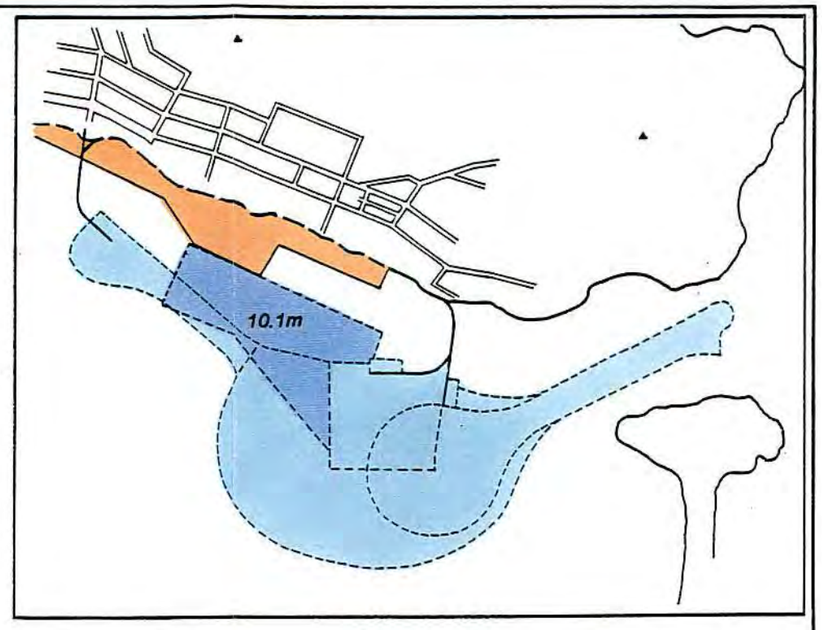
ALAN TINGAY & ASSOCIATES



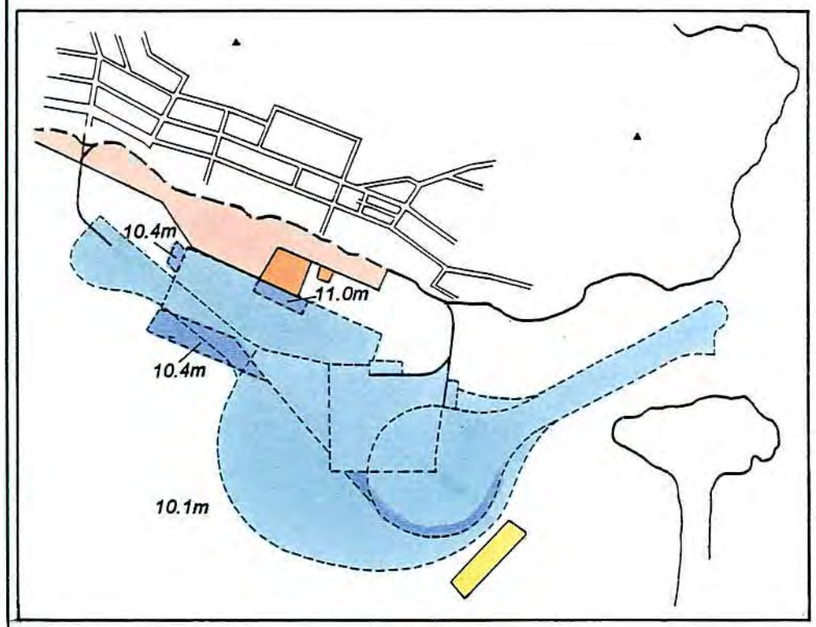
1901-1903



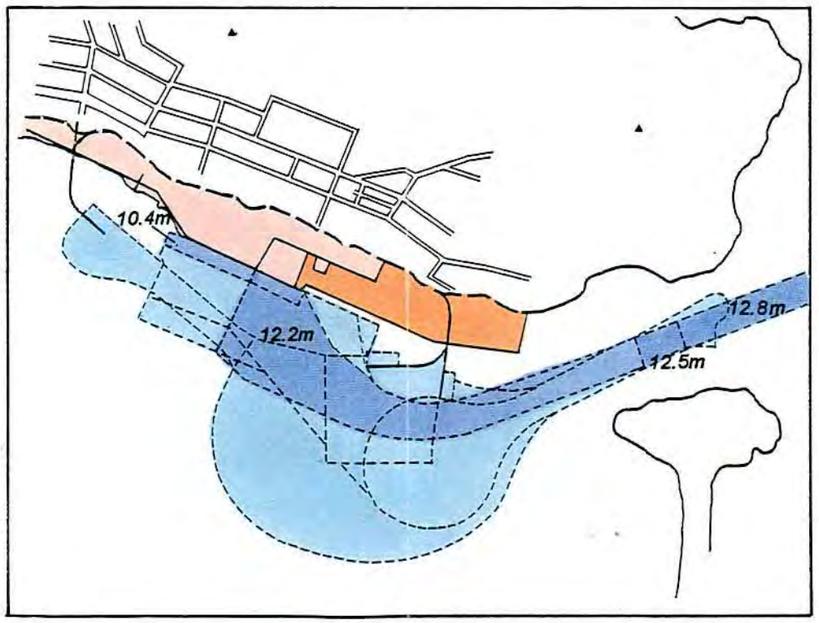
1922-1923



