KWINANA EXPORT FACILITY

Consultative Environmental Review

FEBRUARY 1999

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Westrail

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CONSULTATIVE ENVIRONMENTAL REVIEW

Kwinana Export Facility

for
Koolyanobbing Iron Pty Ltd
Fremantle Port Authority
Westrail

DAMES & MOORE
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INVITATION

The Environmental Protection Authority (EPA) invites people to make a submission on this proposal.

This Consultative Environmental Review (CER) describes a proposal to export iron ore through the Kwinana Bulk Cargo Jetty. The Proponents for the Project are Koolyanobbing Iron Pty Ltd, Fremantle Port Authority, and Westrail.

This document is available for public review for four weeks from 15 February 1999 to 15 March 1999.

Comments from Government agencies and the public will assist the EPA to prepare an Assessment Report in which it will make recommendations to Government.

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 unless provided and received in confidence subject to the requirements of the Freedom of Information Act, and may be quoted in full or in part in each report.

Why not Join a Group?
If you prefer not to write your own comments, it may be worthwhile joining with a group or other groups interested in making a submission on similar issues. Joint submissions may help to reduce the workload for an individual or group, as well as increase the pool of ideas and information. If you form a small group (up to 10 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 this document 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 proposals in this 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:

- attempts 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 this document;
- if you discuss different sections of this document, keep them distinct and separate, so there is no confusion as to which section you are considering; and
- attach any factual information you may wish to provide and give details of the source. Make sure your information is accurate.

Remember to include:

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

The closing date for submissions is: 15 March 1999

Submissions should be addressed to: Mr Richard Sutherland

Environmental Protection Authority
Westralia Square
141 St George's Terrace
PERTH WA 6000

CONSULTATIVE ENVIRONMENTAL REVIEW
KWINANA EXPORT FACILITY
for
Koolyanobbing Iron Pty Ltd, Fremantle Port Authority and Westrail

EXECUTIVE SUMMARY

THE PROPOSAL

The Fremantle Port Authority (FPA), in conjunction with Koolyanobbing Iron Pty Ltd (KIPL) and Westrail, proposes to develop an export facility at the Kwinana Bulk Cargo Jetty (BCJ), in Cockburn Sound.

KIPL currently exports 1.7 million tonnes per annum (Mtpa) of iron ore through the Port of Esperance. An expansion of mining operations at the Koolyanobbing mine site, located in the eastern wheatbelt and approximately 400 km east north east of Perth, will result in KIPL increasing its export of iron ore up to 4 Mtpa. It is proposed to export this ore through a facility based in Kwinana which will be dedicated to exportation of commodities. It is expected that the facility would be used for other dry bulk exports in the future, although these will undergo separate environmental approval if required.

The proposed export facility will consist of three components (rail, terrestrial and marine) each operated separately by the three Proponents of the Project. The facilities required will include:

- *a rail line within the existing service corridor adjacent to the new Kwinana Beach Road (Westrail);*
- *an automated rail car dumper (KIPL);*
- *an enclosed conveying system (KIPL);*
- *a storage shed (KIPL);*
- *an access jetty supporting an enclosed conveyor (FPA);*
- *a berthing jetty constructed as a southern extension of the existing BCJ (FPA); and*
- *bulk material shiploader (FPA).*

The Project is located in an area bounded by Kwinana Beach Road, the BCJ and Wells Road which is zoned for industrial use. Most of the Project Area is within the Town of Kwinana, however, approximately 1.1 km of rail line will be located in the City of Rockingham.

Iron ore from Koolyanobbing Mine Site will be transported in open wagons to Kwinana where it will be removed from the train by an automatic, enclosed car dumping system. The ore will then be transported via enclosed conveyor to a storage shed. Two types of ore (lump and fines) will be stored separately in the shed. Prior to export, the lump ore will be screened inside the shed to remove any fine ore which will be combined with fines and sold separately. The ore will be transported from the storage shed to the new berth on an enclosed conveyor. The ore will be loaded onto the ships using a travelling ship loader.

A total of 200 people will be employed during the construction of the proposed facility, over a 20 month period. Six permanent employees will be required to operate the facility and contractors will also be required for specialist maintenance such as mechanical and electrical duties during the operation of the Project.

A number of alternatives were considered during the initial planning of the Project. These included:

- *other ports (such as Geraldton, Bunbury and Esperance);*
- *other facilities in Kwinana (such as the Kwinana Grain Terminal Jetty and BHP's jetty);*
- *other orientations of the proposed extension to the BCJ.*

The BCJ at Kwinana was considered to be the most appropriate facility for the export of the iron ore. A southern extension has been chosen as the best option for an extension to the jetty as no dredging will be required, the risks associated with ship movements are minimal and there will be minimal interruptions to other users of the BCJ.

ENVIRONMENTAL ISSUES AND MANAGEMENT

Table E1 summarises the major environmental and social issues associated with the Project and these are described in the following sections.

Environmental Management

The FPA is committed to operating the existing BCJ and the proposed new berth according to Best Practice Environmental Management and is currently updating and formulating its existing environmental management practices into a formal Environmental Management System (EMS). It is expected that the EMS will be operational within 18 to 24 months.

The FPA has recently prepared a Common User Agreement, which all users of the facilities at the BCJ will be required to sign. This Common User Agreement outlines the conditions of the FPA's Environmental Licence and requires all users to comply with these conditions until the EMS is in place. All users will be required to comply with the EMS once it is in place.

Procedures for the operation of the car dumper, storage shed and land based conveyors will also be developed. These procedures will take the form of an Environmental Management Plan (EMP).

Flora and Vegetation

The major impact to the vegetation in the Project Area will be the clearing of some exotic tree species from the proposed shed location. Some dune vegetation will also need to be cleared for the construction of the conveyor that extends from the shed to the jetty. As most of the vegetation in the area consists of weed species, there is a potential for these species to be spread around and from the Project Area.

Where possible, large trees will be retained and supplementary planting will be undertaken. Any vegetation removed from the site will be disposed of to an approved council landfill or buried on-site to minimise the further spread of weeds within the Project Area. Topsoil removed from the site will be buried, if possible, prior to landscaping as it will contain large quantities of weed seeds. If the vegetative material needs to be removed from the site it will be disposed of in accordance with council regulations.

Fauna

Fauna in the area is generally limited to nomadic and scavenging bird species which are not restricted to the Project Area. As there are no significant fauna habitats in the Project Area, the construction of the Project will not impact on the fauna species in the area.

Erosion and Sedimentation

The majority of clearing and ground disturbance during construction will be in the vicinity of the proposed stockpile shed. This area is inland from the primary dunes and therefore not highly susceptible to erosion following disturbance.

The area of highest potential for erosion is on the primary sand dunes near the shore crossing. The conveyor will be constructed through the dune area and a clearance of approximately 3 m on either side of the conveyor will be required for maintenance purposes. The conveyor has been designed as an above ground facility. An access road will also be required through the dune system.

During construction, wind erosion of exposed areas will be minimised by implementing the dust control measures. Water runoff from the site (such as runoff from the roof of the shed and unvegetated areas) will be directed to a storm water catchment pond on the northern side of the storage shed and on the eastern side of the car dumper.

At the completion of construction, the dune area which has been disturbed, will be stabilised and rehabilitated. Some ground covering vegetation will be planted along the conveyor to minimise erosion. Other areas will also be stabilised and landscaped as soon as possible after disturbance.

Air Quality

During construction, dust will be generated from earthworks, movement of vehicles and from exposed ground surfaces. Dust generation during construction is expected to be minor and localised. Dust levels will be visually monitored on site by the construction contractor and the site will be sprayed with water as required to minimise dust generation. Areas that have been cleared following construction will be landscaped.

During the operation, there is a potential for dust to be generated during ore transportation and handling operations and through vehicular movement around the site. The dust generated could potentially impact on residents along the rail route from the mine site to the Port, the local residents in the vicinity of the Port, the users of Wells Park, and local industries. KIPL has extensive experience with dust management in Esperance. The measures which have been implemented at Esperance are considered to represent "state of the art" technology and have been included as a case study in Environment Australia's "Best Practice Environmental Management in Mining Module" for Dust Management (Howard and Cameron, 1998). These management measures include:

- *enclosure of all components of the facility;*
- *operating the facility components at negative pressure;*
- *using a specialised ship loader;*
- *regular housekeeping;*
- *training employees; and*
- *implementing a dust monitoring progamme.*

All of these measures will be implemented at Kwinana. Additional measures such as the use of an automated reclaiming system will also be used to minimise dust generation.

Dust monitoring along the rail line from Koolyanobbing Mine Site to Esperance indicates that dust generation from trains is unlikely to be an issue.

Noise

Localised noise will be generated during the construction of the car dumper, storage shed, railway and conveyors by earthmoving machinery, rollers, trucks and pile driving activities. Construction noise is not regulated under the Environmental Protection (Noise) Regulations 1997.

Noise levels during construction are likely to be below assigned noise levels except during pile driving activities. Noise levels at these times could potentially be above "acceptable" noise levels. The Proponents will

- *ensure that the quietest reasonably available equipment is used;*
- *ensure that the construction machinery is maintained in good condition and is fitted with appropriate, and correctly operating, noise control equipment;*
- *only undertake pile driving activities between 0700 and 1900 hours on weekdays and Saturdays.*
- *notify all residents and commercial premises in the vicinity of the Project Area, that pile driving activities will be undertaken and that higher than normal, impulsive noise levels are likely to occur; and*
- *periodically monitor noise levels at Wells Park and the nearest resident (the Caravan Park) during pile driving activities.*

Noise levels during operations will comply with the Environmental Protection (Noise) Regulations 1997.

Noise emissions from the locomotives are calculated to be 75dB(A) inside buildings, which is significantly less than the draft criteria of 85dB(A).

Vibrations

Monitoring undertaken by Westrail on its rail network has found that vibration levels are not high enough to result in structural damage to buildings in the vicinity of the rail lines. However, on occasions, levels can be high enough to cause a nuisance to humans along the rail line. Where the levels of vibrations have been high enough to cause a nuisance to humans, the rail lines have been investigated for irregularities which may cause the vibrations. Where irregularities are found they are rectified wherever possible. Westrail aims to comply with the German Standard DIN 4150 Part 3 (Structural Vibration in Buildings) which is more stringent than the other limits applied in Western Australia.

Groundwater Quality and Usage

Water will be used for dust suppression during the construction and operation of the Project. During operation of the Project, water will be used as a fogging mist at the discharge point into the ship's hold to prevent dust generation during the loading of the ship. Scheme water will be used to meet these requirements. It is not proposed to source any water required for the ongoing operation of the Project from groundwater supplies in the region.

Rehabilitation and Landscaping

At the completion of construction, only small areas will require landscaping or revegetation and these will include the area where the conveyor crosses the sand dunes and around the storage shed and car dumper. The Proponents will stabilise, rehabilitate and/or landscape all disturbed areas as soon as possible after construction.

Tributyltin (TBT)

Once the facility is operational, one additional ship per week will enter the Port and remain for approximately two days, representing a 3% increase in the current total ship movements within the Port of Fremantle. Management of the TBT is being addressed at a national and international level. Monitoring of TBT levels is currently being undertaken at various places in Cockburn Sound by the Department of Environmental Protection (DEP) on a triennial basis. This monitoring programme includes sites around the BCJ. The FPA will continue to liaise and co-operate with the DEP regarding the results of these surveys.

Ballast Water

The use of seawater as ballast water creates opportunities for pest species to invade Australian waters. The FPA is a member of the Western Australian Ballast Water Working Group which is chaired by the Department of Transport which represents FPA on the Australian Ballast Water Management Advisory Council. Currently, discharge of ballast into Cockburn Sound and other port waters requires the approval of the Harbour Master. In granting or refusing approval, the Harbour Master takes into account FPA regulations and the ballast water guidelines produced by the Australian Quarantine and Inspection Services (AQIS). This will continue to be the practice for ships using the proposed Berth 3.

FPA is in the process of initiating a baseline survey for introduced marine pests in both the inner and outer harbours. The baseline survey is being conducted in anticipation of the amendments by the International Maritime Organisation (IMO) to include ballast water as an Annex to the United Nations International Convention for the Prevention of Pollution from Ships (MARPOL). In addition to these measures, the FPA has recently implemented a policy to ban in-water hull cleaning of ships in port waters. This will reduce the potential for exotic species to be introduced into Cockburn Sound.

Seagrasses

There is no seagrass in the vicinity of the proposed southern extension of the BCJ or the proposed oversea conveyor and access jetty. Therefore, there will be no direct impact to seagrasses as a result of this Project.

Hydrodynamics

The potential for the proposed BCJ extension to significantly affect hydrodynamic processes within the Sound is considered to be negligible as the BCJ extension will be an open-pile structure.

Marine Spillages or Discharges

There is the potential for spillages of materials into Cockburn Sound as a result of the export activities. Recently, the FPA has implemented containment improvements on Berths 1 and 2 to make them both "zero" discharge facilities, and these include bunding around the perimeter and deflector plates. The FPA will implement these same controls to the proposed extension of the BCJ. A Contingency Plan, which will be implemented in the event of a spill, will be developed as part of the EMS. The conveyor for transporting iron ore will be fully enclosed for the entire length of the access bridge and berth. Any spillages that occur along the conveyor will be contained within the enclosing structure. The FPA will undertake a sediment monitoring programme to monitor for the presence of iron ore and other metals or contaminants in sediments around the BCJ.

Cumulative Impact to the Sound

The cumulative impact of the Project on Cockburn Sound will be primarily limited to national and international issues such as TBT and ballast water. The FPA is actively involved in groups which aim to minimise the impacts of both TBT and ballast water. There will be no impact to seagrasses as a result of the Project.

Survey of Wells Park

Wells Park and Kwinana Beach are the only local areas of beach access for the residents of the Town of Kwinana. A survey was undertaken over a three week period in November/December 1998 and a total number of 286 people were counted during the seven visits to the area and of these, 65 people were interviewed. Wells Park is predominantly used for picnics, barbecues and children's recreation. Kwinana Beach is used for swimming, sunbathing and walking. Kwinana jetty is mostly used for fishing.

A large number of people surveyed were not locals and came from other suburbs of Perth or from the country. Thirty seven percent of the participants supported the proposal, while 28% objected to the proposal. Seventy two percent of those surveyed indicated that the facility would have no effect on their usage of the area.

The survey results indicate that a substantial majority of users of Wells Park believed that the impacts on usage by will be minimal. In fact, more than one third of the users of Wells Park surveyed support the facility.

Visual Amenity

The view of the proposed extension to the BCJ from the barbecue area at Wells Park is mostly obscured by the presence of the foredunes in the area. The conveyors and portions of the shed will be visible from the park. People using the car park, jetty and beach will have clearer views of the proposed extension to the BCJ and the ship loader.

From Rockingham Beach, the proposed facility is largely concealed by the Kwinana Grain Terminal. Some parts of the facility will be visible underneath the conveyors associated with the Grain Terminal.

Of the people surveyed who were using Wells Park and Kwinana Beach only two raised the issue of the visual impact of the facility. The Proponents will minimise the visual impact of the facility by:

- *painting the facilities with colours that are harmonious with the surrounding environment;*
- *providing screening using vegetation where appropriate; and*
- *upgrading landscaping within Wells Park (particularly the northern and western portions).*

Impacts to Land Users

Impacts to other land users will mostly be limited to the construction period. The Proponents will liaise with potentially affected industrial land users during the construction and when required during operation of the export facilities. Consultation with the general public will be undertaken through the Community Liaison Group for the outer harbour, which the FPA proposes to establish. During construction of the conveyors, the Proponents will minimise the impact to traffic on Kwinana Beach Road by constructing the conveyor crossing during the week when fewer people access the area, and providing a traffic warden at the site to control traffic moving along the road.

The Project has been designed to minimise interruptions to other users of the rail line during operation by constructing a new rail line adjacent to the existing line.

The Project will not restrict access to Wells Park and Kwinana Beach.

Impact to Marine Users

The southern extension to BCJ will be constructed within the existing charted restricted area surrounding the BCJ. This area is currently, and will continue to be, restricted to commercial shipping, hence there will be no additional impact to marine users.

Recreational fishing from pleasure craft in Cockburn Sound will continue to be possible provided the public do not encroach on the operational area around the BCJ.

There are unlikely to be any impacts to the mussel farms located to the south of the Project Area, particularly if these farms are moved, as is currently proposed by the Fisheries Department of WA.

Land access to the BCJ itself will be restricted as it currently is, but with a new security system which will include electronic gates

A hazard and risk assessment will be prepared with the participation of all involved parties.

Impact on Traffic

There will be no impact to public access to Wells Park, although some delays may be experienced by some vehicles on Kwinana Beach Road as a result of additional trains passing through these areas.

Currently, an average of 22 trains (or 44 train movements) cross this road per day. An additional two trains per day will occur as a result of the Project. Each train will take approximately four minutes to cross the road. These trains will not occur at the same time each day as they will be operating on approximately a 28 hour turnaround time. The level crossing will continue to be controlled by traffic signals.

Aboriginal Heritage

An archaeological and ethnographic survey of the Project Area will be undertaken prior to the commencement of construction. The results of this survey will be supplied to the Aboriginal Affairs Department. In addition, the Proponents will obtain clearances under Section 18 of the Aboriginal Heritage Act 1972 to use the land and sea of the Cockburn Sound Ethnographic site, which is required for the extension to the jetty. As part of this application, consultation will be undertaken with the relevant members of the Aboriginal community.

Risk and Hazard

The storage and export of iron ore is a low risk industry. The FPA has quantified the risks associated with its Port operations through a Quantitative Risk Assessment. Safety systems and emergency response plans are implemented to deal with these risks. The FPA has applied the International Safety Rating System to its operations which contains a comprehensive risk management component. A risk assessment will be undertaken specifically for this Project and a risk management plan prepared.

The Proponents have informed the Kwinana Industries Council (KIC) of the proposed Project. The Proponents will continue to liaise with KIC regarding the Project and will meet with KIC to specifically discuss the emergency access routes in the area and the impact of the proposed Project on the current Emergency Response Plan.

CONCLUSIONS

The proposed iron ore export facility is a port related activity. It is proposed to construct this facility in an area that has been designated by the IP14 Structure Plan as appropriate for port related uses. It is a low risk industry, which does not require the use of groundwater, will not discharge any contaminants such as nutrients, heavy metals, hydrocarbons, acids or alkalis, into Cockburn Sound, and is not toxic to the environment. Environmental management strategies and procedures have been developed to minimise environmental impacts and a number of formal commitments have been made by the Proponent. The extension of the BCJ will provide a dedicated bulk export facility that will not only benefit KIPL but will also benefit other potential exporters of bulk materials or commodities. The southern extension is the most environmentally acceptable option as it does not require dredging and therefore minimises substantial disturbance to the seabed, does not require the disturbance of any seagrasses, is operationally efficient, has minimum risks associated with its operation and has minimal cumulative impact to Cockburn Sound.

Table E1

Summary of Issues and Management of the Kwinana Export Facility

Category	Topic	Aspect of Concern	EPA Environmental Objective	Present Status of Environment	Proposed Action	Proposed Management	Predicted Outcome	Compliance Measure
Biophysical Environment	Terrestrial Vegetation and Flora	Loss or degradation of vegetation communities.	Maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities.	The vegetation communities in the Project Area are highly modified. Most of the vegetation consists of lawn grasses and exotic trees which remain from past residential developments.	Vegetation will be removed from the site for the car dumper, storage shed, and conveyor system over the dunes.	• Retain large native trees wherever possible. • Dispose of vegetation removed from the site to an approved landfill to prevent spread of weeds. • Bury topsoil or dispose of it to an approved landfill to prevent the spread of weeds. • Landscape or rehabilitate areas as soon as practicable after disturbance.	No unacceptable impacts anticipated.	No action required.
	Terrestrial Fauna	Protection of fauna habitats.	Maintain the abundance, species diversity and geographical distribution of terrestrial fauna.	No significant fauna habitats for native species exist in the Project Area. Habitats mostly used by generalist or scavenger species.	Clearing of vegetation for the Project will result in very localised loss of fauna habitats. Most species likely to occur in the Project Area are highly mobile and not likely to be restricted to these habitats.	The loss of non-native trees will be supplemented with native trees planted during landscaping of the site. This would provide a more natural habitat for the fauna of the area.	No unacceptable impacts anticipated.	No action required.
	Marine Flora	• Protection of marine flora species. • Protection of seagrasses.	• Maintain the ecological function, abundance, species diversity and geographic distribution of marine flora.	There are no seagrasses present in the vicinity of the proposed extension to the BCJ. The shallow water between the BCJ and the shoreline is a suitable habitat for seagrass growth, however seagrasses have not recolonised the area since their disappearance in the early 1970s.	No seagrasses will be removed during the construction of the jetty.	No management required.	No unacceptable impacts anticipated.	No action required.
	Marine Fauna	• Protection of marine fauna and habitats. • Impacts of introduced species on native species.	• Maintain the abundance, species diversity, and geographic distribution of marine fauna. • Minimise the risk of introduction of unwanted marine organisms.	Marine fauna around the Project Area are typical of Cockburn Sound fauna. Low numbers of the introduced polychaete worm *Sabella* cf. *spallanzanii* were also present in the Project Area	• Minor disturbance of seabed during construction of the jetty. • Potential for introduction of marine organisms through ballast water.	• FPA is a member of the Western Australian Ballast Water Working Group • Ships are not permitted to discharge ballast water into Cockburn Sound without the approval of the Harbour Master, and/or AQIS. • FPA to undertake a baseline survey of introduced marine pests in the Port. • The FPA has introduced a policy to ban in-water hull cleaning of ships in port waters.	No unacceptable impacts anticipated.	• Baseline survey report submitted to DEP. • Final policy banning in-water hull cleaning submitted to the DEP
	Foreshore (beach)	Protection of beaches.	• Maintain the stability of beaches. • Maintain the integrity, function and environmental values of the foreshore area.	Foreshore in the Project Area is currently stable.	• Construction of the jetty and the access bridge will result in disturbance of a small area of the foreshore and beach. • Jetty will be an open pile structure.	Disturbed areas in the dune system, not required for maintenance of the conveyor, will be rehabilitated as soon as possible.	No unacceptable impacts anticipated.	Report to DEP regarding the success of rehabilitation of disturbed areas
	Seabed	Protection of the seabed.	Development should not have a significant impact on existing coastal processes.		The extension to the BCJ will be an open pile structure.	Sand transport in the vicinity of the BCJ would be expected to be very low and it is highly unlikely that it would be significantly hindered by an open-pile jetty structure.	No unacceptable impact.	No action required.
	Soil	Prevention of erosion and sedimentation.	Ensure that clearing does not result in land degradation.	Area is highly disturbed as a result of past residential development but has stabilised over time.	Clearing will be required for the car dumper, storage shed and for the construction of the conveyor. Only small areas will be exposed following construction.	• Dust control measures will be implemented to minimise wind erosion during construction. • Water runoff will be directed to a settling pond. • The conveyor has been designed as an above ground facility which will minimise the disturbance to the dune areas. • Access to the conveyor by operational personnel will be along the sealed access track. Movement off the sealed track will kept to a minimum. • The dune area will be stabilised and rehabilitated at the completion of construction. • Disturbed areas around the shed and car dumper will also be stabilised and landscaped as soon as possible after disturbance.	No unacceptable impact.	• Landscape plan submitted to the Town of Kwinana and DEP. • Report to DEP regarding the success of rehabilitation of disturbed areas.

Table E1 (*cont'd*)

Category	Topic	Aspect of Concern	EPA Environmental Objective	Present Status of Environment	Proposed Action	Proposed Management	Predicted Outcome	Compliance Measure
Pollution Prevention	Air Quality (particulates/ dust)	Impacts of dust on nearby residents and users of Wells Park.	Protect the surrounding land users such that dust and particulate emissions will not adversely impact upon their welfare and amenity or cause health problems by meeting the Guidelines for the Prevention of Dust and Smoke Pollution from Land Development Sites in WA and the *Environmental Protection (Kwinana) (Atmospheric Wastes) Policy* 1992.	The Project is located in an industrial area. Dust is generated from other industries in the area. Dust is not perceived to currently be a problem in the area.	Dust may be generated: • during transportation of the ore from the mine site to the port; • unloading of the wagons; • transportation of the ore from the point of unloading to the storage shed; • screening operations undertaken within the storage shed; • transportation of the ore from the shed to the jetty; and • loading of the ships.	The facility at Esperance is considered to be world class and has been sighted as a case study in Environment Australia's Best Practice Environmental Management Modules. The facility at Kwinana will be equal to, or better than, the Esperance facility. Management measures to be implemented include: • using an enclosed dumper to unload the ore from the trains; • transportation of the ore in fully enclosed conveyors to the storage area; • fully enclosed transfer stations; • storage of the iron ore in a shed which is kept under negative pressure (when conveyors are operating) by air extraction through dust collectors; • reclamation of the ore from the shed using an internal reclaimer and a conveyor system; • transportation of the ore to the jetty in enclosed conveyors; • loading of the ore onto the ship using a chute which can be lowered to minimise dust generation during loading operations; • the use of dust extractors at all loading or transfer points in the overall loading facility. The dust extractor systems will consist of reverse pulse filter baghouses which remove the dust from the extracted air prior to release to the atmosphere; • the use of water fogging dust suppression systems at the ship loader; • regular "housekeeping" in areas where dust accumulates. This involves removal of the dust with a vacuum cleaner; • training employees to ensure that effective dust control measures are implemented; and • implementation of a dust monitoring programme, as well as a visual inspection programme.	No unacceptable impact anticipated.	Results of dust monitoring to be forwarded to the DEP.
		Impacts of dust on residents along the rail line.		The rail line passes through numerous country towns and the Perth Metropolitan area.	Transport of iron ore in open topped wagons along the rail line.	• Investigate the use of crusting agents or other management measures if dust is considered to be an issue once operations commence.	No unacceptable impact anticipated.	Implement management measures if required.
	Groundwater	Potential for further pollution of groundwater.	Maintain or improve the quality of groundwater to ensure that existing and potential uses, including ecosystem maintenance are protected consistent with the draft WA Guidelines for Fresh and Marine Waters (EPA, 1993).	Groundwater in the vicinity of the Project Area is contaminated. Groundwater levels in the vicinity of the car dumper were between 2.3 and 2.9 m below ground level during May 1998.	• It is not proposed to source any water required for the ongoing operation of the Project from groundwater supplies in the region. • Construction of the car dumper will be undertaken using techniques similar to dredging. • No contaminants will be released into the groundwater in the region.	Source all water required for the Project from scheme water supply.	No unacceptable impacts anticipated.	No action required.
	Marine Water and Sediment Quality	Potential for pollution of marine waters and sediments in Cockburn Sound.	• Maintain or improve the quality of marine water consistent with the draft WA Guidelines for Fresh and Marine Waters. • Maintain or improve marine water and sediment quality consistent with Environmental Quality Objectives (EQO's) and Environmental Quality Criteria (EQC's) defined in the Southern Metropolitan Coastal Waters Study (DEP, 1996).	The waters of Cockburn Sound are contaminated with nutrients, heavy metals, hydrocarbons, oil and grease, bacteria and pesticides. Contaminants have also entered the waters from ships, through controlled discharge (such as ballast water and washdown wastes), accidental spillage and through leaching of toxic substances such as tributyltin (TBT) from the hulls of vessels.	• One additional ship per week will enter Cockburn Sound as a result of the Project. These ships are likely to use TBT on their hulls. • There will be no deliberate discharge of iron ore into Cockburn Sound.	• The FPA will undertake a sediment monitoring programme to monitor for the presence of iron ore, TBT and other metals or contaminants in sediments around the BCJ. • The FPA is a member of Kwinana Industry Council's Marine Quality Task Force which monitors water quality in the Sound on an annual basis. • The proposed extension to the BCJ will be constructed as a "zero" discharge facility.	No unacceptable impacts anticipated.	Results from the sediment monitoring programme will be forwarded to the DEP.

Table E1 (*cont'd*)

Category	Topic	Aspect of Concern	EPA Environmental Objective	Present Status of Environment	Proposed Action	Proposed Management	Predicted Outcome	Compliance Measure
Pollution Prevention (*cont'd*)	Marine Water and Sediment Quality (*cont'd*)					• A Contingency Plan will be developed as part of the EMS and will be implemented in the event of a spill. • The conveyor for transporting iron ore to the proposed extension will be fully enclosed and will therefore contain any spills. • If a spillage does occur inside the conveyor it will be cleaned up immediately to prevent any leakage into Cockburn Sound.		
	Noise	Potential impact of noise generated from the Project including noise from: • construction activities (including pile driving); • wagon indexing; • dumping of the ore; • locomotives in the vicinity of the car dumper; • conveyors; • dust extraction systems; • train movements along the route; and • ship loading activities.	• Protect the amenity of nearby residents from noise impacts resulting form activities associated with the proposal by ensuring that noise levels meet statutory requirements and acceptable standards. • [In regards to rail noise] Ensure that noise levels meet acceptable standards.	Noise levels in the vicinity of the Project Area currently exceed *Environmental Protection (Noise) Regulations* 1997 (DEP, 1998.).	• Noise will be generated during construction and operation of the Project. • Noise levels during pile driving activities may be above "acceptable" levels. However, this will be dependant on pile driving equipment used. • Noise levels during operation will not "significantly contribute" to existing noise levels (ie. will comply with *Environmental Protection (Noise) Regulations* 1997).	• Pile driving activities will be undertaken between 0700 and 1900 hours on weekdays and Saturdays. • Residents and commercial premises within the vicinity of the Project Area will be notified about noise generated during pile driving activities. • Noise levels will be periodically monitored during construction to ensure that noise levels are in the order of those predicted by the noise modelling study. • Construction equipment will be maintained in good condition and will be fitted with appropriate and correctly operating noise equipment. • The Project has been designed to minimise noise generation during operation (e.g. incline/decline into and out of the car dumper).	• The construction phase of the proposed facility may impact on residents in the north Rockingham area, users of Wells Park and the nearby commercial premises. • No unacceptable impacts anticipated during operation.	• Results from the noise monitoring programme to be forwarded to the DEP. • Operation of the Project to comply with *Environmental Protection (Noise) Regulations* 1997.
	Vibrations	Vibrations from additional rail movements along the rail line will result in damage to nearby buildings.		Some vibrations are felt along the rail line at Canning Vale.	• Up to four additional rail movements per day will occur as a result of the Project.	• Vibrations are generally only of nuisance levels and are not high enough to create structural damage. • Westrail aims to comply with the German Standard DIN 4150 Part 3 (Structural Vibration in Buildings) which is more stringent than other limits applied in Western Australia. • Westrail will investigate any complaints regarding vibrations along the rail line.	No unacceptable impacts anticipated.	None required.
	Cumulative Impact to Cockburn Sound	Impact of additional industries on Cockburn Sound.		Cockburn Sound is the most intensively used marine embayment in WA. It is used for recreation, fishing and industry.	• The southern extension of the BCJ will be constructed in Cockburn Sound. • Additional shipping movements will occur as a result of the Project.	• Current major cumulative impacts to Cockburn Sound are related to issues of national and international significance, such as ballast waster and TBT, which will be managed according to the measures outlined above.	No unacceptable impact anticipated.	Compliance for each individual issue outlined above.
Social Surrounds	Recreation (Usage of Wells Park)	Potential for the Project to disrupt recreational activities.	To ensure that recreational uses of the area are maintained.	• Well's Park is currently used for picnics, barbecues and children's recreation. • Kwinana Beach is used for swimming, sunbathing and walking. • Fishing is undertaken from the jetty and the waters of Cockburn Sound.	• The construction of the proposed Kwinana Export Facility will not impact on users of Well's Park or recreational fishermen of Cockburn Sound • The majority of the users of Wells Park (72%) indicated that the proposed facility would have no affect on their usage of the area.	• Maintain access to Wells Park and its facilities. • Access to Kwinana Beach will not be affected by the Project. • FPA will make a contribution to the amenities of Wells Park.	No unacceptable impact anticipated.	None required.

Table E1 *(cont'd)*

Category	Topic	Aspect of Concern	EPA Environmental Objective	Present Status of Environment	Proposed Action	Proposed Management	Predicted Outcome	Compliance Measure
Social Surrounds *(cont'd)*	Visual amenity	Impact of the extension to the jetty on the visual amenity of Well's Park	Visual amenity of the area adjacent to the Project should not be unduly affect by the proposal.	The Project Area is located in and industrial area and is surrounded by CBH silo's to the south, the Kwinana Nickel Refinery to the east, and CSBP and the existing BCJ to the north.	• The proposed extension to the BCJ will be visible from Kwinana Beach and the jetty at Well's Park. • Only the shiploader will be visible from the barbecue area at Well's Park. • The proposed extension will mostly be obscured from view from the Rockingham foreshore by the CBH grain terminal. However some parts of the jetty will be visible beneath the conveyor structure at CBH. • Only two of the 65 people surveyed raised the issue of visual amenity.	• The Proponents will: – paint the facilities with colours that are harmonious with the surrounding environment; – provide screening using vegetation where appropriate; and – continue consultation with the public both before and after construction.	Proposed extension is likely to impact on the visual amenity of the area.	Provide details of landscaping and community consultation undertaken to the DEP prior to commencing construction.
	Impacts to Land Users	Potential for the Project to impact on other users of the area.		Other land users in the area include: • surrounding industries such as CBH, WMC Nickel Refinery, and CSBP; • general public who use Kwinana Beach Road; and • users of Wells Park.	Greatest impact to other users of the area will be during construction which may result in some delays to trains using the adjacent line and delays in traffic along Kwinana Beach Road during construction of the conveyor.	• The Proponents will liaise with potentially affected land users during construction and operation of the facilities. • The FPA will continue to consult with the general public through a Community Liaison Group for the Outer Harbour. • The Proponent will construct the conveyor over Kwinana Beach Road on weekdays to minimise impact. • A traffic warden will be provided on site during construction. • There will be no restrictions on access to Wells Park during operation of the Project.	No unacceptable impacts anticipated.	No action required.
	Impacts to Marine Users	Potential for the Project to impact on professional and recreational fishing in Cockburn Sound.		• Eight mussel farms are located approximately 1 km to the southwest of the proposed extension to the jetty. • Over half the annual production of crabs in WA is caught in Cockburn Sound	• Recreational fishing from pleasure craft will still be possible in the vicinity of the BCJ provided the public do not encroach on the operational area around BCJ. • No impacts to the mussel farms and professional fishing industry are expected during the construction and operation of the proposed facility	• Access to the BCJ will be limited from land by a security system including electronic gates.	No unacceptable impacts.	None required.
	Impacts on Traffic	Potential for the Project to delay traffic on Kwinana Beach Road		Currently 22 trains cross Kwinana Beach Road.	• Up to two additional trains per day will cross Kwinana Beach Road as a result of the Project. • Delays of 3.7 minutes per train will be experienced as the trains cross the road.	• The trains will not run at the same time every day (approximately 28 hour turn around time) and therefore will not cross the road during the "peak hour" each day. • Level crossing will continue to be controlled by traffic signals. • While train is crossing Kwinana Beach Road other emergency access routes will be available. • The Proponents will discuss the impact of the proposal on the Kwinana Industries Mutual Aid system with Kwinana Industries Council (KIC).	No unacceptable impact anticipated.	Proponents to meet with KIC.
	Tourism	Potential impact of the Project on the tourism industry of Rockingham.		• Rockingham is considered to be one of WA's top ten day trips. • 511,000 day trips were made to Rockingham in 1996.	• The Project will be obscured by the CBH facilities and is unlikely to impact on the vistas from Rockingham foreshore. • No impact on the Rockingham foreshore is anticipated from dust or noise generated from the Project.	• Noise and dust will be managed according to the measures outlined in this CER. • A Community Liaison Group has been established for the Outer Harbour to ensure communication between the Proponents and representatives from the local tourist industry, to exchange information and to address issues.	No unacceptable impact anticipated.	Consultation occurs through the Community Liaison Group for the Outer Harbour.

Table E1 (*cont'd*)

Category	Topic	Aspect of Concern	EPA Environmental Objective	Present Status of Environment	Proposed Action	Proposed Management	Predicted Outcome	Compliance Measure
Social Surrounds (*cont'd*)	Aboriginal culture and heritage	Potential for the disturbance of areas of significance to Aboriginal people.	• Ensure that the proposal complies with the *Aboriginal Heritage Act* 1972. • Ensure that changes to the biological and physical environment resulting from the Project do not adversely affect cultural associations with the area.	• No know archaeological sites occur in the Project Area. • Potential for Aboriginal archaeological sites to occur in the Project Area, particularly along the sand dunes. • The extension to the BCJ occurs in the Aboriginal ethnographic site of Cockburn Sound. • Potential for other ethnographic sites to occur in the Project Area.	The construction of the Project will by undertaken within a known ethnographic site.	• The Proponent will comply with the *Aboriginal Heritage Act* 1972. • The Proponent will obtain all relevant clearances under Section 18 of the *Aboriginal Heritage Act* 1972. • The Proponents will undertake an archaeological and ethnographic survey of the Project Area prior to commencing construction of the Project.	No unacceptable impact anticipated.	• Section 18 applications submitted to Aboriginal Affairs Dept. • Report of archaeological and ethnographic survey submitted to the Aboriginal Affairs Dept and the DEP.
	Public Health and Safety	Risk and hazards associated with the Project	• Ensure that risk is managed to meet the EPA's criteria for individual fatality risk off-site and the DME's requirements in respect of public safety.	Kwinana Industrial Area has a good record for management of risk issues.	• Iron ore export is a low risk industry. • Major risks associated with the export facility include risks associated with shipping movements and risks associated with emergency ingress and egress from the Kwinana Beach area.	• The FPA has quantified risks associated with port operations and has implemented safety systems and emergency response plans to deal with these risks. • The FPA will undertake a hazard and risk assessment of the construction and operation of the marine component of the Project and will develop a risk management plan specifically for this Project. • FPA is a member of the Kwinana Industry Council. • FPA will ensure that adequate measures are taken during construction to prevent access to the construction site.	No unacceptable impact.	• Risk assessment of the Project to be submitted to the DEP. • Risk Management Plan to be submitted to the DEP.

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CONSULTATIVE ENVIRONMENTAL REVIEW
KWINANA EXPORT FACILITY
for
Koolyanobbing Iron Pty Ltd, Fremantle Port Authority and Westrail

1. INTRODUCTION

1.1 THE PROPOSAL

The Fremantle Port Authority (FPA), in conjunction with Koolyanobbing Iron Pty Ltd (KIPL) and Westrail propose to develop an export facility at the Kwinana Bulk Cargo Jetty (BCJ), in Cockburn Sound.

KIPL currently export 1.7 million tonnes per annum (Mtpa) of iron ore through the Port of Esperance. An expansion of mining operations at the Koolyanobbing mine site, located in the eastern wheatbelt and approximately 400 km east north east of Perth (Figure 1), will result in KIPL needing to increase its exports of iron ore up to 4 Mtpa. The export facility at Esperance and the rail line operating between the mine site and the Esperance Port are not equipped to handle this quantity of ore (Section 3.1.1) and therefore the export of the iron ore through other ports has been considered.

KIPL's interest in exporting a iron ore through Kwinana has initiated the move by the FPA to design a facility which is dedicated for exportation of commodities. It is expected that the facility would be used for other dry bulk exports in the future, although these will undergo separate environmental approval if required.

The proposed export facility will consist of three components (rail, terrestrial and marine) each operated separately by the three Proponents of the Project. The facilities required will include:

- a rail line within the existing service corridor adjacent to the new Kwinana Beach Road (Westrail);
- an automated rail car dumper (KIPL);
- an enclosed conveying system (KIPL);
- a storage shed (KIPL);
- an access jetty supporting an enclosed conveyor (FPA);
- a berthing jetty constructed as a southern extension of the existing BCJ (FPA); and
- bulk material shiploader (FPA).

The rail and storage facilities will be located in an area bounded by Kwinana Beach Road, the BCJ access road and Wells Road (Figure 2). This area is zoned for industrial use. Most of the Project Area is within the Town of Kwinana, although approximately 1.1 km of rail line will be located in the City of Rockingham.

The iron ore will be transported from the mine site to Kwinana in open topped rail wagons. The ore will be unloaded in an automated, enclosed car dumper, and transported to the storage shed via an enclosed conveyor. The ore will then be screened, transported over land and sea in an enclosed conveyor to the ship loader which will deposit the ore into the ship hold, for transportation to overseas consumers.

1.2 BACKGROUND TO THE PROJECT

1.2.1 History of Koolyanobbing Iron Operations

Iron ore was discovered in the Koolyanobbing area in 1887. Production of iron ore at Koolyanobbing Mine commenced in 1950 to supply the Wundowie Charcoal Iron Industry located on the outskirts of Perth. The mine was operated between 1960 and 1983 by BHP Iron Ore and supplied ore, via open topped rail wagons, to the Kwinana Blast Furnace until its closure in 1982. The mine was redeveloped in 1994 by Portman Resources and currently produces approximately 1.7 Mtpa of iron ore, which is exported through the Port of Esperance.

Approval to export the iron ore through Esperance was sought by the Esperance Port Authority in 1993 as part of the redevelopment of the Koolyanobbing Mine undertaken by Portman Resources and was formally assessed by the Environmental Protection Authority (EPA), as a Consultative Environmental Review (CER) (Ashton Environmental and Safety Services 1993). The initial proposal included:

- open stockpiles;
- open conveyors;
- a car dumper; and
- a shiploader.

The export of iron ore through the Esperance Port was highly controversial due to the pristine nature of the local beaches and the close proximity of the residents to the Port facilities (located between 150 m and 300 m from the proposed facilities), and its reputation as a place of unique beauty. As a result of public concern, the initial proposal was substantially modified (EPA, 1993) to incorporate an enclosed stockpile shed, transfer points, and conveyors, modified shiploading facilities and reduced-noise operations. The results of these modifications represent "state-of-the-art" facilities which have virtually eliminated any issues associated with noise and dust due to the unloading, storage and exportation of iron ore. The facility is considered to be of an extremely high standard and exceptionally successful. The facility design and operation has been so successful that it has been cited as a case study for dust control in the "Best Practice Environmental Management in Mining: Dust Control" booklet published by Environment Australia (Howard and Cameron, 1998).

KIPL has recently obtained approval to expand its Koolyanobbing mining operations to produce up to 4 Mtpa of iron ore by the year 2002. This increase in production has prompted KIPL to reconsider the viability of continuing to export iron ore through Esperance. A number of issues have resulted in KIPL considering Kwinana as a more valid port for the export of its iron ore, and these include:

- a decrease of approximately 100 km in the rail transportation distance;
- an increase in tonnage transported per train due to the higher axle loading of rail between Koolyanobbing and Kwinana;
- shorter shipping distances from Kwinana to overseas markets;
- an increase in the cargo capacity of the ships able to berth at Kwinana due to the deeper Port waters; and
- a decrease in the cost of exporting through Kwinana.

These issues are discussed in more detail in Section 3.1.1.

The facility at Kwinana will be of an equal or better standard to that which is in operation at the Esperance Port. KIPL's experience at Esperance will result in the development of a world class, best practice, facility at Kwinana. The facilities at Esperance currently used for the export of iron ore, will remain at the Esperance Port and will be available for use by other exporters.

1.2.2 History of the Bulk Cargo Jetty

The Kwinana BCJ is located in the southern part of Cockburn Sound in naturally deep water. The BCJ currently comprises two berths (Berth 1 and Berth 2), constructed by the FPA in 1968 and 1977 respectively, and an access bridge. The jetty is a T-head, open steel pile structure which extends 400 m from the shore line (Figure 2). The concrete deck is supported on tubular steel piles and the two berths extend for a total of 480 m in a north-south direction. The depth of water adjacent to the existing berths is approximately 13 m and can accommodate vessels of up to 12.9 m draft.

The facilities at the BCJ are predominantly used for importation of products. Berth 1 is equipped with two rail mounted unloaders and is principally used by CSBP for the bulk importation of rock phosphate with smaller tonnages of urea, sulphur, ammonium sulphate and anhydrous ammonia. Other companies also use Berth 1 for the importation of products such as phosphoric acid.

Berth 2 is used for the importation of refined petroleum products, caustic soda and some fertilisers. It has recently become the primary berth for the importation of sulphur for the Murrin Murrin Nickel Cobalt Project. Exports from both berths also occur on occasions.

At the time of construction of Berth 2, it was anticipated that the BCJ would be progressively extended in a southwesterly direction to ultimately join up with the Kwinana Grain Jetty which is situated approximately 1 km to the south of the BCJ. CSBP has preferential access rights to Berth 1 and, as such, this berth cannot be used by others on a regular basis as the risk of additional costs associated with the delays that may be experienced is too high. The utilisation of Berth 2 is likely to increase to 60% in the next 18 months if the Murrin Murrin Nickel Cobalt Project is expanded, and additional sulphur required for the expansion is imported through this Berth.

The efficiencies of the two existing berths are subject to commercial agreements between the FPA and major users. Given the existing high volume of produce and projected increases in imports, the existing berths are not capable of:

- sustaining the volume of exports required by KIPL;
- accommodating the necessary infrastructure required for exporting purposes (export conveyor and high speed loader); or
- accommodating the cape size ship that will be required for the iron ore (from both a dead weight and length perspective).

Therefore, a new facility primarily for exporting materials, will be required for the export of iron ore and other commodities, to minimise delays and interference to the current activities occurring on the other berths.

The extension of the BCJ to provide a third berth (Berth 3) has been considered previously in projects which have proposed to utilise the BCJ facilities to import and export materials/products, such as mineral and silica sands. To date, the commercial reality has been that the levels of exports and their relative values has not justified the capital investment required for the export facility. The proposed export of iron ore by KIPL provides a significant export volume which will allow the Kwinana Export Facility to become commercially viable and will in turn benefit other potential users, enhancing the utilisation of the Port.

1.3 THE PROPONENTS

The various components of the Project are being developed by different Proponents, who are working in cooperation. The marine component of the Project is being managed by the Fremantle Port Authority, while the terrestrial components are being managed by KIPL and Westrail. Details of which components of the Project each Proponent is responsible for are outlined in Table 1.

Table 1

Proponents of the Project

Proponent	Responsibility for Project Component
Koolyanobbing Iron Pty Ltd (KIPL) Level 11 1 William Street PERTH 6000 WA	• Rail car dumper. • Conveyor to storage shed. • Storage shed. • Conveyor to FPA land.
Westrail East Perth Railway Terminal West Parade EAST PERTH 6004 WA	Train operations.
Fremantle Port Authority (FPA) Victoria Quay 1 Cliff Street FREMANTLE 6160 WA	• Conveyor from FPA land to jetty. • Access bridge. • Southern extension to the BCJ. • Outloading facilities.

The FPA is a commercialised Government Trading Enterprise that has primary responsibility for facilitating trade and managing channels and navigation in Cockburn Sound, which is within the FPA port boundary as defined under the *Fremantle Port Authority Act* 1902.

KIPL (ACN 061 859 649) is a joint venture management company between Portman Resources NL (ACN: 001 892 995) and Angang Australia (ACN: 061 851 072). The joint venture was formed when Portman Resources took over the operation of the Koolyanobbing mine site.

Westrail is the trading name for the Western Australian Government Railways Commission. Westrail is a statutory authority which competes in the freight, passenger and related transport markets in southern Western Australia.

If either KIPL or Westrail decide not to proceed with the Project, the FPA may still construct the export facility. FPA believes that there are sufficient requirements for a dedicated export facility to enable it to be viable even if iron ore is not exported through the facility. The export of other products will undergo separate environmental approval, where necessary.

1.4 TIMING OF THE PROJECT

It is proposed to commence construction as soon as practicable following the receipt of environmental and other approvals. Construction of the marine facility is expected to take approximately 18 months while the construction of the terrestrial component is expected to take approximately 20 months.

1.5 THE NEED FOR THE PROJECT

The Kwinana BCJ is predominantly an import facility and is currently unable to facilitate large volumes of dry bulk exports. The proposed increase in production of iron ore at the Koolyanobbing Mine Site will result in an increase in the quantity of iron ore exported from the State. KIPL considers that it is not viable to export greater quantities of iron ore through the Esperance Port for the reasons outlined above in Section 3.1.1. Therefore, it will be necessary to develop an export facility at the Kwinana BCJ to facilitate the export of iron ore produced at the Koolyanobbing Mine Site.

The "no development" option would result in KIPL continuing to export the ore from the Port of Esperance. This option is not considered viable due to limitations on ship sizes, limitations on axle loading and speeds on the railway line to Esperance, and KIPL's desire to increase its mining rate. The inability to develop the export facility at Kwinana will therefore result in a loss of export earnings for the state and the loss of employment opportunities both at the BCJ and at Koolyanobbing Mine.

1.6 ENVIRONMENTAL IMPACT ASSESSMENT

In Western Australia, Environmental Impact Assessment (EIA) is a formalised process designed to provide information to the EPA, the Department of Environmental Protection (DEP) and the public about proposed developments with the potential to impact on the natural and social environment.

The Kwinana Export Facility Project was referred to the DEP on 30 April 1998. The EPA originally set the level of assessment as "Not Assessed – Managed Under Part V of the *Environmental Protection Act*". This level of assessment was appealed by local councils and some members of the public. As a result the Minister for the Environment elected to formally assess the proposal as a CER and this Project will be assessed under the provisions of the Western Australian *Environmental Protection Act* 1986 (amended 1994). Administrative procedures associated with this assessment are illustrated on Figure 3.

A CER is prepared for proposals with environmental impacts that are considered to be significant but relatively easily managed and with public interest restricted to the local community and/or special interest groups (EPA, 1993b). Final guidelines for the preparation of the CER were issued by the EPA on the 11 December 1998 and are presented as Appendix A. The CER is a public document and will be subject to a four week public review period, during which time the government agencies, private organisations and the public are invited to make submissions to the EPA. The EPA will then assess the proposal with consideration of:

- issues raised by the public;
- the Proponent's response to those issues;
- specialist advice from government agencies;

- the EPA's own research; and
- research undertaken by other expert agencies, if required.

The EPA will then submit its report and recommendations to the Minister for the Environment on the environmental acceptability of the Project and the environmental conditions which should apply if the Project proceeds.

The EPA will publish its report and the public may appeal to the Minister for the Environment against the content of the report or its recommendations. The final decision on whether a Project may proceed will then be made by the Minister. Only after the Minister has set the environmental conditions of approval may other Decision Making Authorities (DMAs) give approvals and construction be allowed to commence.

1.7 DECISION-MAKING AUTHORITIES

The DMA's and other involved agencies which may provide input to the environmental assessment and management of the Project include:

- EPA;
- DEP;
- Water and Rivers Commission (WRC);
- Health Department;
- Fisheries Department of WA;
- Town of Kwinana;
- City of Rockingham; and
- Main Roads WA.

1.8 RELEVANT LEGISLATION

In addition to obtaining approval from the Minister for the Environment, the Proponent will have to comply with legislation and regulations administered by a number of Federal and State Government bodies. Relevant legislation includes:

- *Environmental Protection Act* 1986;
- *Port Functions Act* 1994;
- *Marine and Harbours Act* 1981;
- *Fremantle Port Authority Act* 1902;
- *Shipping and Pilotage Act* 1967;
- *Western Australian Marine Act* 1982;
- *Fisheries Act* 1905;
- *Australian Quarantine Act* 1908;

- *Wildlife Conservation Act* 1950;
- *Conservation and Land Management Act* 1984;
- *Bush Fires Act* 1954;
- *Native Title Act* 1993;
- *Aboriginal Heritage Act* 1972-1984;
- *Australian Heritage Commission Act* 1975;
- *Soil and Land Conservation Act* 1945;
- *Health Act* 1911;
- *Occupational Health, Safety and Welfare Act* 1984;
- *Public Works Act* 1902;
- *Commonwealth Arbitration Act* 1985;
- *Local Government Act* 1960;
- *Main Roads Act* 1930;
- *Government Railways Act* 1904;
- *Metropolitan Region Town Planning Scheme Act* 1959;
- *State Planning Commission Act* 1928; and
- *Town Planning and Development Act* 1928.

1.9 PURPOSE AND STRUCTURE OF THIS DOCUMENT

This CER has been prepared in compliance with the *Environmental Protection Act* 1986. The purpose of the CER is to:

- describe the key characteristics of the Project (Section 2);
- describe the Project alternatives that have been considered (Section 3);
- describe the key characteristics of the receiving environment (Section 4);
- outline community consultation undertaken in relation to the Project (Section 5);
- identify the potential impacts of the Project on the natural and social environment (Section 6);
- assess the Project's environmental acceptability (Section 6); and
- broadly define appropriate environmental management strategies and procedures to be implemented during the construction and operation of the Project (Section 6).

Throughout the CER, each section has been split into marine and terrestrial sections to represent the two major components of the Project.

2. PROJECT DESCRIPTION

Iron ore from Koolyanobbing Mine Site will be transported in open wagons to Kwinana where it will be removed from the train by an automatic, enclosed car dumping system. The ore will then be transported via enclosed conveyor to a storage shed. Two types of ore (lump and fines) will be stored separately in the shed and the lump ore will be screened inside the shed, prior to export, to remove any fine ore which will be combined with fines and will be sold separately. The ore will be transported from the storage shed to the new berth on an enclosed conveyor (Figure 2). The ore will be loaded onto the ships using a travelling shiploader.

The following sections provides a detailed description of the various components of the Project and the key characteristics of the Project are outlined in Table 2.

Table 2

Summary of Key Project Characteristics

Project Characteristics	Requirements
Expected Project Life	• 50 years for Berth infrastructure. • 20 to 25 years for cargo handling infrastructure. • 10 years for the iron ore component of the Project.
Terrestrial Requirements	• 3,000 m of additional rail line adjacent to the existing line. • Car dumper. • Fully enclosed conveyor system operating at up to 4,000 t/hr. • A storage shed operating under a negative pressure (approximately 60 m wide by 330 m long and 27 m in height). • An automated reclaiming system to reclaim the ore from the stockpiles onto the conveyors. • A screening facility inside the shed.
Marine Requirements	• A fully enclosed conveyor system operating at up to 4,000 t/hr. • An access bridge. • A southern extension (approximately 410 m long) to the existing Bulk Cargo Jetty. • A ship loader operating at up to 4,000 t/hr.
Quantity of Ore to be Exported (Note: Other commodities may be exported at a later date)	Up to 4 Mtpa.
Proposed Construction Workforce	200.
Proposed Construction Period	• 20 months for terrestrial component of the Project. • 18 months for marine component of the Project.
Proposed Operations Workforce	• Six for operation of car dumper conveyors and storage shed. • Local contracts for specialist maintenance, such as electrical, mechanical, stevedoring/ship repairs and providing/ship stores.

2.1 RAIL TRANSPORT

The ore will be transported from the mine site, to Kwinana via the standard gauge Trans-Australian railway line. This rail line passes through the wheatbelt towns of Burracoppin, Merredin, Kelleberrin, Tamin, Cunderdin, Meckering, Northam, and Toodyay (Figure 4). It enters the Perth metropolitan area through the Swan Valley and travels south past the Perth Airport, through Canning Vale, Leeming, Bibra Lake, Yangebup, Hope Valley and into Kwinana (Figure 5).

The transport of iron ore in uncovered wagons is common practice and is currently the system used for the transportation of iron ore to the Port of Esperance. Half of the ore transported to Kwinana will be lump ore (between 6.3 and 31.5 mm in diameter) and the other half will be fines (less than 6.3 mm in diameter).

Upon entering the Kwinana area, the train will travel to the Project Area where the wagons will be moved through a dumper and unloaded. The locomotive will position the first wagon in the car dumper for unloading. It will then be disconnected from the wagons and will move south along the mainline until it can access the runaround rail where it will then travel north for refueling and servicing at the Kwinana Marshalling Yards. The wagons will be moved through the car dumper facility using a hydraulic wagon positioner (Plate 1). Once the train has been unloaded, the locomotive will reposition at the northern end of the train and push the last wagon through the dumper, before hauling the empty wagons back to the mine. The wagons will be kept under tension both prior to and following unloading, by a slight incline on entry to the car dumper and a slight decline on exit from the dumper (Figure 6).

Approximately 3,000 m of new rail line will be required at Kwinana along the existing cleared service corridor between Kwinana Beach Road and the start of the rail loop to the east of Cooperative Bulk Handling's (CBH) Kwinana Grain Terminal (Figure 2). The rail line will be constructed to the east of the existing line, with an additional runaround line located between the existing line and the proposed new line. This will enable the locomotives to decouple from the wagons and move off for refueling and servicing while the wagons are being unloaded.

Two 'Q' Class locomotives will be used to haul the wagons between the mine site and the Kwinana Export Facility. Approximately, two trains per day will each haul up to 6,100 t of iron ore to Kwinana. The trains will be up to 935 m long, and will consist of up to 83 open top wagons. The trains will operate on a varying timetable with a 28 hour turnaround time between the mine site and Kwinana. Therefore the trains will not operate at the same time every day. An indicative train timetable is presented in Table 3. This timetable will vary during the life of the Project but provides an indication of the times trains are likely to be accessing the Kwinana Industrial Area. The schedule times of the trains takes into consideration other users of the line which will vary throughout the life of the Project and which includes trains from the Eastern States as well as local trains accessing the Kwinana Industrial Area.

Table 3

Indicative Train Timetables

Day	Train Number	Train Arrival Time (hours)	Train Departure Time (hours)
Monday	1	1350	2035
	2	2400	Tues 0450
Tuesday	1	1945	Wed 0030
Wednesday	1	2215	Thurs 0430
	2	0235	0900
Thursday	2	0845	1300
Friday	1	0200	0650
	2	1300	1730
Saturday	1	0435	0845
	2	1550	2010
Sunday	1	0900	1630
	2	1735	Mon 0130

Unloading of the ore trains is expected to take approximately 2.2 hours.

2.2 UNLOADING FACILITIES

A car dumper will be constructed 4 m from the railway and 1,000 m south of the Kwinana Beach Road and Patterson Road intersections. It will be enclosed within a 16 m x 16 m shed (Figure 2) and will operate at a negative pressure to prevent dust from escaping. The dumper will remove the ore by tipping (rotating) the wagons after they have been positioned. The ore will be tipped directly into a below ground storage bin where it is automatically loaded onto a conveyor. A total area of 75 m x 30 m around the car dumper will be fenced to allow for the construction of a workshop and other associated infrastructure, if required.

2.3 CONVEYORS AND STORAGE SHEDS

Once the ore has been removed from the wagons it will be transported from the car dumper via a totally enclosed conveyor to a transfer station (enclosed in a 6 m x 6 m shed), and then to the main storage shed located to the west of the railway line (Figure 2). The conveyor from the rail car dumper will be a low level conveyor but will rise and become an overhead conveyor to cross above the railway line and the new Kwinana Beach Road (at approximately 6.3 m above the ground). Dust collectors will be located at the rail car dumper and the transfer stations and all sheds will be under a negative pressure to prevent dust from escaping from the facilities.

The storage shed, 60 m wide by 330 m long and 27 m in height, is designed to hold 90,000 t of fine ore and 180,000 t of lump ore on a bare earth floor. It will be maintained at negative pressure at times when ore is being moved, with dust collectors at one end of the building to collect dust. A screening facility will be positioned inside, at the northwestern end of the shed, to remove any fine material from the lump ore. This fine material will be returned to the fines stockpile.

Fine and lump ore will be transported separately to the ship loading facility via a totally enclosed reclaim conveyor. An automatic reclaimer will deposit the ore onto the conveyor. The conveyor will be at low level and will pass underneath the old Kwinana Beach Road (which is now closed to public access) in an enclosed culvert. From the transfer station, located near the beach, the conveyor will be supported on a bridge which will provide light vehicle access to the new berth and ship loading facility where it will be loaded onto the ships. A sealed access road, at right angles to the existing Kwinana Beach Road and parallel to the existing Brambles Storage Shed, will be located adjacent to conveyor extending to the access jetty.

2.4 PORT FACILITIES

The existing BCJ consists of two concrete decks which are presently designed to accommodate up to 65,000 Dead Weight Tonne (DWT) (or 85,000 t displacement) vessels with a maximum length of 244 m. Berth 1 is equipped with two rail mounted unloaders which can unload ships at a designed rate of 510 tph.

The southern extension to the BCJ would be constructed southwest of Berth 2 at an angle of 150° in relation to the existing BCJ2 (Figure 6). It would be approximately 410 m in length, approximately 5 m above mean sea level and requires no dredging (water depths in and around the jetty vary between 15 m and 17 m). A number of alternative locations for the new berth were considered prior to selecting a southern extension. These alternatives are outlined in Section 3.2. The third berth would accommodate cape size ships (up to 120,000 DWT).

The southern extension to the BCJ will enable a dedicated export facility to conduct its operations independently, without impacting on import activities at Berth 1 and Berth 2. Separate land access to the southern extension, would facilitate the independent operation of the new berth. Although this berth will initially be used for export of iron ore, other commodities/raw materials will be exported over this berth in the future. The export of other materials will be subject to separate environmental approvals if required.

The method of construction of the new jetty is still under consideration. However, it is envisaged that the tubular steel piles will be driven into the ocean floor from a pile driving rig mounted on a barge. The deck structure will be a pre-cast concrete/structural steel type and will be installed using cranes mounted on barges.

A tripper conveyor, enclosed in a high level gallery will extend from the access bridge along the proposed Berth 3. It will rise from the access bridge to a height of 18 m above the jetty deck.

The total height of the ship loader will be approximately 36 m above the level of the deck. This compares with the height of 39 m of the two existing unloaders. It will load ships at a rate of 4,000 t/hr and will have the capacity to handle iron ore with densities ranging from 1.97 t/m^3 to 2.52 t/m^3. The ship loader will have an extendable loading chute that will enable it to load Panmax size vessels (up to 65,000 DWT) or cape size vessels (up to 120,000 DWT). It will typically consist of a travelling portal, a luffing boom supported by the portal, and a belt tripper inside the wharf gallery. Material would be fed by the tripper onto a conveyor running above the luffing boom and discharging into the hold of the vessel via a telescope chute.

The wharf gallery will totally enclose the conveyor system on the wharf. The bottom of the gantry will be approximately 14 m above the deck of the jetty and the gantry itself will be 4 m from top to bottom.

Approximately one ship per week will be required for exporting iron ore from the facility. These ships will be loaded with up to 120,000 t of ore over a 24 to 28 hour period and will transport the ore to overseas customers.

2.5 ADDITIONAL FACILITIES

Additional facilities required by the Project include:

- an access road;
- power;
- water; and
- telecommunications facilities.

An access road is currently available along the western boundary of the WMC Nickel Refinery. Access to the site is also available from Kwinana Beach Road and Wells Road. A sealed access road will be constructed along side the conveyor from the storage shed to the BCJ access jetty.

It is proposed to access all other facilities from the local supply grids in the Kwinana area.

2.6 WORKFORCE REQUIREMENTS

2.6.1 Construction

A construction workforce of over 200 people will be required over a 20 month period. These will be sourced locally from Kwinana and surrounding areas.

2.6.2 Operations

A total workforce of six people will be required for the operation of the car dumper, conveyor system and storage shed. These personnel will work various shifts to accommodate train timetables and shipping movements. This workforce will be sourced from Kwinana and surrounding areas.

Contractors will also be required for specialist maintenance such as mechanical and electrical duties during operation of the Project. The contractors will also be sourced locally.

Although no direct jobs will be required for operation of the marine component of the Project indirect benefits/employment will be generation from:

- maintenance contracts on the infrastructure such as the loader, conveyor and berth;
- stevedoring/ship repairs; and
- provision of ships' supplies and stores.

Additional jobs will also be generated at the Koolyanobbing mine site.

3. PROJECT ALTERNATIVES

3.1 ALTERNATIVE PORTS

3.1.1 Esperance

Following a decision to expand production at the Koolyanobbing mine site, it was necessary to assess the feasibility of exporting the additional iron ore through the Esperance Port. There were a number of issues associated with exporting the ore through Esperance that required consideration (Section 1.2.1).

The major disadvantage with exporting ore through the Port at Esperance is the size of ships able to berth at the Port. Esperance is only able to accommodate up to 55,000 DWT vessels which can only export 55,000 t of iron ore. Therefore to increase the amount of ore exported out of the Port, either additional ship movements would be required or dredging of the harbour would need to be undertaken to accommodate larger vessels. The capital costs associated with numerous, smaller ship movements between Esperance and the point of sale of the iron ore are much greater than using fewer, larger vessels, making the use of additional vessels commercially unviable.

Another disadvantage with the Port facilities at Esperance is the axle loading and speed limitations of the rail line from Kalgoorlie to Esperance. Axle loading for ore trains on the Esperance line is 20.5 t compared with 24 t on the rail line to Kwinana. Current gazetted maximum train speeds for loaded ore trains on the Esperance line is 50km/hr compared with 60 km/hr to 70 km/hr on the line from Koolyanobbing to Kwinana. In addition, the distance between Koolyanobbing mine site and Kwinana is 100 km shorter than the distance between Esperance and Koolyanobbing. Therefore, the use of Kwinana would reduce transport costs and the time taken to transport the ore to the port.

The majority of the ore from the Koolyanobbing mine is shipped to the People's Republic of China. KIPL is competing in the iron ore market with companies that are operating from the north west of WA. The shipping costs from ports along the north west coast of WA (e.g. the Pilbara) to China and other Asian countries are significantly lower than the costs associated with shipping iron ore from Esperance. By moving its export operations to a port that is closer to the destination countries (but which is still relatively close to the mine site), KIPL can reduce costs associated with shipping the ore, and therefore, be more competitive in the iron ore market.

3.1.2 Kwinana

Kwinana is the closest industrial port area to Koolyanobbing Mine Site, with the potential capacity to export 4 Mtpa of iron ore. Other ports such as Geraldton and Bunbury do not have standard gauge railway lines for the transport of ore from the mine site. Therefore, these ports were not considered to be viable options. The rail line to Kwinana is of a high standard, the shipping distance to customers is shorter, larger ships can berth at the port and it is closer to Koolyanobbing than Esperance. Therefore, Kwinana was chosen for more detailed investigations.

Various jetty options for exporting ore from Kwinana were also considered and these included:

- CBH's Kwinana Grain Terminal Jetty;
- the existing iron ore export facilities at BHP and then exporting through the BHP jetty; and
- the Kwinana BCJ.

3.1.2.1 CBH's Kwinana Grain Terminal Jetty

A review was undertaken to determine the suitability of the Kwinana Grain Terminal jetty for the export of the iron ore. The initial review revealed that there was no suitable land available around the facility and that a major upgrade to the existing jetty would be required to export the iron ore. In addition, the close proximity of the residents from the north Rockingham area makes this a less suitable facility than others further north.

3.1.2.2 BHP Facilities

Some facilities for outloading of small quantities of iron ore are present in the Kwinana area at the old BHP blast furnace site. There is an old car dumper which is suitable for bottom dumping wagons and some iron ore stockpiles are used for the HISmelt project. A review of these facilities and the re-introduction of iron ore into the BHP site undertaken by BHP Engineering, indicated that the cost of new stockpiling facilities (including stacker reclaimer) and load out facilities (including ship loader and conveyors) would prohibit the use of these facilities. The car dumper would also need to be substantially modified for the rotating dumping action required for the trains from the mine site. In addition, the BHP jetty would need to be extended to accept larger vessels and extensive dredging would need to be undertaken.

3.1.2.3 Kwinana BCJ

The Kwinana BCJ is considered to be the most suitable for the export of the iron ore from the Kwinana area. It is located in an area which is zoned industrial and there is adequate land adjacent to the BCJ for the construction of the facilities required for the export of the iron ore. An extension to the BCJ would be required and this can be accommodated without dredging if the extension occurs in a southerly direction (Section 3.2). The proposed dedicated export facility would provide other potential exporters with the opportunity to export their products from Kwinana.

3.2 JETTY ALTERNATIVES

A number of options for the location of the extension to the Kwinana BCJ were considered prior to selecting the preferred option. These are (Figure 7):

- a southern extension from Berth 2;
- a western extension from the existing access road/berth interface; and
- a northern extension from Berth 1.

The advantages and disadvantages of each of these options are summarised in Table 4 and described in more detail in the following sections. For each potential option a rating system was used to rate that option on the following characteristics:

- dredging requirements;
- impact on shipping operations at the existing berths at BCJ;
- increase in risk factor;
- complexity of cargo handling infrastructure;
- impacts on cargo operations at the existing berths at BCJ;
- proximity to landbased facilities;
- safety aspects;
- capital costs; and
- timing for construction.

The results of this analysis are presented in Appendix B.

Table 4

Summary of Advantages and Disadvantages of the Proposed Options for the Extension of the BCJ

Option	Advantages	Disadvantages
Option A - Southern Extension (Preferred Option)	• No dredging required. • No impact on shipping movements at existing berths. • No impact on cargo operations at existing berths. • No increase in operational risk factors. • Simple cargo handling infrastructure. • Close to landbased facilities. • No safety aspects of concern. • Lowest capital cost of all options considered.	Visible from parts of Wells Park and Kwinana Beach
Option B - Western Extension	• Only localised dredging required.	• Partially visible from Wells Park and Kwinana Beach. • Potential impact on shipping movements at existing berths. • Likely to impact on cargo operations at existing berths. • Some increase in operational risk factors. • Complex cargo handling infrastructure required. • Increased distance from landbased facilities. • Some safety aspects of concern. • Medium capital costs.
Option C – Northern Extension	Visibility of the new berth minimised from Wells and Kwinana Beach.	• Dredging required. • Some impact on shipping movements at existing berths. • Likely to impact on cargo operations at existing berths. • Substantial increase in risk factors. • Complex cargo handling infrastructure required. • Long distance from landbased facilities. • Considerable safety aspects of concern. • Anticipated delays during construction from conflict with CSBP operations. • Greatest capital cost of all three options.

3.2.1 Option A - Southern Extension

The preferred option for a third berth is a southern extension to the existing BCJ. This is the option that is currently depicted on the Improvement Plan 14 (IP14) Structure Plan 1996, which has been endorsed by the WA Planning Commission. It has also been depicted on numerous planning drawings prior to this CER being produced.

The southern extension will be constructed to the southwest of Berth 2 at an angle of 150° in relation to the existing BCJ2 (Figure 7). It will be approximately 410 m in length.

No dredging will be required for this extension as water depths are between 15 m and 17 m which is deep enough to accommodate the large cape size ships.

The southern extension enables a dedicated export facility to conduct its operations independently without impacting on import activities at Berths 1 and 2. Separate land access to the southern extension, would allow the totally independent operation of the new berth. The southern extension also provides the most direct access from land based storage facilities to the new berth via road or conveyor.

The alignment of the southern berth is operationally more suitable than either of the other options as vessels may be berthed "head out" which will minimise towing requirements on departure. Due to the alignment of the proposed jetty there is also little likelihood of vessels being "blown off" the berth in common weather conditions.

The main issue associated with the southern extension is its visibility from the beachfront and jetty at Wells Park, which the Social Impact Assessment (SIA) undertaken for the Project (Section 6.4.2), indicates was of concern to only 2 of the 65 people surveyed.

3.2.2 Option B - Western Extension

A western extension would extend west of the BCJ in line with the existing CSBP conveyor and access road, at an angle of 90° in relation to Berth 1 (Figure 7). The main advantage of a western extension would be that it is in deep water, thus avoiding dredging.

However, the major disadvantage, of a western configuration is that it would restrict the length of the vessels that could be berthed at Berths 1 and 2, as no overlap is possible. To avoid this restriction, the existing berths would have to be extended and this would require some localised dredging for the northern extension.

In terms of shipping operations, the positioning of another berth at right angles to the existing facility would increase navigational risks associated with berthing and unberthing of vessels.

To service cargo requirements on the western extension, a complex conveyor system, which does not interfere with the existing conveyors on Berths 1 and 2, would have to be constructed. Conveyors for the new berth would also need to go underneath the jetty at the junction between the access bridge and the deck, as the unloaders will shortly be required to traverse Berths 1 and 2 for importation operations.

3.2.3 Option C - Northern Extension

A northern extension would extend northwest of the BCJ at an angle of 50° in relation to the existing Berth 1 (Figure 7). This option is the least desirable option.

The biggest operational problem with the northern extension is the close proximity of the BP Refinery Jetty. This extension would increase the risk factors associated with tankers berthing and unberthing. A northern berth may also require additional tugs to pull the ships away from the berth on departure in certain weather conditions.

Any northern extension is also likely to be affected by CSBP's operations at Berth 1. CSBP currently have priority use of the facility under the *Industrial Lands (Kwinana) Agreement Act* 1964 and, as such, delays may occur during the construction and operation of the northern extension.

The northern extension is located considerably further from land based storage facilities and would result in a more complex conveyor systems.

Significant dredging would be required for a northern extension to accommodate the vessels at the jetty.

4. EXISTING ENVIRONMENT

4.1 CLIMATE

The climate in the south west of WA is controlled by a succession of high and low pressure systems which move in an easterly direction.

Kwinana has a Mediterranean climate with mild winters and warm dry summers. The summer months are controlled by the low pressure heat troughs which develop southwards between the highs. These high pressure systems draw hot air from the interior of the continent as they approach, resulting in hot easterly winds (Murdoch University, 1986).

The mean annual rainfall in the Kwinana area is 777 mm, of which 70% falls between May and August (Table 5). This is slightly less than that received in Perth (821 mm). Mean daily maximum temperatures range from 17.5°C in July to 29.3°C in February and mean daily minimum temperatures from 10.4°C in August to 19.1°C in February. Mean daily evaporation is 4.5 mm.

Table 5

Climatic Information for the Kwinana Area

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Mean daily max temperature (°C) *	29.0	29.3	27.5	24.1	20.8	18.6	17.5	17.8	19.2	21.1	23.8	26.5	22.9
Mean daily min temperature (°C) *	18.7	19.1	17.8	15.4	13.0	11.6	10.5	10.4	11.2	12.4	14.7	16.8	14.3
Mean monthly rainfall (mm) *	9.2	17.7	15.2	44.0	110.8	168.3	163.6	106.0	67.0	42.1	24.4	8.8	777.3
Mean daily ** evaporation (mm)	8.2	8.0	5.9	3.7	2.1	1.7	1.6	2.2	3.0	4.4	6.1	7.3	4.5

Notes: * Data from BP Refinery
** Data from Medina Research Station

Source: Bureau of Meteorology 1998, Internet site: www.bom.gov.au

Fresh easterly winds during the morning, and strong south-westerlies during the afternoon, are characteristic during summer. The seabreeze (south-westerlies) are common in all seasons except winter. Winds are more variable during winter as cold fronts cross the coast bringing occasional storms. Annual and seasonal wind roses for Hope Valley are presented in Figure 8.

4.2 TERRESTRIAL

4.2.1 Landform and Soils

The Project Area is located on the Swan Coastal Plain and is part of the Quindalup Dune System which consists of a series of dunes running north-south in southern part and then turning northeast and east in the middle sections. The area is generally flat with an average height of 4 m above sea level (Martin Goff Associates, 1988).

Soils consist of highly permeable calcareous Safety Bay Sands over moderately to well cemented Tamala Limestone. Safety Bay Sand is typically, white, medium-grained, round quartz of aeolian origin, with some shell debris (Churchward & McArthur, 1980) and small amounts of feldspar (Dames & Moore, 1993).

The Safety Bay sand is separated from the Tamala Limestone by a thin layer of calcareous clay which is typically up to 2 m in thickness. These sediments are dark grey to dark greenish grey in colour and contain a variable amount of sea shells and shell fragments.

The Tamala Limestone consists of pale yellow, fine to coarse grained, shell debris, quartz and traces of feldspar.

Geotechnical investigations undertaken at the site of the car dumper indicate that the Safety Bay Sand unit is approximately 12 m thick with some weak cementation occurring near the ground surface above the zone of water table fluctuations. The underlying Tamala Limestone is typically of calcarenite strength. Cementation of the unit is highly variable and the presence of solution cavities (vugs) filled with sand or clayey material is common.

4.2.2 Geology

Kwinana occurs on the Phanerozoic sedimentary rocks of the Dandaragan Trough in the deepest part of the Perth Basin. This trough is part of a sedimentary rock formation about 1,000 km long and an average of 65 km wide. The thickness of these sediments may be greater than 15,000 m in places (Department of Conservation and Environment, [DCE] 1980). The trough is bounded in the east by the Darling and Urella Faults and in the west by a series of Quaternary coastal barriers, the most recent of which was formed in the Holocene period, and comprises the Becher-Rockingham beach ridge plain which includes Kwinana Beach (DCE, 1984). The formation of the Becher-Rockingham coast are thought to have formed from a highly variable shoreline in the mid to late Holocene Period. To the north of the Dandaragan Trough is the Northhampton Block and to the south, the Harvey Ridge (Playford Cockbain and Low, 1976).

4.2.3 Surface Hydrology

There are no wetlands, major surface drainage lines or natural streams flowing into Cockburn Sound, in the vicinity of the Project Area (Department of Lands and Surveys, 1979).

Natural drainage around the Kwinana Industrial Area has been significantly altered with industrial development. Stormwater runoff from roads is channelled into a series of stormwater drains which lead to sumps situated at low points in the area. The water collected in these sumps is allowed to percolate through the soil.

4.2.4 Groundwater

The Safety Bay Sand and the highly permeable Tamala Limestone together form a superficial aquifer system. This highly permeable aquifer is unconfined and is recharged directly by percolating rainfall. The depth to the water table in the region is generally less than 5.0 m. Groundwater levels in the vicinity of the car dumper were between 2.3 m and 2.9 m below ground level at the time of the survey in May 1998. The seasonal variation in the water level is probably between 0.5 m and 1.0 m (Dames & Moore, 1993). This aquifer has been affected by saline intrusion along the coast and contaminated as a result of industrial development. Groundwater flow is generally in a north-westerly direction under a low hydraulic gradient and groundwater discharge occurs into Cockburn Sound across a seawater interface.

The confined Leederville aquifer occurs at depths of between 50 m and 350 m below the Kwinana area. It is a multiple aquifer system of discontinuous interbedded siltstone, sandstone, and shale of the Osborne and Leederville Formations. Groundwater quality within the Leederville aquifer is variable and can range from very low salinity to brackish depending on the local hydrogeology.

The Yarragadee aquifer is a confined multiple aquifer system at a depth of approximately 500 m below the Kwinana area. It comprises fine to coarse sands and gravels interbedded with siltstone and shale beds of the, Parmelia, Gage and Yarragadee Formations and the Cattamarra Coal Measures. Groundwater from the Yarragadee aquifer is of variable quality, with salinities generally exceeding 1,000 mg/L.

4.2.5 Flora and Vegetation

The Project Area occurs in the South-West Botanical Province in the Darling Botanical District which is further divided into subdistricts. The Project Area is located on the Swan Coastal Plain which is classified as the Drummond Subdistrict. Heddle, Loneragan and Havel (1980) classify the area as part of the Quindalup Vegetation Complex which is a coastal dune complex consisting of two alliances, the strand and fore dune alliance, and the mobile and stable dune alliance. The area was originally scrub-heath and tuart woodland dominated by species from the Proteaceae and Myrtaceae families. Inland from the foredunes, woodlands of *Eucalyptus gomphocephala* (tuart) originally formed open stands on the coastal limestone from Bunbury northwards with an understorey of *Xanthorrhoea preisii* (grass trees) and *Macrozamia riedlei* (cycads) (Beard, 1981).

Dune colonising species such as *Cakile maritima* (sea rocket), *Arctotheca populifolia, Spinifex hirsutus, Spinifex longifolius* and *Pelargonium capitum* (wild geranium) are present on some of the foredunes in the area. Behind the primary dunes the vegetation includes the *Acacia cyclops* (common coastal wattle), thickets of *Acacia rostellifera* and further inland, trees species such as the *Agonis flexuosa* (Australian peppermint), *Melaleuca* species (paperbarks) and *Eucalyptus gomphocephala* (tuart) (Beard, 1990) (DCE, 1984).

However, much of the coastal vegetation has been disturbed through clearing, burning, erosion and the introduction of exotic species as a result of historical residential and industrial development in the area. The Project Area has very little indigenous vegetation and is dominated by remnant lawn grasses, exotic and weed species such as Japanese peppers (*Schinus terebinthifolia*) and castor oil plants (*Adriana glabrata*). Native plant species noted during site visits include scattered coastal wattles (*Acacia cyclops*) on the land owned by the FPA, and a few Australian peppermint trees and tuarts on the inland property. Native shrubs have also been planted along the verge of the section of Kwinana Beach Road.

4.2.6 Fauna

As a result of vegetation clearing and disturbance from previous developments, no significant faunal habitats for native species exist other than those used by generalist or scavenger species. For example, a number of common bird species are known to occur in the area such as the Australian magpie (*Gymnorhina tibicea*), Australian raven (*Corvus coronoides*), ring-neck parrot/twenty-eight (*Barnardius zonarius*), willie wagtail (*Phipidura leucophrys*), laughing turtle dove (*Streptopelia senegalensis*), singing honeyeater (*Lichenostomus virescens*), red wattlebird (*Anthochaera carunculata*), silver gull (*Larus novaehollandiae*) and magpie lark (*Grallina cyanoleuca*) (Kinhill Engineers, 1996).

No survey of larger vertebrate fauna was conducted for this Project, although previous studies suggest such species are not common in the area (Kinhill Engineers, 1996). The degraded nature of the fauna habitats in the area suggests that the presence of non-mobile fauna is unlikely.

4.3 MARINE

The Project Area is located in Cockburn Sound which was formed during the Holocene sea level rise (between approximately 20,000 and 6,000 years before present) through inundation of the depression between two limestone ridges of the ancient Tamala dune system (the Spearwood and Garden Island ridges) (Institute for Environmental Science 1987). Cockburn Sound extends approximately 15 km north-south and 10 km east-west. The Southern Flats at the southern end of the Sound, almost close the southern opening and two submerged sills, Parmelia and Success Banks are located at the northern perimeter of Cockburn Sound (Figure 9). Relatively narrow sandy beaches line the eastern shoreline while wider beaches occur along Garden Island.

4.3.1 Bathymetry

The basin of Cockburn Sound exceeds 20 m water depth. Erosion by wave action of the eastern shoreline of Cockburn Sound to the north of James Point has resulted in the formation of a shelf some 3 km wide and submerged to a depth of up to 10 m (DEP, 1996). To the south of James Point, the shelf is considerable narrower (300 m to 400 m wide).

In the vicinity of the proposed BCJ extension, the seabed at the edge of the shelf rises markedly from 17 m to 10 m water depth within a horizontal distance of some 100 m. The seabed then gradually shallows up to an intertidal sand beach over a distance of approximately 375 m (Figure 10).

Sediments from eroding offshore ridges have accumulated at the northern entrance to Cockburn Sound (Parmelia Bank, typically 3 m to 5 m deep) and at the southern entrance (Southern Flats, a shallow sill of 1 m to 3 m depth) (DEP, 1996).

4.3.2 Hydrodynamics and Oceanography

4.3.2.1 Waves

The wave climate of Perth's metropolitan coastal waters consists of oceanic swell and wind-generated waves. The swell generally develops in the Southern Ocean and south Indian Ocean and approaches the coastline from the southwest. The wave trains are refracted as they approach the coast and arrive predominantly from the west-southwest (DEP, 1996). The heights of swell waves are significantly attenuated as they approach the coast and cross the reefs, banks and sills to the south of Fremantle. Numerical modelling studies indicate that oceanic swell height is reduced to 5% in southern Cockburn Sound (Department of Transport, unpublished data, in DEP, 1996).

4.3.2.2 Tides

The Perth coastal waters are located in the southwest Australian micro-tidal zone where tides are mainly diurnal with spring amplitudes of less than 1 m (DEP, 1996). The predicted astronomical tidal range at Fremantle varies from 0.1 m to 0.9 m (Department of Defence, 1997). Variations from predicted tide heights are due mainly to wind stress and barometric pressure variations which, in synergy, can alter the water level by up to 0.9 m, although 0.3 m variations are more typical. During the occasional passage (usually less than once a year) of tropical cyclonic depressions down the southwest coast these meteorological effects can alter coastal water levels off Fremantle by up to 1 m (DEP, 1996).

4.3.2.3 Currents

Water circulation within Cockburn Sound is predominantly wind-driven, with near-shore currents typically flowing parallel to the shore at speeds of around 0.1 m/s within a range of 0 m/s to 0.25 m/s. Water exchange through the northern and southern entrances to Cockburn Sound is restricted by the presence of Parmelia Bank and the Garden Island causeway, respectively (Hearn, 1991).

Tidal current speeds within Cockburn Sound are typically very low at around 0.01 m/s (Steedman & Craig, 1983). Low frequency oscillations of water levels off the west coast of Australia have characteristic periods of 5 to 10 days and ranges of 0.1 m to 0.3 m, and have been estimated to cause currents in the order of 0.1 m/s in the shelf zone off Fremantle (Hearn, 1991).

Within 500 km of the Western Australian coastline, the southward flowing Leeuwin Current is present for most of the year as a warm, low salinity tropical water mass. The Leeuwin Current does not enter Cockburn Sound, and while incursions from the eastern edge of the current can on occasions approach within five kilometres of the metropolitan coastline (Mills *et al.*, 1994), it is believed that it does not contribute significantly to water flow within Cockburn Sound (Steedman & Craig, 1983).

4.3.3 Contaminant Status

4.3.3.1 Background

Contaminants such as nutrients, heavy metals, hydrocarbons, oil and grease, bacteria and pesticides have entered the waters of Cockburn Sound from numerous sources including industrial and domestic wastewater outfalls, stormwater drains, groundwater inflow, deposition from the atmosphere and river discharge. Contaminants have also entered the waters from ships, through controlled discharge (such as ballast water and washdown wastes), accidental spillage and through leaching of toxic substances such as tributyltin (TBT) from the hulls of vessels (DEP, 1996).

4.3.3.2 Industrial and Urban Inputs

Industrial development along the eastern shoreline of Cockburn Sound in the 1950s and 1960s resulted in direct and diffuse inputs of contaminants into the Sound. Extensive phytoplankton and epiphyte blooms occurred during the 1960s and 1970s as a result of these inputs, resulting in a catastrophic loss of seagrasses (DCE, 1979). Nutrients contained in these inputs, particularly nitrogen, were identified as the primary cause of the algal blooms. Annual loads of nitrogen peaked at approximately 2,000 t in 1978. In addition, a range of contaminants (such as heavy metals) led to localised contamination of sediments and biota in some areas of the Sound. Following recommendations of the Cockburn Sound Environmental Study (DCE, 1979), the discharge of contaminants into the waters of the sound decreased substantially during the early to mid-1980s (DEP, 1996).

Surveys between 1982 and 1987 indicated that the water quality of Cockburn Sound had improved significantly since the late 1970s (Hillman & Bastyan, 1988). However, by the summer of 1989/90 water quality had deteriorated to levels comparable with the late 1970s (Cary, Simpson and Chase, 1991). This deterioration coincided with a significant increase in nitrogen loading from the CSBP/KNC outfall, which was the major point source of nitrogen into the Sound waters. By 1994, the nitrogen loading had been significantly reduced, although water quality remained unchanged due to the presence of contaminated groundwater inflow, which accounted for about 70% of the 490 t annual nitrogen load (Muriale & Cary, 1995). About 80% of the annual nitrogen input via groundwater appeared to arise from the area adjacent to the Western Mining Corporation (WMC) and CSBP industrial estates (DEP, 1996), which lie adjacent to the BCJ. Further planned reductions in industrial discharges to Cockburn Sound, with most industrial discharges declining to zero by 2021, are projected to reduce nitrogen loads to these waters to approximately 370 t per year by 2021, with over 90% coming from contaminated groundwater inflows (DEP, 1996).

The historic trends in most heavy metal loadings have been similar to those for nutrient inputs. Annual loads from point sources for copper, lead, zinc, chromium and cadmium were generally low in the 1950s, increased sharply around the mid-1960s and decreased markedly between the late 1970s and 1990. The increases were due to industrial and domestic waste inputs and the reductions were due to improved industrial waste treatment and diversion of domestic wastes to outside of the Sound. An exception was the mercury load (mainly from CSBP) which increased to approximately 450 kg in 1991 but had decreased to around 15 kg in 1994. By the year 2021 direct inputs of most heavy metals are predicted to decline to zero, or to early 1950s levels (DEP, 1996).

Hydrocarbon load, primarily from the BP outfall, some two kilometres to the north of the BCJ, were approximately 350 t per year from the mid-1950's to 1979. They declined to around 80 t by 1992, then decreased further to around 30 t by 1994. Phenol loadings, also from BP, have shown a similar trend, decreasing from approximately 180 t in 1978 to 5 t in 1994. Hydrocarbon and phenol loading from the BP outfall is projected to be zero by the year 2011 (DEP, 1996).

The discharge of fluoride into Cockburn Sound primarily from CSBP, reached a peak of >2,600 t in 1977, decreasing to just over 300 t in 1994 (DEP, 1996).

Annual loads of grease and sulphate from the Woodman Point Treatment Plan, at the north end of Cockburn Sound, were each around 700 t in 1981 and 1983 respectively. Both loads were removed from the Sound in 1985, when the effluent outfall was diverted to Sepia Depression to the south of Cockburn Sound. The sulphate loading to the Sound in 1994 was approximately 3,000 t, primarily from the Tiwest Joint Venture 1.5 km to the north of the BCJ with a lesser contribution from contaminated groundwater beneath the WMC lease. The DEP (1996) predicted that the sulphate loading would remain at that level.

The loading of Total Dissolved Solids (TDS) from Tiwest (approximately 2,400 t in 1994) was also predicted by the DEP (1996) to remain unchanged. Discharge concentrations of four radionuclides from Tiwest between 1994 and 2021 were predicted by the DEP (1996) to be 22 mBq/l for radium 224, 75 mBq/l for Radium 226, 50 mBq/l for Radium 228 and 22 mBq/l for Thorium 228.

4.3.3.3 Shipping Inputs

Over 1,900 vessels, averaging 22,000 DWT, visited Fremantle Harbour and Cockburn Sound in 1997 with an average time in port of two days. Contaminants from vessels may have been introduced directly into Cockburn Sound waters through accidental discharges, controlled discharges of sewage, ballast, engine coolant and bilge waters, or as a result of washdown procedures, although controlled discharges of sewage, engine coolant and bilge waters into Cockburn Sound are no longer permitted. Washdown of hulls in FPA waters is also no longer permitted. Contaminants may also be added indirectly as a result of flaking or chemical leaching from the vessels' hulls (DEP, 1996).

Accidental spillages of both solid and liquid materials may occur during the loading and unloading of cargo. Most documented spillages into Cockburn Sound near the Project Area relate to fertiliser and grains spilled during transfer at the BCJ. The annual loss of fertilisers in 1984 was conservatively estimated to be between 500 t and 800 t, although changes in loading practices were reported to have reduced spillage of nitrogen and soluble phosphorous to about 5 t/year each by 1994. They were therefore considered a minor nutrient source to the Sound (DEP, 1996).

Until 1992, most vessels underwent hatch washdowns within port waters and it has been estimated that up to 1 t of nitrogen and 10 t of phosphorous per year entered Cockburn Sound waters from this source (C. Deans *Pers. comm.* in DEP, 1996).

The most common liquid spills have been of petroleum-related products. Four such spills, totalling approximately 8 t, were recorded between 1991 and 1994, although the total spillage was probably an order of magnitude higher (C. Deans *Pers. comm.* in DEP, 1996).

The FPA regulations prohibit the discharge into port waters (which include Cockburn Sound) of oil, oily water, oil sludge, oil refuse, oily bilge water, sewage, poisons or any substance which is likely to contribute to the formation of sludge (or other deposits), scum (or other floating materials), or objectionable odours or discolouration. Matter such as garbage, ashes and mud is also not permitted to be deposited or discharged into port waters.

In 1994, an estimated 3.5 Mt of ballast water was discharged within the Port of Fremantle. Up until 1994, 21 foreign species had been recorded in Perth's coastal waters and were considered to have been introduced by the discharge of ballast water and associated sediments or by dislodgment from vessel hulls (DEP, 1996).

From the 1960s until 1991, the most commonly used antifouling paints on vessels contained Tributyltin (TBT). In November 1991, legislation was introduced which prohibited the use of TBT on vessels less than 25 m in length (Section 4.3.3.4).

4.3.3.4 Contaminants in Sediments

Heavy Metals

Sediment concentrations of heavy metals are generally highest in the southern half of Cockburn Sound and along the eastern margin adjacent to the Kwinana Industrial Area (and the proposed development site). This reflects the proximity to the major historical and present-day industrial sources of heavy metals. The mean concentrations of most heavy metals have decreased significantly since the late 1970s, most probably as a result of improved industrial wastewater treatment processes (DEP, 1996).

In 1994, the concentrations of most heavy metals in Cockburn Sound sediments were below the draft sediment criteria given in DEP (1996). The criteria were exceeded for arsenic and mercury at some sites, including the CSBP outfall to the north of the BCJ (DEP, 1996).

Tributyltin

TBT is an organic tin compound found in marine paints, which are used as antifouling agents to prevent ship hulls from becoming encrusted with barnacles and other fouling organisms. While these agents are effective in killing marine organisms attached to the vessels, TBT is known to cause reproductive disorders and shell deformities in non-target organisms such as mollusks. It is persistent in sediments and may have long term effects on marine biota (Seligman, Aldis and Johnson, 1998).

The use of TBT on vessels less than 25 m in length was prohibited by legislation in November 1991, and the leaching rate of TBT from antifoulant paints applied to vessels greater than 25 m in length was required to be less than 5µg TBT/cm^2/day (Le Provost Dames & Moore, 1997).

Concentrations of TBT exceeded draft sediment criteria levels at many sites within Cockburn Sound in 1994, with some of the higher concentrations occurring near the industrial wharves along the eastern shoreline. Since restrictions on the use of TBT were introduced in 1991 concentrations of TBT at sites predominantly visited by recreational boats have either remained at similar levels, or declined. Conversely, TBT levels around the industrial wharves and areas used by vessels over 25 m have continued to increase since 1991 suggesting that these vessels are the major contributors to TBT contaminants in the Sound (DEP 1996).

Hydrocarbons

Polycyclic aromatic hydrocarbons were recorded in the sediments throughout Cockburn Sound in 1994, though it was considered unlikely that these contaminants in isolation would have affected the biota of the sound. Contamination by pesticides and polychlorinated biphenyls was localised and not considered significant by the DEP (1996).

4.3.3.5 Water Quality

The southern metropolitan coastal waters of Perth are considered oligotrophic, with chlorophyll *a* concentrations and light attenuation low by world standards (Pearce, 1991).

Mean water temperatures in Cockburn Sound range from 16 °C to 24 °C. Salinities are higher in summer than in winter, when freshwater outflow from the Swan River enters the Sound. Studies have shown light attenuation in the water column to be bimodal, with a primary maximum in winter (when chlorophyll *a* concentrations are highest) and a secondary maximum in summer. Since the 1970s, chlorophyll *a* levels along the eastern margin of Cockburn Sound, including areas near Mangles Bay in the south, have consistently been among the highest recorded in the Sound (DEP, 1996).

The water quality of Cockburn Sound was in its poorest state in the late 1970s as a result of high nitrogen loads, mainly from industrial point sources (DCE, 1979). Reductions in point source industrial and domestic waste discharges into the Sound after 1981 were reflected in a marked increase in water quality. However, water quality deteriorated from the early to the late 1980s as nitrogen loads from industrial point sources increased again (Cary *et al.*, 1991). By 1993/94 the water quality was only marginally better than in the late 1970s, due to a major nitrogen flux into the Sound via groundwater, predominantly from the industrial areas along the south-eastern shore of the Sound (DEP, 1996). The summer surveys of 1996/97 and 1997/98 indicated an improvement in water quality (KIC, 1998).