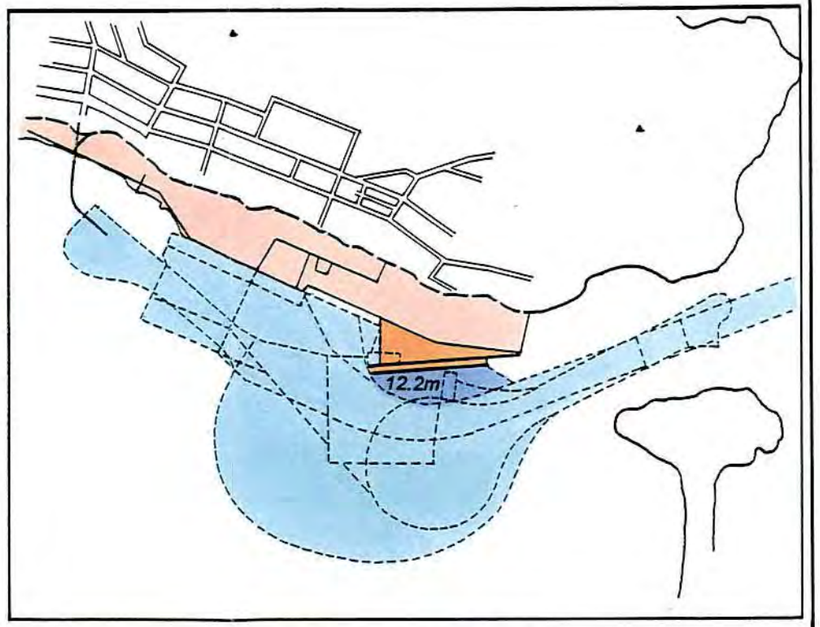
1951-1952



1967



1978-1979



1995 PROPOSAL

LEGEND

- Previously Dredged
- New Dredging
- Former Coastline
- Previously Reclaimed
- New Reclamation
- Spoil Dump Area 1967