4.3.4 Biological Communities

4.3.4.1 Benthic Biota

A survey of the seabed in the vicinity of the proposed southern extension of the BCJ was undertaken by Dames & Moore in April 1998. The sediments at the base of the slope forming the edge of the proposed loading berth basin (approximately 17 m water depth) were very soft silts. DEP (1996) estimated that this "deep basin" habitat occupied 60% of the Cockburn Sound area. The sand fraction progressively increased upslope and the sediments at the crest of the slope were fine sandy silts. Sand grain sizes increased shorewards, although the high silt content persisted through to the lower intertidal zone.

The epibenthic biota were typical of the soft sediment communities within Cockburn Sound and were generally sparse and patchily distributed over the entire area. The predominant biota of the deeper areas (greater than 5 m depth) were tube anemones (*Cerianthus* sp.), burrowing anemones (Zoantharia), sea pens (Pennatulacea) and fan worms (*Phoronis* sp.). The few scattered pieces of hard substrate encountered were thickly covered with ascidians (Ascidiacea) and sponges (Porifera), supported numerous sea cucumbers (Holothuridae) and were surrounded by schools of small fish (predominantly perchlets, Ambassidae). Low numbers of the introduced polychaete worm *Sabella* cf. *spallanzanii* were also present where hard substrate occurred. This species is reported to be widespread within Cockburn Sound, including the Southern Flats area where it has occupied up to 20 ha. It is presumed that this species has been introduced into the Sound through ballast water discharge (DEP, 1996).

In the shallower areas (less than 5 m depth) saddle oysters (*Anomia* sp.), tube worms (Polychaeta), sand dollars (Echinoidea) and small swimmer crabs (Portunidae) were common and several sea hares (*Aplysia* sp.) were noted to be feeding on a thin veneer of benthic microalgae on the sand surface. These microalgae, mainly comprising diatoms living on or between the surface sand grains, are the dominant primary producers on the bare sand areas, which represent approximately 30% of the seabed habitat in Cockburn Sound (DEP, 1996).

Bioturbation of the sediments was moderate, indicating the presence of a considerable benthic infaunal community. This would predominantly comprise bivalve mollusks, crustaceans (shrimp, prawns and crabs) and polychaete worms. Several burrowing fish (Gobiidae) were observed during the marine survey and inshore there was evidence of considerable feeding activity by rays (Rajiformes).

4.3.4.2 Marine Mammals

Bottlenose dolphins (*Tursiops truncatus*) are common within Cockburn Sound (DEP, 1996) and one pod which occurs in Cockburn Sound has become a popular tourist attraction. Colonies of the Australian sea lion (*Neophoca cineria*) are present on Carnac Island and individuals have been seen within the waters of the sound (I. Baxter, *Pers. comm.*).

4.3.4.3 Seagrasses

Seagrasses play an important role in the marine ecological communities. Seagrasses are primary producers of organic matter, which is used as a food source by animals either directly or after it has been broken down into detritus. Seagrasses also provide habitats for small, sedentary animals and provide shelter for juveniles and adults of larger animals during the early part of their life cycle (EPA, 1998). They generally occur in relatively shallow, depositional environments which are protected from ocean swells (DEP, 1996). In addition, they require nutrient poor water for survival. Excess nutrients can result in high abundances of filamentous epiphytic algal growth on the leaves which can reduce seagrass cover.

Seagrass meadows (predominantly *Posidonia* species) were present on the eastern shelf of Cockburn Sound until 1957, after which there was a gradual retreat of meadows from the deeper margin of the shelf and thinning along portions of the adjacent shoreline. By 1972, most of the meadows had disappeared from the shelf (DCE, 1979). It is estimated that by 1973 approximately 700 ha of the original 3,900 ha of seagrasses remained in Cockburn Sound (DEP, 1996). Seagrass loss has slowed since the early 1970's. However, there does not appear to have been any significant recovery of the seagrass meadows in the Sound.

Aerial photography of the area taken on 5 January 1997 provided no indication that substantial seagrass meadows or algal communities were present. The survey undertaken by Dames & Moore in April 1998 for this Project indicated that there were no seagrasses present in the vicinity of the proposed extension to the BCJ. While the shallow water between the BCJ and the shoreline is a suitable habitat for seagrass growth, seagrasses have not recolonised the area since their disappearance in the early 1970s. This may be related to a combination of some of these factors:

- distances from seagrass beds with the potential to provide sources of seed may be too great;
- bare seabed may not provide sufficient shelter for any colonising seedlings to survive winter swell action;
- the seabed may be too unstable, causing colonising seedlings to be dislodged or buried;
- components of the seabed sediments necessary for seagrass survival may have been lost through erosion in the absence of seagrass meadows;
- sediment contaminant levels may be too high for seagrasses to become established;

- water clarity may be insufficient to permit adequate light levels at the seabed; and/or
- nutrient levels may be too high for seagrasses to become established.

4.3.5 Fisheries

Both professional and recreation fishing is undertaken in Cockburn Sound and it is considered to be one of the most popular, protected recreational fishing areas in close proximity to the Perth metropolitan area.

The main target species for professional fishers in Cockburn Sound include crabs, garfish, Australian herring, shark, King George whiting, mullet, pink snapper, squid and octopus (Fisheries Department of WA, 1997). Over half of the 1996/97 annual production of crabs for WA was caught in Cockburn Sound.

Recreational fish caught in the Sound include tailor, Australian herring, trevally, King George Whiting, garfish, yellow tail, scad, snapper and mulloway. Recreational fishers also take considerable quantities of crabs (Fisheries Department of WA, 1997).

In addition to commercial and recreational fisheries, there are eight mussel farms located around the Kwinana Grain Terminal jetty some 1 km to 2 km southwest of the BCJ. The Fisheries Department of WA, in consultation with the FPA and the Royal Australian Navy, is proposing to relocate these farms to an area near Garden Island to provide the mussel farmers with lease sites which have security of tenure. The current leases cannot be guaranteed long term access because of potential problems with port operations in the area (Fisheries Department of WA, 1998).

4.4 SOCIAL

4.4.1 Demographics

The Project Area is mostly located in the Town of Kwinana with a small component (1.1 km of rail line) located in the City of Rockingham. The total population of the Town of Kwinana has increased by 11% between 1991 to 1996 (from 17,307 to 19,185). By comparison, the population of the City of Rockingham has increased by 39% between 1991 to 1996 (from 41,868 to 58,167) and the increase in the state population was approximately 8% over this period. The populations of the both the City of Rockingham and the Town of Kwinana are relatively evenly distributed between 0 and 50 year age groups (Figure 11). The majority of the residents in both the Town of Kwinana and the City of Rockingham are Australian born. However, 22% of the residents from the City of Rockingham and 20% from the Town of Kwinana were born in the United Kingdom.

Characteristic of an industrial area, the majority of persons were employed in the manufacturing or retail trade industries at the time of the 1996 census. The most common occupations held amongst men were tradespersons and intermediate production and transport workers. For women the most common occupations were intermediate clerical, sales and service workers.

The unemployment rate was slightly higher for the Town of Kwinana than for the City of Rockingham. These unemployment rates were both above the State unemployment figure of 8.1% for the same time. The majority of unemployed people in both the Town of Kwinana and the City of Rockingham were between the ages of 25 and 34 years.

Table 6

Demographic Information for the Project Area

Statistic	Town of Kwinana	City of Rockingham
Total persons	19,185	58,167
Aged 15 years and over	14,041	42,844
In primary/secondary education	3,404	11,922
In tertiary/other education	736	2,564
Employed	6,705	22,081
Unemployed	1,021	2,598
Not in labour force	5,497	17,259
Unemployment rate	13.2%	10.5%

Source: Australian Bureau of Statistics, Census Data 1996.

4.4.2 Land Use and Zoning

The Project Area is located in the northern part of the East Rockingham Industrial Area which is the area encompassed by IP14. IP14 was established for the purpose of advancing the planning, development and use of land in this area for industrial purposes (Dames & Moore, 1990). The IP14 Structure Plan, which has been endorsed by the WA Planning Commission, designates the Project Area as Precinct 1-Port Related Industry. This is defined as an area for industries requiring port access and port related facilities, or requiring land for stockpiling of imported materials or materials destined for export.

Under the City of Rockingham Town Planning Scheme No. 1 and the Town of Kwinana *Town Planning Scheme No. 2*, the Project Area is zoned as General Industrial. In the Metropolitan Region Scheme, the area is zoned Special Industrial in recognition of the importance of port-related industrial development.

To the south-west of the Project Area is Wells Park, which is zoned as Parks and Recreation under the Metropolitan Region Scheme and the City of Rockingham and Town of Kwinana Town Planning Schemes. The priority use of Wells Park and the adjacent Kwinana Beach is for foreshore recreation and it is recognised as being Town of Kwinana's only recreational beach area (Section 4.4.3.1). Access to Wells Park is via Kwinana Beach Road which has recently been partly relocated east of its old alignment and now lies adjacent to, and on the western side, of the existing rail line. (Figure 2).

The City of Rockingham has also established a Statement of Planning Policy to establish guiding principals and policies for the environmental acceptability of industrial development on industrial zoned land within the City of Rockingham, and predominantly within the IP14 *area* (*Statement of Planing Policy No. 7.1 – Environmental Protection [Industrial Development]*). An industry classification is provided in the *Statement of Planning Policy No. 7.1*. However, no definitions are provided for the different classes of industry and therefore it is not possible to assign the proposed facility to a class. A report prepared for the City of Rockingham (ERM Mitchell McCotter, 1998) suggested that this type of exporting industry would be classified as a Class 3 industry. Class 3 industries are deemed acceptable in the IP14 area when they comply with all policies in the *Statement of Planning Policy No 7.1*, the *Environmental Protection Act* and other statutory obligations. The *Statement of Planning Policy No 7.1* also outlines policies for air quality, risk and hazards, water quality and social environment. These are discussed in the relevant sections throughout this CER.

The Kwinana Port is acknowledged as the only developed port along Western Australia's southwest coastline with deep protected waters close to shore (Dames & Moore, 1996). It is recognised by Industry and Government as one of the most suitable sites for the development of general purpose and specific purpose port facilities within the state and that long term use of land near BCJ should be reserved for industries with a significant relationship to port facilities.

The southern extension to the BCJ is not a new concept. It has been depicted on plans of the BCJ since 1971 and the original plan was to extend the BCJ to join up with the Kwinana Grain Terminal jetty, hence the angle of the end of Berth 2. The current East Rockingham Industrial Park IP14 Structure Plan, which has been endorsed by the WA Planning Commission and the East Rockingham's Strategic Development Plan (Dames & Moore, 1991) also depicts the southern extension to the BCJ.

4.4.3 Recreational Facilities and Nearest Residents

4.4.3.1 Wells Park and Kwinana Beach

Wells Park and Kwinana Beach are popular for picnicking, swimming, sunbathing, fishing and boating. The use of Wells Park declined in the 1980's due to the presence of major industries and deterioration of public facilities. However, within the Town of Kwinana it is the only recreational facility associated with a beach jetty and boat ramp (Kwinana Industries Co-ordinating Committee, 1988) and the only area of beach accessible to the general public.

The foredunes of Kwinana Beach lead up to Wells Park through stabilised dunes and a grassed area above the beach front. A large carpark provides easy access to the beach, jetty and boat ramp and pedestrian access is also available at the northern end of the park where a fenced path leads through the dunes. Other facilities in the park include shaded barbecue facilities, picnic tables, a children's playground, tennis courts and public toilets and changerooms. A liquor store and deli are located on the eastern side of Kwinana Beach Road opposite Wells Park. The remains of the historical Kwinana wreck at the end of the jetty is another attraction of Wells Park.

The Kwinana Beach, Wells Park Structure and Landscape Plan (Taylor and Burrell, 1988), proposed to upgrade public recreation and rest areas while conserving beaches and dune stability of the Wells Park area. Recommendations were made for ongoing improvements which included:

- further plantings and a dune stabilisation programme;
- upgrading of the boat ramp, amenities and playground;
- redesigning the carpark to make more efficient use of space and making it safer for children;
- the construction of a bike path; and
- reconstruction of the Kwinana wreck.

None of the recommendations of this report were implemented as the State Government objected to upgrading the facilities on the basis that it would attract significant numbers of people to an area subject to industrial risk and hazards (D. Smith, Town of Kwinana, *Pers. comm.*). The IP14 Draft Strategic Development Plan for the area, also noted that while low key development of Wells Park as a local recreational area is supported, improvements which increase the number of people visiting the area should not be undertaken (Dames & Moore, 1990). Therefore the council has only undertaken ongoing maintenance of the Park.

Wells Park, although listed as a recreational area is located in an industrial area and, on occasions, access along Kwinana Beach has been restricted during importation of anhydrous ammonia.

4.4.3.2 Nearest Neighbours

The Project Area is largely surrounded by industry (Figure 2) including:

- Wesfarmers CSBP Ltd/Kwinana Nitrogen Company to the north;
- the Brambles WA Storage Shed and the BCJ to the west and north;
- WMC Nickel Refinery to the east; and
- CBH to the south.

Other industries in the immediate vicinity include Australian Gold Reagents Pty Ltd sodium cyanide manufacturing plant, Coogee Chemicals Pty Ltd chemical manufacturing plant, and Hanwa Corporation advanced ceramics plant.

The nearest residential areas are in north Rockingham and include the Cee'n See Caravan Park along the Rockingham Road (1.8 km south of the proposed rail car dumper and approximately 2.3 km from the storage shed). The CBH Kwinana Grain Terminal and jetty are located between the Project Area and north Rockingham area.

4.4.4 Tourism

The Western Australian Tourist Commission lists Rockingham and Safety Bay as one of the top 10 day trip destinations around Perth. It is estimated that around 511,000 day trips were made to the Rockingham/Safety Bay area by Western Australians in 1996. A total of $6,953,000 was spent in the area as a result of tourism (WA Tourism Commission, 1998).

Activities available for tourists to Rockingham include:

- indoor and outdoor sports (archery, badminton, volleyball, golf, squash, ten pin bowling and tennis);
- visits to parks and wildlife centres (Cape Peron, Garden Island, Lake Richmond Environmental Walk, Linga Longa Park, Marapana Wildlife Park, Swim with the Dolphins, and Sea Tours);
- arts and crafts and museums (art and craft centre, art gallery, museum, Sunday Markets, Swap Meet and the Granary Museum); and
- water sports and activities (ancient mariner cruise, diving, surfcat hire, sea kayaking, Rockingham aquatic centre, boat hire, water ski hire, and jet ski hire)

Kwinana is not listed in the Tourist Commission's top ten destinations and no statistics are available on the number of tourists visiting Kwinana. However, the SIA undertaken for the Project identified the number of daytrippers to Wells Park and the results of this survey are summarised in Section 6.4.2.

4.4.5 European Heritage

A search of the following heritage databases was undertaken as part of this Study to identify any sites of significance in or near the Project Area:

- Australian Heritage Commission Internet site;
- Heritage Council of Western Australia;
- National Trust; and
- the local Municipal Heritage Inventories.

The "Kwinana" wreck located at the end of the jetty at Wells Park, and Wells Park itself, are listed as heritage items on the Town of Kwinana's Municipal Heritage Inventory. The "Kwinana" was originally purchased by the State Government in 1912 for transporting cattle from the north west to the south. The ship eventually met its demise in 1922 when gale force winds broke the moorings and blew the ship to its resting place in Cockburn Sound. The Town of Kwinana was named after the ship.

Wells Park is also considered significant because it is the only coastal reserve in Kwinana which can be used for public recreation.

There will be no direct or indirect impact on these heritage items as a result of the proposed development.

4.4.6 Aboriginal Heritage

A desktop Aboriginal Heritage study was undertaken by McDonald Hales and Associates (1998) for the Project. A summary of this study is provided below.

4.4.6.1 Archaeological Sites

A review of the Aboriginal Affairs Department database revealed that 12 archaeological sites have previously been recorded within a 5 km radius of the Project Area but were not located at the actual site proposed for development. These sites included small artefact scatters, a stone arrangement, kangaroo pits and a burial site.

Aboriginal sites previously recorded on the Swan Coastal Plan are generally concentrated around lakes, swamps and wetlands. Although no archaeological sites have been previously recorded in the Project Area there is a low to moderate potential for Aboriginal cultural material to be present. The lack of surface drainage features and flakeable material around the Project Area indicates that any sites found in the Project Area are likely to be small and would represent opportunistic usage of the area. An Aboriginal archaeological survey of the IP14 area resulted in the discovery of one archaeological site which contained worked glass and porcelain, and one isolated artefact (Locke and Smith, 1990).

Burials are also common on the coastal fringe of Western Australia with the closest site being located at Safety Bay to the southwest of the Project Area. There is a low to moderate possibility that burials exist in the coastal dune system around the Project Area.

4.4.6.2 Ethnographic Sites

The Project Area is located within one mythological site (Cockburn Sound) and a number of other sites are located near the Project Area (Mandurah Road Trees and the East Rockingham Cemetery). Cockburn Sound is listed as an ethnographic site because of the myths associated with its creation. The mythology also applies to the off shore islands (Carnac, Garden and Rottnest Islands). There is a low to moderate potential for other ethnographic sites to occur within the Project Area.

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5. PUBLIC CONSULTATION

Prior to submitting the Environmental Referral to the EPA for the Kwinana Export Facility Project, FPA and KIPL commenced consultation with representatives of the Kwinana Town Council, Rockingham City Council and Cockburn City Council. Once the Project had been referred to the EPA, the Proponents commenced an extensive community consultation programme which included detailed briefings for each of the councils, public meetings and various meetings with community groups. The dates and groups consulted with are outlined in Table 7.

Table 7

Community Consultation Meetings

Agency or Party	Date of Meeting
Informal Briefing to Council Representatives for Kwinana, Rockingham and Cockburn Councils.	8 April 1998
Town of Kwinana	14 May 1998
City of Cockburn	2 June 1998
City of Rockingham	2 June 1998
Comnet (including Kwinana Watchdog, Wattleup Citizens Association, Coolbellup Community Organisation, Hope Valley Progress Association, Coolbellup Progress Association)	9 June 1998
Southern Metropolitan Regional Council (briefing to CEO)	15 June 1998
IP14 Consultative Committee	16 June 1998
CSBP	18 June 1998
Anaconda Nickel	19 June 1998
Kwinana Industries Co-ordinating Committee	23 June 1998
Coogee Chemicals	23 June 1998
Summit Fertilizers	23 June 1998
Brambles WA	23 June 1998
BP Kwinana	23 June 1998
Indian Ocean Shipping	23 June 1998
Gull Petroleum	25 June 1998
WMC	25 June 1998
Cooperative Bulk Handling	25 June 1998
Southern Metropolitan Regional Council (briefing to Council)	16 July 1998
Rockingham electors (Public Meeting)	20 July 1998
Rockingham Chamber of Commerce	21 July 1998

The environmental and social issues raised at these meetings are listed below and the sections of the CER in which they are addressed are provided in brackets:

- the EIA process (Section 1.6)
- employment (Section 2.6);
- location of the facility (Section 2);
- use of existing facilities (Section 3.1.2);
- community consultation (Section 5)
- dust (Section 6.2.4);
- noise (Section 6.2.5);
- vibrations (Section 6.2.6);
- TBT (Section 6.3.1);
- ballast water (Section 6.3.2);
- loss of seagrasses (Section 6.3.4)
- flushing of Cockburn Sound (Section 6.3.5);
- drainage system on the BCJ (Section 6.3.6);
- SIA (Section 6.4.1)
- visual impacts (Section 6.4.3);
- impact on fishing industry (Section 6.4.5);
- Kwinana Beach Road/rail crossing (Section 6.4.6); and
- impact on tourism (Section 6.4.7).

The FPA is a long standing member of the community in the Kwinana area and has contributed to the community through a diverse array of Projects through both sponsorship and direct involvement (e.g. Kwinana 2001 Project, Safety House Programme, and the Australian Association for Environmental Education's Coastcare Day). The FPA has also contributed to environmental studies (such as water quality monitoring) of Cockburn Sound through Kwinana Industries Council (KIC).

FPA has established an Inner City Residents Liaison Group for regular contact between the local community of the inner harbour (Fremantle area) and the FPA regarding Port related matters. These meetings are attended by a range of community and local government organisations. The FPA has recently established a similar group for the outer harbour (Cockburn Sound) which aims to:

- provide a regular two way channel of communication between the FPA and community groups on matters of mutual interest;
- help enhance community understanding, acceptance and support for the needs of the working port;
- help enhance the FPA's understanding, acceptance and support for the needs of the broader community;
- create opportunity to increase awareness of achievements of the port and its positive impact on the economic and social well being of the community;
- achieve a more proactive (rather than reactive) approach to issues management; and
- supplement other consultation with other relevant groups.

The first meeting for this group was held on the 2 February 1999.

Commitment 1

The Proponent will continue to operate the Outer Harbour Liaison Group to enable local community, industry and Government representatives to discuss Port related issues.

FPA is committed to the orderly development of industries in the immediate area. FPA is a member of Kwinana Industries Coordinating Committee (KICC), KIC, Kwinana Industries Mutual Aid (KIMA) and the Cockburn Sound Conservation Committee. The FPA played a significant role in developing the Kwinana Integrated Emergency Management System which was subsequently replaced by KIMA. The FPA is also represented on the working group for the East Rockingham Park Development Plan.

KIPL is currently a responsible corporate citizen of the Esperance community. It plans to develop a similar image in the Kwinana community. KIPL will become a member of the KIC and will welcome contact made by members of the community.

During the preparation of the CER, further community consultation was undertaken as part of a SIA undertaken for the Project (Section 6.4.1). Groups contacted included:

- the City of Rockingham;
- the Town of Kwinana;
- the Shire of Esperance;
- representatives of key community/environmental groups;
- representatives of the local business community;
- users of Wells Park, Kwinana Beach and coastal waters;
- local politicians; and
- other stakeholders (e.g. local residents).

These groups were invited to provide comments for the SIA and responses were received from 11 groups or individuals.

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6. ENVIRONMENTAL IMPACTS AND MANAGEMENT

6.1 GENERAL

This section outlines the potential environmental and social impacts associated with the construction and operation of the export facility and the proposed management techniques for mitigating or minimising these impacts.

Potential impacts associated with the terrestrial component of the Project include:

- disturbance to flora, vegetation and fauna;
- erosion;
- generation of dust during construction and operation;
- generation of noise from the construction and operation of the facility and from train movements along the rail line;
- impacts to properties adjacent to rail lines as a result of vibrations;
- impacts on groundwater in the area;
- waste disposal; and
- landscaping and rehabilitation of disturbed areas.

Potential impacts associated with the marine component of the Project include:

- impact of TBT on marine organisms;
- ballast water management;
- impacts on seagrasses;
- disturbance to marine life;
- impacts on the hydrodynamic processes in Cockburn Sound;
- waste disposal and the potential for spills;
- noise and dust generation; and
- cumulative impact on Cockburn Sound.

Potential social impacts associated with the Project include:

- visual impact of the facility
- impacts to land and marine users (including access to Wells Park and Kwinana Beach);
- impact on traffic in the vicinity of the Project;
- impact on tourism in the area; and
- risk and hazards associated with the Project.

These issues and management measures are outlined in the following sections.

KIPL has experience in establishing a world class, "state of the art" iron ore export facility. The FPA has been a long term member of the local community. KIPL, together with the FPA, propose to construct a facility in Kwinana equal to, or better than, the facility currently being used for the export of iron ore from Esperance.

6.1.1 Environmental Management System

The existing facilities at the BCJ currently operate under a variety of management procedures. The FPA is committed to operating the existing BCJ and the proposed new berth according to Best Practice Environmental Management and is currently updating and formulating the existing environmental management practices into a formal Environmental Management System (EMS). The EMS will be incorporated into an Integrated Management System which has been established by the FPA to address safety, quality and environmental issues. The EMS will provide a more structured approach to environmental management of the BCJ and will include information on:

- the development, description and implementation of procedures;
- the monitoring, recording and reporting of environmental impacts and performance; and
- the formulation of strategies to minimise environmental impacts (Natoli, 1995).

The development of the EMS is being undertaken according to the following steps:

- definition of environmental aspects;
- definition of legal and other requirements;
- development of an environmental policy;
- establishment of operational controls;
- definition of objectives and targets;
- outline of a management programme;
- outline of procedures to deal with non-compliance;
- establishment of procedures for management review;
- definition of communication procedures;
- development of EMS documentation;
- establishment of roles and responsibilities;
- development of training programmes;
- establishment of methods of document control;
- establishment of monitoring procedures;
- development of records; and
- establishment of a systems audit.

The FPA is currently developing the management programme to incorporate the objectives and targets into the business planning process.

It is expected that the EMS will be operational within 18 to 24 months.

Commitment 2

The FPA will prepare and implement and Environmental Management System during the operation of the Kwinana Export Facility. This will be undertaken to the reasonable satisfaction of the DEP.

The FPA has recently prepared a Common User Agreement, which all users of the facilities at the BCJ will be required to sign. This Common User Agreement will outline the conditions of the FPA's Environmental Licence and will require all users to comply with these conditions until the EMS is in place.

Operational procedures for the car dumper, storage shed and land based conveyors will also be developed by KIPL. The procedures will take the form of an Environmental Management Plan (EMP) and will outline:

- the major environmental issues associated with these facilities;
- general management procedures to be implemented during normal operation of the Project;
- management procedures to be implemented in unusual circumstances (e.g. control of dust during dry or windy periods);
- procedures to be followed in the event of a public complaint; and
- reporting procedures in the event of an incident, accident or hazard;

KIPL's EMP will be consistent with the FPA's EMS when this becomes operational.

Commitment 3

KIPL will prepare and implement an Environmental Management Plan (EMP) prior to the commencement of construction phase of the Project. Further, KIPL will ensure that its contractors comply with the environmental management strategies and procedures described in the EMP. This will be undertaken to the reasonable satisfaction of the DEP.

6.2 TERRESTRIAL

6.2.1 Flora

Issues

The major impact to the vegetation in the Project Area will be the clearing of some trees around the proposed shed location. These trees are mostly exotic species such as castor oil plants and Japanese peppers, and remain in the area from the residential properties which were demolished in the late 1970s (Plate 2). The vegetation in the area is already highly disturbed with very little native vegetation being found in the Project Area. Some dune vegetation will also need to be cleared for the construction of the conveyor that extends from the shed to the jetty.

As most of the vegetation in the area consists of weed species, there is a potential for these species to be spread around and from the Project Area.

Management

Where possible large trees, particularly tuarts which are native to the area, will be retained and supplementary planting will be undertaken around the facilities using native plant species to reduce the visual impact of the Project. Any vegetation removed from the site will be disposed of to an approved council landfill or buried on-site. This will minimise the further spread of weeds within the Project Area.

Topsoil removed from the site will not be re-spread during landscaping as it will contain large quantities of weed seeds. Storing this material for use in landscaping or rehabilitation will only result in the further spread of weeds. Topsoil removed will be buried on-site during construction activities if possible. If the material needs to be removed from the site it will be disposed of in accordance with council regulations.

6.2.2 Fauna

Fauna in the area is generally limited to nomadic and scavenging bird species which are not restricted to the Project Area. Construction of the railway, storage shed and the conveyor is unlikely to result in the loss of trees which are used as refuges for these bird species. The loss of non-native trees (such as Japanese peppers and castor oil plants) will be supplemented with native trees planted during landscaping of the site. This would provide a more natural habitat for fauna of the area than that which is presently available. Therefore, the construction of the Project will not impact on the fauna species in the area.

6.2.3 Erosion and Sedimentation

Issues

Any removal of vegetation cover and disturbance of the ground surface during construction works has the potential to cause erosion (by water and wind) and sedimentation of surface water runoff. The majority of clearing and ground disturbance during construction will be in the vicinity of the proposed stockpile shed. This area is inland from the primary dunes and therefore not highly susceptible to erosion following disturbance. The absence of defined natural surface drainage and the sandy nature of the soils would also combine to minimise the risk of significant erosion and sedimentation.

The area of highest potential for erosion is on the primary sand dunes near the shore crossing. The conveyor will be constructed through the dune area and a clearance of approximately 3 m on either side of the conveyor will be required for maintenance purposes. An access road will also be required through the dune system. The vegetation communities along the sand dunes are relatively sensitive and any disturbance in these areas can result in rapid degeneration of nearby vegetation, as a result of sand blasting, burial or under-mining. Regeneration on the sand dunes is slow and this can result in the movement of large quantities of sand by wind action.

Management

During construction, wind erosion of exposed areas will be minimised by implementing the dust control measures outlined in Section 6.2.4.2. Water runoff from the site (such as runoff from the roof of the shed and unvegetated areas) will be directed to a storm water catchment pond on the northern side of the storage shed. A storm water catchment pond will also be located on the eastern side of the car dumper. Water in the catchment ponds will be disposed of via evaporation.

The conveyor has been designed as an above ground facility which will minimise the disturbance to the dune areas. During construction of the conveyor every effort will be made to minimise disturbance to vegetation along the sand dunes. The general public will not be able to access this part of the Project Area as the road will be closed and access to Wells Park will be via the new road adjacent to the rail line. Access to the conveyor along areas which are not sealed will also be kept to a minimum.

At the completion of construction the dune area which has been disturbed will be stabilised and rehabilitated in accordance with the measures outlined in Section 6.2.9. Some ground covering material will be allowed to regenerate along the conveyor to minimise erosion. Other disturbed areas will also be stabilised and landscaped as soon as possible after disturbance.

Commitment 4

The Proponents will stabilise, rehabilitate and/or landscape all disturbed areas which are no longer required, as soon as possible after disturbance. This will be undertaken to the reasonable satisfaction of the DEP.

6.2.4 Air Quality

6.2.4.1 Criteria

Dust is a generic term used to describe fine particles that are suspended in the atmosphere (Howard and Cameron, 1998). There is a potential for dust to be generated during both the construction and operation phase of the Project.

The WA DEP and EPA do not have any ambient standards for dust deposition. However, the NSW EPA utilise a standard of $4g/m^2$/month which is one of the lowest in the world (Parrett, 1992). Deposition standards used by some States in America are as high $11g/m^2$/month. Parret (1992) states that dust levels of around $6g/m^2$/month for most non-toxic dusts and $2.4g/m^2$/month for black coal dust would result in nuisance dust problems. Even "clean" areas experience naturally occurring dust deposition as indicated by Parrett (1992);

- country areas - 0.3 to $1.5g/m^2$/month; and
- industrial areas – 2.4 to $4.8g/m^2$/month.

The EPA does however have standards for dust concentrations in the air. The EPA has established the Kwinana Environmental Protection Policy (EPP) (*Environmental Protection [Kwinana] [Atmospheric Waste] Policy 1992*) and regulations (*Environmental Protection [Kwinana] [Atmospheric Waste] Regulations 1992*) for the Kwinana Industrial Area to maintain acceptable air quality in the area. The policy and regulations outlines the concentrations of Total Suspended Solids allowable in the air in various Policy areas in the Kwinana Area. The proposed facility is located in Policy Area A for which the ambient air quality standard is 150 $\mu g/m^3$ for a 24 hour average and the limit is 260$\mu g/m^3$ for a 24 hour average.

The trains travelling through the metropolitan area will travel through Policy Areas B and C for which the ambient air quality standards are 90$\mu g/m^3$ for a 24 hour period and the limits are 260$\mu g/m^3$ for a 24 hour period for Area B, and 150$\mu g/m^3$ for a 24 hour period for Area C.

In addition, the National Environment Protection Measure for Ambient Air Quality (NEPM) sets an ambient particulate standard of $50\mu g/m^3$ for particles less than 10 micron in size. This standard is applicable to those parts of the Project located outside the EPP Policy Areas (i.e. the rail line).

The EPA (EPA, 1992) in relation to the EPP states that:

> "*...particulates will be handled via the general provisions of the Act* [Environmental Protection Act 1986], *because:*
>
> *(i) they do not currently warrant more complicated treatment; and*
> *(ii) quantitative emissions limits can not be sensibly determined for some industrial sources like stockpiles and ship loading facilities"*

Therefore, it is assumed that the issue of dust will continue to be managed under the *Environmental Protection Act* 1986. However, it is not expected that dust concentrations will be higher than the levels specified by the EPP due to the operation of the export facility, because iron ore dust is relatively heavy and therefore likely to be deposited close to the source. Iron ore has a reputation of being "dirty" through deposition, and therefore the following sections detail the proposed issues and management associated with dust deposition rather than concentration.

6.2.4.2 Construction

Issues

During construction, dust will be generated from earthworks, movement of vehicles and from exposed ground surfaces. The degree of dust generated would depend on the moisture content of the ground surface during construction. The sandy soils in the Project Area are likely to give rise to low levels of fugitive dust.

Management

Dust generation during construction is expected to be minor and localised. Dust levels will be visually monitored on site by the construction contractor and the site will be sprayed with scheme water as required to minimise dust generation. Areas that remain cleared following construction will be landscaped and mulching will be applied to minimise dust generation and assist with plant growth.

Commitment 5

The Proponents will implement dust control measures during the construction of the Kwinana Export Facility in the event that:

- *unacceptable levels of dust are observed;*
- *strong winds and dry conditions make dust generation likely; or*
- *reasonable complaints about dust are received.*

6.2.4.3 Operation

Issues

During operation, there is a potential for dust to be generated during:

- transportation of the ore from the mine site to the port;
- unloading of the wagons:
- transportation of the ore from the point of unloading to the storage shed;
- screening operations undertaken within the storage shed;
- transportation of the ore from the shed to the jetty;
- loading of the ships; and
- vehicular movement around the Project Area.

The dust generated could potentially impact on residents along the rail route from the mine site to the Port, the local residents at the Port, the users of Wells Park, and local industries. In addition to impacts on people, there is the potential for dust to impact on the marine biota of Cockburn Sound. Dust which is blown into the Sound is likely to settle to the seabed around the jetty where it may contaminate the sediments and may affect benthic biota. This issue is addressed in Section 6.3.6.

Management

Past Experience

KIPL has had extensive experience in managing dust in an environmentally sensitive area. The iron ore export facilities at Esperance are located approximately 150 m from the nearest resident and as a result dust was highlighted as an important issue during the original environmental assessment process. Concerns raised during the public consultation process included (Ashton Environmental and Safety Services, 1993):

- impact of dust on the local residents;
- potential for iron ore dust to stain buildings;
- impact of dust on the pristine white beaches in the Esperance area;
- impact of dust on the bay;
- potential for iron ore dust to contaminate other commodities shipped through the port;
- disposal of water used for dust control; and
- potential for the strong winds experienced in Esperance to generate unacceptable levels of dust.

In response to these concerns, KIPL, in association with the Esperance Port Authority and Westrail, modified the proposed Project to incorporated dust management measures to ensure that dust generated from the Project was minimised. These measures included enclosing the stockpiles in a shed, covering the conveyors, fitting doors to partially enclose the ends of the car dumper, and designing a telescopic delivery chute on the ship loader to deliver the ore directly into the ship hold. The export of iron ore through Esperance was approved in 1994, with the modified dust management measures. The facility was constructed and during the loading of the first ship it became evident that additional dust management measures would be required to minimise dust generation. The telescopic chute was modified, a negative pressure was applied to the shed and the conveyors and transfer points were fully enclosed. In addition a "fogging system" was included at the ship loader. This system sprays very fine mist of water around the ship hold opening. The water effectively traps the dust and it, along with the water, falls into the ships hold.

Dust management measures currently operating at Esperance include:

- using an enclosed dumper to unload the ore from the trains;
- transportation of the ore in fully enclosed conveyors to the storage area;
- fully enclosed transfer stations;
- storage of the iron ore in a shed which is kept under negative pressure (when conveyors are operating) by air extraction through dust collectors;
- reclamation of the ore from the shed using an internal conveyor system;
- transportation of the ore to the jetty in enclosed conveyors (Plate 3);
- loading of the ore onto the ship using a chute which can be lowered to minimise dust generation during loading operations;
- the use of dust extractors at all loading, discharge or transfer points in the overall loading facility. The dust extractor systems consist of reverse pulse filter baghouses which remove the dust from the extracted air prior to release to the atmosphere;
- the use of water fogging dust suppression systems at the ship loader;
- regular "housekeeping" in areas where dust accumulates. This involves removal of the dust with a vacuum cleaner;
- training employees to ensure that effective dust control measures are implemented; and
- implementation of a dust monitoring programme which includes the use of three high volume air samplers which operate for a 24 hour period every six days, as well as a visual inspection programme.

The measures which have been implemented at Esperance are considered to represent "state of the art" technology and have been included as a case study in Environment Australia's "Best Practice Environmental Management in Mining Module" for Dust Management (Howard and Cameron, 1998).

Monitoring at Esperance

The monitoring at Esperance has shown that the dust management measures are extremely efficient at minimising dust emissions. However, very small quantities of dust will be emitted by the dust extraction system (due to the fact that elimination of all dust is not practical). Analysis of the dust deposition monitoring samples collected at various locations around Esperance has shown that on average the amount of haematite (iron ore) in the samples ranged between 0.008 and 0.031g/m^2/month (Table 8). The maximum recorded value between November 1995 and November 1997 was 0.068g/m^2/month. Although the dust levels presented in Table 8 are not the total dust deposition for the samples, they indicate that the recorded haematite deposition levels are well below the NSW EPA standards outlined in Section 6.2.4.1. The low deposition levels in the vicinity of the export facility show that dust levels from the export facility can be effectively managed.

Table 8

Haematite Deposition Levels at Esperance

Dust Gauge	Location	Average (g / m^2 / month)	Range (g / m^2 / month)	Standard Deviation (g / m^2 / month)	No. of Samples
DG1	Esp Bay Caraban Pk	0.031	0.005 – 0.062	0.019	16
DG2	Esp Port Authority Office	0.016	0.009 – 0.046	0.015	23
DG3	37 Bostock Street	0.014	0.028 – 0.039	0.011	13
DG4	Jetty Tea Rooms	0.021	0.008 – 0.068	0.025	25
DG5	38 Crossland Street	0.008	0.001 – 0.023	0.005	25
DG6	2 Adelaide Street	Results not available			
DG7	38 Crossland Street	0.008	0.009 – 0.026	0.007	18

There has been concern expressed by the general public that the levels of dust at Kwinana will be greater than at Esperance due to the greater quantity of ore being exported. The greater quantity of ore being loaded at Kwinana will result in greater quantities of dust being generated. However the dust control equipment (e.g. dust collectors) will be appropriately sized to ensure that the dust emitted from the facility is not significantly greater than that at Esperance. In addition, the equipment at Esperance currently operates at a rate of 2,000 t/hr, whilst at Kwinana it will operate at 4,000 t/hr. Therefore, the ore would be loaded in a similar period of time to that at Esperance.

Management at Kwinana

KIPL's experience at Esperance has been drawn upon for the design of the proposed export facility at Kwinana. The same dust control measures currently operating in Esperance will be implemented in Kwinana and the Proponents consider that these measures will be equally successful in the Kwinana area where the nearest residence is located further from the proposed activities than at Esperance.

In addition, the Proponent is proposing to install an automatic reclaiming system in the storage shed rather than use front end loaders (as is currently the practice in Esperance) to load the ore on to the conveyor for transport to the ship. This will minimise any occupational hazards associated with loader drivers operating inside the shed.

The Proponent will also incorporate automatic control measures to ensure that dust control equipment is operating effectively. The dust collection facilities will operate with a pressure detection system which will sound an alarm and stop the activity until the dust collector is repaired. As very low emissions are expected from the Project, no significant cumulative impact on air quality is anticipated in the Kwinana area.

Monitoring at Kwinana

Dust deposition monitoring stations have already been installed in the vicinity of the Project Area to collect baseline data which will provide an indication of existing dust levels in the Kwinana area. It will also provide information on the amount of haematite (iron ore) in the baseline samples collected

The Proponent will continue to monitor dust deposition levels during construction and operation of the Project. The results from these samples will be compared to baseline data to identify any significant changes in total dust levels and the quantity of haematite in the samples. If at any stage dust levels associated with the Project are found to be unacceptable, the Proponent will initiate additional dust management measures. KIPL will also visually monitor dust in and around the Project Area. This will include a regular inspection of Kwinana Beach.

In addition, KIPL will establish a short term high volume air sampling programme at its Kwinana site at the commencement of operations to ensure compliance with Kwinana EPP standards. This will be managed in accordance with the environmental licence. KIPL will also establish a community complaints register which will record the complainant's name and address and the nature of the complaint. Remedial actions taken to rectify the problem will also be recorded. The register will be provided to the DEP on an annual basis.

Commitment 6

KIPL will undertake a dust monitoring programme in the vicinity of the Project Area and should unacceptable dust levels attributable to the Project be observed, additional dust management measures will be incorporated into the Project. This will be undertaken to the reasonable satisfaction of the DEP.

The contact telephone for the lodgement of complaints will be advertised locally.

Commitment 7

KIPL will establish a community complaints register. This will be undertaken to the reasonable satisfaction of the DEP.

Dust Generation from Trains

The ore is currently transported from the mine site through Norseman to Esperance. The wagons transporting the iron ore into Kwinana will not be covered and there has been some community concern regarding generation of dust along the route from the mine site to Kwinana. Uncovered wagons are currently being used to transport the ore from the mine site, through the town of Esperance to the Esperance Port.

Dust from transporting the iron ore from the mine to the port could be generated from:

- fines blowing off the top of the iron ore load; or
- air movement across the ground as a result of the train movements.

The DEP Kalgoorlie office indicated that no dust complaints have been received as a result of the iron ore transport operations in the past two years. An ex-Kalgoorlie DEP officer indicated that prior to this time, only one complaint was received regarding dust along the rail line and this was early in the operations.

The Shire of Esperance has maintained a formal complaints register for the past two years. There are no records of complaints being received regarding dust generation along the rail line during this two years. Prior to this time, complaints were not formally registered but are included in the files. There are no records of complaints regarding dust along the rail line prior to the register being established.

The Shire of Dundas (includes the town of Norseman) does not maintain a formal register but occassionally complaints regarding issues around the Shire are made to the Shire office. The Shire of Dundas advised that no complaints have been received regarding iron ore dust from the rail line.

Monitoring was undertaken at the commencement of operations at the Koolyanobbing mine site to determine if the dust was being generated by the iron ore trains. Dust deposition monitoring gauges were placed at the mine site, 5 km along the track, 10 km along the track, at Norseman and at Esperance. The gauges at the mine site, 5 km along the track and 10 km along the track are considered to be close to the mine site while Norseman and Esperance gauges are considered to be away from the site. These gauges were placed 5 m from the track to give an indication of a worst

case scenario. Control gauges were also used to determine the background levels at each location. Samples were collected in the months of August, September, October and November 1994. No data are available for other months of the year. There are no particulate concentration monitoring data available along the rail line. Therefore, it is not possible to assess the dust generation based on NEPM standards. Instead, a comparison has been made in relation to the NSW dust deposition standards.

Summary of Results

During August and September all dust samples collected were below the NSW EPA standard of 4 mg/m^2/month (Figure 12). The August samples were all well below this level and this is probably as a result of the above average rainfall received in that month. September also received above average rainfall in 1994. The September data also indicates that dust generation was greatest closer to the mine site and decreased further along the rail line.

In August, the iron ore content of the dust samples collected was generally below 20% with only one sample recording more than this. In September the iron ore content was generally higher than that recorded in August, which is likely to be a reflection of the higher levels of dust recorded. At the mine site and at 5 km and 10 km along the rail line the iron ore content in the dust samples was around 40-50%. This reduced to a maximum of 30% further away from the mine site.

The monitoring data for the month of October indicated that a number of samples at the Koolyanobbing Mine Site were above the NSW EPA standards and the iron content of the samples near the mine site was between 8% and 35%. The mine site control had an iron content of 4%. All samples at Norsman and Esperance, which are further from the mine site were below the NSW EPA standard for the month of October (Figure 12) indicating that dust was generated along the rail line close to the mine site but decreased further from the mine site.

The data for November indicates that numerous samples at the mine site, along the route, at Norseman and at Esperance were above the NSW EPA standards. However, the iron content in these samples was below the NSW EPA standards in all samples except one which was located at the mine site. The control site at Norseman, although not above the 4 mg/m^2/month, was also relatively high at 3.7 mg/m^2/month. There is a high level of iron in the dust collected at the Esperance (E3) site which is not readily explicable. It is possible therefore that the high levels of dust recorded at all sites in November are indicative of the low rainfall received in this month in 1994 and are a reflection of the normal background levels.

Conclusions from the 1994 Monitoring Data

It would appear from the monitoring data that dust generation from the iron ore trains is not an issue during the wetter months of the year. However, during the drier months, the levels of dust measured along the rail line in the vicinity of, and around the mine site, can be greater than the NSW EPA standards. As the train leaves the mine site, it gathers speed and the fine particulate matter blows off the top of the load in the first few kilometers of the train's journey. After this, dust generated is generally minimal and below NSW EPA standards, indicating that dust generation along the rail line is unlikely to be significant. It is only in extreme, dry conditions where dust generated away from the mine site is greater than the NSW EPA standards and in these situations even the ambient dust levels are close to these standards.

The low levels of iron ore in the dust samples indicated that a large portion of the dust generated along the track is not a result of the iron ore load but is more likely to be a result of dust generated by the movement of the train over the ground surface and other natural and man-made sources. This dust generation is likely to be exacerbated during the dry conditions of the summer months.

Therefore dust generation from the iron ore trains is only likely to be an issue directly around the mine site, which is unpopulated. Through the Perth Metropolitan region there is unlikely to be any significant quantities of dust generated from the ore trains. However, should it become evident that dust along the rail line resulting from KIPL's operations is an issue then KIPL will investigate the use of crusting agents or other management measures such as washing out wagons after unloading to minimise the impact to residents along the rail line.

Commitment 8

KIPL will investigate the use of crusting agents or other management measures if dust from its operations is considered to be an issue along the rail line through the Metropolitan Area. This will be undertaken to the reasonable satisfaction of the DEP.

6.2.5 Noise

6.2.5.1 Criteria

The *Environmental Protection (Noise) Regulations 1997* (the Regulations) currently represent the prescribed standards for noise under the *Environmental Protection Act 1986*. The regulations specify the acceptable noise levels for different times of the day as a function of the land use zoning and the presence of major roads around the receptor. The maximum allowable noise levels for residences, without a tonal penalty, are presented in Table 9. The night-time (i.e. 2200 hours to 0700 hours) criterion is the most stringent due to protection of sleep amenity and the generally reduced background noise levels during these times.

Table 9

Maximum Allowable Noise Levels For Residences

Type of Premises Receiving Noise	Time of Day	Assigned Level dB(A)		
		$L_{A\,10}$	$L_{A\,1}$	$L_{A\,max}$
Noise sensitive premises at locations within 15 m of a building directly associated with a noise sensitive area	0700 to 1900 hours Monday to Saturday	45+ influencing factor	55+ influencing factor	65+ influencing factor
	0900 to 1900 hours Sunday and public holidays	40+ influencing factor	50+ influencing factor	65+ influencing factor
	1900 to 2200 hours all days	40+ influencing factor	50+ influencing factor	55+ influencing factor
	2200 hours on any day to 0700 hour Monday to Saturday and 0900 hours on Sunday and public holidays	35+ influencing factor	45+ influencing factor	55+ influencing factor
Noise Sensitive Premises at locations further than 15 m from a building directly associated with a noise sensitive use.	All hours	60	75	80
Commercial premises	All hours	60	75	80
Industrial and utility premises.	All hours	65	80	90

Notes: $L_{A\,max}$ means an assigned level which, measured as a $L_{A\,Slow}$ (reading in decibels obtained using the A frequency weighting and the slow time weighting characteristics as specified in AS1259.1-1990) value is not to be exceeded at any time.
$L_{A\,1}$ means an assigned level which, measured as a $L_{A\,Slow}$ value is not to be exceeded for more than 1% of the representative assessment period
$L_{A\,10}$ means an assigned level which, measured as a $L_{A\,Slow}$ value is not to be exceeded for more than 10% of the representative assessment period.
Influencing factor is determined under Schedule 3 of the Regulations.

Source: *Environmental Protection (Noise) Regulations* 1997

The influencing factor in Table 9 is calculated based on land usage within two circles of 100 m and 450 m radii from the premise of concern. The levels outlined in Table 8 are conditional in that no annoying characteristics (such as tonality, modulation and impulsiveness) exist in the noise levels being measured. Some of the noise emissions from the Project are likely to have these characteristics (e.g. pile driving activities during construction) and, therefore, a penalty will further reduce the acceptable levels for these sources (Table 10).

Table 10

Adjustments to Measured Noise Levels

Where tonality is present	Where modulation is present	Where impulsiveness is present
+5 dB(A)	+5 dB(A)	+10 dB(A)

Construction activities are exempt from these regulations if it is undertaken during the day time (between 0700 hours and 1900 hours) and not on Sundays or public holidays. However the regulations do stipulate that:

- on a construction site, that construction work must comply with environmental noise practices as set out in Section 6 of the Australian Standard (AS) 2436-1981 (Guide to Noise Control on Construction, Maintenance and Demolition Sites);

- the equipment on site is the quietest reasonably available; and
- if a noise management plan is required, then it is approved by the Chief Executive Officer of the DEP and it is adhered to.

Under the Regulations, residential areas (such as north Rockingham) are classified as noise sensitive premises. Wells Park is also classified as a noise sensitive premise. The delicatessen and the liquor store opposite Wells Park are classified as commercial premises. The influencing factors for these areas have been calculated and the assigned outdoor noise levels for these areas are presented in Table 11 (Herring Storer Acoustics, 1998a).

Table 11

Assigned Outdoor L_{A10} Noise Levels

Location	Time of Day	
	Day Time (0700-1900 Hours) dB(A)	Night Time (2200-0700) dB(A)
Caravan Park (Governor Road)	56	46
214 Kent Street (closest residence)	51	41
179 Kent Street (DEP Monitoring Location)	47	37
Wells Park	60	60
Commercial Premises (crn of Well's Road and Rockingham Road)	60	60

As these locations are within close proximity to other industries, and the assigned level for these residences is reportedly already being exceeded (DEP, 1998), the introduction of a new industry must not "significantly contribute" to the level at these residences (Regulation [7][1]a). The noise level is considered to not significantly contribute to background levels when its level is 5dB(A) below the assigned level (Regulation [7][2]). This effectively reduces the assigned levels in Table 11 by 5dB(A).

The *Environmental Protection (Noise) Regulations* 1997 specifically excludes noise emissions from vehicles and trains. However, the DEP are currently in the process of developing an EPA Policy on road and rail transportation noise (*Draft Environmental Impact Policy for Road and Rail Transportation Noise*) (the draft Policy). This draft Policy has outlined maximum noise levels inside buildings for:

- proposed increases in road or rail traffic (modification of existing transport);
- proposed urban developments near pre-existing major transport routes (new residence/ existing transport); and
- proposed road or rail infrastructure developments adjacent to noise sensitive areas (new transport/existing residence).

The first point (modification of existing transport) is relevant to this proposal. The noise levels for additional train movements are calculated based on the estimated increase in train movements per hour. Two additional trains per day will be required for the Kwinana Export Facility Project. Therefore, it is assumed that there will be an increase of one train movement per hour, despite the increase being much less than this in reality. The allowable noise level inside buildings for this increase of one train per hour, is 85dB(A). This level has been calculated according to the methodology outlined in the draft Policy and is based on three existing train movements per hour. A more detail description of this calculation is provided in Appendix C).

The following sections outline the issues associated with noise generation from the Project, the results of a modelling study undertaken (Appendix C, Herring Storer Acoustics, 1998a) and management measures to be implemented to minimise noise generation. Predictions of noise levels in the surrounding areas were achieved using the computer program Environmental Noise Model (ENM). This modelling was conducted in accordance with the EPA's *Draft Guidance for Assessment of Environmental Factors No. 8 – Environmental Noise*. Sound power levels used in the modelling were based on Herring Storer Acoustics' file data and measurements taken from similar equipment at the Esperance Port facility.

6.2.5.2 Construction

Issue

Localised noise will be generated during the construction of the car dumper, storage shed, railway and conveyors by earthmoving machinery, rollers, trucks and other mechanical equipment used on site. In addition, noise will be generated during the construction of the jetty and the access bridge as a result of pile driving activities which is expected to take eight to ten weeks to complete.

Management

The Project Area is located in an industrial area, the closest residence is located approximately 1.8 km to the southwest of the car dumper and the nearest public facility is Wells Park which is located 500 m to the northwest of the car dumper.

Noise modelling was undertaken for construction under calm conditions and 4 m/s northwesterly winds. Noise level contour maps showing predicted noise levels (under 4 m/s northwesterly wind conditions) as a result of construction activities are shown in Figure 13. As equipment for construction as not yet been finalised, typical construction equipment was used for the modelling (Appendix C). Table 12 presents the results of the modelling undertaken. The assigned levels in this table are taken from the Regulations. However, it should be noted that construction activities are not required to comply with the assigned noise levels, but they have been provided as a guide. An "acceptable" level of noise for construction activities is generally considered to be +10dB(A). This is

perceived as being a doubling of the noise levels compared to the assigned level and is said to cause "sporadic complaints" (Public Health Department, 1976).

Table 12

Predicted Noise Emissions from Construction Activities

Location	Sound Pressure Level dB(A)			
	Predicted Noise Levels (4 m/s NW winds*)	Adjusted Levels#	Assigned Level**	Acceptable Level
Caravan Park (Governor Road)	46 (33)	56 (38)	51	61
214 Kent Street (closest residence)	45 (31)	55 (36)	46	56
179 Kent Street (DEP Monitoring Location)	44 (30)	54 (35)	42	52
Wells Park and Commercial Premises	63 (44)	73 (49)	55	65

Notes: * Numbers in brackets indicate the noise level without pile driving activities.
** 5dB(A) subtracted from the assigned level to allow for "significant contribution" by new industry.
# Pile driving adjusted for impulsiveness, mobile equipment adjusted for tonality.

Noise emissions during construction will generally comply with the assigned levels except during pile driving activities. During pile driving the predicted noise levels are likely to be above both the assigned and "acceptable" levels. The predicted noise levels presented in Table 12 were based on an equipment list and associated noise levels provided in AS 2436-1981. FPA's experience with previous pile driving activities undertaken in the Fremantle Port is that the noise levels emitted during pile driving is actually 25dB(A) less than that used in the modelling undertaken for the Project. This would result in the predicted noise levels from the pile driving activities being within both the "acceptable" and assigned levels.

To minimise any noise impacts from construction activities, the Proponents will:

- ensure that the quietest reasonably available equipment is used;
- ensure that the construction machinery is maintained in a near new condition and is fitted with appropriate, and correctly operating, noise control equipment;
- comply with the *Environmental Protection (Noise) Regulations* 1997; and
- comply with AS 2436-1981.

Commitment 9

All equipment used during construction will comply with the sound power levels used in the noise modelling. If the equipment is markedly different from that used in the modelling, the model will be rerun and the noise impacts reassessed. This will be undertaken to the reasonable satisfaction of the DEP.

In addition to the above management measures, the Proponent will implement the following measures to minimise the impact of pile driving activities:

- undertake pile driving activities between 0700 hours and 1900 hours on weekdays and Saturdays only in accordance with the *Environmental Protection (Noise) Regulations* 1997. No pile driving activities will be undertaken on Sundays or public holidays.
- notify all residents and commercial premises where the assigned level is likely to be exceeded, that pile driving construction activities will be undertaken and that higher than normal, impulsive noise levels are likely to occur, and the period for which these noise levels are likely to be experienced; and
- periodically monitor noise levels at Wells Park and the nearest resident (the Caravan Park) during pile driving activities to ensure that noise levels are in the order of those predicted by the noise modelling undertaken.

Commitment 10

The FPA will notify all residents and commercial premises in the immediate vicinity of the Project prior to pile driving being undertaken. This will be undertaken to the reasonable satisfaction of the DEP.

Commitment 11

The FPA will periodically monitor noise levels at Wells Park and the nearest residence during pile driving activities to ensure that noise levels are in the order of those predicted by the noise modelling undertaken for the CER. This will be undertaken to the reasonable satisfaction of the DEP.

6.2.5.3 Operation

Issues

The operation of the iron ore unloading facility and the export facility has the potential to generate noise from a number of sources. These sources may include:

- "indexing" (positioning) of the wagons;
- dumping of the ore from the wagons;
- train movements along the route;
- locomotives in the immediate vicinity of the unloader;

- conveyors (including warning beepers for startups, motor startup, conveyor noise, motor noise and noise from transfer of ore between conveyors);
- dust extraction systems; and
- ship loading activities.

The nearest resident to the Port facilities at Esperance is located only 150 m to the south west of the facility and the natural contours of the land result in an amphitheatre effect. By comparison, the nearest resident in Kwinana is located 1.8 km from the car dumper and the flatness of the land prevents amphitheatre effects.

The residents of the north Rockingham area currently experience noise levels which exceed the *Environmental Protection (Noise) Regulations* 1997 (DEP 1998). Therefore any new industry can not "significantly contribute" to these existing noise levels.

Management

Noise modelling has been undertaken for the Project which take into account all of the foreseeable noise sources (Herring Storer Acoustics, 1998a; Appendix C). The noise level contours (under night time conditions from this modelling are presented in Figure 13. The predicted noise levels for operation of the Project are presented in Table 13.

Table 13

Predicted Noise Emissions from Operation of the Project

Location	Day Time dB(A)		Night Time dB(A)	
	Predicted Level	Assigned Level	Predicted Level	Assigned Level
Caravan Park (Governor Road)	28	51	28	41
214 Kent Street (closest residence)	28	46	28	36
179 Kent Street (DEP Monitoring Location)	21	42	21	32
Wells Park and Commercial Premises	42	55	43	55

These results indicated that operation of the export facility will comply with the Regulations at all locations, and at all times. The noise results in Table 13 have not taken into consideration tonality. However if a 5dB(A) penalty was applied to these results the noise levels would still comply with the Regulations.

Management measures that are currently being implemented in Esperance to control noise will be incorporated into the Project at Kwinana to ensure that noise is minimised as much as possible. In addition the Proponents will further minimise noise from operation of the Project by implementing the following management measures:

- constructing the rail so that there is an incline as the wagons approach the car dumper and a decline as the wagons leave the car dumper (Figure 6). These sloping approaches will ensure that the wagons remain under tension during the unloading operations and should minimise any noise associated with the wagon couplings. The adoption of this approach demonstrates KIPL's commitment to best practice and its willingness to apply its knowledge gained at Esperance to minimise any impacts of the operation of the Project at Kwinana;
- minimising the amount of time that the locomotives are in the Project Area. The Project has been designed so that the locomotives position the first wagon in the car dumper, detach from the wagons and move a few hundred metres past the car dumper before moving northward for servicing at the Kwinana Marshalling Yards while the train is being unloaded. They will then return to the site when the train has been unload, push the last car through the dumper, and then take the empty train back to the mine site; and
- undertaking periodic noise monitoring at Wells Park and the nearest residence to ensure that noise generated during operation complies with the *Environmental Protection (Noise) Regulations* 1997.

6.2.5.4 Train Movement

Issues

Up to two trains per day, hauled by two Q Class locomotives, will transport the iron ore from the mine site to the Kwinana Port. The trains will pass through numerous country towns and the Metropolitan area. There has been some concern raised during the consultation process that the additional trains on the track will result in an unacceptable increase in noise levels.

Management

The noise levels associated with the additional trains were assessed according to the *Draft Environmental Impact Policy for Road and Rail Transportation Noise* (Appendix C). The existing noise level inside houses along the rail line is calculated to be 80dB(A) (based on D-Class locomotives using the line) and, according to the draft Policy, this level is allowed to increase to 85dB(A). Noise emissions from the two Q Class locomotives (which are the newest and quietest locomotives available) are calculated to be 75dB(A) inside buildings which is significantly less than the allowable 85dB(A), therefore complying with the draft specified criteria.

6.2.6 Vibrations

Issues

Vibrations can occur from rail operations. The vibration is carried from the source by the rail track and surrounding soil and can result in the following effects:

- instability of structures;
- damage of structures; and
- annoyance to residents.

There are no regulatory criteria for vibration limits in Western Australia. However, the NSW *Environmental Noise Control Regulations* include the *Vibration in Buildings* guidelines. These are generally the same as the guidelines provided in AS2670 (Evaluation of Human Exposure to Whole Body Vibration) and AS2670.2 (Continuous and Shock Induced Vibration in Buildings).

Management

Generally, vibrations along the railway lines are not an issue. They have not been found to be high enough to result in structural damage to buildings but on occasions can be at levels high enough to cause a nuisance to humans (Herring Storer Acoustics, 1998b). Where levels of vibrations have been high enough to cause a nuisance to humans, the rail lines have been investigated for irregularities which may cause the vibrations. Where irregularities are found they are rectified wherever possible. Westrail aims to comply with the German Standard DIN 4150 Part 3 (Structural Vibration in Buildings) which is more stringent than the other limits applied in Western Australia.

6.2.7 Groundwater Quality and Usage

Issue

The groundwater extraction rate around the Project Area is currently approaching its sustainable yield (Dames & Moore, 1991). The City of Rockingham's *Statement for Planning Policy No. 7.1 Environmental Protection (Industrial Development)* states that:

> *"no industry requiring large groundwater draw should be permitted to become established unless clearly able to demonstrate sustainability and that preference should be expressed, in zoning schemes and instruments, for industries with low groundwater demand, and low effluent discharge requirements".*

Water will be used for dust suppression during the construction and operation of the Project. During construction, dust levels will be visually monitored and the site will be sprayed as required to minimise dust generation. Water usage will vary depending on moisture content in the soil and climatic conditions at the time of construction. During operation of the Project, water will be used as a fogging mist at the discharge point to prevent dust generation during the loading of the ship. An average of 12 t of water will be used for dust suppression per ship load and this is equivalent to an average of 0.015% of the total load of iron ore.

Management

Some groundwater may be lost through evaporation during construction of the car dumper. Techniques similar to dredging will be used, which will require groundwater to be pumped from around the car dumper. This water will be stored in a holding dam, and overflow will be pumped back into the car dumper to assist with the excavation. The groundwater loss through evaporation will be very localised and short term.

It is not proposed to source any water required for the ongoing operation of the Project from groundwater supplies in the region. The contaminated nature of the groundwater prevents it from being used for dust suppression during ship loading as it may contaminate the ore product. Use of contaminated groundwater for dust suppression during construction is also not feasible as it will result in the further spread of contamination in the area. Scheme water will be used and, therefore, the Project will comply with the requirements of the *Statement for Planning Policy No. 7.1.*

6.2.8 Waste Disposal

Issue

The construction and operation of the Project will generate a number of different types of waste including:

- inert waste such as excess fill and building rubble;
- organic debris such as vegetation;
- general refuse such as scrap metal, cardboard and plastics;
- toxic or hazardous wastes such as waste oils and solvents; and
- sewage and sullage.

Management

Different types of wastes will be kept and disposed of separately as far as practicable. Most of the waste material will be disposed of to an approved council landfill. Recyclable material will be kept and disposed of separately in accordance with the requirements of the local councils. All vegetative material removed from the site will also be disposed of at an approved landfill or buried on-site to minimise the spread of weeds within the Project Area.

Waste oils and solvents will be collected in drums or tanks and will be periodically removed by a licensed contractor for recycling or disposal at an approved liquid waste disposal facility.

Portable toilets and washing facilities will be provided on-site during construction. These facilities will retain sewage and sullage in sealed tanks until they are removed by a licensed contractor for disposal into an approved sewage treatment facility or liquid waste disposal facility.

During operation the export facility, sewage will be disposed of in an environmentally acceptable sewage disposal system recommended by the Town of Kwinana.

6.2.9 Rehabilitation and Landscaping

Historically, the Kwinana Industrial Area has presented an unattractive image to the general public. More recently, however, many industries are implementing landscape strategies to minimise their visual impact, improve their public image and improve their working environment. An overall landscape strategy was developed for the industrial area as part of the "Toward Optimising Kwinana" study (Dames & Moore, 1996) which aims to:

- secure a more attractive vista for the general public who commute on major roads in the Kwinana Industrial Area; and
- provide a more appealing environment for those who work within the Kwinana Industrial Area.

These general principles will be applied to landscaping around the shed, conveyors, car dumper and Wells Park. In accordance with the Town of Kwinana's *Town Planning Scheme No. 2* at least 5% of the site will be set aside for landscaping.

At the completion of construction, only small areas will require landscaping or revegetation. These will include areas:

- where the conveyor crosses the sand dunes; and
- around the storage shed and car dumper.

Removal of vegetation in coastal areas can destabilise the surrounding vegetation. It allows winds to attack the sand's surface and move the sand around resulting in sandblasting, burial or undermining of surrounding vegetation (Oma *et al.*, 1992). It is therefore necessary to provide some long term protection to the surface of the sand via revegetation.

The Proponents will stabilise, rehabilitate and/or landscape all disturbed areas as soon as possible after construction (Commitment 3).

6.2.9.1 Rehabilitation Around the Conveyor

The conveyor will be constructed through the dune system and will require an area of approximately 3 m wide to be cleared either side for construction purposes. A sealed access track will be constructed on the northern side of the conveyor. The southern side of the conveyor will be rehabilitated with low-lying species as it will only be required for limited access. Brush or mulch will be placed on unsealed, disturbed areas to minimise wind erosion and low lying plants will be encouraged to grow on these areas.

Areas that have been cleared and are not required for the operation and maintenance of the conveyor will be rehabilitated as soon as possible after construction. Coastal species will be planted or seed will be spread in the winter season, and brush or mulch will be spread over the surface for protection against the wind. The area will be fenced to prevent access by either foot or vehicle. The rehabilitated area will be monitored to identify areas where rehabilitation has not been successful and remedial activities, such as additional planting, brushing and mulching, or fencing, will be undertaken where necessary.

6.2.9.2 Landscaping Around Shore Based Facilities

Most areas around the shore based facilities will remain vegetated. Large trees in particular will be retained, wherever possible. However there will be some areas where the vegetation has been removed and these areas will be covered with mulch and landscaping will be undertaken to stabilise the soil and minimise dust generation from the surface. Vegetation planted around the facilities will consist of local native species where possible. The plantings will also include some fast growing species to rapidly establish some screening vegetation. Some trees may also be planted around the north east corner of Wells Park to minimise the visual impact of the shed and conveyors. If areas do need to be left clear for access purposes they will be compacted to allow vehicle access and to prevent dust being generated from the surface and landscaping will be undertaken along the edges of the road to minimise the visual impacts.

Commitment 12

The Proponents will prepare a landscape plan which will provide details on the areas to be landscaped and the types of landscaping that will be undertaken in these areas. This will be undertaken to the reasonable satisfaction of the Town of Kwinana and the DEP.

6.3 MARINE

6.3.1 Tributyltin

Issues

Once the facility is operational, one additional ship per week will enter the port and remain for approximately two days, representing a 3% increase in the current total ship movements within the Port of Fremantle. The ships will predominantly visit from China and are likely to be treated with TBT-based antifouling paints.

TBT, a known contaminant within Cockburn Sound (Section 4.3.3.4), accumulates in the sediments and can cause abnormal shell development, poor weight gain and brittle shells in mussels and oysters (Pesticide Action Network North America, 1998).

Although TBT is toxic to mussels, oysters and other shell fish, detailed investigations undertaken by the National Food Authority indicated that there is no apparent health risk to the general public from either normal or excessive consumption of seafood contaminated with TBT (Fisheries Department of WA, 1998). This result was verified by the Health Department of Western Australia.

Management

Management of the TBT is being addressed at a national and international level. There is a proposal before the International Maritime Organisation (IMO) that TBT be banned on all shipping by the year 2006. If this proposal is not adopted, TBT may continue to be used and will continue to contribute to the marine communities in Cockburn Sound.

Researchers at Australia's Defence Science and Technology organisation are currently developing alternatives to the use of TBT. However, to date, no other commercially viable alternative is available.

Monitoring of TBT levels is currently being undertaken in various places in Cockburn Sound by the DEP on a triennial basis. This monitoring programme includes sites around the BCJ. The FPA will continue to liaise with the DEP regarding the results of these surveys.

Commitment 13

The FPA will liaise with the DEP, regarding the results of the three yearly TBT programme being undertaken by the DEP.

6.3.2 Ballast Water

Ballast water is used to maintain the stability and structural integrity of ships when sailing without full cargo. The use of seawater as ballast creates opportunities for pest species to invade Australian waters. Twenty one foreign species have been recorded in Perth's coastal waters and are considered to have been introduced through the discharge of ships ballast water (DEP, 1996). The introduction of such species threatens the integrity of the ecosystems in the area.

The polychaete worm *Sabella* cf. *spallanzanii* is presumed to have been introduced to Cockburn Sound through ballast water discharge (DEP, 1996). The potential exists for the introduction of further exotic marine fauna if ballast water is permitted to be discharged at the loading facility or within Cockburn Sound waters. The likelihood of invasions of exotic species occurring increases in proportion to shipping activity in the Sound. The DEP (1996) suggested that the large areas of

unvegetated, disturbed habitat within Cockburn Sound, coupled with a highly abundant food source (phytoplankton) make it ideally suited for the establishment of exotic species.

Management

While at present there is no binding international requirement for ballast discharge, it is envisaged that by the year 2000 the United Nations International Convention for the Prevention of Pollution from Ships (MARPOL 1973/78) will have been amended to specify the requirements for ballast discharge. Then signatory countries will be able to draft domestic legislation to implement these requirements in their respective jurisdictions

Australia is one of the first countries to introduce voluntary ballast water control measures for international ships visiting Australia. These guidelines are based primarily on a requirement for ships to reballast or exchange ballast at sea. In addition the Australian approach to ballast water management includes (Raaymakers, 1998):

- the establishment of an Australian Ballast Water Management Advisory Council (ABWMAC); and
- the publication of an Australian Ballast Water Management Strategy which sets out broad objectives that Australian is trying to achieve, defines roles and responsibilities and outlines a Strategic Research Programme.

The FPA is a member of the Western Australian Ballast Water Working Group. The Department of Transport chairs this group, and represents the FPA on the ABWMAC.

Currently, discharge of ballast into Cockburn Sound and other port waters requires the approval of the Harbour Master. In granting or refusing approval, the Harbour Master takes into account FPA regulations and the ballast water guidelines produced by the Australian Quarantine and Inspection Services (AQIS). Essentially this means that ships which need to discharge ballast at the BCJ must be able to clearly demonstrate the location of their ballast exchange at sea to the Harbour Master. This will continue to be the practice for ships using the proposed Berth 3.

AQIS also monitors ballast water discharge by application of the *Australian Quarantine Act* 1908. AQIS has implemented Ballast Water Management Procedures that require vessel Masters to submit declarations regarding the locations at which the last three ballast water uptakes occurred and any intention to discharge ballast water in Australian waters. AQIS has the power to sample ballast water and to prohibit discharge if a vessel is suspected of carrying ballast water from high risk waters.

FPA is in the process of initiating a baseline survey for introduced marine pests in both the inner and outer harbours. The resultant data will be collated into a national databank for further national and international research. The baseline survey is being conducted in anticipation of the amendments by the IMO to include ballast water as an Annex to MARPOL. The ballast water management plans

published by the IMO are expected to take into consideration the risk from visiting ships to the port and then the subsequent risk to ships leaving Western Australian ports and then visiting other ports. The assessment of this risk is dependant on knowing what species occur in each port.

In addition to these measures, the FPA has introduced a policy to ban in-water hull cleaning of ships in port waters. This will reduce the potential for exotic species to be introduced into Cockburn Sound.

6.3.3 Seagrasses

There is no seagrass in the vicinity of the proposed southern extension of the BCJ or the proposed oversea conveyor and access jetty. Therefore there will be no direct impact to seagrasses as a result of this Project.

Although the construction of the BCJ will not result in any direct losses of seagrasses, it will result in the loss of a small amount of potential seagrass habitat along the proposed access jetty and oversea conveyor. The construction of the access jetty would result in the loss of approximately 0.2ha which is equivalent to 0.005% of potential seagrass habitat in Cockburn Sound. The berth will be located in deeper water which is not suitable for seagrass growth.

Cockburn Cement is currently undertaking a study into various aspects of seagrass restoration. Should a technically and practically feasible method of regenerating seagrasses be found, there would be the opportunity to use this methodology to regenerate seagrasses around the shallow areas of the BCJ. The jetty structure is an open pile structure and the only limiting factor would be light penetration under the jetty.

6.3.4 Marine Habitat Disturbance

Issue

Some disturbance to marine habitats in the vicinity of the jetty will occur during construction. However, these habitats are widely distributed throughout Cockburn Sound. The deep basin fauna of southern Cockburn Sound were considered by the DEP (1996) to be 'moderately disturbed', probably as a result of the combined effects of a range of toxic contaminants.

Following construction, the jetty will provide a hard substrate which is expected to develop into an artificial reef habitat. Existing hard substrate in the area is colonised by a fouling community of ascidians and sponges. Other fauna, including echinoderms and fish, are associated with these communities.

Management

Construction of the jetty will not impact biotic communities of particular sensitivity or significance, the nearest of which are many kilometres from the jetty site. It is expected that the soft sediments disturbed during piling operations will be quickly recolonised by benthic fauna, with micro-algal mats re-established in the shallow water areas. Monitoring of the marine benthic fauna (as was suggested in the appeals to the Minister for the Environment on the level of assessment) is not considered to be warranted. Any adverse impacts on the species would have already occurred and it would be more appropriate to sample sediments around the BCJ and monitor them for changes in levels of metals and other contaminants. This will ensure that any potentially adverse impacts can be averted before impacting on the benthic fauna.

Therefore, the FPA will undertake a sediment monitoring programme. Should significant trends indicate an increase in the levels of iron or other contaminants in the sediments, an investigation into the source of this contamination will be undertaken and appropriate management measures implemented if the iron contamination is attributable the FPA's activities.

Commitment 14

The FPA will undertake a sediment monitoring programme to monitor for the presence of iron ore and other metals around BCJ. This will be undertaken to the reasonable satisfaction of the DEP.

6.3.5 Hydrodynamic Processes

The results of hydrodynamic modelling undertaken as part of the Southern Metropolitan Coastal Waters Study (SMCWS) (DEP, 1996) indicated that water currents within the Project Area were among the weakest occurring within the Sound. Water circulation within the Sound is predominantly wind-driven (DEP, 1996) and water flow past the BCJ would therefore be primarily in a northerly direction under the influence of south-westerly winds (Figure 8).

Kinhill (1998) modelled the effects of construction of two major port developments on the circulation and flushing characteristics within the Sound. Both of these developments were in the northern part of the Sound, where water currents are considerably stronger than at the BCJ (DEP, 1996). It was concluded that the developments would have no strong effect on overall circulation within the Sound or on circulation patterns within the broader Sound (Kinhill Engineers, 1998). There is negligible potential for the proposed BCJ extension to significantly affect hydrodynamic processes within the Sound because the BCJ extension:

- is orders of magnitude smaller in scale than either of the port developments; and
- will be an open-pile structure, which would exert a considerably lesser influence than the rock seawalls proposed for the northern port developments.

It is considered that there would be very little potential for turbid water plumes generated by ship movements around the BCJ to have a detectable impact upon the mussel farms 1 km to 2 km to the south-west of the BCJ. Water flow, and therefore plume dispersion, in a south-westerly direction would be expected to occur only under northerly wind conditions, which have an annual occurrence of ~15%. Northerly winds only predominate in the winter months (Figure 8) when background turbidity levels are highest due to the influence of swell and wind waves (DEP, 1996).

The predominance of south-westerly winds within the Sound leads to a net northward movement of coastal sediments along the eastern shoreline (DEP, 1996). Beach sediments in the vicinity of the BCJ exhibit a pattern of minor erosion in winter and minor accretion in summer (Environmental Resources of Australia, 1993). Given the minimal water currents in the vicinity of the BCJ, sand transport in this area would be expected to be very low and it can be considered highly unlikely that it would be significantly hindered by the presence of an open-pile jetty structure.

6.3.6 Marine Spillages or Discharges

Issues

Although unlikely, there is the potential for spillages of materials into Cockburn Sound as a result of the export activities. Such spillages could include both toxic and non-toxic substances such as iron ore, oil, fuel and solvents.

Iron ore could potentially spill into Cockburn Sound as a result of:

- transport of iron ore to the jetty along the conveyor; and
- during out-loading operations.

Iron ore that is spilt into the water will settle on the seabed and may smother some of the benthic biota in the immediate vicinity of the loading facility.

There is also the potential for contamination of Cockburn Sound as a result of leakages from ships or tugboats, or from dust generated during loading of the ore.

Management

Spillages have occurred from the BCJ in the past. The FPA is responsible for co-ordinating, managing and monitoring environmental issues at the BCJ. Recently the FPA has implemented containment improvements on Berths 1 and 2 to make them both "zero" discharge facilities. All drainage points have been directed below the wharf surfaces to a sump from which spillage and washdown water can be pumped directly into a tanker for disposal or recycling. Alternatively the material can be pumped into one of two 65,000 L tanks for settling and subsequent removal.

The surface of both existing berths are bunded around the perimeter to approximately 200 mm high. When liquids are discharged from tankers, the drains are filled with water and sealed so that any spillage is contained on the wharf surface. The FPA is responsible for the cleanup of any spillages and the owner of the product is responsible for the disposal or recycling of the material.

In addition, the FPA is undertaking the following activities to minimise the chances of any further spillages:

- consulting with the BCJ users and the relevant authorities to develop a common understanding of environmental legislative requirements and to develop systems to minimise spillages; and
- requiring all users of the BCJ to sign a Common User Agreement (agreement between FPA and berth users) which will include environmental issues.

The FPA will continue to undertake these activities and will develop, as part of the EMS, a Contingency Plan which will be implemented in the event of a spill. This Contingency Plan will be updated to accommodate other material being exported from the BCJ as required and if other exporters use the facilities at Berth 3. It will detail clean-up measures to be implemented in the event of a spill.

The conveyor for transporting iron ore along the proposed extension will be fully enclosed for the entire length of the access bridge and berth to minimise dust generation and to prevent spillage of the iron ore material into Cockburn Sound. Any spillages that occur along the conveyor will be contained within the enclosing structure. In addition, scrapers and hoppers will be fitted to the conveyor system to ensure spillage does not occur. Each conveyor will be interlocked so that the failure of any conveyor automatically stops the operation of other conveyors in the system and prevents loading operations from continuing.

If a spillage does occur inside the conveyor it will be cleaned up immediately to prevent any leakage into Cockburn Sound. In the unlikely event of spillages into Cockburn Sound, these will be cleaned up immediately in accordance with measures outlined in the Contingency Plan.

During loading of the ships a fogging system will be used to reduce dust emissions from the ship hold. Dust management measures are outlined in more detail in Section 6.2.4.

A sediment monitoring programme will be undertaken by the FPA to identify any iron or other contaminants in the sediment surrounding the BCJ (Commitment 11, Section 6.3.4).

The FPA is also a member of the KIC's Marine Quality Task Force which undertakes water quality monitoring (such as chlorophyl levels, light attenuation and nutrient levels) on an annual basis.

The FPA regulations prohibit the discharge of oil, oily water, oil sludge, oily bilge water, sewerage, poisons or scum into Cockburn Sound. These regulations will continue to be implemented for those ships entering the Port for export of materials from the proposed extension to the BCJ.

6.3.7 Noise from Ship Loading

Noise associated with ship loading has been included in the overall noise modelling undertaken for the Project. The results of this modelling study are presented in Section 6.2.5 and Appendix C.

6.3.8 Cumulative Impact to the Sound

A number of studies have been undertaken in the past, assessing the impact on industry on Cockburn Sound. These include:

- the Strategic Advice Environmental Advice on the Marine Environment of Cockburn Sound prepared for the Minster for the Environment by the EPA (1998);
- draft Environmental Protection (State Marine Waters) Policy (1998); and
- the SMCWS undertaken by the DEP (1996).

The Strategic Advice provided to the Minister for the Environment by the EPA discussed the potential cumulative environmental impacts associated with multiple developments in Cockburn Sound (EPA, 1998). The developments included in the advice were:

- residential Marina in Mangles Bay, Rockingham by the Department of Transport;
- the construction of a longer term harbour at Naval Base/Kwinana by the Fremantle Port Authority;
- construction of a private port in Cockburn Sound, for which expressions of interest have been called by the Department of Transport;
- the Jervoise Bay industrial harbour and infrastructure development by the Department of Commerce and Trade; and
- construction of Berth 3 of the BCJ by the FPA.

Major issues addressed by the EPA report included:

- loss of seagrasses and potential seagrass habitats;
- the impact of dredging on marine life on the seabed, and the release of nutrients, the mobilisation of toxicants and reduction in light regimes as a result of this disturbance;
- management of pollution entering the Sound;
- impacts associated with TBT;
- impacts associated with ballast water; and
- obstruction of water currents and the increases in flushing times caused by harbour developments.

One of the conclusions from this report was that all future Proponents should consider the cumulative impact of their proposal on the Sound. The construction of the proposed southern extension to the BCJ will result in the following cumulative impacts to Cockburn Sound:

- an increase in the number of ships entering the port and therefore an increase in the leaching of TBT from the hulls of these ships into the Sound;
- potential impacts associated with ballast water; and
- loss of potential seagrass habitats, although there will be no direct loss of seagrass from Cockburn Sound.

The issue of TBT is the most difficult to manage as it cannot be addressed in isolation or on a Project specific basis, but rather, needs to be managed at a national and international level. As discussed in Section 6.3.1 these issues are being addressed on a wider scale and the FPA is proactive in its involvement to minimise the impact of TBT on marine environments.

The issue of ballast water is also one of national and international significance. Ships are prohibited from disposing of ballast water into Cockburn Sound without the permission of the Harbour Master. The FPA is also proactive in its involvement in managing ballast water and the potential introduction of exotic species to Western Australia (Section 6.3.2).

The proposal will have no direct impact on seagrasses and only minimal impact on seagrass habitats as outlined in Section 6.3.3. No dredging will be required for the facility which will minimise the disturbance to the sediments of Cockburn Sound and discharges into Cockburn Sound associated with the Project will be limited to ballast water which has been exchanged in open seas. The open pile structure of the jetty will also minimise any impacts associated with water circulation of the Sound.

The SMCWS was undertaken to develop an understanding of the cumulative impacts and the long term environmental consequences of contaminant inputs to the southern metropolitan coast waters of Perth and to develop a comprehensive management strategy of these waters (DEP 1996). The SMCWS included a comprehensive set of actions for the DEP and recommendations to the EPA. The draft Environmental Quality Objectives generated from these actions and recommendations are currently undergoing a public review process through the EPA/CSIRO discussion paper *The Future of Perth Coastal Waters: Have Your Say* (October 1998). Actions relevant to Cockburn Sound are listed in Appendix D with a brief assessment of the impacts likely to occur as a result of the development of the proposed Kwinana Export Facility. A number of these actions are directly applicable to the FPA and where possible the FPA has already begun to implement these environmental management strategies.

The draft *Environmental Protection (State Marine Waters) Policy* 1998 (EPP) aims to:

> *"provide for, under the Environmental Protection Act, a consistent regulatory framework for the protection of the State's marine waters according to the principals of ecologically sustainable development"*

This draft policy outlines methods for protection of the state marine waters through:

- drafting of regulations under the *Environmental Protection Act* which includes provisions for monitoring, sampling, simulation modelling and reporting procedures, and the establishment of procedures to prevent and control activities that may adversely affect the environmental values;
- developing and implementing appropriate policies, plans and strategies for the preservation and protection of environmental values;
- requiring State departments and Local Government to develop and implement land management plans, schemes, marine management plans and conservation plans;
- requiring the EPA to conduct environmental impact assessments of proposals, plans, schemes, policies and strategies likely to adversely affect the environmental values of the marine environment; and
- promotion of an understanding of the EPP.

The EPP is currently still in draft form and none of the above programmes have been implemented to date.

The cumulative impact to Cockburn Sound as a result of the proposed development will be minimal and will be primarily limited to national and international issues (e.g. TBT and ballast water).

6.4 SOCIAL

6.4.1 Social Impact Assessment

A SIA was undertaken by Alison Day and Associates (1998), which aimed to identify and address social issues associated with the proposed export facility and recommend management strategies where appropriate. More specifically the SIA:

- addressed issues identified during community consultation and the EIA process;
- surveyed the users of Wells Park and Kwinana Beach to determine the usage of the area and the potential impacts associated with the proposed export facility;
- identified additional social issues that may not have been raised previously.

Additional community consultation was undertaken as part of the SIA (Section 5). A list of stakeholders was compiled and these people or organisations were invited to comment on the proposal.

Social issues identified during the SIA were:

- environmental issues such as dust and noise (addressed in Sections 6.2.4 and 6.2.5 respectively);
- visual impact of the facility;
- recreational use of Wells Park, the foreshore and the coastal waters;
- impact of the facility on tourism in the region;
- access to the area;
- heritage of the area;
- the social impacts associated with alternatives to the proposal;
- public health and safety issues; and
- economic impacts associated with the proposal.

The following sections outline the results of the SIA, address the social issues listed above and details the management measures identified in the SIA.

6.4.2 Survey of Wells Park

Wells Park and Kwinana Beach are the only areas of beach access for the residents of the Town of Kwinana. The proposed iron ore storage shed, conveyors, car dumper and rail line will be located near Wells Park. The proposed extension of the BCJ will extend across the vista from Kwinana Beach. Therefore the survey of Wells Park and Kwinana Beach aimed to:

- gain an indication of the number and origin of users of Wells Park, Kwinana Beach and Kwinana jetty;
- identify the range of activities undertaken in the area;
- identify how often individuals use the area and if they would visit the area over the Christmas/New Year period;
- determine if the users of the area were aware of the Project and if the Project would impact on their usage of the area; and
- determine how the proposal could be modified to minimise the impact on the users of the area.

The survey was undertaken over a three week period in November/December 1998, and was conducted at various times of the day, on different days of the week (including weekends) and involved seven site visits. The survey involved counts of the number of users of Wells Park, Kwinana Beach and the jetty, and interviews with approximately 20% of the users.

A total of 286 people[1] were counted during the seven visits to the area and of these, 65 people were interviewed. There is no particular "accepted" sample size for a SIA. The overall sample rate was 23% for all persons counted and 31% for all adults counted. As it was the purpose of this survey to deal with adults, a survey rate of one third has a high confidence level and is certainly statistically valid. The people surveyed were randomly selected. The full survey results are presented as Appendix E but are summarised below.

Wells Park is predominantly used for picnics, barbecues and children's recreation by groups of people. Kwinana Beach is used for swimming, sunbathing and walking. The protected beach area is popular for young children. Kwinana jetty is mostly used for fishing by single people or couples.

Fifty four percent of the people using Wells Park came from the local area (e.g. Kwinana, Rockingham and Cockburn), 40% from other suburbs in the Perth Metropolitan region (e.g. South Guildford, Balga, Duncraig) and 6% from country regions of WA. The beach area was the busiest of all of the areas being used (124 people) with the park being the next busiest (114 people) and the fishing jetty used by the lowest number of people (59)[1].

Of the people who were surveyed 77% were not aware of the proposal. This high number of people who were not aware of the Project is most likely to be a reflection of the number of non-local people visiting the Park and Beach. The people interviewed were given a brief description of the proposed facility and shown photos with the proposed facility superimposed (such as those presented in Plates 4, 5 and 6). Once the Project had been explained to the participants, each person was asked their opinion on the Project. Thirty seven percent of the participants supported the proposal, 28% objected to the proposal (55% of those who objected to the proposal and 38% of those who approved of the proposal were from the Rockingham and Kwinana areas), and the remainder had either no opinion or didn't know.

Twenty eight percent of the participants indicated that the proposed facility would affect their use of the area, The major reason for this was the potential for pollution of both the marine and terrestrial environment. Seventy two percent of those surveyed indicated that the facility would have no affect on their usage of the area.

Thirty one percent of the visitors to Wells Park who were surveyed stated that they would be using the Park over the Christmas/New Year holiday period. The majority of these people said that they would visit the Park and Beach between one and two times over this period.

A secondary count of the number of people using Wells Park was undertaken over the Christmas period. No surveys of those using the Park were undertaken, however the results give an indication of the number of users of the Park and Beach.

[1] The maximum number of people using an area at any one time is counted. Totals given are a sum of these maximum counts for each visit to the area.

Three visits were made to the area (26 December 1998 – Boxing Day; Sunday, 27 December 1998; and Tuesday, 29 December 1998) and the maximum number of people using the Park and Beach at any one time was counted. A total of 264 people were counted over the three days, with 134 people using the area on Boxing Day, 102 on 27 December 1998, and 28 on 29 December 1998. These results indicate that the Park and Beach have a greater usage over the Christmas holiday period than during the other periods when the Park was surveyed.

During the Christmas period, as with the SIA survey undertaken in November/December, the beach was the most used location. The five most frequently observed activities undertaken during the Christmas period were the same as those undertaken in November and December. More children were also seen to be using the park (i.e. 35% of people counted at Christmas were children in comparison to 27% in the earlier survey).

The survey results indicate that the impacts on users of Wells Park will be minimal and in fact over a third of users of Wells Park support the facility. The Project will not impose on the recreational activities in the area and access will not be restricted. The SIA suggested that consideration be given to enhancing the recreational enjoyment of the area.

FPA will make a contribution to amenities at Wells Park in consultation with the Town of Kwinana.

The Proponent will be implementing the management measures outlined through out this CER to ensure that the Project does not impact on the users of the Park.

6.4.3 Visual Amenity

Issues

The construction and operation of the extension to the BCJ will result in a change in the visual amenity of the area. This impact will be most obvious from Kwinana Beach and the Kwinana Beach jetty. However, concerns have also been raised by residents in the Rockingham area and by businesses along the Rockingham foreshore regarding the visual impact of the facility from these areas.

Impacts from Wells Park and Kwinana Beach

Wells Park is located in an industrial area and as a result many of the surrounding vistas are dominated by industrial activities. From the barbecue area looking out to sea (west), only a small area of ocean is visible and the existing loading facility on the BCJ is partly visible above the dunes (Plate 4). The existing jetty itself is not visible from the barbecue area as it is screened by the foredunes and vegetation of the edge of the park.

The operation of the Project may also impact on the trains entering and exiting from the CBH Kwinana Grain Terminal. There will also be delays on Kwinana Beach Road while the train is crossing. This issue is addressed in more detail in Section 6.4.5.

Construction of the shed is unlikely to impact on other land users as it will be located on vacant land.

Management

The Proponents will liaise with potentially affected industrial land users during the construction and when required during operation of the export facilities. Consultation with the general public will be undertaken through the Community Liaison Group for the outer harbour (Section 5).

CBH will be consulted regarding the timing of trains entering and exiting the rail loop to the south of the Project Area. The Proponent will continue to liaise with CBH during operation of the Project. The rail facilities have been designed so that no interference with CBH's activities occur during the unloading of the wagons. Westrail is responsible for co-ordinating train movements in the Kwinana area. Train timetables will be developed to ensure that all users of the rail line are catered for.

The new road recently constructed adjacent to the rail line will continue to be used by the general public to access Wells Park. The conveyor will be elevated over the road and some disruption may occur to traffic using the road during construction of the conveyor. The Proponents will minimise the impact to this traffic by:

- constructing the conveyor crossing during the week when fewer people access the area; and
- providing a traffic warden at the site to control traffic moving along the road.

During operation there will be no limitations on general public access to Wells Park. The *Town Planning Scheme No. 2* for the Town of Kwinana, requires provisions to be made for continuity of public access along the foreshore or as close thereto as practicable. The FPA boundaries extend down to the high water mark from the land side and up to the high water mark from the water side. Therefore, technically, public access to this area is restricted. However, such restriction has only been enforced by the FPA during the unloading of anhydrous ammonia. In practice, the public can currently access this area from Wells Park up to the BCJ access bridge, although the majority of the users of the beach tend to congregate near the fishing jetty.

6.4.5 Impacts to Marine Users

Issues

Concerns have been raised regarding the potential for the construction and operation of the marine component of the Project to impact on recreational and professional fishing in the area and the eight mussel farms located approximately 1 km to the south west of the Project at the Kwinana Grain Terminal. In particular concerns were raised about the cumulative impact of industry in the Sound.

The boat ramp at the Kwinana Beach Jetty is the only boat ramp in the area and is generally well used. However, little boating activity was observed during the site visits undertaken for the SIA.

Management

Recreational fishing from pleasure craft will still be possible provided the public do not encroach on the operational area around the BCJ. This area is only accessible to those with the appropriate authority. Land access to the BCJ itself is currently restricted and will in future be restricted by a new security system which will include electronic gates and access via swipe cards to authorised personnel only. This is required for security and safety reasons.

During construction, equipment will be located around the construction site and the FPA will ensure that adequate measures are taken to ensure the safety of small vessels moving around the area. A hazard and risk assessment will be prepared with the participation of all involved parties (Section 6.4.10). An area of approximately 100m around the construction site will be restricted to public access.

There are unlikely to be any impacts to the mussel farms located to the south of the Project Area. The most likely impact would be associated with potential increases in TBT that may occur as a result of the increased shipping rate. However, these farms are located at least 1 km from the Project Area and the Fisheries Department of WA are currently considering moving the mussel farms closer to Garden Island to provide security of tenure for the farmers. If this proposal goes ahead the mussel farms will be located even further from the jetty. There are not expected to be any impacts to mussel farmers, associated with the proposed extension of the BCJ.

Construction and operation of the southern extension to the BCJ may impact on users of the existing berths. Access to the construction site may also be limited during loading or unloading of hazardous materials on the BCJ. Due to the potential for construction activities to be affected by activities on the existing jetty the access bridge to the new jetty will be constructed as soon as is practicable. These facilities will ensure unrestricted access to the construction site for the construction equipment and personnel. Users of the Berth 2 will be consulted regarding the timing of ship movements around the jetty and every attempt will be made to co-ordinate construction activities with the current operating procedures. Once operational there will be no impact to the current users of the other berths.

6.4.6 Impact on Traffic

Issues

The proposed Kwinana Export Facility could potentially impact on traffic by:

- limiting access to Wells Park during construction;
- delaying vehicles at the rail level crossing at Kwinana Beach as a result of additional rail traffic; and

- periodically blocking off one of the emergency access routes to the area.

Management

There will be no impact to public access to Wells Park. A new road has recently been constructed adjacent to the railway line which joins up with Wells Road to allow access to Wells Park. The section of Kwinana Beach road which runs alongside the FPA land has been closed to the general public. This road is now used for access to the BCJ and associated facilities for approved personnel only. The conveyor which will cross Kwinana Beach Road will be a high level conveyor ensuring that it does not impact on access along the road or the adjacent rail line.

Some delays may be experienced by some vehicles on Kwinana Beach Road as a result of additional trains passing through these areas. Currently 22 trains (or 44 train movements) cross this road per day. An additional two trains per day will occur as a result of the Project. Each train will take approximately 3.7 minutes to cross the road[2]. In addition, the signals will operate for 20 seconds before the train crosses the road and five seconds after the train has crossed the road. These trains will not occur at the same time each day as they will be operating on approximately a 28 hour turnaround time. Therefore they will not cross the road during the "peak hour" period every day but will cross at varying times each day.