Kilometres
0 1

PORT OF ALBANY
HISTORY OF DEVELOPMENT FROM 1901
FIGURE 10

ALAN TINGAY & ASSOCIATES

Hanover Bay

PRINCESS ROYAL HARBOUR

TOWN JETTY

SLIPWAY

Dredged to 10.4 metres

Dredged to 10.1 metres

Dredged to 12.2 metres

Dredged to 8.8 m

Dredged to 12.2 metres

Dredged to 12.5 metres

Dredged to 12.8 metres

Semaphore Point

King Point

Bramble Point

Possession Point

ALB 7

ALB 3

WT ADELAIDE

WT CLARENCE

STIRLING STREET

STIRLING DRIVE

PORT BURGOYNE ROAD

APEX DRIVE

MARINE DRIVE

metres

0 500

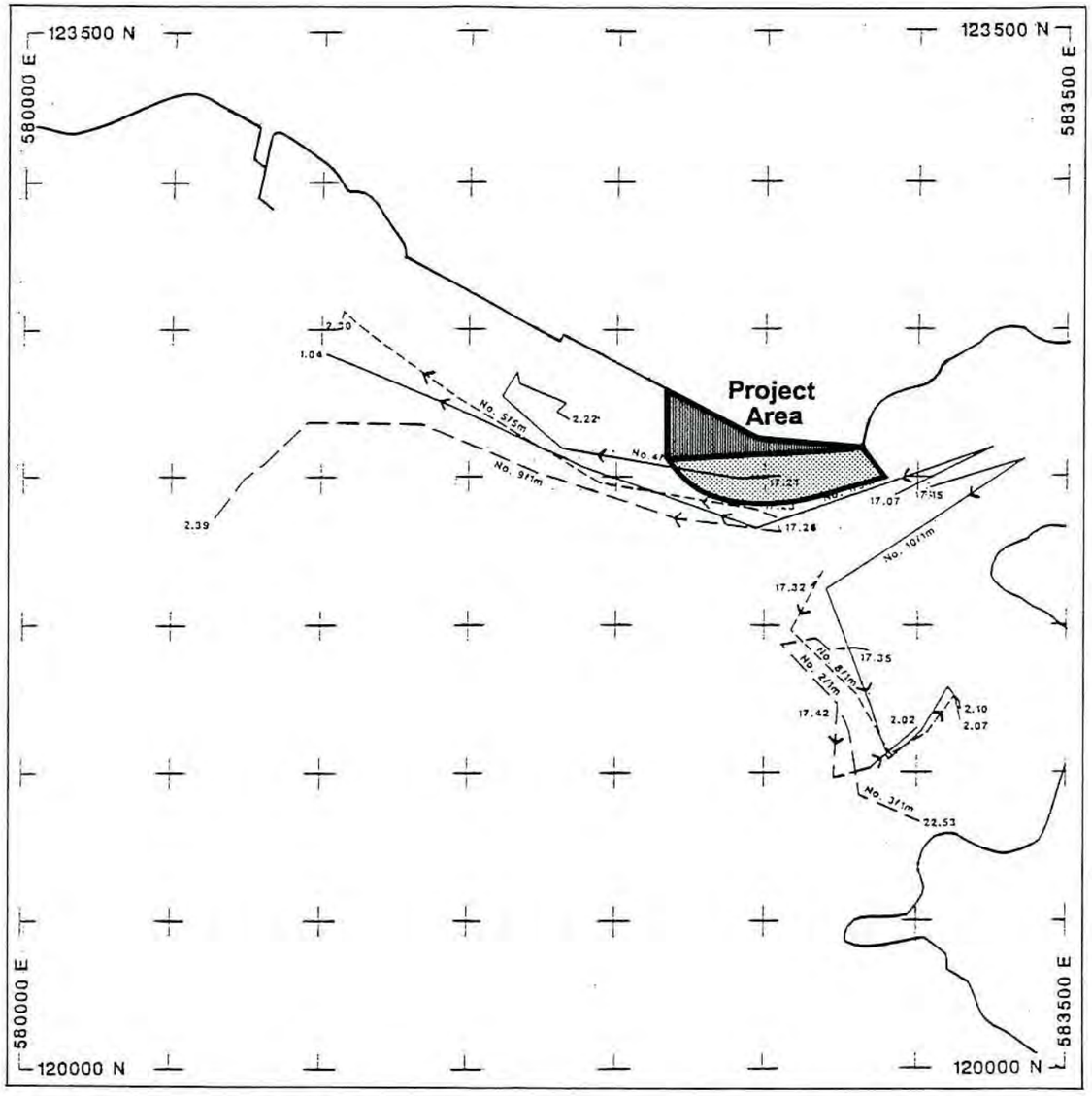
SCALE 1:10,000

Topographic Contours in metres (Australian Height Datum)