The level crossing will continue to be controlled by traffic signals. The amount of traffic using Kwinana Beach Road and the number of trains using the rail track are not likely to be sufficient to warrant the use of boom gates. Main Roads is responsible for determining the level of protection required at each crossing.

The Department of Resources Development (DRD) has recently commissioned a study on behalf of a working group consisting of the Kwinana Industries Co-ordinating Committee, Main Roads WA, Westrail and the Department of Transport, of the Kwinana Beach Road rail crossing to determine if the crossing needs to be upgraded. This study found that by 2001, there will be a 5% chance (probability) that queues in excess of 300 m could result from 3 minute train crossings. Queues of lengths greater than 300 m would result in the queue extending back through the intersection with Patterson Road (Halpern Glick Maunsell, 1998).

DRD has advised that traffic lights are to be installed at the Patterson Road/Kwinana Beach Road intersection. It has been recommended that the impact of rail movements and the controlled intersection on traffic queues from the rail crossing, be monitored.

As the train crosses Kwinana Beach Road, it will be effectively closed to emergency traffic during this time. This issue is addressed in Section 6.4.10.

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[2] This estimate is based on the locomotive crossing the road at 25km/hr and the last wagon crossing the road at 5km/hr. Therefore, the average speed of the train will be 15km/hr. These figures have been obtained from Westrail

6.4.7 Tourism

Issues

The general public from the Rockingham and Kwinana areas have questioned the potential impact of the proposed facility on tourism and potential tourism in the area. Concerns have been raised over the potential impact of noise, dust, visual amenity and public perception of the area.

Rockingham is considered to be a popular day trip destination around the Perth area and the majority of concerns relating to tourism have come from the Rockingham community. Considerable efforts have been made to boost tourism to the area including foreshore improvements, increased numbers of cafes and restaurants along Rockingham Road and improved car parking along the foreshore area. It has also been suggested that if the number of tourists to the area decreases, there is a potential for the loss of jobs in the Rockingham.

Kwinana is not considered to be one of the top destinations for day trips. However, the number of non-local visitors to Wells Park indicated that there are still a large number of visitors to the area.

Management

The SIA indicated that the proposed facility is unlikely to have significant impacts on tourism in the area. Noise and dust will be controlled through the management measures outlined in Sections 6.2.4 and 6.2.5 respectively. The visual impact of the facility will be limited to users of Kwinana Beach. The facility is unlikely to affect the visual amenity of the vistas from Rockingham Beach and there will be only minimal impact on the users of Wells Park. As such, the facility is unlikely to impact on the number of tourists visiting the Rockingham area. The SIA indicated that generally people would not be deterred from visiting Wells Park as a result of construction of the facility and therefore there is unlikely to be a decline in the amount of tourist dollars spent in the Kwinana area.

A number of mitigation strategies were proposed in the SIA to minimise the impact on the tourist industry in the area. These were:

- to place limits on train operation timetables; and
- ensure the communication between the proponents and representatives of the local tourism industry to exchange information and address issues.

It will not be possible to limit the times during which the trains will operate as outlined in Section 2.1. However, the Proponents will liaise with the community through the development of a Liaison Group for the outer harbour as outlined in Section 5.

6.4.8 Strategic Planning issues

The proposed development complies with the *Statement for Planning Policy No. 7.1* for the City of Rockingham which states that there should be a preference for industries which have low groundwater usage requirements, are low risk, and which are in certain classes. In addition, priority should be given to industries that require port access on land adjacent to the Port, light to medium industry and industries which do not pose any constraints on the access of uses of Wells Park. There is also a preference for rail transport of products.

Despite only a small section of rail being present in the City of Rockingham, the entire proposed export facility complies with all of these requirements:

- very localised groundwater will be used during the construction of the Project, and no groundwater will be used during operation of the Project;
- iron ore is a low risk facility;
- it is an industry that requires port access;
- it will not restrict access to Wells Park or Kwinana Beach; and
- it uses rail for the transport of the material.

In addition, the proposed facility will comply with the Town of Kwinana's *Town Planning Scheme No. 2*, including:

- landscaping around the facility to minimise any visual impacts;
- maintaining public access, and recreational use of Wells Park;
- ensuring that public access to Kwinana Beach is maintained; and
- monitoring dust and noise during operation of the facility.

6.4.9 Aboriginal Heritage

Issues

The majority of the Project Area has been disturbed previously. However, there is a potential for Aboriginal archaeological sites to occur in some parts of the Project Area, particularly the dune system which will be traversed by the conveyor. Burials and skeletal material may be located within the dunes.

In addition, the proposed southern extension to the BCJ occurs within Cockburn Sound which is listed as an ethnographic site.

Management

An archaeological and ethnographic survey of the Project Area will be undertaken prior to the commencement of construction. The results of this survey will be supplied to the Aboriginal Affairs Department. In addition, the Proponents will obtain clearances under Section 18 of the *Aboriginal Heritage Act* 1972 to use the land and sea of the site, required for the extension to the jetty. As part of this application, consultation will by undertaken with the relevant members of the Aboriginal community. This consultative process will be undertaken simultaneously with the ethnographic survey.

Commitment 15

The Proponents will undertake an archaeological and ethnographic survey of the Project Area prior to commencing construction to the reasonable satisfaction of the Aboriginal Affairs Department and the DEP.

6.4.10 Risk and Hazard

The storage and export of iron ore is a low risk industry. Iron ore export has successfully occurred for many years in the Pilbara and for the last four years at Esperance. The major risks associated with the export facility will involve:

- risks associated with shipping movements; and
- emergency ingress and egress from Kwinana Beach Road.

The FPA has quantified the risks associated with port operations through a Quantitative Risk Assessment. Safety systems and emergency response plans are implemented to deal with these risks. The FPA has applied the International Safety Rating System to its operations. This system contains a comprehensive risk management component.

Commitment 16

The FPA will undertake a hazard and risk assessment of the construction and operation of the marine component of the Project and will develop a risk management plan specifically for this Project. This will be undertaken to the reasonable satisfaction of the DEP.

This risk assessment will include consideration of risks associated with access along the beach, beneath the new conveyor.

As the trains move across Kwinana Beach Road they temporarily block this road to the movement of emergency traffic to and from the Kwinana Industrial Area. This is currently the case for trains already using the rail line. However, an additional 2 trains (4 train movements) will cross Kwinana Beach Road each day. The major industries in Kwinana, including the FPA, have a mutual aid system in place to manage emergencies (Kwinana Industries Mutual Aid). This system identifies alternative access routes for responding to any incident. In respect to the BCJ or CSBP workers, three alternatives are available (Figure 14):

- from the south (behind the Nickel Refinery);
- south along Rockingham Road; and
- another from the north (behind CSBP).

The trains moving across Kwinana Beach Road into the unloader will temporarily block two of the emergency routes (Kwinana Beach Road and behind the Nickel Refinery) which are only approximately 750m apart as they move into the unloader. However, the route to the north behind CSBP and the route south along Rockingham Road will be available.

The Proponents have informed the Kwinana Industries Council (KIC) of the proposed Project. The Proponents will continue to liaise with KIC regarding the Project and will meet with KIC to specifically discuss the emergency access routes in the area and the impact of the proposed Project on the current Emergency Response Plan.

Commitment 17

The Proponents will meet with the Kwinana Industries Council to discuss the Emergency Response scheme and to identify alternative emergency routes to the Bulk Cargo Jetty and the Kwinana Industrial Area. This will be undertaken to the reasonable satisfaction of the Kwinana Industries Council and the DEP.

7. CONCLUSION

The proposed iron ore export facility is a port related activity. It is proposed to construct this facility in an area that has been designated by the IP14 Structure Plan as appropriate for port related uses. It is a low risk industry, which does not require the use of groundwater, will not discharge any contaminants such as nutrients, heavy metals, hydrocarbons, acids or alkalis, into Cockburn Sound, and is not toxic to the environment. As such the Project complies with the City of Rockingham's *Statement of Planning Policy No 7.1.* In addition, the Project will meet the air quality criteria required by this Policy. Therefore, the iron ore export facility is considered to be relatively benign and therefore an appropriate industry for this area.

The extension of the BCJ will provide a dedicated bulk export facility that will not only benefit KIPL but will also benefit other potential exporters of bulk materials or commodities. The southern extension is the most environmentally acceptable option as it does not require dredging and therefore minimises substantial disturbance to the seabed, does not require the disturbance of any seagrasses, is operationally efficient, has minimum risks associated with its operation and has minimal cumulative impact to Cockburn Sound.

Each component of the Project has a separate Proponent who will be responsible for their own part of the Project. However, these Proponents will work in cooperation to ensure that the proposed facility operates efficiently.

The successful operation of a similar facility at Esperance, and the inclusion of this facility as a case study in the "Best Practice Environmental Management" modules produced by Environment Australia, has proven that the potential environmental impacts can be successful managed and that such a facility can be beneficial to the local community.

Environmental management strategies and procedures have been developed to minimise environmental impacts and a number of formal commitments have been made by the Proponent. These commitments will be implemented to the satisfaction of the DEP and other relevant DMA's. The commitments are outlined below in Table 14.

Table 14

Summary of Proponents Commitments

Commitment No.	Commitment	Timing	Objective	Action	To Whose Satisfaction	Completion Criteria
1	The Proponent will continue to operate the Outer Harbour Liaison Group to enable local community, industry and Government repreentatives to discuss Port related issues.	Ongoing.	• To provide a regular two way channel of communication between the FPA and community groups on matters of mutual interest. • To provide a more proactive approach to issues management. • Enhance community understanding, acceptance and support for the needs of the working port. • Enhance the FPA's understanding, acceptance and support for the needs of the broader community.	Continue meetings with the community.	DEP	Ongoing consultation during operation of Port.
2	The FPA will prepare and implement an Environmental Management System during the operation of the Kwinana Export Facility.	Developed during the construction phase. Ongoing implementation and review.	To ensure sound environmental management of the FPA operations.	Continue to develop the EMS.	DEP	Meet the requirements of ISO 14001.
3	KIPL will prepare and implement an Environmental Management Plan (EMP).	Pre-construction.	To ensure sound environmental management of the iron ore component of the export facility.	Prepare EMP.	Developed in consultation with the DEP.	Acceptance of EMP.
4	The Proponents will stabilise and/or landscape all areas disturbed by this Project and no longer required as soon as possible after disturbance.	Post construction.	To minimise the impact to flora and vegetation in the Project Area.	Prepare EMP.	DEP and Town of Kwinana	Acceptance of EMP.
5	The Proponents will implement dust control measures during the construction of the Kwinana Export Facility in the event that: • Unacceptable levels of dust are observed; • strong winds and dry conditions made dust generation likely; or • reasonable complaints about dust are received.	During construction.	To control any dust generated as a result of construction activities.	Apply water sprays where required.	DEP	Compliance with Works Approval conditions.

Table 14 (*cont'd*)

Commitment No.	Commitment	Timing	Objective	Action	To Whose Satisfaction	Completion Criteria
6	KIPL will undertake a dust monitoring programme in the vicinity of the Project and should unacceptable dust levels attributable to the Project be observed additional dust management measures will be incorporated into the Project.	Pre-construction, construction, and operations.	To minimise dust generation during operation of the Project.	Continue monitoring dust deposition at Kwinana.	DEP	Compliance with licence conditions and NSW EPA dust deposition standards.
7	KIPL will establish a community complaints register.	Pre-construction.	To provide the general community with a means of registering complaints.	Establish a telephone number and advertise it locally.	DEP	Telephone number established and advertised.
8	KIPL will investigate the use of crusting agents or other management measures if dust is considered to be an issue along the rail line through the Metropolitan area due to its operations.	Operation.	To minimise the impact of dust on residents along the rail line.	Investigate complaints related to dust along the rail line.	DEP	Management measure implemented if required.
9	All equipment used during construction will comply with the sound power levels used in the noise modelling. If the equipment is markedly different from that used in the modelling, the model will be rerun and the noise impacts reassessed.	Construction.	To minimise the impact of noise from construction on nearby residents.	Undertake noise modelling.	DEP	Noise levels comply with noise modelling sound power levels.
10	The FPA will notify all residents and commercial premises in the immediate vicinity of the Project prior to pile driving being undertaken.	Pre-construction.	To ensure that residents are aware of potential noise emissions.	Communicate times, dates and proposed construction activities to nearby residents and businesses.	DEP	Written indication of activities provided to all nearby residents and businesses.
11	The FPA will periodically monitor noise levels at Wells Park and the nearest residence during pile driving activities to ensure that noise levels are in the order of those predicted by the noise modelling undertaken for the CER.	Construction.	To ensure that noise levels are in the order of those predicted in the noise modeling study.	Undertake noise monitoring.	DEP	Acceptance of monitoring reports.

Table 14 (*cont'd*)

Commitment No.	Commitment	Timing	Objective	Action	To Whose Satisfaction	Completion Criteria
12	The Proponents will prepare a landscape plan which will provide details on the areas to be landscaped and the types of landscaping that will be undertaken in these areas.	Pre-construction.	To minimise the visual impact of the Project.	Prepare Landscape Plan.	Town of Kwinana and DEP	Acceptance of Landscape Plan
13	The FPA will liaise with the DEP regarding the results of the three yearly TBT programme being undertaken by the DEP.	Ongoing.	To monitor the impact of TBT around the BCJ.	Contact DEP on a three yearly basis.	DEP	Results obtained from DEP.
14	The FPA will undertake a sediment monitoring programme to monitor for the presence of iron ore and other metals around BCJ.	Operations.	To monitor the impact of the Export Facility on the marine habitats in the Project Area.	Implement a sediment monitoring programme.	DEP	Submit annual report to the DEP.
15	The Proponents will undertake an archaeological and ethnographic survey of the Project Area prior to commencing construction.	Pre-construction.	To determine if any significant Aboriginal Heritage sites occur in the Project Area.	Consult with Aboriginal communities.	AAD and DEP	Compliance with *Aboriginal Heritage Act* 1972.
16	The FPA will undertake a hazard and risk assessment of the construction and operation of the marine component of the Project and will develop a risk management plan specifically for this Project.	Pre-construction.	To identify hazards and risks associated with construction and operation of the export facility.	Undertake hazards and risk assessment.	DEP	Comply with statutory requirements.
17	The Proponents will meet with the Kwinana Industries Council to discuss the Emergency Response scheme and to identify alternative emergency routes to the Bulk Cargo Jetty and the Kwinana Industrial Area.	Pre-construction.	To ensure the safety of workers and general public in the Kwinana Industrial Area.	Meet with KIC.	KIC and DEP	Comply with the requirements of the KIC.

8. ABBREVIATIONS

AQIS	:	Australian Quarantine and Inspection Services
AS	:	Australian Standard
AWBMAC	:	Australian Ballast Water Management Advisory Council
BCJ	:	Bulk Cargo Jetty
CBH	:	Co-operative Bulk Handling
CER	:	Consultative Environmental Review
dB(A)	:	Sound level in decibels obtained using the A frequency weighting
DCE	:	Department of Conservation and Environment
DEP	:	Department of Environmental Protection
DRD	:	Department of Resources Development
EIA	:	Environmental Impact Assessment
EMP	:	Environmental Management Plan
EMS	:	Environmental Management System
EPP	:	Environmental Protection Policy
EPA	:	Environmental Protection Authority
FPA	:	Fremantle Port Authority
IMO	:	International Maritime Organisation
IP14	:	Improvement Plan 14
KIC	:	Kwinana Industries Council

KIMA	:	Kwinana Industries Mutual Aid
KIPL	:	Koolyanobbing Iron Pty Ltd
km	:	Kilometres
m	:	Metres
mm	:	Millimeters
Mtpa	:	Million tonnes per annum
NSW	:	New South Wales
SIA	:	Social Impact Assessment
SMCWS	:	Southern Metropolitan Coastal Waters Study
TBT	:	Tributyltin
WA	:	Western Australia
WMC	:	Western Mining Corporation
WRC	:	Water and Rivers Commission

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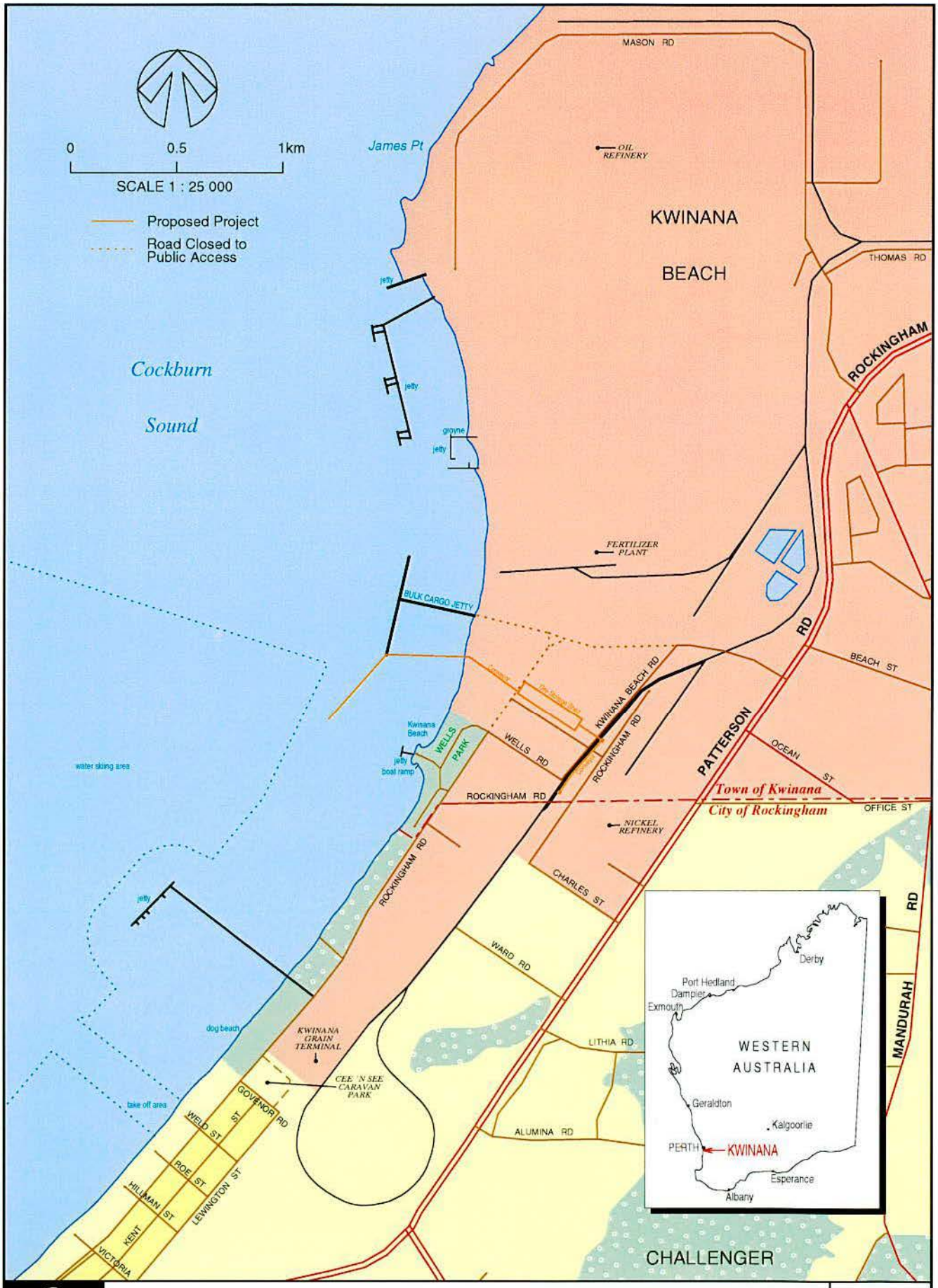

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Kwinana Export Facility
Consultative Environmental Review

LOCATION MAP

Figure 1

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Kwinana Export Facility
Consultative Environmental Review

AERIAL PHOTOGRAPH
SHOWING PROPOSED PROJECT LAYOUT

Figure 2a

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Kwinana Export Facility
Consultative Environmental Review

AERIAL PHOTOGRAPH
SHOWING PROPOSED RAIL DETAIL

Figure 2b

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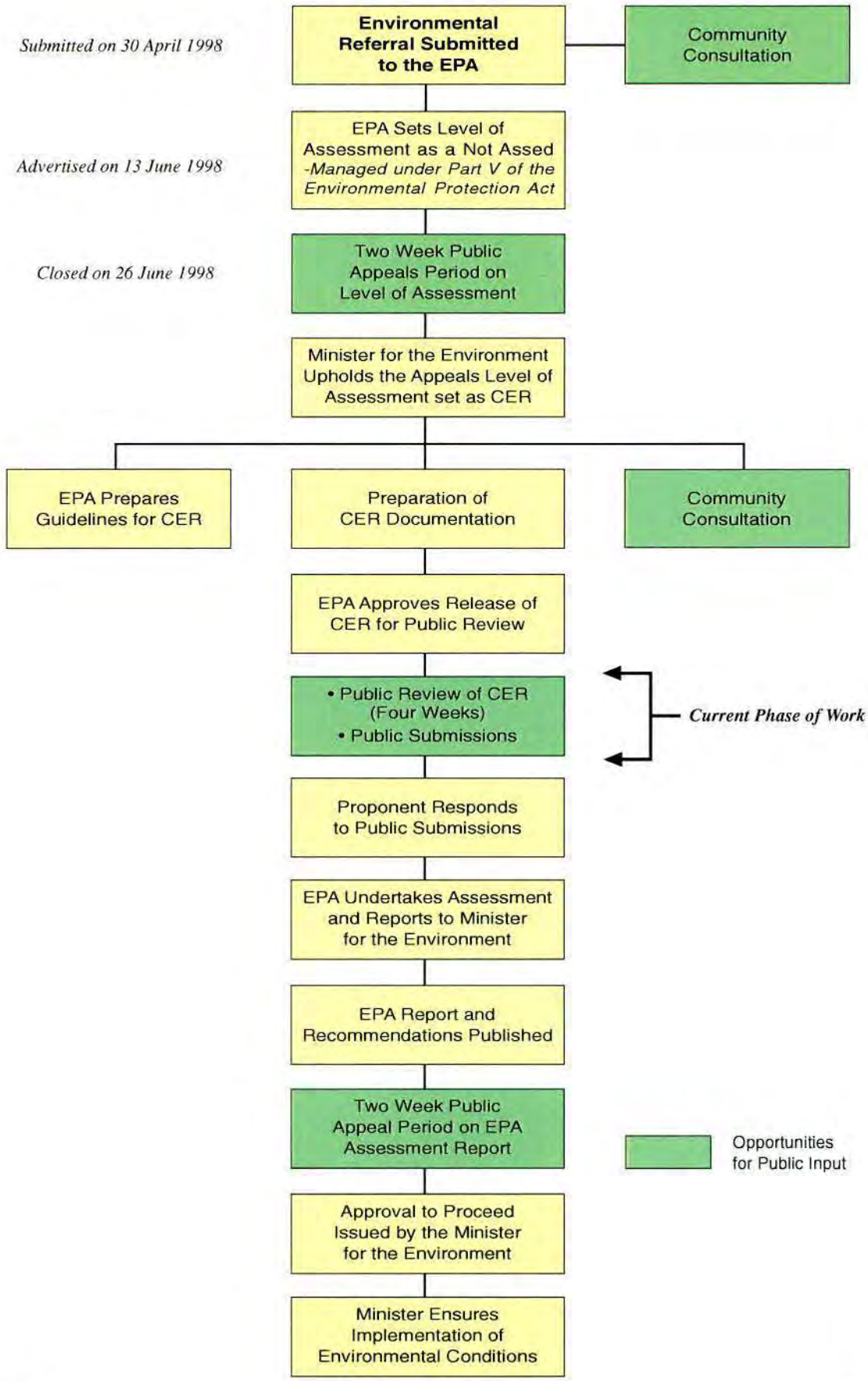

Kwinana Export Facility
Consultative Environmental Review

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

Figure 3

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Kwinana Export Facility
Consultative Environmental Review

RAIL TRANSPORT THROUGH COUNTRY AREAS

Figure 4

Kwinana Export Facility
Consultative Environmental Review

RAIL TRANSPORT ROUTE THROUGH THE METROPOLITAN AREA

Figure 5

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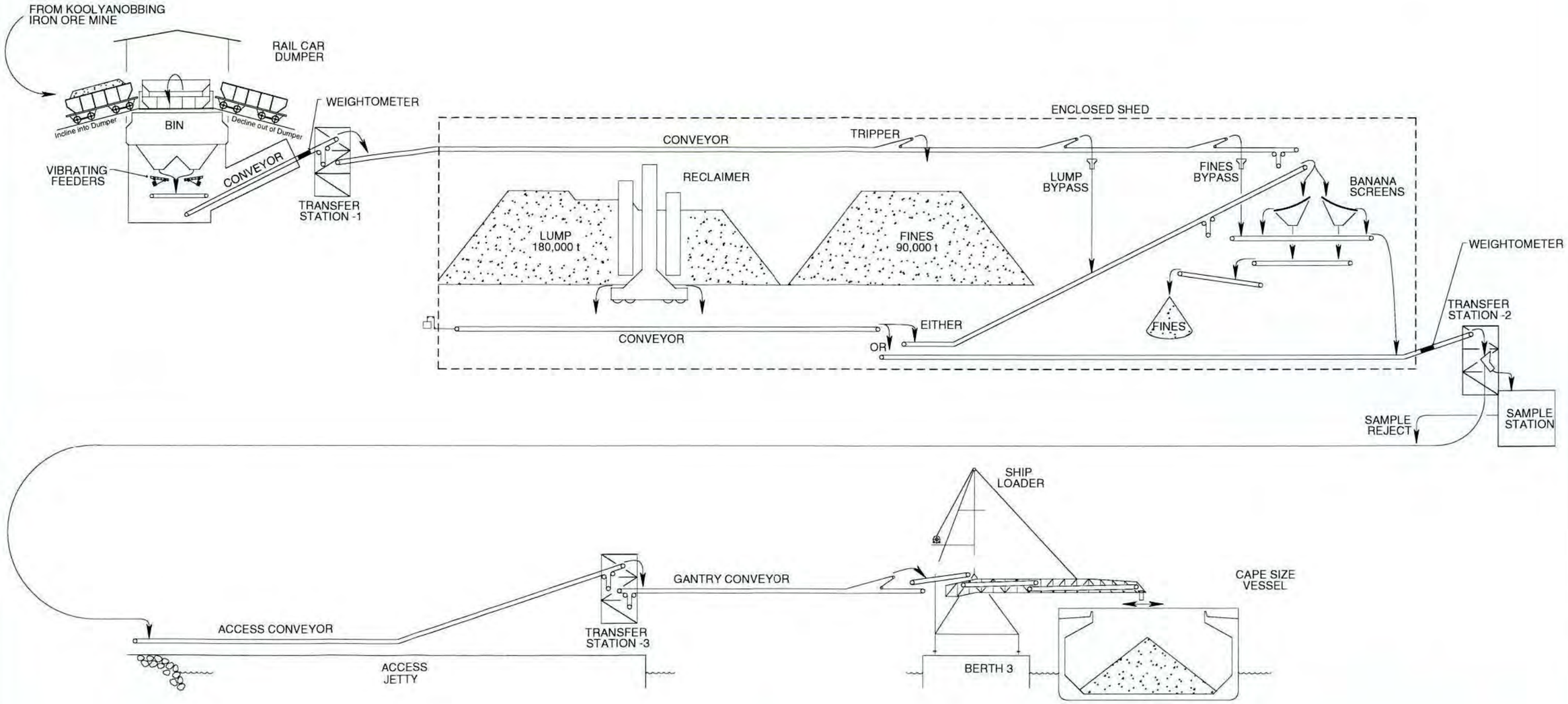

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Kwinana Export Facility
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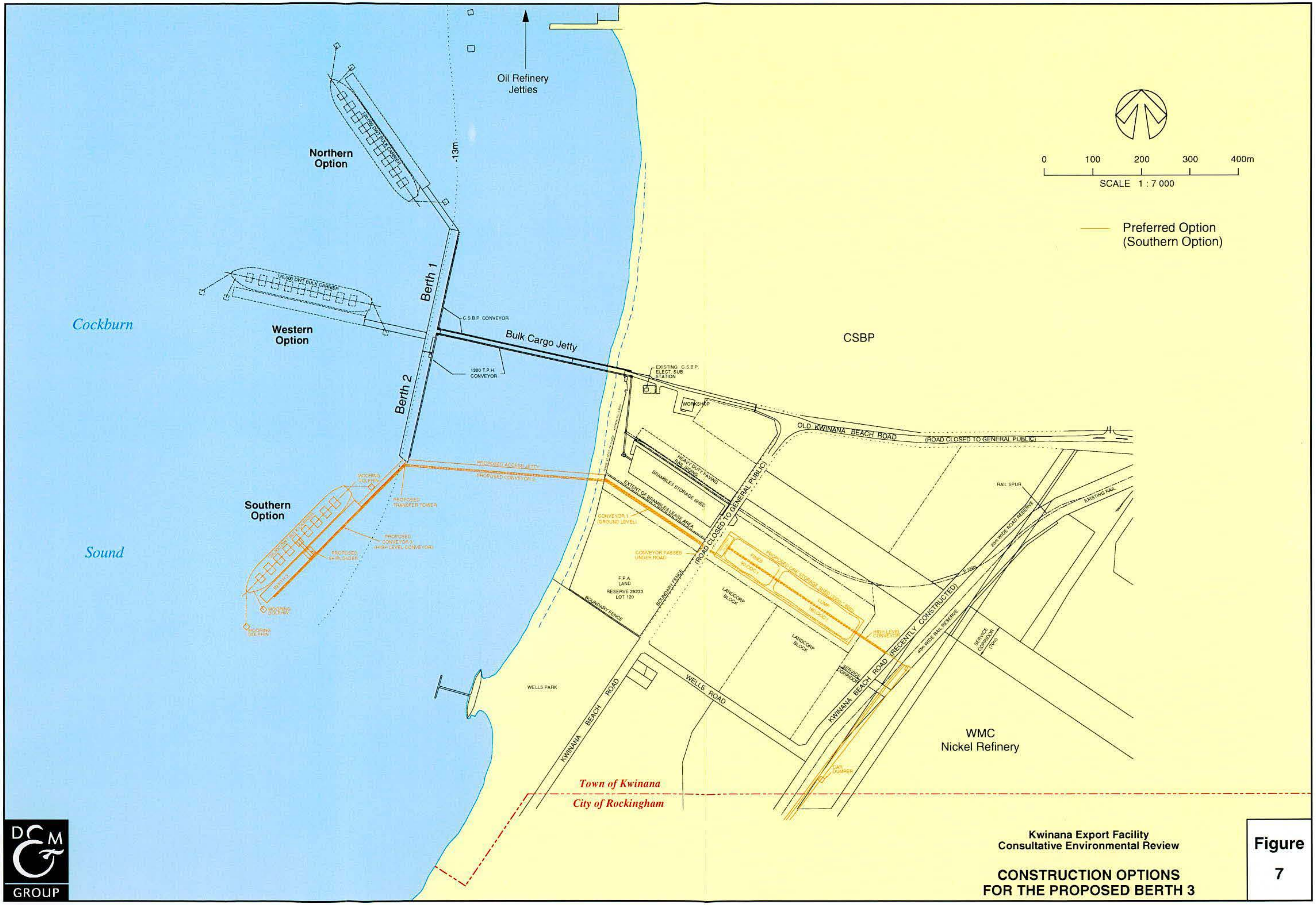
PROCESS FLOW DIAGRAM

Figure 6



Oil Refinery
Jetties
Northern
Option
-13m
Berth 1
C.S.B.P. CONVEYOR
Western
Option
Bulk Cargo Jetty
1300 T.P.H.
CONVEYOR
Berth 2
Cockburn
Sound
Southern
Option
CSBP
EXISTING C.S.B.P.
ELECT. SUB
STATION
WORKSHOP
OLD KWINANA BEACH ROAD
(ROAD CLOSED TO GENERAL PUBLIC)
HEAVY DUTY PAVING
BRAMBLES STORAGE SHED
EXTENT OF BRAMBLES LEASE AREA
(ROAD CLOSED TO GENERAL PUBLIC)
F.P.A.
LAND
RESERVE 29233
LOT 120
BOUNDARY FENCE
LANDCORP
BLOCK
RAIL SPUR
EXISTING RAIL
KWINANA BEACH ROAD (RECENTLY CONSTRUCTED)
WELLS PARK
KWINANA BEACH ROAD
WELLS ROAD
WMC
Nickel Refinery
Town of Kwinana
City of Rockingham
0
100
200
300
400m
SCALE 1 : 7 000
Preferred Option
(Southern Option)

Kwinana Export Facility
Consultative Environmental Review

CONSTRUCTION OPTIONS FOR THE PROPOSED BERTH 3

Figure 7

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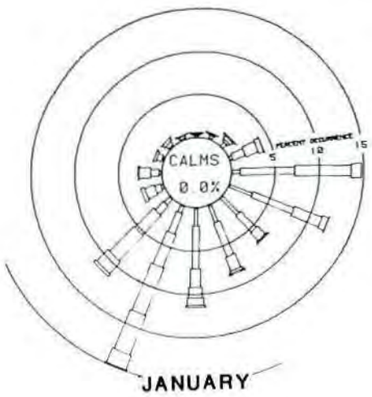

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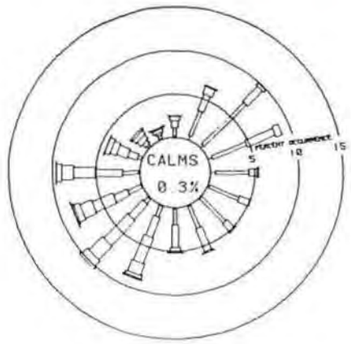

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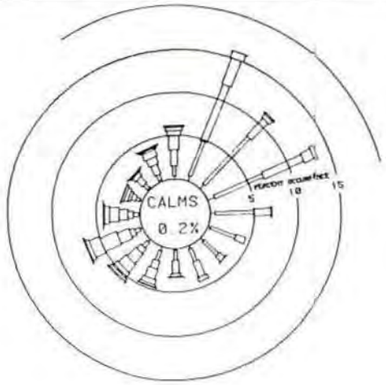

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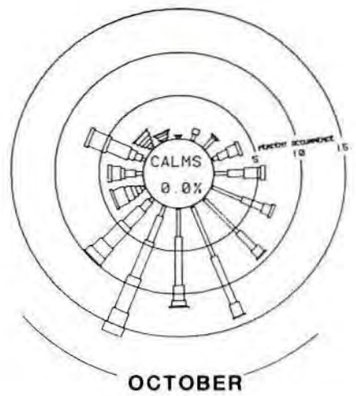

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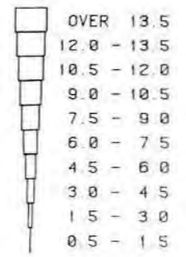
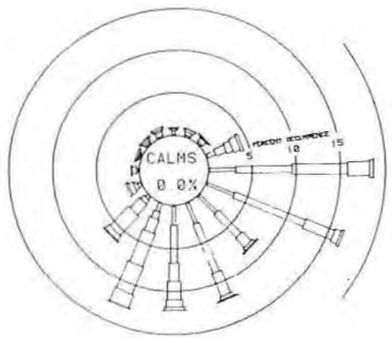


WIND SPEED
RANGE (M/S)



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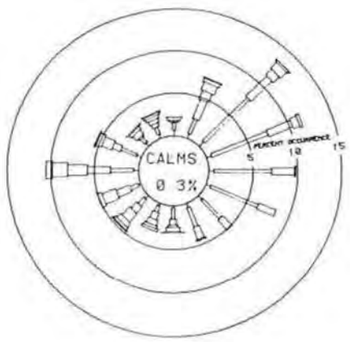

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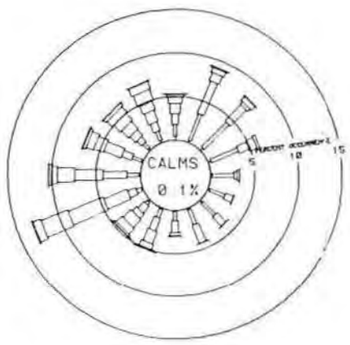

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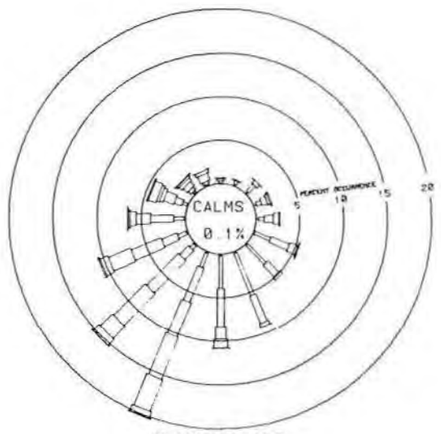

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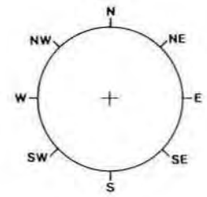
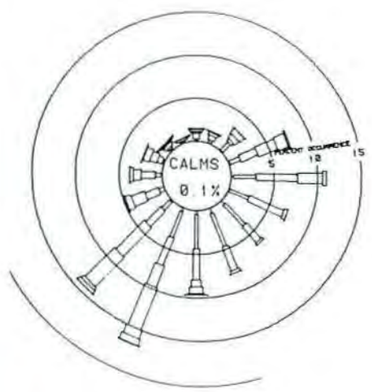


WIND
DIRECTION



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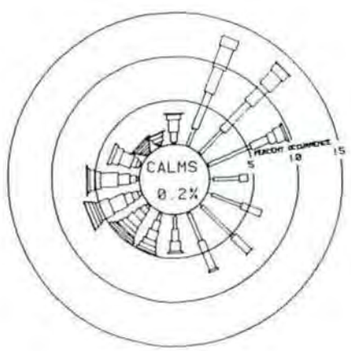
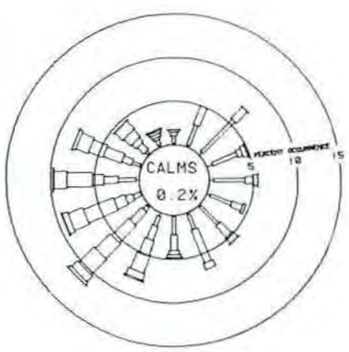


JUNE



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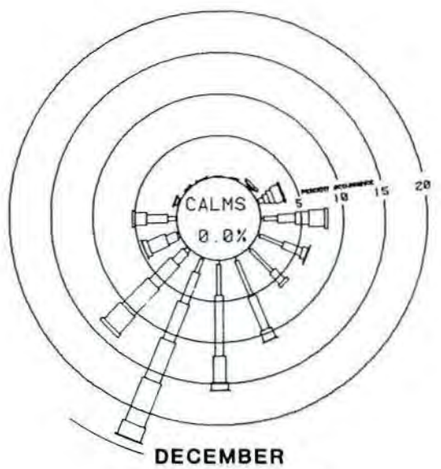

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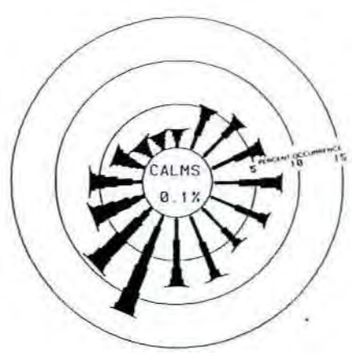


ANNUAL

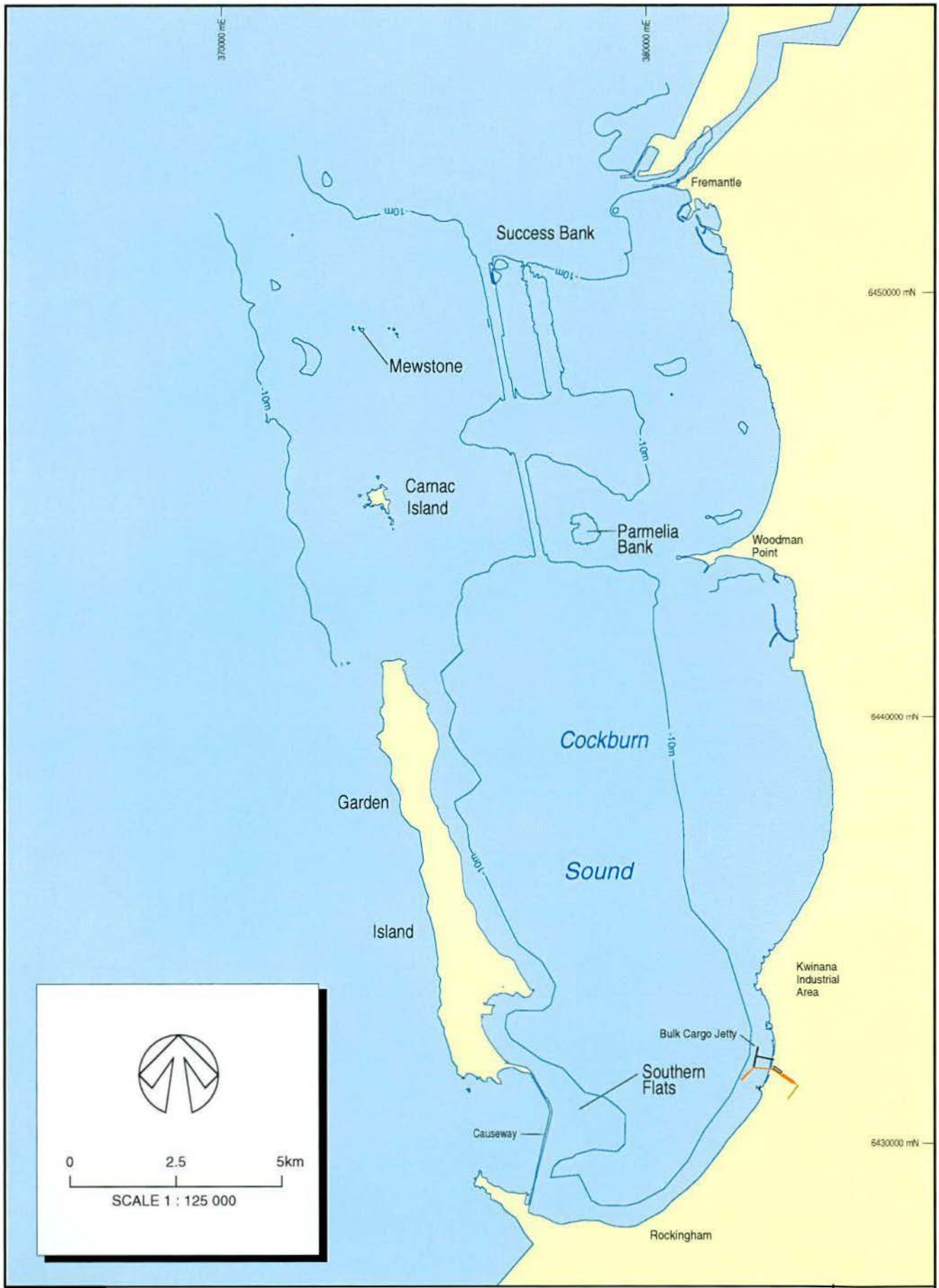
Ref: 12700-004-2005-071 Rev: 0

DCM GROUP

Kwinana Export Facility
Consultative Environmental Review

WINDROSES FOR THE KWINANA AREA (HOPE VALLEY)

Figure 8



Kwinana Export Facility
Consultative Environmental Review

COCKBURN SOUND

Figure 9

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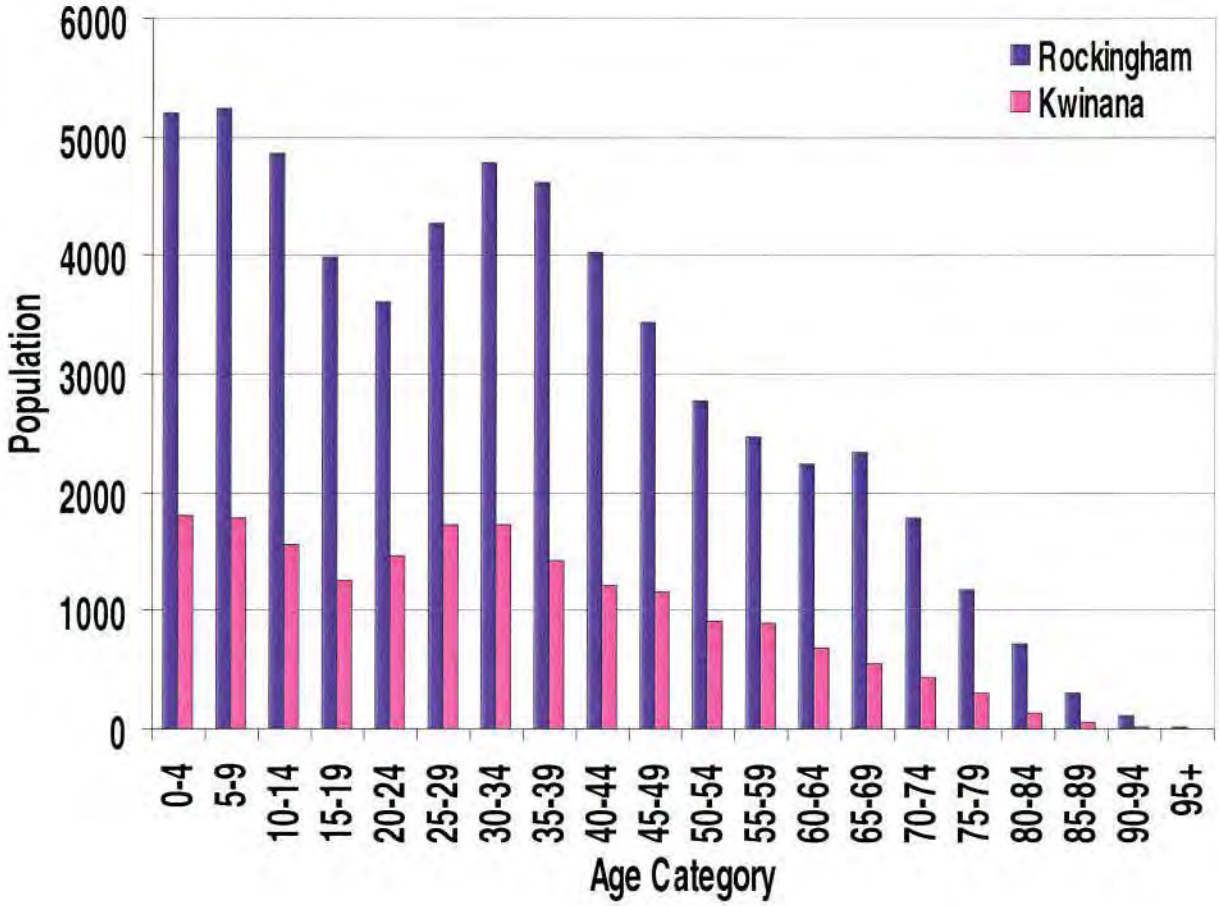
DCM GROUP

Kwinana Export Facility
Consultative Environmental Review

BATHYMETRY AROUND THE BULK CARGO JETTY

Figure 10



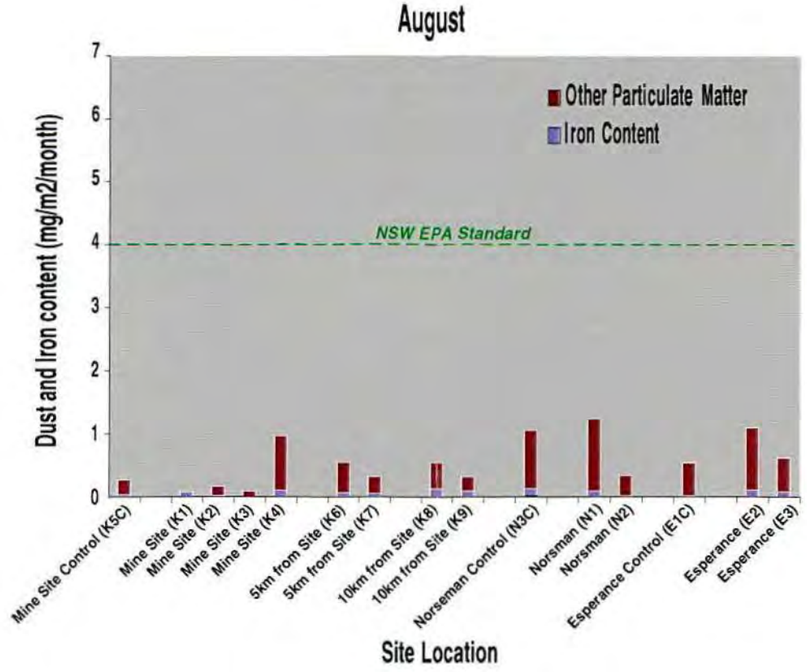
SOURCE: Australian Bureau of Statistics Census 1996.

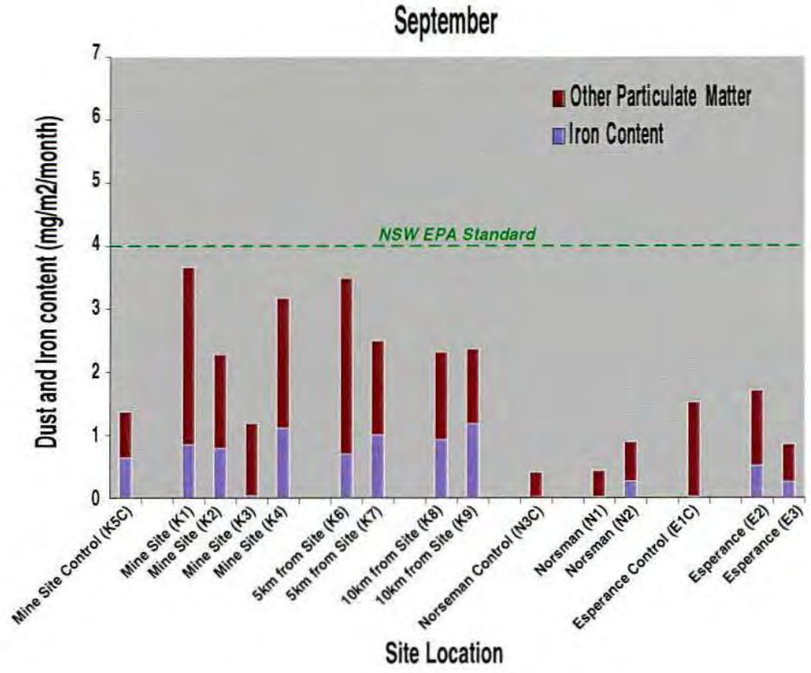
Kwinana Export Facility
Consultative Environmental Review

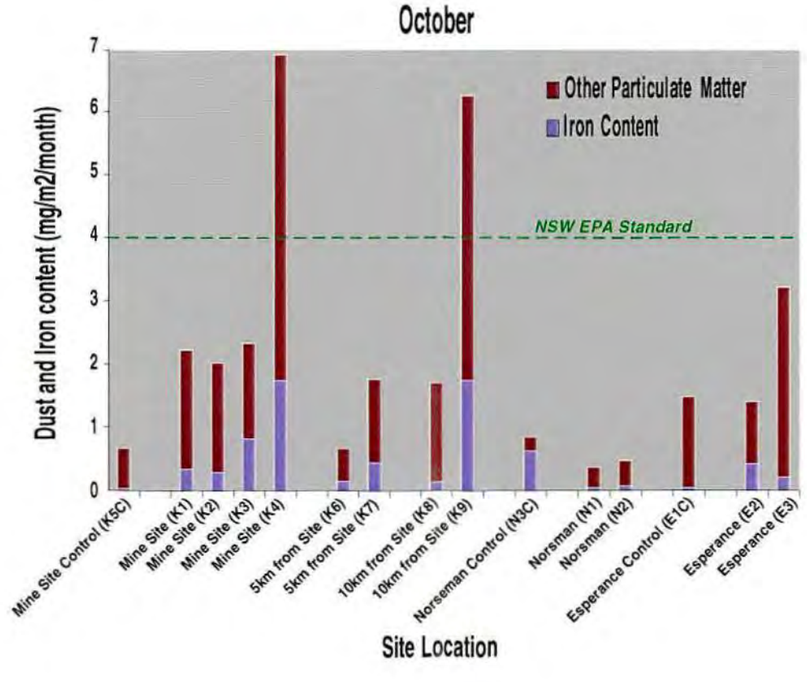
POPULATION STRUCTURE OF ROCKINGHAM AND KWINANA

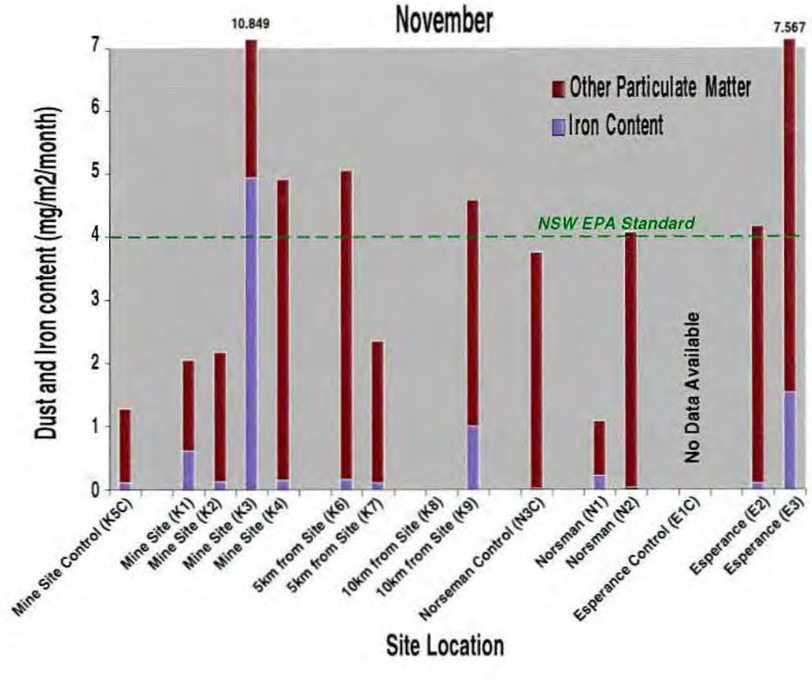
Figure 11

Ref: 12700-004-2005-071 Rev. 0









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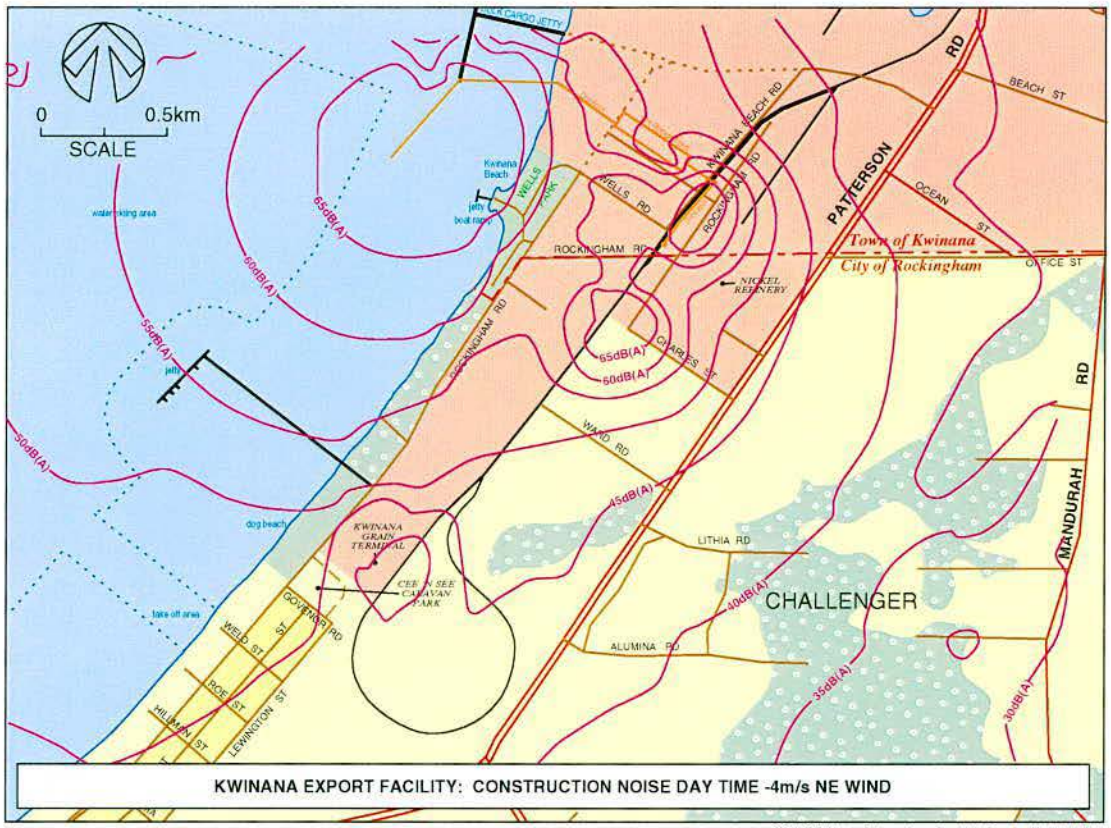
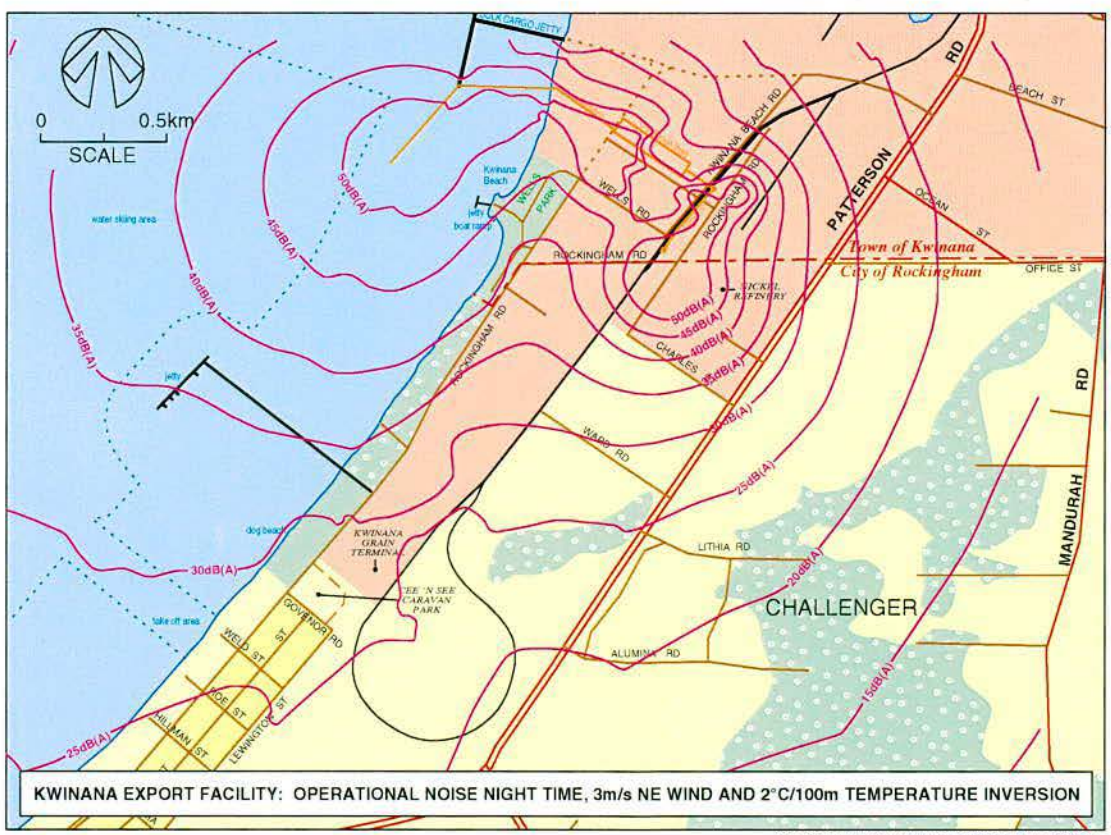
Kwinana Export Facility
Consultative Environmental Review

DUST MONITORING ALONG RAIL LINE FROM KOOLYANOBBING TO ESPERANCE

Figure 12



SOURCE: Herring Storer Acoustics 1998, Drawing No. 98149/02.



SOURCE: Herring Storer Acoustics 1998, Drawing No. 98149/05.

Ref: 12/00-004-2005-071 Rev. 0

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Kwinana Export Facility
Consultative Environmental Review

CONSTRUCTION AND OPERATION NOISE LEVEL CONTOURS

Figure 13

Ref: 12700-004-2005-071 Rev. 0

DCM GROUP

MANNED SECURITY GATES

UNMANNED LOCKED GATES

PRIVATE ACCESS

PUBLIC ROADS-MAIN

RAILWAY LINES

OUTLINE OF INDIVIDUAL PROPERTIES

1. WMC - MAIN GATE
   - 1.1 SOUTH WEST GATE
   - 1.2 NORTH WEST GATE
2. WESFARMERS CSBP
   - 2.1 WESFARMERS CSBP SOUTH WEST GATE
   - 2.2 WESFARMERS CSBP/BP WEST GATE
   - 2.3 WESFARMERS CSBP/BP EAST GATE
3. BP - MAIN SECURITY GATE
   - 3.1 EAST GATE
   - 3.2 NORTH GATE
4. TIWEST/NUFARM COOGEE - MAIN SECURITY GATE
   - 4.1 TIWEST/BP NORTH GATE
   - 4.2 TIWEST/BP WEST GATE
   - 4.3 TIWEST/BP SOUTH WEST GATE
5. WESFARMERS LPG - MAIN SECURITY GATE
6. BHP - MAIN SECURITY GATE
   - 6.1 BHP SOUTH GATE
   - 6.2 BHP SOUTH EAST GATE
   - 6.3 BHP EAST GATE
7. SEC - MAIN SECURITY GATE
   - 7.1 SEC SOUTH GATE
   - 7.2 SEC SOUTH EAST GATE
8. ALCOA - MAIN GATE
   - 8.1 SOUTH GATE

COCKBURN ROAD
ROCKINGHAM ROAD
QUARRIES
QUARRIES
ALCOA JETTY
ALCOA
WESTERN POWER
BRAMBLES MANFORD
THERMAL CERAMICS
WESTON ROAD
TUBEMAKERS BTM
TUBEMAKERS W. O AND G
RISELEY ROAD
LEATH ROAD
BEARD ROAD
BHP JETTYS
BHP
HISMELT
UNSURFACED TRACK
TAILINGS PONDS
TAILING PONDS
EDISON MISSION
BP OIL KWINANA REFINERY
EARTHWORKS
AIR LIQUIDE
BUS STATION
WESFARMERS LPG
WESTERN POWER SUB STATION
JAMES POINT
ESI
ALINTA GAS INSTALLATION
THOMAS ROAD
BOC
MAXWELL CHEMICALS
SDR
AGREVO
CBI
NUFARM AGCHEM
MASON ROAD
BP REFINERY JETTYS
TIWEST
NUFARM COOGEE
OVAL
COCKBURN SOUND
WESFARMERS CSBP
SODIUM CYANIDE PLANT
UNITED CONSTRUCTION
MANDURAH ROAD
UNDERGROUND NATURAL GAS PIPELINE
CHALK HILL
FPA BULK CARGO JETTY
GOLF COURSE
KWINANA BEACH ROAD
EMERGENCY ACCESS ROUTES
COOGEE CHEMICALS
TERMINALS WEST
PATTERSON ROAD
KWINANA BEACH
WMC
OFFICE ROAD
WELLARD ROAD
CHARLES STREET
WARD ROAD
HANWHA
CBH GRAIN TERMINAL
AFM
ALUMINA ROAD
CHESTERFIELD ROAD

Kwinana Export Facility
Consultative Environmental Review

EMERGENCY ACCESS PLAN

Figure 14

Plate 1: Hydraulic Train Positioner

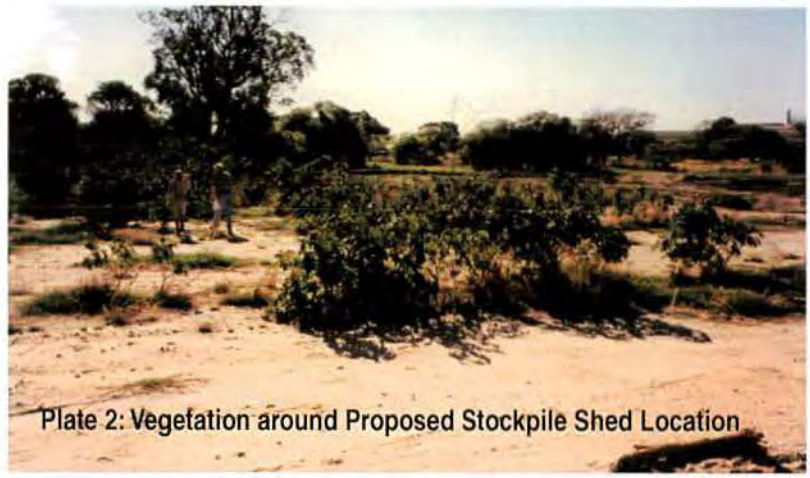


Plate 2: Vegetation around Proposed Stockpile Shed Location

Plate 3: Enclosed Conveyor at Esperance

Proposed Facility

Plate 4: View from Well's Park BBQ Area

This image is produced to show the comparative size of the existing and proposed facilities. It may not accurately represent the view as seen by the naked eye and hence the reader is encouraged to visit Wells Park to assess the visual impact themselves.

Plate 5: View from Well's Park Jetty

This image is produced to show the comparative size of the existing and proposed facilities. It may not accurately represent the view as seen by the naked eye and hence the reader is encouraged to visit Wells Park to assess the visual impact themselves.

Proposed Facility

Plate 6: View from Rockingham Beach

This image is produced to show the comparative size of the existing and proposed facilities. It may not accurately represent the view as seen by the naked eye and hence the reader is encouraged to visit Rockingham Beach to assess the visual impact themselves.

Appendix A

EPA Guidelines

Environmental Protection Authority
Guidelines

KWINANA EXPORT FACILITY

(Assessment Number 1243)

Part A	Specific Guidelines for the preparation the Consultative Environmental Review
Part B	Generic Guidelines for the preparation of an environmental review document

Attachment 1	Example of the invitation to make a submission
Attachment 2	Advertising the environmental review
Attachment 3	Project location map

These guidelines are provided for the preparation of the proponent's environmental review document. The specific environmental factors to be addressed are identified in Part A. The generic guidelines for the format of an environmental review document are provided in Part B.

To expedite the assessment process, the proponent should supply the project officer with an electronic copy of the document for use on Macintosh, Microsoft Word Version 6, and any scanned figures. Where possible, figures should be reproducible in a black and white format.

The environmental review document must address all elements of Part 'A' and Part 'B' of these guidelines prior to approval being given to commence the public review.

Part A: Specific Guidelines for the preparation of the Consultative Environmental Review

1. The proposal

Koolyanobbing Iron Pty Ltd, in conjunction with Westrail and the Fremantle Port Authority (the proponent), propose to develop an export facility at the Kwinana Bulk Export Jetty. The proposed export facility is indicated on the attached plan (Attachment 1).

Initially the facility will be used for the export of four million tonnes per annum of iron ore which is currently mined at Koolyanobbing. The proposed facility consists of:

- a berthing jetty constructed as a southern extension of the existing Bulk Cargo Jetty;
- an access jetty supporting a road and a low level enclosed conveyor;
- a rail line along the existing service corridor;
- a rail car dumper;
- enclosed conveyors; and
- a bulk material ship loader.

Iron ore from the Koolyanobbing Mine is currently exported through the Port of Esperance. However, due to increases in the quantity of iron ore being exported each year, the lower carrying capacity of the railway line to Esperance and the closer proximity to the markets, the proponent has decided to export iron ore through Kwinana.

2. Environmental factors relevant to this proposal

At this preliminary stage, the Environmental Protection Authority (EPA) believes the relevant environmental factors, objectives and work required is as detailed in the attached table.

These factors should be addressed within the environmental review document for the public to consider and make comment to the EPA. The EPA expects to address these factors in its report to the Minister for the Environment.

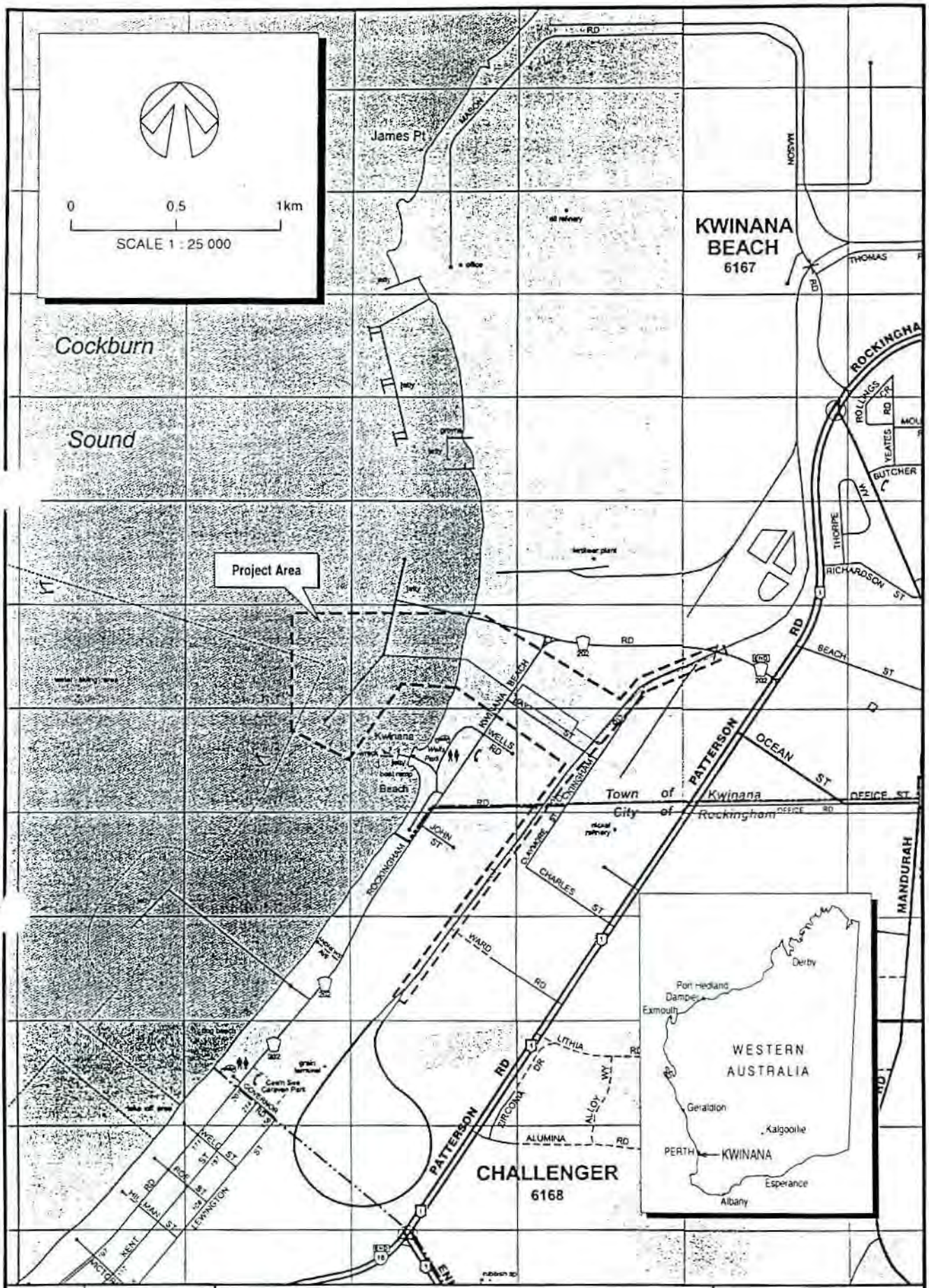
The EPA expects the proponent to take due care in ensuring any other relevant environmental factors which may be of interest to the public are addressed.

Following discussions with the EPA, it was agreed that the proponent needs to give attention to all factors in the attached table, with focus on the following relevant factors:

- social effects (visual amenity);
- dust; and
- noise.

Element of the Environment	Environmental Factor	Sub-factor or Site Specific Factor	Preliminary Environmental Objective
BIOPHYSICAL			
Terrestrial Flora			
	Vegetation communities		Maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities.
Terrestrial Fauna			
	Terrestrial Fauna		Maintain the abundance, species diversity and geographical distribution of terrestrial fauna.
Marine Flora			
	Marine Flora		Maintain the ecological function, abundance, species diversity and geographic distribution of marine flora.
Marine Fauna			
	Marine Fauna		Maintain the abundance, species diversity and geographic distribution of marine fauna.
		introduced species	Minimise the risk of introduction of unwanted marine organisms
Coast			
	Foreshore (beach)		• Maintain the stability of beaches. • Maintain the integrity, function and environmental values of the foreshore area.
	Seabed		Development should not have a significant impact on existing coastal processes, including off-shore sediment movement.
Land			
	Soil		Ensure that clearing does not result in land degradation.
POLLUTION MANAGEMENT			
Air			
	Particulates / Dust		• Protect the surrounding land users such that dust and particulate emissions will not adversely impact upon their welfare and amenity or cause health problems by meeting the Guidelines for the Prevention of Dust and Smoke Pollution from Land Development Sites in WA and the Environmental Protection (Kwinana)(Atmospheric Wastes) Policy 1992.
Water			
	Groundwater quality		• Maintain or improve the quality of groundwater to ensure that existing and potential uses, including ecosystem maintenance are protected, consistent with the draft WA Guidelines for Fresh and Marine Waters (EPA, 1993).
	Marine water and sediment quality		• Maintain or improve the quality of marine water consistent with the draft WA Guidelines for Fresh and Marine Waters (EPA, 1993); • Maintain or improve marine water and sediment quality consistent with Environmental Quality Objectives (EQO's) and Environmental Quality Criteria (EQC's) defined in the Southern Metropolitan Coastal Waters Study (1996).
Non-chemical Emissions			
	Noise		• Protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring that noise levels meet statutory requirements and acceptable standards.
		rail transport	Ensure that noise levels meet acceptable standards.

Element of the Environment	Environmental Factor	Sub-factor or Site Specific Factor	Preliminary Environmental Objective
SOCIAL SURROUNDINGS			
Social			
	Public health and safety		
		risk and hazard	• Ensure that risk is managed to meet the EPA's criteria for individual fatality risk off-site and the DME's requirements in respect of public safety.
Aesthetic			
	Visual amenity		• Visual amenity of the area adjacent to the project should not be unduly affected by the proposal.
Culture and Heritage			
	Aboriginal culture and heritage		(i) Ensure that the proposal complies with the requirements of the Aboriginal Heritage Act 1972; and (ii) Ensure that changes to the biological and physical environment resulting from the project do not adversely affect cultural associations with the area.
Recreation			
	Recreation		To ensure that recreational uses of the area are maintained.



Job No.	21019-033-071	
Prep. By	KAC	20 Apr. '98
Chk'd By	BPB	29 Apr. '98
Revision No.		0

Koolyanobbing Iron Pty Ltd, Fremantle Port Authority & Westrail
KWINANA EXPORT FACILITY

LOCATION MAP

Figure 1

DAMES & MOORE PTY LTD

ATTACHMENT 1

3. Availability of the environmental review

3.1 Copies for distribution free of charge

Supplied to DEP:

- Library/Information Centre.....9
- EPA members.....6
- DEP (Perth).....8

Distributed by the proponent to:

Government departments	• Department of Minerals and Energy.....2
	• Ministry for Planning.....2
	• Department of Resources Development.....2
	• Landcorp.....1
Local government authorities	• Town of Kwinana.....2
	• City of Rockingham.....2
Libraries	• J S Battye Library.....3
	• The Environment Centre.....2
	• City of Rockingham Library.....2
	• Town of Kwinana Library.....2
Other	• Conservation Council of WA.....1
	• Hon. Jim Scott MLC.....1
	• Appellants / action groups (recommended)..... 18

3.2 Available for public viewing

- J S Battye Library;
- City of Rockingham Library;
- Town of Kwinana Library; and
- Department of Environmental Protection.

Part B: Generic Guidelines for the preparation of an environmental review document

1. Overview

All environmental reviews have the objective of protecting the environment. Environmental impact assessment is deliberately a public process in order to obtain broad ranging advice. The review requires the proponent to describe:

- the proposal;
- receiving environment;
- potential impacts of the proposal on factors of the environment; and
- proposed management strategies to ensure those environmental factors are appropriately protected.

Throughout the assessment process it is the objective of the Environmental Protection Authority (EPA) to help the proponent to improve the proposal so the environment is protected. The DEP will co-ordinate, on behalf of the EPA, relevant government agencies and the public in providing advice about environmental matters during the assessment of the environmental review for this proposal.

The primary purpose of the environmental review is to provide information on the proposal within the local and regional framework to the EPA, with the aim of emphasising how the proposal may impact the relevant environmental factors and how those impacts may be mitigated and managed.

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

Information used to reach conclusions should be properly referenced, including personal communications. Assessments of the significance of an impact should be soundly based rather than unsubstantiated opinion, and each assessment should lead to a discussion of the management of the environmental factor.

2. Objectives of the environmental review

The objectives of the environmental review are to:

- place this proposal in the context of the local and regional environment;
- adequately describe all components of the proposal, so that the Minister for the Environment can consider approval of a well-defined project;
- provide the basis of the proponent's environmental management program, which shows that the environmental impacts resulting from the proposal, including cumulative impact, can be acceptably managed; and
- communicate clearly with the public (including government agencies), so that the EPA can obtain informed public comment to assist in providing advice to government.

3. Environmental management

The EPA expects the proponent to have in place an environmental management system appropriate to the scale and impacts of the proposal including provisions for performance review and a commitment to continuous improvement. The system may be integrated with quality and health and safety systems and should include the following elements:

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

A description of the proposed environmental management system should be included in the environmental review documentation. If appropriate, the documentation can be incorporated into a formal environmental management system (such as AS/NZS ISO 14001). Public accountability should be incorporated into the approach on environmental management.

The environmental management program (EMP) is the key document of an environmental management system that should be adequately defined in an environmental review document. The EMP should provide plans to manage the relevant environmental factors, define the performance objectives, describe the resources to be used, outline the operational procedures and outline the monitoring and reporting procedures which would demonstrate the achievement of the objectives.

4. Format of the environmental review document

The environmental review should be provided to the DEP officer for comment. At this stage the document should have all figures produced in the final format and colours.

Following approval to release the review for public comment, the final document should also be provided to the DEP in an electronic format.

The proponent is requested to supply the project officer with an electronic copy of the environmental review document for use on Macintosh, Microsoft Word Version 6, and any scanned figures. Where possible, figures should be reproducible in a black and white format.

5. Contents of the environmental review document

The contents of the environmental review should include an executive summary, introduction and at least the following:

5.1 The proposal

A comprehensive description of the proposal including its location (address and certificate of title details where relevant) is required.

Justification and alternatives

- justification and objectives for the proposed development;
- the legal framework, including existing zoning and environmental approvals, and decision making authorities and involved agencies; and
- consideration of alternative options.

Key characteristics

The Minister's statement will bind the proponent to implementing the proposal in accordance with any technical specifications and key characteristics[1] in the environmental review document. It is important therefore, that the level of technical detail in the environmental review, while sufficient for environmental assessment, does not bind the proponent in areas where the project is likely to change in ways that have no environmental significance.

Include a description of the components of the proposal, including the nature and extent of works proposed. This information must be summarised in the form of a table as follows:

[1] Changes to the key characteristics of the proposal following final approval, would require assessment of the change and can be treated as non-substantial and approved by the Minister, if the environmental impacts are not significant. If the change is significant, it would require assessment under section 38 or section 46. Changes to other aspects of the proposal are generally inconsequential and can be implemented without further assessment. It is prudent to consult with the Department of Environmental Protection about changes to the proposal.

Table 1: Key characteristics (example only)

Element	Description
Life of project (mine production)	< 5yrs (continual operation)
Size of ore body	682 000 tonnes (upper limit)
Area of disturbance (including access)	100 hectares
List of major components • pit • waste dump • infrastructure (water supply, roads, etc)	refer plans, specifications, charts section immediately below for details of map requirements
Ore mining rate • maximum	 • 200 000 tonnes per year
Solid waste materials • maximum	 • 800,000 tonnes per year
Water supply • source • maximum hourly requirement • maximum annual requirement	 • XYZ borefield, ABC aquifer • 180 cubic metres • 1 000 000 cubic metres
Fuel storage capacity and quantity used	litres; litres per year
Heavy mineral concentrate transport • truck movements (maximum)	 • 75 return truck loads per week

Plans, Specifications, Charts

Adequately dimensioned plans showing clearly the location and elements of the proposal which are significant from the point of view of environmental protection, should be included. The location and dimensions (for progressive stages of development, if relevant) of plant, amenities buildings, accessways, stockpile areas, dredge areas, waste product disposal and treatment areas, all dams and water storage areas, mining areas, storage areas including fuel storage, landscaped areas etc.

Only those elements of plans, specifications and charts that are significant from the point of view of environmental protection are of relevance here.

Figures that should always be included are:

- a map showing the proposal in the local context - an overlay of the proposal on a base map of the main environmental constraints;
- a map showing the proposal in the regional context; and, if appropriate,
- a process chart / mass balance diagram showing inputs, outputs and waste streams.

The plan/s should include contours, a north arrow, a scale bar, a legend, grid co-ordinates, the source of the data, and a title. If the data is overlaid on an aerial photo then the date of the aerial photo should be shown.

Other logistics

- timing and staging of project; and
- ownership and liability for waste during transport, disposal operations and long-term disposal (where appropriate to the proposal).

5.2 Environmental factors

The environmental review should focus on the relevant environmental factors for the proposal, and these should be agreed in consultation with the EPA and DEP and relevant public and government agencies. Preliminary environmental factors identified for the proposal are shown in Part A of these guidelines.

Further environmental factors may be identified during the preparation of the environmental review, therefore on-going consultation with the EPA, DEP and other relevant agencies is recommended. The DEP can advise the proponent on the recommended EPA objective for any new environmental factors raised. Minor matters which can be readily managed as part of normal operations for the existing operations or similar projects may be briefly described.

Items that should be discussed under each environmental factor are:

- a clear definition of the area of assessment for this factor;
- the EPA objective for this factor;
- a description of what is being affected - why this factor is relevant to the proposal;
- a description of how this factor is being affected by the proposal - the predicted extent of impact;
- a description of where this factor fits into the broader environmental / ecological context (only if relevant - this may not be applicable to all factors);
- a straightforward description or explanation of any relevant standards / regulations / policy;
- environmental evaluation - does the proposal meet the EPA's objective as defined above;
- if not, environmental management proposed to ensure the EPA's objective is met;
- predicted outcome.

The proponent should provide a summary table of the above information for all environmental factors, under the three categories of biophysical, pollution management and social surroundings:

Table 2: Environmental factors and management (example only)

Environ-mental Factor	EPA Objective	Existing environment	Potential impact	Environ-mental management	Predicted outcome
BIOPHYSICAL					
vegetation community types 3b and 20b	Maintain the abundance, species diversity, geographic distribution and productivity of vegetation community types 3b and 20b	Reserve 34587 contains 45 ha of community type 20b and 34 ha of community type 3b	Proposal avoids all areas of community types 20b and 3b	Surrounding area will be fully rehabilitated following construction	Community types 20b and 3b will remain untouched Area surrounding will be revegetated with seed stock of 20b and 3b community types
POLLUTION MANAGEMENT					
Dust	Ensure that the dust levels generated by the proposal do not adversely impact upon welfare and amenity or cause health problems by meeting statutory requirements and acceptable standards	Light industrial area - three other dust producing industries in close vicinity Nearest residential area is 800 metres	Proposal may generate dust on two days of each working week.	Dust Control Plan will be implemented	Dust can be managed to meet EPA's objective
SOCIAL SURROUNDINGS					
Visual amenity	Visual amenity of the area adjacent to the project should not be unduly affected by the proposal	Area already built-up	This proposal will contribute negligibly to the overall visual amenity of the area	Main building will be in 'forest colours' and screening trees will be planted on road	Proposal will blend well with existing visual amenity and the EPA's objective can be met

5.3 Environmental management commitments

The implementation of the key characteristics of the proposal and the environmental management commitments made by the proponent become legally enforceable under the conditions of environmental approval issued in the statement by the Minister for the Environment. All the auditable environmental management commitments should be consolidated in the public review document in a list (usually in an Appendix). This list is attached to the Minister's statement and becomes part of the conditions of approval.

The proponent's compliance with the consolidated environmental management commitments will be audited by the DEP, so they must be expressed in a way which enables them to be audited.

A commitment needs to contain most (if not all) of the following elements to be auditable:

- who (eg. the proponent)

- will do what (eg. prepare a plan, take action)
- why (to meet an environmental objective)
- where/how (detail the action and where it applies)
- when (in which phase, eg. before construction starts)
- to what standard (recognised standard or agency to be satisfied)
- on advice from (agency to be consulted).

The proponent may make other 'commitments', which address less significant or non-environmental matters, to show an intention to good general management of the project. Such 'commitments' (or management strategies/policies) would not be included in the consolidated list of environmental management commitments appended to the statement.

Continuous improvement during the implementation of the consolidated commitments may necessitate changes whilst ensuring the environmental objective is still achieved; these can be made in updates to the environmental management plan. Modified and/or additional proponent commitments arising from the fulfilment of environmental conditions will be audited by the DEP and should follow the accepted format.

Once the proposal is approved under a statement of conditions, any proposed modifications or additional commitments should be referred to the EPA for consideration of the environmental impacts. Such changes to the consolidated list of commitments would normally be dealt with through the audit process; however, if significant impacts are involved, the proposed changes may constitute a change to the proposal which would require assessment.

Examples of the preferred format for typical commitments are shown in the following table:

Table 3: Summary of proponent's commitments (example only)

Who/What Commitment	When plan prepared Timing	Why Objective	How/Where Action	Whose advice expert consulted	Evidence Standard Compliance criteria
1. The Proponent will develop and implement a rehabilitation plan	before construction commences	to protect the abundance, species diversity, geographic distribution and productivity of the vegetation community types 3b and 20b (fig 3.1, EMP)	by limiting construction to 10 ha of Reserve 34587 and rehabilitating the area	on advice of CALM.	similarity rating of rehab'd area consistent with vegetation community types 3b and 20b.
2. The Proponent will prepare and implement a dust control plan	before the start of construction	to minimise dust generation and impact on nearby land owners	by measures such as watering roads and monitoring wind direction	preparation of the plan on advice of DEP.	1000mg/m3 (EPA Dust Control Criteria)

Commitments should preferably be written in tabular format, preferably with some specification of ways in which the commitment can be measured, or how compliance can be demonstrated.

Draft commitments, whether in textual or tabular format, which are not in a format that can be audited will not be accepted by DEP assessment officers for public review documentation. Proponents will be assisted to revise inadequate commitments.

5.4 Public consultation

A description should be provided of the public participation and consultation activities undertaken by the proponent in preparing the environmental review. 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 factors which should clearly indicate how community concerns have been addressed. Those concerns which are dealt with outside the EPA process can be noted and referenced.

5.5 Other information

Additional detail and description of the proposal, if provided, should go in a separate section.

Attachment 1

The first page of the proponent's environmental review document must be the following invitation to make a submission, with the parts in square brackets amended to apply to each specific proposal. Its purpose is to explain what submissions are used for and to detail why and how to make a submission.

Invitation to make a submission

The Environmental Protection Authority (EPA) invites people to make a submission on this proposal.

[the proponent] proposes [the rezoning of land and the development of a Marina Complex in the City of Bunbury]. In accordance with the Environmental Protection Act, a [PER] has been prepared which describes this proposal and its likely effects on the environment. The [PER] is available for a public review period of [8] weeks from **[date]** closing on **[date]**.

Comments from government agencies and from the public will help the EPA to prepare an assessment report in which it will make recommendations to government.

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 unless provided and received in confidence subject to the requirements of the Freedom of Information Act, and may be quoted in full or in part in the EPA's report.

Why not join a group?

If you prefer not to write your own comments, it may be worthwhile joining with a group interested in making a submission on similar issues. Joint submissions may help to reduce the workload for an individual or group, as well as increase the pool of ideas and information. If you form a small group (up to 10 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 [PER] 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 more environmentally acceptable.

When making comments on specific elements of the [PER]:

- clearly state your point of view;
- indicate the source of your information or argument if this is applicable;
- 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 issues raised are clear. A summary of your submission is helpful;
- refer each point to the appropriate section, chapter or recommendation in the [PER];
- if you discuss different sections of the [PER], keep them distinct and separate, so there is no confusion as to which section you are considering;
- attach any factual information you may wish to provide and give details of the source. Make sure your information is accurate.

Remember to include:

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

The closing date for submissions is: [**date**]

Submissions should be addressed to:

The Environmental Protection Authority
Westralia Square
141 St George's Terrace
PERTH WA 6000

Attention: **[Project Officer name]**

Attachment 2

Advertising the environmental review

The proponent is responsible for advertising the release and arranging the availability of the environmental review document in accordance with the following guidelines:

Format and content

The format and content of the advertisement should be approved by the DEP before appearing in the media. For joint State-Commonwealth assessments, the Commonwealth also has to approve the advertisement. The advertisement should be consistent with the attached example.

Note that the DEP officer's name should appear in the advertisement.

Size

The size of the advertisement should be two newspaper columns (about 10 cm) wide by about 14 cm long. Dimensions less than these would be difficult to read.

Location

The approved advertisement should, for CER's, appear in the news section of the main local newspaper and, for PER's and ERMP's, appear in the news section of the main daily paper's ("The West Australian") Saturday edition, and in the news section of the main local paper at the commencement of the public review period and again two weeks prior to the closure of the public review period.

Timing

Within the guidelines already given, it is the proponent's prerogative to set the time of release, although the DEP should be informed. The advertisement should not go out before the report is actually available, or the review period may need to be extended.

Example of the newspaper advertisement

SCM CHEMICALS LTD

Consultative Environmental Review

EXTENSION TO DALYELLUP RESIDUE DISPOSAL PROGRAM

(Public Review Period: **[date]** to **[date]**)

SCM Chemicals Ltd is planning to extend the company's existing residue disposal program at Dalyellup, south of Bunbury, from March 1992 to March 1993.

A Consultative Environmental Review (CER) has been prepared by the company to examine the environmental effects associated with the proposed development, in accordance with Western Australian Government procedures. The CER describes the proposal, examines the likely environmental effects and the proposed environmental management procedures.

SCM has prepared a project summary which is available free of charge from the company's office on Old Coast Road, Australind.

Copies of the CER may be purchased for $5 from:

SCM Chemicals Ltd
Old Coast Road
AUSTRALIND WA 6230
Telephone: (08) 9467 2356

Copies of the complete Consultative Environmental Review will be available for examination at:

- Environmental Protection Authority
  Library Information Centre
  8th Floor, Westralia Square
  38 Mounts Bay Road
  PERTH WA 6000
- Environmental Protection Authority
  65 Wittenoom Street
  BUNBURY WA 6230
- City of Bunbury public libraries
- Shire of Capel libraries
- Shire of Harvey library (Australind)
- Shire of Dardanup (Eaton)

Submissions on this proposal are invited by **[closing date]**. Please address your submission to:

Chairman
Environmental Protection Authority
8th Floor, Westralia Square
38 Mounts Bay Road
PERTH WA 6000
Attention: **[Project Officer name]**

If you have any questions on how to make a submission, please ring the project officer, **[Project Officer name]**, on (08) 9222 7xxx.

Appendix B

Analysis of Bulk Cargo Jetty Extension Options

APPENDIX B

ANALYSIS OF BULK CARGO JETTY EXTENSION OPTIONS

1 = Not acceptable
2 = Acceptable
3 = Very Acceptable

	Option A – Southern Extension		Option B – Western Extension		Option C – Northern Extension	
	Requirements	**Rating**	**Requirements**	**Rating**	**Requirements**	**Rating**
Dredging Requirements	Nil	3	Minimal	2	Yes	1
Impacts on Existing Berths – Shipping	Nil	3	Moderate	2	Moderate	2
Increase in Risk Factors	No	3	Yes	1	Yes	1
Complexity of Cargo Handling Infrastructure	Simple	3	Complex	1	Complex	1
Impact on Existing Berths – Cargo Operations	Nil	3	High	1	High	1
Proximity to Landbased Facilities	Close	3	Medium	2	Distant	1
Safety Aspects	Nil	3	Some	2	Considerable	1
Capital costs	Low	3	Moderate	2	High	1
Timing of Construction	Suitable	3	Less Suitable	2	Difficulties anticipated	1
Score out of 27		**27**		**18**		**12**

* * *

Appendix C

Noise Modelling Study

Rochdale Holdings Pty Ltd A.C.N. 009 049 067 trading as:
HERRING STORER ACOUSTICS
P.O. Box 219
Suite 34, 11 Preston Street
Como, W.A. 6152
Telephone: (08) 9367 6200
Facsimile: (08) 9474 2579
Email: hsa@icenet.com.au

ALLAN HERRING M.I.E. AUST. M.A.A.S.
LYNTON STORER M.A.I.E.A., M.A.A.S.

KWINANA EXPORT FACILITY

NOISE EMISSION & IMPACT ASSESSMENT

BY

HERRING STORER ACOUSTICS

FOR

DAMES & MOORE

DECEMBER 1998

REFERENCE: 7072-98149-612

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E Source Sound Power Levels

F Map Showing Assessment Locations

Dames and Moore commissioned Herring Storer Acoustics to carry out an acoustic assessment of noise emission from the proposed Kwinana Export Facility. This facility will be used to load iron ore onto ships via a conveyor, screening and ship loading system. The ore will be transported by rail from the Koolyanobbing Mine site. The issues related to noise are deemed to be construction noise associated with the building of the facility, plant operational noise and the noise affects from the increased number of rail movements through residential areas.

As contractors or equipment for the construction of the plant has not been finalised, typical construction equipment has been used in the assessment. For the plant operation, noise levels have been based upon a combination of file data and that supplied by Kenrac Consultancy Pty Ltd (ref: Moore.doc) of the Esperance Port Facility. Train noise emissions have been based upon file data and previous similar assessments.

Construction is proposed to be carried out during day time hours from Monday to Saturday. The plant itself will operate intermittently depending upon when a ship is in dock, however due to the duration of operation, it is assessed as a 24 hour operation.

The nearest residential area to the proposed facility is approximately 2km to the south west. A caravan park is also located near these residences adjacent to the CBH Grain Terminal. In closer proximity to the facility is Wells Park and some commercial premises in which the noise emissions have also been assessed. The rail route between the Koolyanobbing Mine Site and Kwinana exists for the majority of the line where noise sensitive premises (Canning Vale etc) are assumed to be no closer than 30 metres to the line.

It is the objective of this study to predict the noise emissions from construction activities and operational activities, assess the impact to residential locations and commercial premises and indicate engineering controls and management strategies where necessary in accordance with the Environmental Protection (Noise) Regulations 1997.

1) SUMMARY OF FINDINGS & RECOMMENDATIONS

Noise levels due to the operation of the plant and train noise emissions comply with the specified criteria at all times. The sound power levels used in the predicative modelling were based on file data and measurements from the Esperance Port facility of similar equipment. These sound power levels should be used as a guide for either the specification and / or during detailed design.