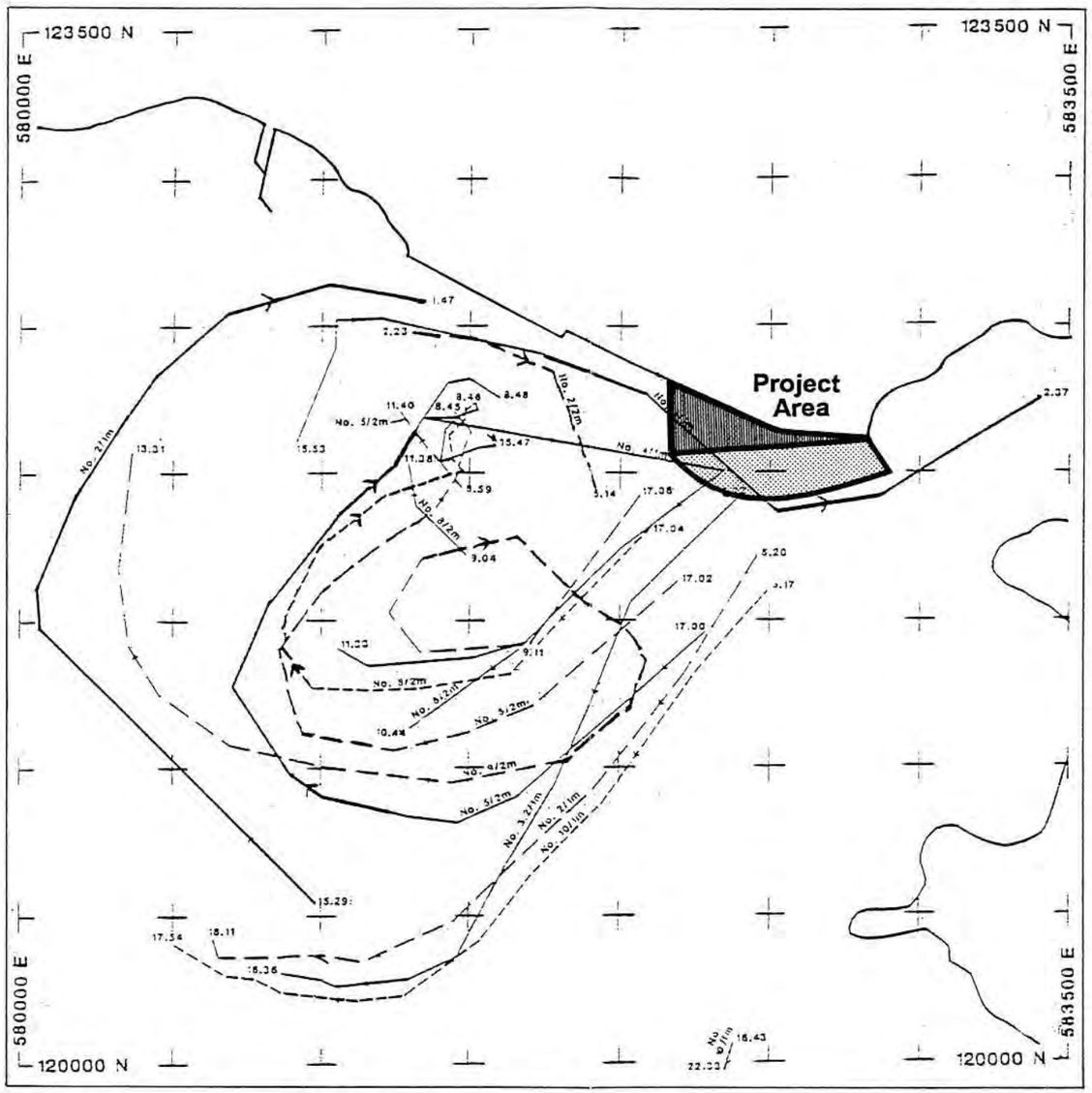
Water Depth in metres (Australian Chart Datum)