Similarly, the sound power levels of the construction equipment has been based on file data and Australian Standard 2436-1981. These sound power levels should also be used for guidance for the quietest equipment reasonably available. The items of equipment used were chosen to be typical and if the equipment varies from that specified in this report, the noise emissions should be reassessed.

Noise emissions from construction are predicted to exceed the assigned levels as per Regulation 8 due to pile driving operations. All other equipment can operate and comply with these assigned levels. Construction will be carried out during day time hours only and as per Regulation 13, does not need to comply with the assigned levels of Regulation 8. However, a rule of thumb for the 'acceptable' level is +10 dB(A) above the assigned levels. Piling noise complies with this criteria at all locations.

Management practices are recommended for construction noise (see Section 5.1) to ensure noise emissions are within the limits as defined in this report. Amongst these practices is the recommendation for all construction equipment to have a sound power level rating (as defined in this report) prior to commencement of construction.

2) METHODOLOGY

Prediction of the noise level propagation to surrounding areas was achieved utilising the computer program ENM (Environmental Noise Model). This program incorporates various parameters including source sound power levels, ground topography and atmospheric conditions.

Using recognised algorithms the program then calculates the sound levels at distances from the source resulting in noise level contours which can be overlayed on an area plan.

Modelling was carried out in accordance with the Environmental Protection Authority's *"Draft Guidance for Assessment of Environmental Factors No. 8 - Environmental Noise"*. This defines wind conditions as 4m/s during the day time and 3m/s with a 2°C/100m temperature inversion during the evening and night time periods.

Sound power levels of all equipment have been developed from file data and from measurements made at the Esperance Port Facility of similar equipment by Kenrac Consultancy Pty Ltd and are shown in Appendix E.

Single point calculations have also been performed which rank the contribution of each source at a particular location i.e. nearest residence.

3) REGULATORY CRITERIA

3.1 CONSTRUCTION NOISE

Environmental noise is governed by the Environmental Protection (Noise) Regulations 1997. These regulations stipulate maximum allowable external noise levels determined by the calculation of an influencing factor which is then added to the base levels shown below. The influencing factor is calculated for the usage of land within the two circles, having a radius 100 metres and 450 metres from the premises of concern.

TABLE 1 - BASELINE ASSIGNED OUTDOOR NOISE LEVEL

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		$L_{A\,10}$	$L_{A\,1}$	$L_{A\,max}$
Noise sensitive premises at locations within 15 metres of a building directly associated with a noise sensitive use	0700 - 1900 hours Monday to Saturday	45 + if	55 + if	65 + if
	0900 - 1900 hours Sunday and Public Holidays	40 + if	50 + if	65 + if
	1900 - 2200 hours all days	40 + if	50 + if	55 + if
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	35 + if	45 + if	55 + if
Noise sensitive premises at locations further than 15 metres from a building directly associated with a noise sensitive use	All hours	60	75	80
Commercial Premises	All hours	60	75	80

Note: if - influencing factor

The above levels are conditional on no annoying characteristics existing in the noise of concern, such as tonality, amplitude modulation or impulsiveness. If such characteristics exist then any measured level is adjusted according to Table 2 below.

TABLE 2 - ADJUSTMENTS TO MEASURED LEVELS

Where **tonality** is present	Where **modulation** is present	Where **impulsiveness** is present
+5 dB(A)	+5 dB(A)	+10 dB(A)

Note: these adjustments are cumulative to a maximum of 15 dB.

The above criteria are the assigned levels in accordance with Regulation 8. In accordance with Regulation 13, construction noise is exempt from Regulation 8 if that work is only carried out between the hours of 0700 to 1900 on any day except Sundays and Public Holidays. Also, the following management practices are adhered to:-

a) Work is carried out in accordance with Section 6 of AS2436-1981 *GUIDE TO NOISE CONTROL ON CONSTRUCTION, MAINTENANCE AND DEMOLITION SITES.*

b) The equipment used on site is the quietest reasonably available.

If a noise management plan is to be prepared that:

i) The noise management plan (NMP) was prepared and given in accordance with the requirement, and approved by the Chief Executive Officer; and

ii) the construction work was carried out in accordance with the management plan.

In assessing noise from construction activities, Regulation 8 should be used as the level of noise that ideally should be sought. Further where the construction noise is significant for a relatively long period then a management plan should be prepared.

When work is carried out outside of the above hours, Regulation 8 does not apply providing the above is adhered to and;

a) A noise management plan is prepared and given to the CEO at least 7 days before construction commences and is approved by the CEO.

b) Written notice is given to the occupiers of all premises at which noise emissions received are likely to exceed those levels specified under Regulation 8 of the proposed construction work

c) It was reasonably necessary for the construction work to be carried out at that time.

3.2 OPERATIONAL NOISE

Operational noise must comply with the Environmental Protection (Noise) Regulations 1997 mentioned previously. The base levels are shown above in Table 2. Due to the influencing factor, the assigned level varies depending upon a residences locality with respect to industrial land, commercial land and major and secondary roads.

The following locations are used in this assessment and their locations are shown in Appendix F:

1) Caravan Park - Governor Road, Kwinana; adjacent to CBH Grain Terminal

2) 214 Kent Street, Rockingham - Closest residence

3) 179 Kent Street, Rockingham, - Location of monitoring carried out by the Department of Environmental Protection's Kwinana Branch

4) Wells Park, Wells Road Kwinana

5) Commercial Premises, corner of Wells Road and Rockingham Road, Kwinana.

The influencing factors for these locations have been calculated and the assigned levels shown below in Table 3 for Monday to Saturdays, day time and night time. Only the L_{A10} value is shown as it is considered that the L_{A1} and L_{Amax} values will not be significant. Locations 1 - 3 are assessed as "noise sensitive premises at locations within 15 metres of a building directly associated with a noise sensitive use". Location 4 is assessed as "noise sensitive premises at locations further than 15 metres from a building directly associated with a noise sensitive use" and Location 5 is assessed as commercial premises.

TABLE 3 - ASSIGNED OUTDOOR L_{A10} NOISE LEVEL

Location	Time of Day	
	Day time (0700 - 1900 hrs)	Night time (2200 - 0700)
1	56	46
2	51	41
3	47	37
4	60	60
5	60	60

All locations are influenced by the surrounding industrial areas and Area B of the Kwinana Policy Area within the meaning of the *Environmental Protection (Kwinana) (Atmospheric Wastes) Policy Approval Order 1992*.

As these locations are within close proximity to other industries and the assigned level for these residences is reportedly already being exceeded (Kwinana DEP report) the introduction of a new industry must not "significantly contribute" to the level at the residences as per Regulation 7(1)(a). The noise emission is considered to not significantly contribute when its emission is 5 dB(A) below the assigned level. This effectively reduces the assigned levels in Table 3 by 5 dB(A).

3.3 TRAIN NOISE

There are no Regulations governing noise emissions from trains in Western Australia, however the DEP are developing a policy to address this issue: *"Draft Environmental Impact Policy for Road and Rail Transportation Noise"*, hereafter termed the Policy. This Policy assigns internal maximum noise levels for 3 categories; New Residence/existing Transport, New Transport/Existing Residence and Modification of Existing Transport. In this instance, it is the Modification of existing Transport which is relevant. Table 4 below shows the acceptable levels for an increase of 1 train movement per hour. This will be the worst case in this instance.

TABLE 4 - APPLICABLE INTERNAL LEVELS FOR TRAIN NOISE EMISSIONS

Scenario		$L_{Adesign}$
MODIFICATION OF EXISTING TRANSPORT		
If Not Already Exceeding Existing LAdesign		
Bedrooms (2200 - 0700 hrs)	Outer Metropolitan	55 - 10*LOG(N) = 55
	Inner Metropolitan	60 - 10*LOG(N) = 60
Living Areas (0700 - 2200 hrs)		65 - 10*LOG(N) = 65
If already Exceeding Existing LAdesign		
Internal		$L_{AdesignP} + L_{AmaxE} - L_{AdesignE}$

N = number of train movements per hour

The existing $L_{Adesign}$ is calculated to be 55 dB(A) (assuming 3 movements per hour as a worst case as indicated by Westrail). The existing internal L_{Amax} is calculated to be 80 dB(A) based on a D Class locomotive and 10 dB(A) difference between internal and external noise levels. Therefore, the noise levels are already exceeding the existing LAdesign and it is the final row of Table 4 which applies. The proposed LAdesign is calculated to be 60 dB(A) based on the 1 train movement per hour increase. Therefore the allowable internal noise level is:

$$L_{AdesignP} + L_{AmaxE} - L_{AdesignE} = 60 + 80 - 55 = 85 \text{ dB(A)}$$

Hence, $L_{Adesign}$ equals 85 dB(A) internally or 95 dB(A) externally.

4) RESULTS

4.1 CONSTRUCTION NOISE

Predicted noise levels in the form of noise level contour maps are shown in Appendix A.

These were modelled for the following scenarios:

98149/01 Export Facility Construction Noise - Calm
98149/02 Export Facility Construction Noise - 4m/s North Westerly Winds

Single point calculations for locations 1 - 5 were calculated and are summarised below in Table 5. Appendix B contains the source rankings for each calculation.

TABLE 5 - RESULTS OF SINGLE POINT CALCULATIONS - CONSTRUCTION NOISE

Location(s)	Sound Pressure Level, dB(A)			
	Calm	Adjusted Level *	4m/s NW Winds	Adjusted Level *
1	39 (26)	49 (31)	46 (33)	56 (38)
2	38 (24)	48 (29)	45 (31)	55 (36)
3	36 (21)	46 (26)	44 (30)	54 (35)
4 & 5	62 (42)	72 (47)	63 (44)	73 (49)

( ) indicates noise level without pile driving
* Pile driving adjusted for impulsiveness, mobile equipment adjusted for tonality

4.2 OPERATIONAL NOISE

Predicted noise levels in the form of noise level contour maps are shown in Appendix C.

These were modelled for the following scenarios:

98149/03 Export Facility Operation - Calm
98149/04 Export Facility Operation - 4m/s North Westerly Winds
98149/05 Export Facility Operation - 3m/s North Westerly Winds & 2°C/100m Temperature Inversion

Single point calculations for locations 1 - 5 were calculated and are summarised below in Table 6. Appendix D contains the source rankings for each calculation.

TABLE 6 - RESULTS OF SINGLE POINT CALCULATIONS - OPERATIONAL NOISE

Location(s)	Sound Pressure Level, dB(A)		
	Calm	4m/s NW Winds	3m/s NW Winds & 2°C/100m
1	17	28	28
2	16	28	28
3	14	21	21
4 & 5	41	42	43

4.3 TRAIN NOISE

For the Policy, it is only the maximum noise level which is used for assessment hence, it is only the locomotive which is of concern. File data exists for L, D and P class locomotives. In this instance, 2 Q class locomotives will be coupled together. It has been estimated by Westrail, and used in previous assessments, that the Q class locomotive will be 3 dB(A) quieter than the P Class locomotive. The maximum noise level for the various locomotive classes are summarise below in Table 7.

TABLE 7 - MAXIMUM NOISE LEVELS FROM A PASSING LOCOMOTIVE

Locomotive Type	Maximum External Noise Level at 30 metres	Maximum Internal Noise Level at 30 metres
L Class	90	80
D Class	90	80
2 D Class	93	83
P Class	85	75
2 P Class	88	78
Q Class	82	72
2 Q Class	85	75

5) DISCUSSION AND ASSESSMENT

5.1 CONSTRUCTION NOISE

Although the assigned levels in Table 3 do not specifically apply to construction noise, a general rule of thumb for 'acceptable' levels is the assigned level + 10 dB(A). This would be perceived as a doubling of noise compared to the assigned level and is said to cause "sporadic complaints" [Noise - A Handbook for Inspectors, Public Health Department, Western Australia June 1976]. A comparison between the predicted levels, assigned levels and the 'acceptable' levels is shown below in Table 8.

TABLE 8 - COMPARISON BETWEEN PREDICTED LEVELS AND 'ACCEPTABLE' LEVELS

Location(s)	Sound Pressure Level, dB(A)			
	4m/s NW Winds	Adjusted Level #	Assigned Level *	'Acceptable' Level
1	46 (33)	56 (38)	51	61
2	45 (31)	55 (36)	46	56
3	44 (30)	54 (35)	42	52
4 & 5	63 (44)	73 (49)	55	65

( ) indicates noise level without pile driving
* 5 dB(A) subtracted from the assigned level so as to not significantly contribute
# Pile driving adjusted for impulsiveness, mobile equipment adjusted for tonality

It can be seen from the above table that the noise emissions during construction do not comply with the assigned levels of Regulation 8 due to pile driving at all locations by up to 18 dB(A). At locations 1 and 2, the noise emissions do comply with the 'acceptable' level. Noise emissions from all equipment other than pile driving comply with the assigned levels.

It is understood that construction work will be carried out during day time hours only and thus the following management practices during construction are recommended:

1) Ensure the quietest reasonably available equipment is used.

2) Ensure all equipment is maintained in near new condition in particular that any factory fitted noise controls are in place and in order i.e. exhaust silencer, enclosures etc.

3) As a minimum, all equipment should comply with the sound power level data in this report. If contractors do not have sound power data of their equipment, these should be determined by a qualified person prior to commencement.

4) If the equipment is greatly different to that used in this report, the model should be recalculated and reassessed.

For pile driving activities, the above procedures apply as well as:

1) Notify all residents and/or commercial premises where the assigned level is exceeded that this activity will be occurring, that they may experience higher than normal and distinct noise and the period for which this will occur.

2) Strictly limit operations to between 0700 and 1900 hours from Monday to Saturday. That is, no pile driving on Sundays or Public Holidays.

3) Monitor noise levels at locations 1 and 4 or 5 for piling operations. This can be by hand held meter over a 30 minute period providing downwind conditions exist or can be interpolated. The purpose of this monitoring is to ensure noise levels are in the order of those predicted herein.

5.2 OPERATIONAL NOISE

A comparison between the worst case predicted noise levels and the assigned levels is shown below in Table 9 for operational noise.

TABLE 9 - COMPARISON BETWEEN PREDICTED LEVELS AND ASSIGNED LEVELS

Location	Day time		Night time	
	Predicted	Assigned Level *	Predicted	Assigned Level *
1	28	51	28	41
2	28	46	28	36
3	21	42	21	32
4 & 5	42	55	43	55

* 5 dB(A) subtracted from assigned level so as to not significantly contribute.

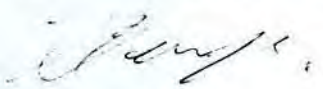
As can be seen, noise emissions for the plant operation comply at all locations for all times. If the noise was considered tonal and a + 5 dB(A) adjustment was applied to the predicted levels, the emissions would still comply at all locations for all times.

5.3 TRAIN NOISE

It is proposed to use two Q Class locomotives to haul the 83 wagons. Whilst these are travelling between the mine and Kwinana they are not subject to the Regulations but are subject to the Policy. However, once on the Kwinana Port Facility land they must comply with the Regulations and this has been included as part of the operational noise.

In terms of the Policy, the allowable internal noise level increases because the noise emissions from the proposed locomotives is less than that for the existing locomotives. That is, the existing internal maximum is 80 dB(A) which in accordance with the Policy is allowed to increase to 85 dB(A). Noise emissions from 2 Q Class locomotives are calculated to be 75 dB(A) internally which is significantly less than the allowable 85 dB(A). Therefore, noise emissions from the train travelling between the mine and Kwinana are seen to comply with the specified criteria.

Yours faithfully,
for **HERRING STORER ACOUSTICS**

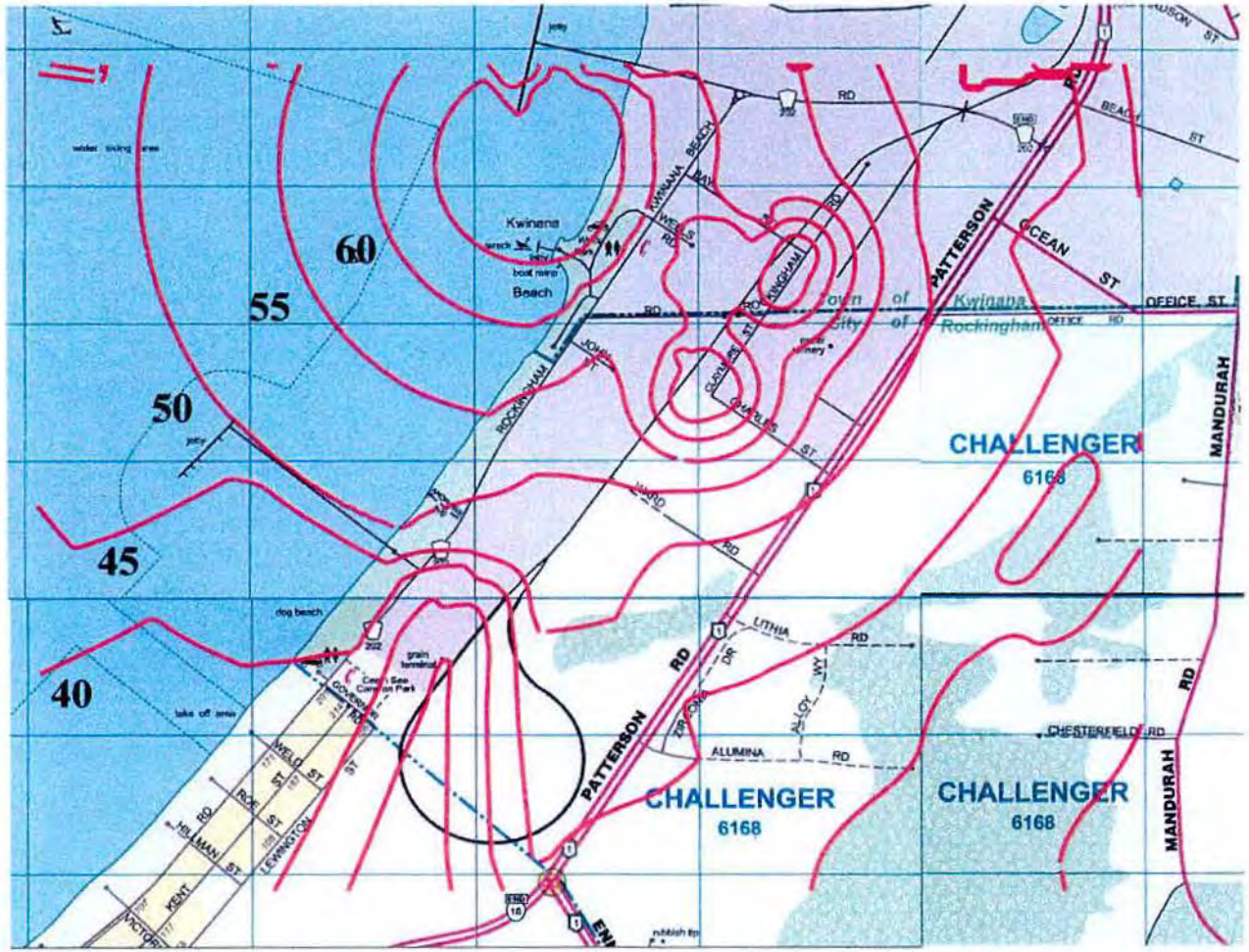


Terry George Checked: Lynton Storer

17 December 1998

APPENDIX A

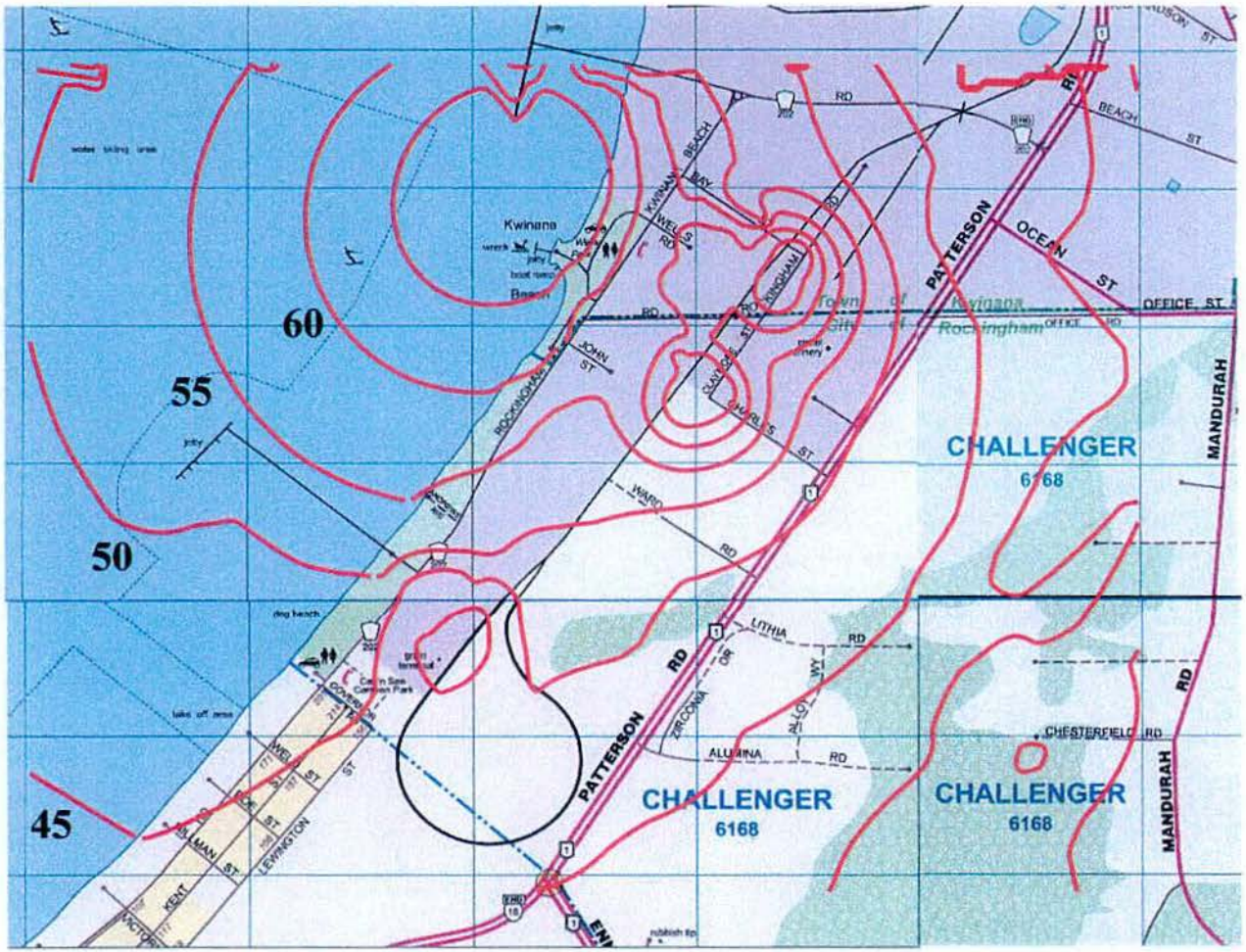
NOISE LEVEL CONTOURS - CONSTRUCTION



KWINANA EXPORT FACILITY
NOISE LEVEL CONTOURS dB(A) - CONSTRUCTION NOISE
CALM

Herring Storer Acoustics

Drg No. 98149/01



KWINANA EXPORT FACILITY
NOISE LEVEL CONTOURS dB(A) CONSTRUCTION NOISE
DAY TIME - 4m/s NORTH EASTERLY WIND

Herring Storer Acoustics

Drg No. 98149/02

APPENDIX B

SINGLE POINT CALCULATIONS - CONSTRUCTION

CONSTRUCTION NOISE
CALM

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 1 - CARAVAN PARK

	SOURCE TITLE	dB(A)
2	Piling Hammer	38.4
11	Concrete Truck	20.7
1	150t Crane	18.4
12	Concrete Truck	17.8
3	Mobile Equipment - CAT 980 FEL	15.1
7	Concrete Vibrators	4.9
4	Mobile Equipment - CAT 980 FEL	4.2
6	Diesel Welsing Machine	3.6
10	100kVA Genset	-.2
8	Power Tool	-1.9
5	Compressor 350cfm	-2.0
9	Power Tool	-2.2
	TOTAL	38.6

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 2 - 214 KENT STREET

	SOURCE TITLE	dB(A)
2	Piling Hammer	37.8
11	Concrete Truck	19.6
1	150t Crane	17.4
12	Concrete Truck	16.9
3	Mobile Equipment - CAT 980 FEL	13.8
4	Mobile Equipment - CAT 980 FEL	8.9
7	Concrete Vibrators	4.8
6	Diesel Welsing Machine	3.9
10	100kVA Genset	.1
8	Power Tool	-1.3
9	Power Tool	-1.5
5	Compressor 350cfm	-1.6
	TOTAL	38.0

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 3 - 179 KENT STREET

	SOURCE TITLE	dB(A)
2	Piling Hammer	36.2
11	Concrete Truck	17.1
1	150t Crane	14.9
12	Concrete Truck	14.7
3	Mobile Equipment - CAT 980 FEL	10.8
4	Mobile Equipment - CAT 980 FEL	6.6
10	100kVA Genset	5.4
7	Concrete Vibrators	3.7
6	Diesel Welsing Machine	3.2
5	Compressor 350cfm	-2.2
8	Power Tool	-2.2
9	Power Tool	-2.4
	TOTAL	36.4

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 4 - WELLS PARK

	SOURCE TITLE	dB(A)
2	Piling Hammer	62.0
6	Diesel Welsing Machine	35.6
11	Concrete Truck	35.0
1	150t Crane	34.5
7	Concrete Vibrators	33.9
3	Mobile Equipment - CAT 980 FEL	33.8
12	Concrete Truck	33.4
8	Power Tool	29.0
4	Mobile Equipment - CAT 980 FEL	28.6
10	100kVA Genset	26.3
5	Compressor 350cfm	26.2
9	Power Tool	25.6
	TOTAL	62.1

CONSTRUCTION NOISE
4m/s NORTH EASTERLY WINDS

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 1 - CARAVAN PARK

	SOURCE TITLE	dB(A)
2	Piling Hammer	45.5
4	Mobile Equipment - CAT 980 FEL	30.4
11	Concrete Truck	23.8
1	150t Crane	22.0
12	Concrete Truck	20.8
3	Mobile Equipment - CAT 980 FEL	20.2
7	Concrete Vibrators	17.4
6	Diesel Welsing Machine	15.5
10	100kVA Genset	15.3
9	Power Tool	14.0
8	Power Tool	13.7
5	Compressor 350cfm	11.0
	TOTAL	45.7

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 2 - 214 KENT STREET

	SOURCE TITLE	dB(A)
2	Piling Hammer	44.9
10	100kVA Genset	22.7
11	Concrete Truck	22.7
9	Power Tool	22.6
7	Concrete Vibrators	22.5
8	Power Tool	21.7
6	Diesel Welsing Machine	21.6
1	150t Crane	21.0
12	Concrete Truck	19.9
3	Mobile Equipment - CAT 980 FEL	18.9
5	Compressor 350cfm	17.3
4	Mobile Equipment - CAT 980 FEL	14.0
	TOTAL	45.1

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 3 - 179 KENT STREET

	SOURCE TITLE	dB(A)
2	Piling Hammer	43.3
6	Diesel Welsing Machine	23.9
7	Concrete Vibrators	23.7
8	Power Tool	20.9
9	Power Tool	20.6
11	Concrete Truck	20.1
1	150t Crane	18.5
5	Compressor 350cfm	18.1
12	Concrete Truck	17.7
3	Mobile Equipment - CAT 980 FEL	15.9
4	Mobile Equipment - CAT 980 FEL	11.6
10	100kVA Genset	8.9
	TOTAL	43.5

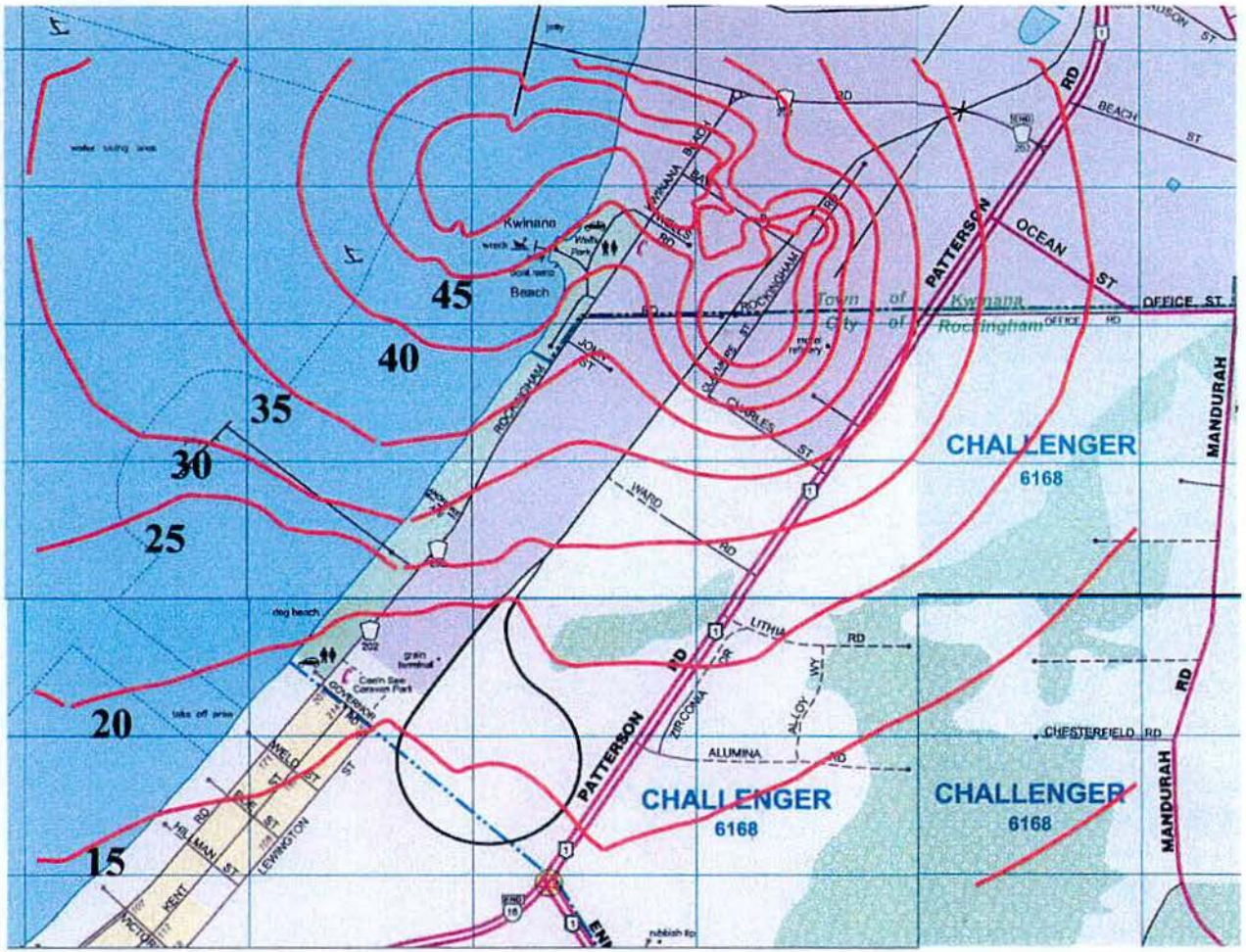
PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 4 - WELLS PARK

	SOURCE TITLE	dB(A)
2	Piling Hammer	63.1
6	Diesel Welsing Machine	36.9
12	Concrete Truck	35.4
11	Concrete Truck	35.1
1	150t Crane	34.8
7	Concrete Vibrators	34.7
3	Mobile Equipment - CAT 980 FEL	33.1
4	Mobile Equipment - CAT 980 FEL	31.8
8	Power Tool	31.4
9	Power Tool	28.4
5	Compressor 350cfm	28.1
10	100kVA Genset	26.4
	TOTAL	63.2

APPENDIX C

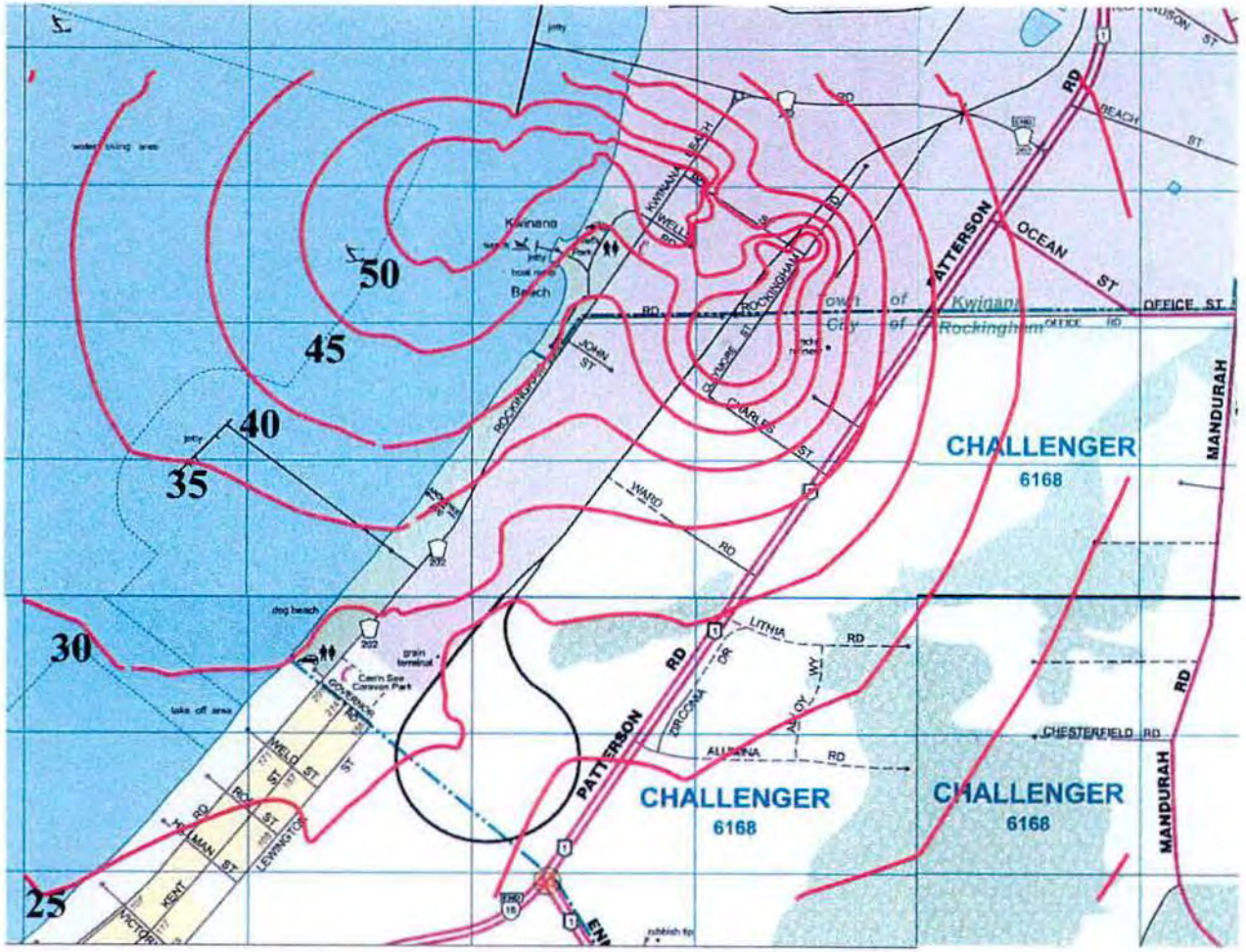
NOISE LEVEL CONTOURS - PLANT OPERATION



KWINANA EXPORT FACILITY
NOISE LEVEL CONTOURS dB(A) OPERATIONAL NOISE
CALM

Herring Storer Acoustics

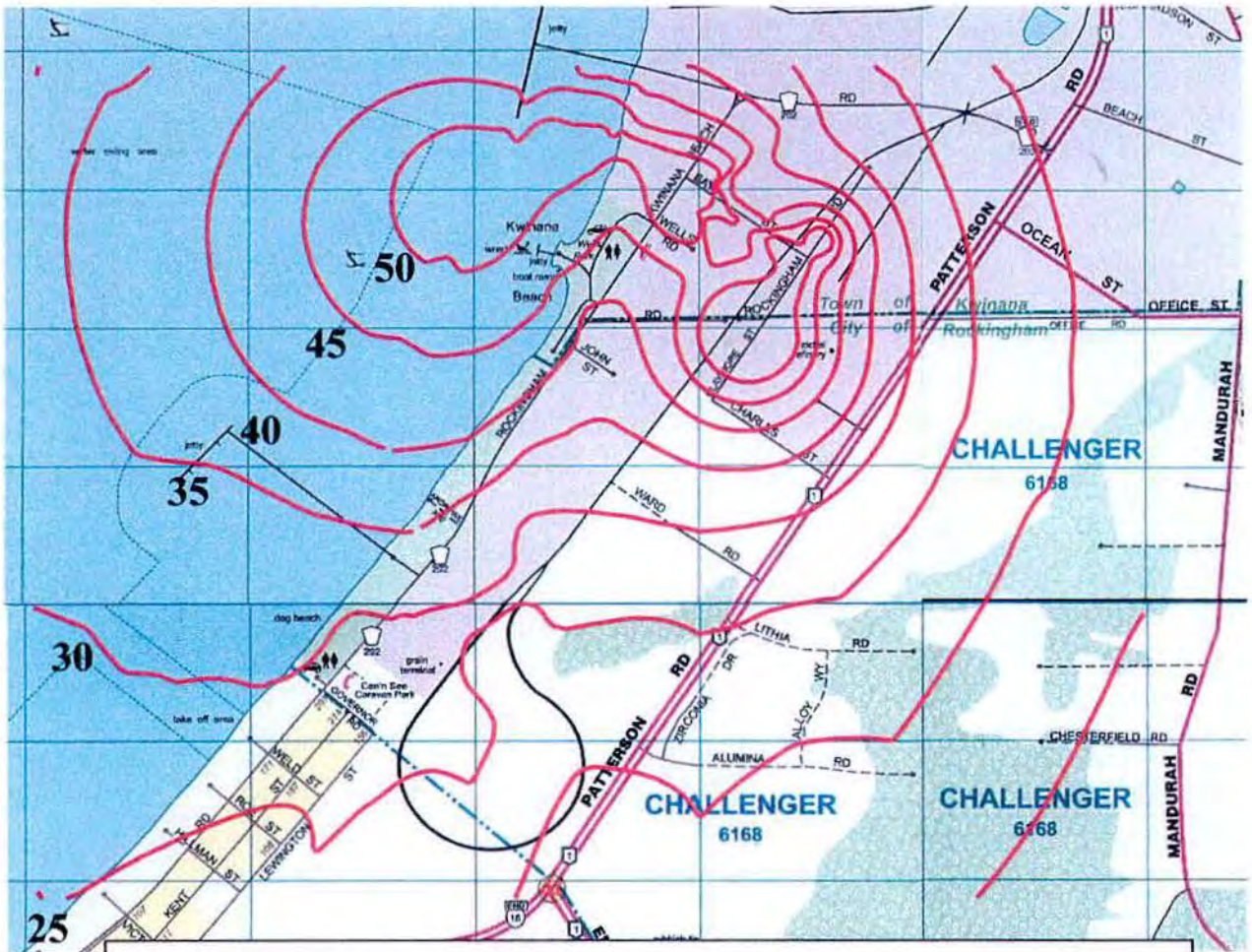
Drg No. 98149/03



KWINANA EXPORT FACILITY
NOISE LEVEL CONTOURS dB(A) OPERATIONAL NOISE
DAY TIME - 4m/s NORTH EASTERLY WIND

Herring Storer Acoustics

Drg No. 98149/04



KWINANA EXPORT FACILITY
NOISE LEVEL CONTOURS dB(A) OPERATIONAL NOISE
NIGHT TIME - 3m/s NORTH EASTERLY WIND &
2^{O}C/100m TEMPERATURE INVERSION

Herring Storer Acoustics

Drg No. 98149/05

APPENDIX D

SINGLE POINT CALCULATIONS - PLANT OPERATION

OPERATIONAL NOISE
CALM

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 1 - CARAVAN PARK

	SOURCE TITLE	dB(A)
5	ShipLoader	13.8
10	Conveyor 5 - Enclosed	9.7
4	Car Dumper	8.7
9	Conveyor 1 - Enclosed	7.9
6	Dust Collector	5.5
2	Conveyor 1 - Enclosed	-2.5
8	Conveyor 1 - Enclosed	-4.4
1	Idling Q Class Locomotive	-7.9
3	Conveyor 1 - Enclosed	-8.5
7	Screening Plant in Shed	-8.6
	TOTAL	17.1

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 2 - 214 KENT STREET

	SOURCE TITLE	dB(A)
5	ShipLoader	13.0
10	Conveyor 5 - Enclosed	9.0
4	Car Dumper	7.7
9	Conveyor 1 - Enclosed	7.3
6	Dust Collector	5.8
1	Idling Q Class Locomotive	-3.0
2	Conveyor 1 - Enclosed	-3.4
8	Conveyor 1 - Enclosed	-3.4
3	Conveyor 1 - Enclosed	-8.1
7	Screening Plant in Shed	-8.2
	TOTAL	16.5

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 3 - 179 KENT STREET

SOURCE	TITLE	dB(A)
5	ShipLoader	8.7
10	Conveyor 5 - Enclosed	7.1
6	Dust Collector	6.7
9	Conveyor 1 - Enclosed	5.6
4	Car Dumper	5.1
1	Idling Q Class Locomotive	-5.2
2	Conveyor 1 - Enclosed	-5.8
8	Conveyor 1 - Enclosed	-7.6
7	Screening Plant in Shed	-8.1
3	Conveyor 1 - Enclosed	-9.4
	TOTAL	14.0

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 4 - WELLS PARK

SOURCE	TITLE	dB(A)
5	ShipLoader	37.6
10	Conveyor 5 - Enclosed	34.9
9	Conveyor 1 - Enclosed	33.2
6	Dust Collector	32.5
4	Car Dumper	27.5
7	Screening Plant in Shed	20.8
8	Conveyor 1 - Enclosed	19.6
2	Conveyor 1 - Enclosed	12.8
1	Idling Q Class Locomotive	12.0
3	Conveyor 1 - Enclosed	9.4
	TOTAL	41.3

OPERATIONAL NOISE
4m/s NORTH EASTERLY WINDS

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 1 - CARAVAN PARK

SOURCE TITLE	dB(A)
5 ShipLoader	22.8
6 Dust Collector	20.8
8 Conveyor 1 - Enclosed	18.0
1 Idling Q Class Locomotive	16.8
10 Conveyor 5 - Enclosed	16.5
9 Conveyor 1 - Enclosed	14.6
3 Conveyor 1 - Enclosed	14.2
4 Car Dumper	13.6
7 Screening Plant in Shed	11.7
2 Conveyor 1 - Enclosed	1.9
TOTAL	27.5

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 2 - 214 KENT STREET

SOURCE TITLE	dB(A)
6 Dust Collector	24.9
5 ShipLoader	22.1
10 Conveyor 5 - Enclosed	15.9
7 Screening Plant in Shed	15.6
9 Conveyor 1 - Enclosed	14.0
3 Conveyor 1 - Enclosed	13.4
4 Car Dumper	12.5
8 Conveyor 1 - Enclosed	7.0
1 Idling Q Class Locomotive	1.9
2 Conveyor 1 - Enclosed	.9
TOTAL	27.9

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 3 - 179 KENT STREET

	SOURCE TITLE	dB(A)
5	ShipLoader	17.1
10	Conveyor 5 - Enclosed	13.8
9	Conveyor 1 - Enclosed	12.1
4	Car Dumper	10.0
6	Dust Collector	9.7
8	Conveyor 1 - Enclosed	2.0
1	Idling Q Class Locomotive	-.3
2	Conveyor 1 - Enclosed	-1.6
7	Screening Plant in Shed	-2.8
3	Conveyor 1 - Enclosed	-5.2
	TOTAL	20.6

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 4 - WELLS PARK

	SOURCE TITLE	dB(A)
5	ShipLoader	37.4
9	Conveyor 1 - Enclosed	35.5
6	Dust Collector	34.8
10	Conveyor 5 - Enclosed	34.6
4	Car Dumper	29.3
7	Screening Plant in Shed	24.6
8	Conveyor 1 - Enclosed	23.0
2	Conveyor 1 - Enclosed	15.6
1	Idling Q Class Locomotive	15.5
3	Conveyor 1 - Enclosed	12.8
	TOTAL	42.1

OPERATIONAL NOISE
3m/s NORTH EASTERLY WINDS & 2°C/100m TEMP INV

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 1 - CARAVAN PARK

	SOURCE TITLE	dB(A)
5	ShipLoader	23.1
6	Dust Collector	21.1
8	Conveyor 1 - Enclosed	18.3
1	Idling Q Class Locomotive	17.0
10	Conveyor 5 - Enclosed	16.7
9	Conveyor 1 - Enclosed	14.8
3	Conveyor 1 - Enclosed	14.4
4	Car Dumper	13.7
7	Screening Plant in Shed	12.5
2	Conveyor 1 - Enclosed	2.0
	TOTAL	27.8

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 2 - 214 KENT STREET

	SOURCE TITLE	dB(A)
6	Dust Collector	25.0
5	ShipLoader	22.4
10	Conveyor 5 - Enclosed	16.1
7	Screening Plant in Shed	15.8
9	Conveyor 1 - Enclosed	14.1
3	Conveyor 1 - Enclosed	13.6
4	Car Dumper	12.7
8	Conveyor 1 - Enclosed	7.2
1	Idling Q Class Locomotive	2.0
2	Conveyor 1 - Enclosed	1.0
	TOTAL	28.1

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 3 - 179 KENT STREET

	SOURCE TITLE	dB(A)
5	ShipLoader	17.4
10	Conveyor 5 - Enclosed	13.9
9	Conveyor 1 - Enclosed	12.2
4	Car Dumper	10.1
6	Dust Collector	9.8
8	Conveyor 1 - Enclosed	2.2
1	Idling Q Class Locomotive	-.2
2	Conveyor 1 - Enclosed	-1.5
7	Screening Plant in Shed	-2.6
3	Conveyor 1 - Enclosed	-5.1
	TOTAL	20.8

PROGRAM ENM SOURCE RANKING
SINGLE POINT CALCULATION

LOCATION 4 - WELLS PARK

	SOURCE TITLE	dB(A)
5	ShipLoader	38.8
9	Conveyor 1 - Enclosed	36.0
10	Conveyor 5 - Enclosed	35.7
6	Dust Collector	34.9
4	Car Dumper	30.0
7	Screening Plant in Shed	24.7
8	Conveyor 1 - Enclosed	23.1
2	Conveyor 1 - Enclosed	16.1
1	Idling Q Class Locomotive	15.9
3	Conveyor 1 - Enclosed	13.2
	TOTAL	43.0

APPENDIX E

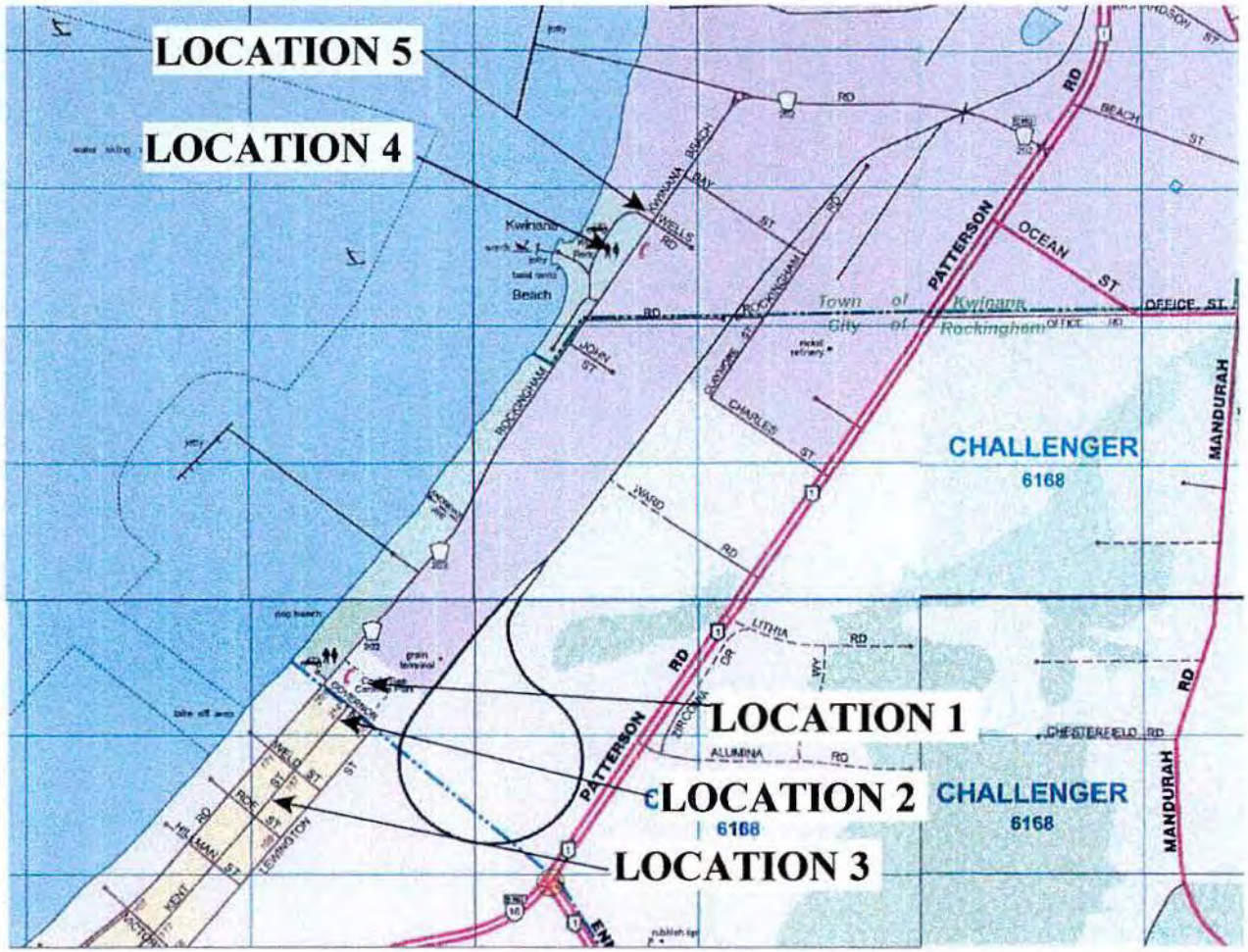
SOURCE SOUND POWER LEVELS

EQUIPMENT SOUND POWER LEVELS

Equipment	No. off	Octave Band Centre Frequency (Hz)								dB(A)
		31.5	63	125	250	500	1k	2k	4k	
Construction Equipment										
Piling Equipment	1	125	131	131	120	119	121	118	114	125
Compressor 350cfm	1	89	105	100	96	97	95	92	88	100
Diesel Welding Machine	1	94	110	105	101	102	100	97	93	105
Concrete Vibrators	1	105	111	111	100	99	101	98	94	105
Power Tools	2	99	99	97	94	99	101	99	94	105
150t Crane	1	99	115	110	106	107	105	102	98	110
100kVA Genset	1	89	105	100	96	97	95	92	88	100
CAT 980 Front End Loader	2	106	106	104	101	106	108	106	101	112
Concrete Trucks	2	111	115	114	115	108	107	106	97	113
Plant Equipment										
2Q Class Idling Locomotives	1	94	94	96	89	97	86	84	80	96
Enclosed Conveyor /100 metres	-	86	85	89	93	89	91	82	80	94
Car Dumper	1	101	101	102	103	104	102	100	92	107
Ship Loader	1	96	96	96	98	101	101	96	92	104
Dust Collector	1	103	104	110	106	102	98	95	91	104
Screening Plant in Shed	1	88	88	88	90	93	93	88	84	96

APPENDIX F

MAP SHOWING ASSESSMENT LOCATIONS



KWINANA EXPORT FACILITY
LOCATIONS OF ASSESSMENT LOCATIONS

Appendix D

Actions from the Southern Metropolitan Coastal Waters Study

APPENDIX D

ACTIONS FROM THE SOUTHERN METROPOLITAN COASTAL WATERS STUDY

CONTRIBUTION OF NUTRIENTS TO COCKBURN SOUND

Action 1

Under Part V of the *Environmental Protection Act* (EP Act), the DEP will require that major contributors of nutrients to Cockburn Sound implement a nutrient management strategy to ensure that the draft Environmental Quality Objective (EQO) 2 (ie. the maintenance of ecosystem integrity) for these waters (excluding designated exclusion zones) is achieved by 31 March 2001, with appropriate annual environmental performance indicators.