PORT OF ALBANY TOPOGRAPHY & CURRENT BATHYMETRY FIGURE 11

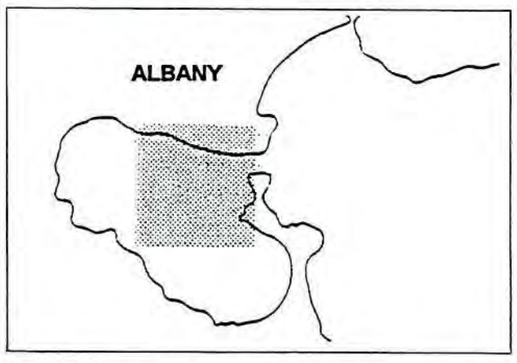
ALAN TINGAY & ASSOCIATES

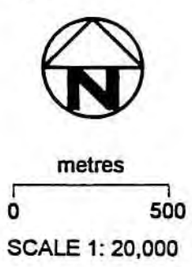


A Typical Winter Pattern
Drogue Trajectories induced by tide & north-westerly wind
(25-26 August 1985, 1700-0240 hours)



B Typical Summer Pattern
Drogue Trajectories induced by tide & easterly wind
(19-20 February 1986, 2130-0530 hours)





SOURCE: ENVIRONMENTAL PROTECTION AUTHORITY, TECHNICAL SERIES NO.51, 1993

DETAILED WATER CIRCULATION NEAR MOUTH OF PRINCESS ROYAL HARBOUR
FIGURE 12

Mt Clarence
Ellen Cove
Stirling Street
York Street
Frederick Street
Terrace
Railway
Railway Station
Princess Royal Drive
Burgoyne Street
Brunswick Road
Apex Drive
Mt Adelaide
Forts Road
Marine Drive
Theatre
Marine Centre
Customs
Boat Storage
ALBANY PORT AUTHORITY OFFICE
Workshops
Seafood Plant
CBH GRAIN STORAGE
Hanover Bay
SLIPWAY
TOWN JETTY
Cold Store
Workshops
Conveyor
Storage
BERTH 1
BERTH 2
BERTH 3
Dredged to 10.4 metres
New Grain Storage Area
Former Abattoir
Shell
Boral Gas
Ampol
FUEL STORAGE
Silica Sands Loading
Summit Fertiliser
Vital Foods
Semaphore Point
King Point
Dredged to 10.1 metres
Dredged to 12.2 metres
Dredged to 8.8 m
Dredged to 12.8 metres
Dredged to 12.5 metres
Dredged to 12.2 metres
Bramble Point
Possession Point
PRINCESS ROYAL HARBOUR
N
metres
0
500
SCALE 1:10,000

LEGEND

Boundary of Port Authority Area

PORT OF ALBANY
LAYOUT OF EXISTING FACILITIES
FIGURE 13

ALAN TINGAY & ASSOCIATES

A. VIEW FROM BRUNSWICK ROAD

B. VIEW FROM MARINE DRIVE

NOTE: The Development Area is not visible from the sealed Lookout Points

Stirling
Railway
Princess
Royal
Drive
Burgoyne
Brunswick
Road
Apex
Drive
Forts
Road
Mt Adelaide
Hanover
Bay
Road
ALBANY PORT
AUTHORITY OFFICE
Marine
VIEW A
VIEW B
TOWN
JETTY
SLIPWAY
King
Point
Semaphore
Point
PROPOSED
RECLAMATION
Area to be dredged to 12.2m
N
metres
0
500
SCALE 1:10,000

PORT OF ALBANY
VISIBILITY OF DEVELOPMENT AREA
FIGURE 14

ALAN TINGAY & ASSOCIATES

APPENDIX 1

NEW BERTH, PORT OF ALBANY
CONSULTATIVE ENVIRONMENTAL REVIEW
GUIDELINES

New Berth
Port of Albany

Consultative Environmental Review Guidelines

Overview

All environmental reviews have the objective of protecting the environment, and environmental impact assessment is deliberately a public process in order to obtain a broad range of advice. The review requires the proponent to describe the proposal, the receiving environment, all potential environmental impacts, and management of the environmental impacts, so that the environment is protected to an acceptable level.

Throughout the assessment process it is the Department of Environmental Protection's (DEP's) role to assist the proponent in modifying the proposal so that the environment is protected in the best manner possible. The DEP will also co-ordinate advice on environmental matters from relevant government agencies and the public.

Contents of the CER

The contents are to reflect the purpose of the CER, which is:

- to communicate clearly with the public (including government agencies), so that EPA can obtain informed public comment to assist in providing advice to government;
- to describe the proposal adequately, so the Minister for the Environment can consider approval of a well-defined project; and
- to provide the basis of the proponent's environmental management programme, which shows that the environmental issues resulting from the proposal can be managed acceptably.

The language used in the body of the CER should be kept simple and concise, considering that the audience includes non-technical people. Any extensive, technical detail should either be referenced or appended to the CER. The CER will form the legal basis of the Minister for the Environment's approval of the proposal, and should therefore, include a description of all the main and ancillary components of the proposal, including any options available.

The environmental management programme for the proposal should be developed in conjunction with the engineering and economic programmes of the proposal. Therefore, the CER should be designed to be useful immediately at the start of the proposal, and an environmental management and audit programme should be developed as the concluding part of the CER.

The contents of the CER should include:

- introduction of the proponent, the project and its location;
- the legal framework, decision making authorities and involved agencies;
- description of the components of the proposal and their potential impacts;
- description of the receiving environment and the predicted impacts on it;
- discussion of the key issues, including an assessment of their significance as related to any policies, objectives of standards which may apply;
- discussion of the management of the issues, including commitments to appropriate action; and
- a summary of the environmental management programme, including the key commitments, monitoring work and the auditing of the programme.

For this proposal, the environmental review would focus on protecting the natural and social values of the Port of Albany and Princess Royal Harbour, particularly as perceived by the communities of Albany and Denmark, and ensuring the appropriate development of the local port industry.

Key Issues

The key issues can be determined from a consideration, called scoping, of the potential impacts from the various components of the proposal on a receiving environment, which includes people. The CER should focus on the key issues for the proposal, and these should be agreed in consultation with the DEP and relevant public and government agencies. A description of the project component and its receiving environment should be directly included with, or referenced to, the discussion of the issue. The technical basis for measuring the impact and any objectives or standards for assessing and managing the issue should be provided.

For this proposal, the key issues at this stage include:

1. Justification

- Justification for additional berths;
- other options for proposed berths;
- justification for the preferred option.

2. Proposal

- the precise location of preferred option;
- details of proposed infrastructure associated with the site, including conveyor belts, railway lines, berths, bulk storage areas, services such as water, sewerage and power;
- possible transport issues including rail and road access; navigational requirements, turning circles and pathways of shipping and their effect on the sea bed (in map form)
- comparative navigational safety both for laden and unladen ships;

- details of associated works such as reclamation, beacons, breakwater structures;
- dredging, methods of dredging and spoil containment, ongoing requirements for dredging as a result of construction;
- layout and type of construction of proposed berths, including proposed materials and their source, for example required quantity of fill and its source;
- any plans for future port expansion; and
- construction timetable

3. Existing Environment

- harbour dynamics, including circulation and flushing
- detailed description of and local and regional significance of major marine habitats (including open sand areas, seagrass beds, and types of marine fauna/flora which may be affected by expansion and on-going use of the port facility;
- existing and proposed professional and amateur fishing and aquaculture operations in the vicinity of any of the option;
- existing recreational use by tourists and local residents of the proposed development areas and their tourist/recreational values;
- existing port facilities and operations;
- future expansion of use of land-based port infrastructure, for example larger stockpiles in the same area.

4. Environmental Impacts and their Management

4.1 Marine Impacts and their Management

- impacts of dredging and reclamation on the circulation and flushing of Princess Royal Harbour including a cross section of Harbour entrance;
- impacts on water quality; particularly sedimentation and turbidity, particularly on light penetration, epiphyte growth and seagrass and its management of these impacts;
- spillages during bunkering, vessel loading and unloading and its management;
- loss of coastal and marine resources by dredging and reclamation;
- ecosystem disturbance in Princess Royal Harbour, particularly on seagrass beds;
- release of toxic spores resulting from disturbance to the sea beds;
- impacts on local fisheries, including aquaculture;
- sullage, oil spillage, and their management; and
- ballast water contamination from additional shipping from other areas and its management.

- impacts from construction and additional on-going traffic, including noise, frequency and magnitude, and its management;
- impacts from dust and noise during dredging and reclamation, and its management;
- impacts of dredge spoil, and its management;
- impacts from site drainage particularly stormwater and septage, and its management, including sedimentation/pollution controls and litter traps;
- impacts of construction and on-going use of proposed berths on recreation and tourism;
- visual impacts from construction of new berths and reclamation, proposed new infrastructure and stockpiles, particularly on recreation and tourism and their management;
- the handling and transport of hazardous and dangerous goods and its management.

Further key issues may be raised during the preparation of the CER, and on-going consultation with the DEP and relevant agencies is recommended. Minor issues which can be readily managed as part of normal operations for similar projects should be described briefly. Information used to reach conclusions should be properly reference, including personal communication. Assessments of the significance of an impact should be soundly based rather than unsubstantiated opinions, and the assessment should lead to a discussion of the management of the issue.

Public Consultation

A description should be provided of the public participation and consultation activities undertaken by the proponent while preparing the CER. It should describe the activities undertaken, the dates, the groups/individuals involved and the objectives of the activities. Cross reference should be made with the description of environmental management of the issues and should clearly indicate how community concerns have been addressed. Those concerns which are dealt with outside the EPA process can be noted and referenced.

Environmental Management Commitment

If the proposal is approved, the proposal's method of implementation and all the proponent's commitments listed in the CER would become legally enforceable under the environmental conditions approved by the Minister for the Environment. Specific commitments to protect the environment, typically related to the key issues, should be separately listed, numbered and take the form of: who would do the work; what the work is; when the work would be carried out; and what agencies would be involved. These key commitments show that the proponent is committed to legally enforceable and auditable management of the environmental issues.

APPENDIX 2

EXTRACTS FROM THE REPORT OF THE ALBANY TECHNICAL COMMITTEE ON ROAD ACCESS TO THE PORT (1969)

Report of the

ALBANY TECHNICAL COMMITTEE

on its enquiry into

ROAD ACCESS TO THE PORT
AND
INDUSTRIAL LAND REVIEW
IN THE
TOWN AND PORT OF
ALBANY
WESTERN AUSTRALIA

The Hon. Ross Hutchinson, D.F.C., M.L.A.,
Minister for Works,
Public Works Department,
2 Havelock Street,
WEST PERTH. 6005.

The Albany Technical Committee, comprising the following members :-

E.R. Gorham	-	Executive Engineer, Public Works Department
A.H. Tognolini	-	Assistant Commissioner, Main Roads Department
J.D. Gillespie	-	Engineer for Harbours and Rivers, Public Works Department
E.J. Norman	-	Managing Secretary, Albany Port Authority
F.R. Brand	-	Town Clerk, Albany Town Council
T.J. Lewis	-	Industries Promotion Officer, Department of Industrial Development

has pleasure in submitting for your consideration, this report relating to road access at the Port of Albany and industrial land requirements in close proximity to the Port.

ALBANY TECHNICAL COMMITTEE

REPORT

INTRODUCTION

In February 1969, the Hon. Minister for Works agreed, in collaboration with the Albany Town Council and Albany Port Authority, to initiate a study of matters relating to road access to the Port of Albany and industrial land requirements in close proximity to the Port, with due regard to future harbour development.

A technical committee representing the Albany Town Council, the Albany Port Authority, the Main Roads Department, the Department of Industrial Development and the Public Works Department was directed to examine the position, to co-ordinate the investigation and advise on the matters under reference.

It was agreed that Sir Alexander Gibb and Partners, Consulting Engineers, would be commissioned to undertake an assignment in close collaboration with the Albany Technical Committee.

The Terms of Reference to be as follows :

To investigate the requirements for road access from Hanrahan Road to the Port of Albany and advise on the feasibility of alternate routes.

To investigate the requirements for and availability of industrial land in reasonable proximity to the Port and advise on the feasibility of making provision for immediate and future requirements by reclamation or alternative means.

It should be noted that the Committee and the Consultant have expressly excluded from their considerations and recommendations any comment on the distribution of the costs of the remedial measures proposed.

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

(i) The fundamental problem is that the only viable and economic routes between the origins and destinations of industrial traffic, through Albany, are through developed and traditional residential or business areas. A sociological problem has been created by the accelerated growth in the density of industrial traffic, by day and by night, and over inadequate roads, generating noisy, dangerous and allegedly noxious conditions which have become unacceptable, to the point of protest, to residents and business houses in the worst affected areas.

(ii) The preferred solution :

(a) should obviate present causes for local complaint and ensure that there should be no resurgance of the same problems later and elsewhere in Albany

(b) should be implemented in stages, the first of which alleviates conditions, and the ultimate of which facilitates considerable new industrial development to be undertaken without the disturbance to urban and business areas which has already occurred at the present lower levels of industrial development

(c) should encourage new industrial development west of the Port on alienated and on Crown reserves concurrently. Such development should begin, preferably, to the west of the Albany Wool Stores and the Phosphate Works and not contiguous thereto

(d) should not, as a result of re-routing of roads, prejudice the revenues and expenditures of the Port Authority.

RECOMMENDATIONS

(i) The Committee submits that the road access design, shown in Plate A makes provision for a high capacity partially controlled access facility connecting the Albany hinterland and the western industrial zone with the Port. It recommends the adoption of the road planning proposal, and early implementation of Stage I, involving the connecting of Festing Street to the Port by a new foreshore road, as shown.

(ii) The Committee recognised the necessity to alter the road alignment at the junction of Hanrahan Road and Festing Street at an early stage of development of the Access Road Proposal and recommends action be taken accordingly.

(iii) It is further recommended that Stage 2 involving the realignment of the Frenchman Bay Road and relocation of the level crossing of the railroad, should be proceeded with at an early date.

(iv) Stage 3 involving a dual carriageway from Hanrahan Road to the Port with high capacity at grade intersections, and road overpass connection to the Frenchman Bay Road be reviewed from time to time in the light of industrial and port developments and traffic growth.

(v) The Committee anticipates a requirement for substantial areas of land for industrial purposes in addition to the land zoned for industry in the Local Authority planning scheme, and it recommends action be taken to dedicate a suitable area of Crown land of approximately 500 acres in the vicinity of the Gaol for industrial purposes. Plate B refers.