Action 2

Under Part V of the EP Act, the DEP will require that major contributors of nutrients to Cockburn Sound jointly undertake annual water quality monitoring programmes in Cockburn Sound until the draft EQO 2 (ie. the maintenance of ecosystem integrity) for these waters (excluding designated exclusion zones) is finalised, and the finalised EQO 2 is achieved and maintained for at least two years. Future monitoring requirements will be reviewed at this time.

Action 3

Under Part V of the EP Act the DEP will not issue works approvals or licenses to increase nutrient loads, particularly nitrogen to Cockburn Sound until the draft EQO 2 (ie. the maintenance of ecosystem integrity) for these waters (excluding designated exclusion zones) is finalised, and the finalised EQO 2 is achieved and maintained for at least two years at levels that would permit consideration of further loadings.

Impact of Proposed Kwinana Export Facility

The proposed Kwinana Export Facility will not be a contributor of nutrients to Cockburn Sound. There will be no deliberate discharges into Cockburn Sound of any sort as a result of the Kwinana Export Facility.

TRIBUTYLTIN

Action 9

The DEP will recommend to the Minister for the Environment that the Western Australian Government request the Australian Government to initiate further action with international agencies to prohibit the use of TBT-based antifouling paints on all vessels, or reduce allowable TBT release rates to levels that would achieve the criteria for draft EQO 2 (ie. the maintenance of ecosystem integrity) and draft EQO 3 (ie. maintenance of aquatic life for human consumption) in Perth's coastal waters.

Action 10

The DEP will recommend that the Western Australian Minister for the Environment request ANZECC to review its existing, recommended TBT release rate for anitfouling paints used on Australian registered vessels (including naval vessels) greater than 25 m in length, with a view to prohibiting the use of this substance or reducing the allowable TBT release rates to levels that would achieved the criteria for draft EQO 2 (ie. the maintenance of ecosystem integrity) and draft EQO 3 (ie. maintenance of aquatic life for human consumption) in Perth's coastal waters.

Action 11

The DEP will recommend to the Minster for the Environment that the Western Australian Government coordinate the implementation of incentives to encourage 'TBT-free" ships to Western Australian Ports.

Action 13

The DEP will request the Department of Health to investigate the potential health implications of the exceedances of the TBT criterion for draft EQO 3 (ie. maintenance of aquatic life for human consumption) and if necessary, implement a public health risk minimisation strategy.

Impact of Proposed Kwinana Export Facility

One additional ship associated with the Project per week will visit the Port. The FPA will monitor the amount of TBT in the sediments around the BCJ.

CONTAMINATION OF COCKBURN SOUND

Action 14

Under Part V of the EP Act the DEP will require that the major contributors of arsenic to Perth's southern metropolitan coastal waters investigate the ecological implications of the current levels of arsenic in sediments with a view to the development of arsenic criteria, and implement (if necessary) an arsenic management strategy, with appropriate environmental performance indicators, to ensure draft EQO 2 (ie. the maintenance of ecosystem integrity) sp., for areas influenced by their discharges (excluding designated exclusion zones) is achieved by 31 of December 1999.

Action 15

Under Part V of the EP Act the DEP will require that the major contributors of zinc to Perth's southern metropolitan coastal waters investigate the ecological implications of the current levels of zinc in mussels with a view to the development of zinc criteria, an implement (if necessary) a zinc management strategy, with appropriate environmental performance indicators, to ensure draft EQO 2 (ie. the maintenance of ecosystem integrity), for areas influenced by their discharges (excluding designated exclusion zones) is achieved by 31 of December 1999.

Action 16

That, in relation to possible synergistic effects of heavy metal and polycyclic aromatic hydrocarbon contamination on benthic faunal communities, the DEP will require that major discharges of these substances to Cockburn Sound conduct investigations (e.g. ecotoxicological) to evaluate this possibility, develop criteria as appropriate and implement a management strategy as required by 31 December 2001.

Action 17

Under Part V of the EP Act the DEP will require that current major contributors of heavy metals and polycyclic aromatic hydrocarbons to Cockburn Sound jointly undertake triennial monitoring programmes of basin sediment contamination and benthic community structure in Cockburn Sound from 1998 until the relevant criteria are met or until the input of these contaminants to Cockburn Sound from these contributors ceases.

Impact of Proposed Kwinana Export Facility

The Proponents will not be contributors of arsenic, zinc, heavy metals or polycyclic aromatic hydrocarbons into Cockburn Sound. The FPA has implemented a number of changes on the BCJ to prevent spillages of materials from the BCJ into Cockburn Sound.

The FPA will undertake sediment monitoring to identify any changes in contaminants (such as iron ore) around the BCJ. Should significant changes, attributable to the Project be observed around the BCJ, management measures will be implemented to eliminate or minimise any further impacts.

BALLAST WATER

Action 23

The DEP will recommend to the Minister for the Environment that the Western Australian Government request the Australian Government to encourage the International Maritime Organisation to expedite, as a matter of high priority, finalisation of an Annex to the International Convention for the Prevention of Pollution from Ships (MARPOL 1973/78) requiring new vessels, especially bulk carriers and tankers, to have upgraded ballast water management systems.

Action 24

The DEP will recommend to the Minster for the Environment that the Western Australian Government request the Australian Government to encourage the IMO to research strategies, such as in-transit sterilisation of ballast waters, to minimise risk of introduced organisms from ballast water discharge to Australian waters.

Action 25

The DEP will recommend to the Minister for the Environment that the Western Australian Government request the Australian Government to implement incentives to encourage ships with appropriate ballast water management systems.

Action 26

The DEP will request the Department of Transport and the FPA to further encourage ship operators to adopt the guidelines recommended in the Australian *Draft Ballast Water Management Strategy.*

Action 27

The DEP will request the Department of Transport and FPA to jointly examine the Australian Draft Ballast Water Management Strategy and implement practical measures as soon as possible.

Action 28

The DEP will request the CSIRO Centre for Research on Introduced Marine Pests to give high priority to research activities related to the formulation of ballast water risk minimisation strategies.

The Impact of the Proposed Kwinana Export Facility

The FPA is proactive in its involvement with the Western Australian Ballast Water Working Group. Currently, discharge of ballast water into Cockburn Sound requires the approval of the Harbour Master, who takes into account FPA regulations and AQIS ballast water guidelines. The FPA will initiate a baseline survey for introduced marine pests in both the inner and outer harbour. In addition, the FPA are in the process of reviewing the Australian Ballast Water Management Strategy with the Department of Transport.

DISCHARGES INTO COCKBURN SOUND

Action 31

The DEP will request the FPA in collaboration with major port users to implement codes of practice for vessel wash down and cargo handling operations to further reduce and minimise impacts on the aesthetic quality of Perth's coastal waters from these operations in Port waters.

The Impact of the Proposed Kwinana Export Facility

The FPA has initiated a draft Common User Agreement to be signed by all users of the BCJ which will include environmental issues.

The FPA has implemented containment improvements on BCJ1 and 2 to make them both "zero" discharge facilities.

The FPA is developing an EMS, part of which will include a Contingency Plan which will be implemented in the event of a spill.

The FPA are in the process of finalising a policy to ban in-water hull cleaning of ships in Port waters.

* * *

Appendix E

Social Impact Assessment

KWINANA EXPORT FACILITY

SOCIAL IMPACT ASSESSMENT

Prepared for the Fremantle Port Authority

Alison Day & Associates

February 1999

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1. INTRODUCTION

A social impact assessment (SIA) has been undertaken for the Fremantle Port Authority, Koolyanobbing Iron and Westrail proposal for an iron ore export facility at the Kwinana Bulk Cargo Jetty .

The purpose of the SIA is to identify and address social issues associated with the proposed export facility and recommend impact management strategies where appropriate.

The SIA was commissioned by the Fremantle Port Authority and took place over the period November 2 to December 22 1998. The SIA was undertaken by independent consultant Alison Day of Alison Day & Associates.

The brief for the SIA was to undertake a study of social issues associated with the proposed export facility to provide information for inclusion in the Consultative Environmental Review (CER) document being prepared by consultants Dames & Moore on behalf of the proponents.

The Department of Environmental Protection (DEP) Guidelines for the CER require the following social issues to be addressed:

- Public health and safety
- Visual amenity
- Aboriginal culture and heritage
- Recreation

The SIA consultant was required by the Fremantle Port Authority to:

- Address issues identified in the DEP Guidelines (with the exception of Aboriginal heritage which is addressed in the CER but not in this SIA)

- Undertake a survey of users of Wells Park/Kwinana Beach (in response to a request from the Town of Kwinana) in order to determine who uses Wells Park, the foreshore and the coastal waters around the project area, and to determine if, and how, they would be impacted by the proposed iron ore export facility

- Provide guidance to identify other issues that may require addressing

Recognising that the proposed export facility has the potential to have local and non-local social impacts, this SIA considers a range of social issues relevant to Kwinana and Rockingham, and considers social issues pertinent to Esperance and the transport of iron ore by rail from Koolyanobbing to Kwinana.

2. METHODOLOGY

This SIA follows the traditional approach to SIA which is:

- Scoping of issues
- Identification of stakeholders
- Community involvement
- Assessment and evaluation of impacts
- Formulation of impact management strategies

A ***Framework for a Social Impact Assessment*** was prepared by Alison Day & Associates and was provided to Dames & Moore, the Fremantle Port Authority, the City of Rockingham, the Town of Kwinana and the Department of Environmental Protection for information and comment. This framework is included as Appendix A and outlines the approach to the SIA. The SIA consultant had meetings with officers from the City of Rockingham, Town of Kwinana and Department of Environmental Protection to discuss the SIA process and obtain information for the SIA.

Scoping of issues involved the identification of a range of social issues associated with the proposed export facility. Social issues were identified by consultation with the City of Rockingham and Town of Kwinana, a review of public submissions made to the Minister for the Environment (appealing the initial level of environmental assessment set for the proposed export facility), a review of submissions made to the Town of Kwinana (objecting to the planning application for the proposal), a review of relevant literature, by contact with members of the public who are stakeholders for the project (eg. representatives of local organisations) and by visits to the project area and its environs.

A list of stakeholders was compiled to identify persons/organisations who need to be consulted at this stage and those who should be targeted during the public review period for the CER. Stakeholders were identified by information provided by Dames & Moore, the City of Rockingham and the Town of Kwinana, and by information supplied by members of the public. Community involvement in the SIA is described in detail in Section 3.2.

The assessment and evaluation of impacts involved the identification of potential social impacts associated with the proposed export facility. Comment was then made about the significance of the impacts (ie. the degree of effect) and whether there will be beneficial or adverse effects on communities. This phase relies on the results of the public input, site visits and the expertise of the SIA consultant.

Impact management strategies have been formulated to avoid or reduce potentially adverse social impacts.

3. COMMUNITY INVOLVEMENT

3.1 PREVIOUS COMMUNITY INVOLVEMENT

According to information provided by Fremantle Port Authority, there have been meetings held by the proponents with the following since April 1998:

City of Rockingham
Rockingham residents (at a public meeting)
Town of Kwinana
City of Cockburn
Southern Metropolitan Regional Council
IP14 Consultative Committee
Rockingham Chamber of Commerce
Kwinana Industries Co-ordinating Committee
CSBP
Anaconda Nickel
Coogee Chemicals
Gull Petroleum
WMC
Summit Fertilisers
Brambles WA
BP Kwinana
Indian Ocean Shipping
CBH
Through Comnet, representatives of:

- Wattleup Citizens Association
- Coolbellup Community Organisation
- Coolbellup Progress Association
- Hope Valley Progress Association
- Kwinana Watchdogs

There were twenty appeals against the level of environmental assessment originally set by the EPA for the export facility proposal. These submissions to the Minister for the Environment identify a range of social issues which are addressed in this study.

Issues raised by members of the public at the City of Rockingham Special Council Meeting (June 2 1998) and a Special Meeting of Electors (July 20 1998), have also been taken into account.

3.2 COMMUNITY INVOLVEMENT ASSOCIATED WITH THE SIA

Given previous community involvement, the future public review period for the CER, and the timeframe available for the SIA, the consultation process undertaken for the SIA focussed on information gathering from key stakeholders.

As such, there was contact with:

- The City of Rockingham
- Town of Kwinana
- The Shire of Esperance
- The City of Cockburn
- Representatives of key community/environmental groups
- Representatives of the local business community
- Wells Park and beach/coastal water users
- Local politicians
- Other stakeholders (eg. residents)

The different approaches used are depicted in the following table.

Table 1: Approach to information gathering

Stakeholder group	Meetings	Telephone	Correspondence	Survey
City of Rockingham/Town of Kwinana	*	*	*	
Shire of Esperance		*	*	
City of Cockburn		*	*	
Community/environmental group representatives		*	*	
Business community representatives		*	*	
Wells Park and beach/coastal water users				*
Local politicians			*	
Other stakeholders identified (eg. some local residents)		*	*	

Community involvement in the SIA was primarily by means of:

- A survey of users of Wells Park, Kwinana Beach and jetty
- An invitation to stakeholders to provide comment for the SIA

The Survey

The purpose of the survey exercise was to:

- To gain an indication of how many people use:
  - Wells Park
  - Kwinana Beach fishing jetty
  - Kwinana Beach and coastal waters
- To understand the range of uses of the area (eg. fishing, walking, swimming, exercising dogs)
- To identify how often users visit the area and if they would visit the area over the Christmas/New year period
- To identify if people were aware of the project
- To identify if people's use of the area would be affected by the project and, if so, how
- To identify what can be done to minimise the impacts of the proposed facility on use of the area
- To identify opinions about the proposed export facility

At the request of the Fremantle Port Authority, the survey was undertaken as a matter of priority and took place over a three week period in late November/early December. It involved visits at different times of the day, on different days of the week, when conditions were warm to hot. There were two elements to the survey:

- A count of people in the Wells Park/Kwinana Beach area and recording of where they were and what they were doing (the Observation Survey)
- Interviews with a proportion of people in the area using: Wells Park, the car park, the fishing jetty and the beach/coastal waters.

The number of people surveyed for each site visit varied according to the total number of persons counted but was generally at a rate of more than 20%.

While people may have been counted more than once (ie. if they were present for more than one site visit) care was taken to ensure that people were interviewed only once. The survey was piloted.

Overall, a maximum of 286 persons (210 adults and 76 children) were counted during seven visits to the area and sixty five people were interviewed. Therefore, 23% of all persons counted, and 31% of all adults counted, were interviewed. As it was the purpose of this survey to deal with adults, a survey rate of almost one third has a high confidence level and is certainly statistically valid.

As interviews were undertaken without prior knowledge of the community, were conducted on different days of the week and at different times, and as there was random selection of interviewees (at different locations), there is no reason to suspect that more interviews would necessarily provide significantly different results.

Due to the nature of the survey it can also be construed that the 31% of adults interviewed are likely to be representative of the overall user population ie. there is no reason to believe that the people surveyed, who are from a diversity of areas and who gave a range of opinions, would have significantly different responses from other park/beach users not surveyed.

Examples of the Observation Survey Form and the Interview Form are included in Appendix B Both survey forms were presented to the Town of Kwinana for comment as the Town had requested that the survey exercise take place. The results of the surveys are provided in Section 4.3 and in Appendix C.

Invitation to stakeholders

Over thirty stakeholders were identified and sent a letter which outlined the SIA study and invited contact with the consultant and contribution towards the SIA. The list of stakeholders sent correspondence, and a copy of the letter, are included in Appendix D.

3.3 PERSONS/ORGANISATIONS WHO HAVE PROVIDED DIRECT INPUT TO THE SIA

Persons/organisations who responded to the invitation to make a contribution to the SIA are:

Town of Kwinana (several officers)
City of Rockingham (Principal Planner)
City of Cockburn (Manager Environmental Services)
Shire of Esperance (Shire Planner)
Mr John Smedley (Cockburn Power Boats Association)
Rockingham Beach Traders and Owners Association
Ms L Junghans "Sunsets" restaurant, Rockingham
M and A Veal (Kent St., Rockingham)
Kwinana Industries Council
Mrs D Hesse (Calista)
Ms W Durant (Waikiki)

4. THE SOCIAL ISSUES

4.1 INTRODUCTION

This Section addresses the social issues that have so far been identified in relation to the proposed export facility. These social issues have been identified through a review of relevant documentation, consultation with local government, contact with the local community and several visits to the proposed project site and coastal areas within Kwinana and Rockingham.

To address the social issues it is intended to:

- define the issue (identifying the component parts)
- describe what people have expressed concern about
- clarify what is actually proposed and describe the social impacts that can be expected
- identify where impact management strategies will be required

The issues identified in this SIA are :

- The visual impact of the facility
- Recreational use of Wells Park, the foreshore and coastal waters
- Tourism
- Economic impacts
- Public health and safety
- Environmental issues: noise and dust
- Access
- Heritage
- Social impacts associated with alternatives to the proposal

Social issues are seen by some parties as the significant issues to be addressed in the environmental approval process.

The social issues raised to date, and the public concern demonstrated in City of Rockingham meetings, in correspondence to the Minister for the Environment (in relation to the initial level of environmental assessment), in correspondence to the Town of Kwinana, in the local media and in contributions to this study, have diverse origins. These origins include:

Existing environmental concerns

- the cumulative impacts of development within Cockburn Sound
- current environmental problems
- previous dust issues in Esperance

Existing social concerns

- current social impacts (noise from trains and industrial operations)
- Kwinana Beach is the only beach available to the public in the Town of Kwinana

Concerns associated with the export facility proposal

- the level of environmental assessment originally set by the EPA for the project
- the limited information available to the community
- the nature and timing of the initial consultation process (mid 1998)
- the absence, to date, of a SIA for the proposal
- the future use of the export facility (number of ships, trains, types of material to be exported)
- creation of a small number of permanent jobs

It is recognised (and indicated by the Wells Park/Kwinana Beach survey) that many members of the public would not be aware of the export facility proposal and that those who are aware have different levels of knowledge about the proposal.

People who are currently concerned and/or opposed to the proposal may therefore not always have adequate information about the proposal and the impact management strategies which can be implemented. The public release of the CER will provide the public with detailed information and may alleviate concerns for some.

Given the existing community concerns about current and future development in and around Cockburn Sound, it can be expected that the release of the CER will attract considerable attention from the public. Further social issues may be identified during the public review period for the CER.

4.2 VISUAL IMPACT

The visual impact of the proposed export facility has been considered in relation to:

- Users of Wells Park
- Users of the Kwinana Beach foreshore, jetty and coastal waters
- Users of the coast to the south of the project area
- Rockingham residents/businesses

Concerns raised by the community which relate to visual amenity include the following:

- Potential impacts on Wells Park

- Potential loss of amenity for the last stretch of beach in the Town of Kwinana available to the public
- Potential impact on the visual amenity for the Cockburn Sound coastline and beyond
- Potential impacts on the visual amenity of Rockingham residents and visitors
- Cumulative visual impact
- The scale of the facility and the ability of various colours to minimise the impact
- The adequacy of proposed landscaping

The main visual components of the export facility will be the:

- Berthing jetty as a southern extension of the existing Bulk Cargo Jetty (a 410m extension south west of Berth 2 at an angle of 150 degrees)
- Bulk material ship loader, the top of which is 36m above the jetty (and 41m above sea level)
- Open steel pile access jetty (5m above sea level) and enclosed conveyor (18m above the deck of the jetty)
- Iron ore storage shed (60m x 330m and 27m high)
- Conveyor on land (low level and goes underneath Kwinana Beach Road)

The current Bulk Cargo Jetty extends for 400m from the beach and berths 1 and 2 (running almost in a north-south direction) are 480m in length.

Persons interviewed in the Wells Park/Kwinana Beach survey were shown photos showing the superimposed locations of the proposed access jetty and berthing jetty.

What are the visual impacts?

From Wells Park

Users of Wells Park can currently see an existing shed to the north (Brambles Bulk Terminal), the existing Bulk Cargo Jetty facility out to sea (only some sections from some areas of the park) and the CBH facility to the south. To reach the park from the north and east they have to travel past industrial land uses including Coogee Chemicals, CSBP, Gull Petroleum and the WMC Nickel Refinery.

People using the picnic, barbecue and playground facilities in the park are expected to have minimal views, if any, of the proposed facility. Due to the terrain, only the top of the ship loader, and possibly some sections of the access jetty (and conveyor), will be visible. Those standing in the park looking out to sea will see portions of the access jetty and berthing jetty and ship loader (depending on where they are standing).

Those standing in the car park between the park and the beach will have clearer views of the jetties and ship loader. Those travelling to the park will see the iron ore storage shed and

conveyors and portions of the shed will also be visible from the park (the shed will be approximately 250m from the northern boundary of the park and from the liquor store/deli).

While elements of the facility will be visible to some users of Wells Park it is not considered that there will be a significant visual impact on users of the park, indeed, only two persons of the sixty five interviewed for the park/beach survey raised the issue of visual impact - and these were users of the beach not the park.

For users of the park, the proposed facility would not be a visually intrusive element and the facility will not be incongruous with the existing landscape.

From Kwinana Beach

People using the beach and jetty will have clear views to the north of the access jetty and conveyor and clear views out to sea of the berthing jetty and ship loader. The access jetty will be approximately 450m north from the fishing jetty and the end point of the proposed southern berthing jetty will be approximately 400m from the fishing jetty.

Only two of the forty three people interviewed on the beach and jetty raised the issue of visual impact. This may be due to a number of factors - they did not think of the issue at the time of interview, they are used to the current views out to sea with the Bulk Cargo Jetty to the north and the CBH facility and Garden Island causeway to the south, they did not comprehend the extent of the visibility issue (although photographs with the jetty superimposed were shown to interviewees) or they did not see the visibility of the facility as an issue. In fact, people were more likely to be concerned about environmental impacts.

From areas to the South

Some concerns have been raised about the visibility of the proposed export facility from areas to the south including the Rockingham coastline. Visits were made to Governor Road Reserve (over 1.5 km from the proposed berthing jetty), Bell Park (over 3 km from the berthing jetty) and Churchill Park (over 3.5 km from the berthing jetty), the visits indicated that the proposal is likely to be considerably or partially concealed (depending on the viewing location) by the CBH jetty/conveyor and berthing facility - a significant visual element in Cockburn Sound. Ship movements will be visible but are less likely to be considered intrusive.

Given the distance factor and the degree of concealment likely to be provided by the CBH facilities at sea, there will not be a significant visual impact on users of the beaches and coastal parks in Rockingham.

The export facility will not have a significant visual impact on residents and businesses in Rockingham. The storage shed is over 2 km from Governor Road (the most northern road in the residential area) and would be obscured by vegetation and/or housing and/or the CBH facility.

The current Bulk Cargo Jetty is over 2.5 km (straight line distance) from the residential area and is largely obscured by the CBH jetty. Residents and businesses on Rockingham Road who have views to the north would have vistas dominated by the CBH jetty. The proposed export facility will be a distant element in a view dominated by the CBH facility.

Mitigation

Although this was not considered a concern for the majority of users surveyed, visual impact for users of Kwinana Beach and Wells Park can be minimised by:

- Painting structures to harmonise with the local environment
- Providing screening vegetation around the storage shed and along access roads
- Upgrading landscaping within Wells Park (particularly the northern and western portions)

Positioning the berthing jetty in a different direction (preferably in a northerly orientation) would also reduce visual impact from Kwinana Beach (and areas to the south). The CER provides information as to why other jetty positions are not considered to be feasible.

4.3 RECREATIONAL USE OF WELLS PARK, THE FORESHORE AND COASTAL WATERS

The impact of the proposed export facility on recreation has been considered in relation to:

- Users of Wells Park
- Users of the Kwinana Beach foreshore, jetty and coastal waters
- Users of the coast to the south of the project area

Concerns raised by the community in relation to recreation include the following:

- The cumulative impact of industry on recreational fishing
- Potential impacts on users of Wells Park (views, noise, dust)
- Wells Park is an important recreational resource and the only beach which the public can use in the Town of Kwinana
- Wells Park is used for social occasions and for workers having lunch
- Wells Park is used by many ethnic groups (especially over the Christmas period)
- The Kwinana Beach boat ramp is the only ramp in area and is well used

Wells Park is predominantly used for picnics, barbecues and children's recreation. Kwinana Beach is used for swimming, sunbathing and walking and appears to be a popular spot for people with young children. The Kwinana jetty is used predominantly for fishing. There is a boat ramp near the jetty but little boating activity was observed during site visits for this SIA. There is no water skiing permitted in this area.

What are the impacts?

General

The proposed export facility will not limit access to Wells Park and the coast and will not physically intrude upon the park.

The proposed access jetty (and conveyor) will pass over the beach in the vicinity of the Brambles Bulk Terminal (a storage shed about 450m north of the Kwinana Beach fishing jetty). This section of the beach is not heavily used as most people tend to congregate near the fishing jetty and car park areas. The Fremantle Port Authority has advised that public access to the beach in the vicinity of the proposed conveyor is not expected to be restricted.

The access jetty and berthing jetty will intrude in the ocean but will have minimal impact on recreational use due to the distance of the berthing jetty offshore and the fact that the facility is adjoined to an existing jetty rather than being a stand alone structure. The new jetty falls within an area already designated and charted as a restricted area for commercial shipping only, and it is estimated that there will only be 40 - 50 ships per annum for iron ore export.

Swimming, and recreational fishing from the Kwinana Beach Jetty and from the shore and boats, can continue.

Survey results

To identify impacts on recreational use, a Wells Park/Kwinana Beach survey was conducted by Alison Day & Associates in November/December 1998.

Sixty five users of this area were interviewed. This represents an overall interview rate of 23% as a maximum of 286 persons (adults and children) were counted over seven visits to the area, and an interview rate of 31% of all adults using the area. The responses provide an indication of the views of users towards the facility and the kind of impacts the facility is expected to have.

Details of the survey methodology are provided in Section 3.2 and the full results are provided in Appendix C. Below is a summary of the key findings of the survey.

Who uses Wells Park and the adjacent foreshore and waters?

The survey revealed that users come from a diverse number of locations. Of the 65 persons interviewed, 35 (54%) came from the local area (suburbs of Kwinana, Rockingham and Cockburn), 26 (40%) came from suburbs elsewhere in Perth (eg. South Guildford, Balga, Duncraig) and 4 (6%) came from the country. Overall, 18 respondents (28%) came from the Town of Kwinana and 14 (21%) came from the City of Rockingham.

How is the area used?

People were using Wells Park, the car park, the fishing jetty and the beach on all occasions that the survey was conducted in the area. On some occasions, there were people boating just offshore.

The beach and park tended to be used by groups and the fishing jetty tended to be used by individuals and couples. There were significant numbers of children using the beach which appears to provide safe conditions for the very young. Adults use the area for a variety of activities, the main ones being fishing, recreation, swimming and picnicking. Children were mostly observed swimming.

The survey was deliberately taken on different days and at different times to get an indication of use. The maximum counts recorded for each survey visit are shown in the table below.

Table 2: Wells Park/ Kwinana Beach user counts

Survey	Date	Time	Max no. of people observed*
1	Weds Nov 18	5-7 pm	28
2	Sat Nov 21	4.30 -6.30 pm	67
3	Tues Nov 24	12.45 - 2.30 pm	22
4	Sat Nov 28	10.15 - 12.15 pm	29
5	Sun Nov 29	1.30 - 3.30 pm	62
6	Thurs Dec 3	1.15 - 3 pm	21
7	Sat Dec 5	1.15 - 3.15 pm	57
Total			286

* Two counts were undertaken each survey visit. The maximum number of people observed at any one time is recorded here.

There was continuous use of the area during all survey visits, with maximum use being on weekends. The survey showed that the beach was the busiest area. The totals of the maximum usage recorded for three distinct areas are:

Area	Persons*
Beach	124
Wells Park	114
Fishing jetty	59

(* for each area the maximum counts for all 7 site visits were totalled)

Frequency of visitation to the area was very varied amongst those interviewed. Twenty eight per cent of those interviewed visited more than once per week and fourteen per cent more than once per month. Fourteen per cent were visiting the area for the first time this year and twelve per cent were visiting the area for the first time.

When asked whether they would visit the Park/beach in the Christmas- New Year period, thirty one respondents said yes, thirty two said no and two were not sure. Of those who said 'yes', thirteen said they would visit twice, eleven said they would visit once, four would visit three times, two would visit more often and one was unsure how often they would visit.

Awareness of the export facility proposal

Fifty survey respondents (77%) were not aware of the proposal and fifteen (23%) were. This limited awareness is partly due to the large proportion of park/beach visitors who were non local.

Opinion of the proposal

Those interviewed were given a brief, basic, description of the proposed export facility and shown photos with the proposed jetty/conveyor superimposed. Of the respondents, twenty four (37%) said that they supported the proposal, eighteen (28%) objected to the proposal, eighteen (28%) indicated that they have no opinion and five (8%) indicated that they do not know. People who supported the project included local residents and workers and people from elsewhere in the metropolitan region. Of the supporters, 9 persons (37.5%) were from the Rockingham/Kwinana area.

Of the eighteen who object to the proposal, fourteen believe that the facility would affect their use of the area. Of the objectors ten (55.5%) were from the Rockingham and Kwinana areas, seven from elsewhere in the metropolitan region and one from the country.

Will the facility affect use of the park/beach?

Forty seven respondents (72%) said that the facility would not affect their use of the area. Eighteen respondents (28%) said the facility would affect their use. Of these, the reasons give are outlined in Table 3 below.

Opportunities for impact mitigation

In response to the question: "What should be done to minimise this effect on your use?" People offered the following comments:

- Do not build facility (10 responses - from local and non-local persons)
- Nothing can be done (2 responses)
- Retain in Esperance
- Position jetty in other direction
- EPA impose restrictions
- Prevent dust and noise
- Take care of environment
- Provide opportunity to fish from new jetty

Table 3: Reasons given as to how the proposal may affect use of the area

Reason	Response rate
Pollution (marine, air)	12
Impact on fishing	4
Impact on beach use	2
Visual impact	2
Ship traffic	2
Don't want industry at all/more industry	2
Concerned about existing facility	1
Noise	1
Would not use area	1

Comments

The location of the proposed export facility, and the survey results, suggest that impacts on recreation will be minimal. People will still be able to access recreational areas and use those areas in the same way they do now.

The main concerns in relation to recreational use are those of marine and air pollution. People need to be reassured that the technology to manage, and respond to, environmental issues is adequate and that there will be regular monitoring of emissions. Environmental issues and their management are addressed in detail in the CER.

It is recognised that future use of the Bulk Cargo Jetty, and further industrial development in the East Rockingham Industrial Park, may have greater effects on recreation within Wells Park and the beach/coastal environment. The future of the park (and beach) as a public recreational resource is a community concern.

The ***East Rockingham Industrial Park Strategic Development Plan Supporting Technical Document*** (1991) prepared by the Kwinana Industries Co-ordinating Committee states:

"The current low key development of Wells Park as a local recreational area is supported. However, any improvements which might attract an increase in the number of people visiting the area should not be undertaken, as they will contribute to increased societal risk which may further constrain development of the heavy industrial core". (page 41)

While there are no societal risks associated with the export of iron ore, significant improvements to Wells Park would not be supported by government and continued industrial development in the vicinity of the park may ultimately pose sufficient risks that the viability of the park as a recreational resource will be compromised.

Mitigation

For this proposal, measures that could be considered in order to reduce the impact of the facility and/or enhance recreational enjoyment include:

- Reconstruction of the damaged section of recreational jetty (including the ladder) as current neglect suggests a limited lifespan.
- No operations, or reduced operations, over the Christmas/New Year period

4.4 TOURISM

The impact of the export facility on tourism has been considered in relation to:

- Kwinana Beach
- Rockingham

Concerns raised by the community in relation to tourism include the following:

- Visual impacts
- Noise issues
- Dust issues
- The image that the area is becoming more industrial

The infrastructure for the export facility is considered unlikely to have a significant impact on tourism. The components of the facility are within land zoned for industrial uses, there will be no intrusion into Wells Park, physical impacts on Kwinana Beach are limited to the access jetty (with its conveyor) and the main visual impacts are confined to users of Kwinana Beach.

The survey conducted for this SIA did not indicate that people would stay away from Wells Park or Kwinana Beach if the proposal proceeds. People who use this area drive through an industrial estate and put up with industrial vistas now and the proposal is not regarded as making a significant difference to the area except for the visual impact of some components of the facility. Even though people understood the visual components of the proposed facility, visual impact was not a significant concern. The key concern was the potential for marine pollution.

Most of the concern relating to tourism has come from the Rockingham community. Here there are concerns that the recent and current initiatives to boost tourism (foreshore improvements, increasing number of restaurants on Rockingham Road, improved car parking) will be undermined by the impacts of the proposed export facility.

Due to Council and community efforts, tourism in Rockingham is considerably healthy despite the presence of industrial development in the region. However there are concerns that the cumulative effect of further industrial development in Cockburn Sound may have an impact on that tourism.

As stated elsewhere, from the Rockingham coastline the export facility will be partially obscured (if not significantly obscured in some locations) by the CBH jetty. The presence of the CBH jetty and the distance of the Bulk Cargo Jetty and other export facility infrastructure from Rockingham will not result in a significant visual impact for people in the Rockingham area.

A number of environmental concerns have been raised in relation to tourism. Noise (from trains) may impact on some tourists to Rockingham. Noise is considered to be an environmental issue and is addressed in the CER. Dust is also considered to be an environmental issue and is addressed in the CER. Issues relating to the marine environment are also addressed in the CER.

Mitigation

To ensure that tourism is not adversely affected by the proposed export facility the following could be considered:

- Communication between the proponents and representatives of the local tourism industry to exchange information and address issues

4.5 ECONOMIC IMPACTS

Economic impacts have been considered in relation to:

- Employment
- Tourism
- Esperance

Concerns raised by the community in relation to economics include the following:

- The project will generate a small number of jobs
- The potential for the loss of jobs in Rockingham as visitor numbers decline

- Potential impacts on the mussel farm in Cockburn Sound (Note: there is a proposal to relocate the mussel farm to provide more secure tenure)
- Potential impacts on the marine environment and professional fishermen

Employment

The proposal will require a construction workforce of over 200 people over a 16 month period. Construction jobs will be available to the local workforce (depending on skill requirements).

Six people will be employed on project once it becomes operational. In addition to the jobs created directly for the project, there will be a spin-off effect to the local economy, including increased trade to local businesses, local materials suppliers, local contractors etc.

With the adoption of a range of strategies to reduce impacts on the marine environment, the proposal should not impact on the fishing industry in Cockburn Sound.

Tourism

The survey conducted for this SIA identified that the people who use Wells Park and the beach include locals and people from different parts of the metropolitan area. The latter could be construed as tourists but they would not necessarily purchase goods and services in Kwinana and Rockingham as many people appeared to be self-sufficient with food and drinks and several come to the area to collect mussels and fish - obtaining a 'free feed'.

Any reduction in visitors to the area could be construed as a drop in tourism numbers but would not necessarily be a drop in tourist dollars spent in the region.

Impacts on tourism in Rockingham are addressed in Section 4.4

Esperance

Different opinions have been expressed regarding the impact on the Esperance economy if the export facility relocates to Kwinana.

Employment losses are expected with a reported 12 to 13 Westrail employees likely to lose work in the region (however jobs will be generated for the transport of iron ore by rail to Kwinana) and the potential for some loss of employment for port workers.

There is a view that the current export of iron ore at Esperance is relatively small in relation to the current and proposed export of grains and that the loss of the iron ore export trade would not be significant to the town. An alternative view is that the iron ore trade is an important component of the export trade from Esperance and that the relocation would result in a loss and the loss of a potentially greater iron export trade.

The CER provides information about the current iron ore export trade through Esperance and the reasons for relocating to Kwinana. The CER indicates that a move to Kwinana is required to achieve greater export volumes.

Other major shipping projects are planned for Esperance (eg. CBH expansion) although it is not clear whether these will make upfor any losses due to a relocation of the iron ore export trade.

This SIA has not been able to reach a conclusive view but impacts on the Esperance economy of relocating the iron ore export trade are unlikely to be significant.

4.6 PUBLIC HEALTH AND SAFETY

Possible public health and safety issues are related to:

- Industrial activity
- Shipping
- Marine pollution
- Road/rail interface

Concerns raised by the community in relation to public health and safety include the following:

- Iron ore export is not a hazardous industry but can have nuisance and health effects (dust and noise)
- Existing concerns about air quality
- More ships in area may impact on recreational fishing
- Potential for impacts from ballast water
- Potential for contamination of mussels
- Potential for accidental spillage
- Kwinana Beach Road is a designated safety route (emergency route)
- Extra trains crossing Kwinana Beach Road could pose risks

These issues are addressed in the CER and a range of preventative and responsive strategies are proposed to ensure acceptable levels of safety and environmental impact.

4.7 ENVIRONMENTAL ISSUES: NOISE AND DUST

4.7.1 Noise

Noise issues which the community have identified in relation to the proposed facility include:

- Need for noise measurements now and after facility developed
- Need for more noise monitoring
- Existing noise in the area will be exacerbated - noise is a major issue now (particularly for some Rockingham residents)
- Noise during construction (level and duration)
- Noise associated with the facility - impact on users of Wells Park, Rockingham residents
- Noise and vibration from trains along entire route and in Kwinana
- Concern that noise is amplified by water
- Noise at night
- Need for noise management strategies

Noise issues and management strategies are addressed in the CER.

The potential noise impacts associated with trains is a community concern. The proposal would mark the re-introduction of iron ore carrying trains into the metropolitan area as such activity did occur prior to 1984.

The proposed export facility will require iron ore to be transported to Kwinana by train from Koolyanobbing. The train would travel through the Wheatbelt and then through metropolitan Perth to Kwinana.

The iron ore trains will pass through, or pass adjacent to, the metropolitan suburbs of: Kwinana Beach, Naval Base, Hope Valley, Wattleup, Yangebup, South Lake, Bibra Lake, Jandakot, Leeming, Canning Vale, Langford, Thornlie, Kenwick, Beckenham, East Cannington, Welshpool, Forrestfield, High Wycombe, Hazelmere, South Guildford, Midland, Bellevue, Swan View, Midvale, Middle Swan, and then through the Swan Valley.

The train would cross several roads including: Morrison Road (Swan View/Midvale), Lloyd St (Midland), Albany Highway (Kenwick), Spencer Road (Thornlie), Nicholson Road (Canning Vale), Forrest Road (Bibra Lake), Yangebup Road (Yangebup), Russell Road (Yangebup), Hope Valley Road (Hope Valley) and Kwinana Beach Road (Kwinana Beach).

However putting this in context, there are other trains using this route every day (22 trains per day going to Kwinana) and the proposed export facility will require two trains, each operating on a 28 hour cycle (a maximum of 2 trains, or 4 train movements per day).

4.7.2 Dust

Community concerns regarding dust issues are associated with:

- the proposed export facility
- the transport of iron ore by trains

Community concerns raised in relation to dust include:

- Potential impact on health
- Potential impact on exteriors and interiors of buildings
- Potential impact on tourist businesses (eg. outdoor cafes in Rockingham)
- Potential impact on marine environment and beaches
- Previous dust issues at Esperance facility
- Current dust issues
- Need for ambient dust level measurements for monitoring

Along with noise, dust is currently a major community concern. Dust issues are an environmental issue and are addressed in the CER.

4.8 ACCESS

Access is not a significant community concern, but issues raised by the community in relation to access include:

- Maintenance of access to industries along Kwinana Beach Road for emergency situations
- Kwinana Beach Road/Patterson Road intersection has existing problems
- Potential for disruption to road traffic flow due to trains
- Potential for road/rail accidents at rail crossings

The Fremantle Port Authority is an associate member of the Kwinana Industries Council which develops and operates the Kwinana Industries Mutual Aid (KIMA) Plan. KIMA addresses emergency access/egress needs for the area.

Access issues for the Kwinana Beach Road/Patterson Road area are the subject of a study recently commissioned by the Kwinana Industries Coordinating Committee (of which the Fremantle Port Authority is a member). The draft report was not available at the time of this SIA study.

While the proposed export facility does not require a change to public access to Wells Park and Kwinana Beach, and to existing industrial land uses, the train movements may cause some minor disruptions to traffic flow, especially when both rail crossings over Kwinana Beach Road are activated at the same time by a train over 900m in length.

4.9 HERITAGE

The European heritage of the Kwinana Beach area was addressed in the Environmental Referral document submitted to the Department of Environmental Protection. No additional issues have been raised as a part of this SIA. Aboriginal heritage is addressed in the CER.

4.10 ALTERNATIVES TO THE PROPOSAL

In theory the alternatives to the current proposal are:

- Provide a berthing jetty in a different position on the Kwinana Bulk Cargo Jetty
- Use of another site in the metropolitan area (including the Kwinana industrial strip)
- Provide an export facility outside of the region
- Remain in Esperance

The proponent has considered alternative berthing options for the Bulk Cargo Jetty (options to the west and north) but has dismissed these on safety, environmental and capital expenditure grounds.

The proponent has also considered other ports (eg. Bunbury and Geraldton) and other facilities at Kwinana (eg. CBH and BHP jetties). The reasons for these facilities not being suitable are addressed in the CER.

It could be argued that the social (and environmental) impacts of using the existing Bulk Cargo Jetty, and placing infrastructure in an appropriately zoned location with existing rail infrastructure, are likely to be lower than the impacts of establishing an entirely new facility in the metropolitan region or elsewhere. However, this would depend on the alternative sites available and no detailed information on alternative locations has been provided for this SIA.

As the current iron ore export facility at Esperance is working effectively in relation to the management of environmental impacts, the retention of the facility in Esperance would be beneficial to the Town in terms of employment and economic benefits.

The retention of the facility in Esperance would also alleviate the concerns expressed by some members of the public in Kwinana/Rockingham about the potential impacts of the facility. However, it is recognised that remaining in Esperance is not an option for Koolyanobbing Iron in relation to its plans for expansion of the export trade.

The proposal to locate at the Kwinana Bulk Cargo Jetty should be acceptable from a social impact point of view if environmental safeguards and other mitigation measures are implemented.

5. KEY FINDINGS

Wells Park

While elements of the facility will be visible to some users of Wells Park it is not considered that there will be a significant visual impact on users of the park. For users of the park, the proposed facility would not be a visually intrusive element and the facility will not be incongruous with the existing landscape.

The proposed export facility will not limit access to Wells Park (and the coast) and will not physically intrude upon the park. People will still be able to use the park in the same way they do now.

Future use of the Bulk Cargo Jetty, and further industrial development in the East Rockingham Industrial Park, may have greater effects on recreation within Wells Park and the beach/coastal environment. The future of the park (and beach) as a public recreational resource is a community concern.

Kwinana Beach

People using the beach and jetty will have clear views to the north of the access jetty and conveyor and clear views out to sea of the berthing jetty and ship loader. However, all but two of the forty three people interviewed on the beach or jetty did not regard the proposal as having a visual impact. The survey of beach and park users revealed that visual amenity is not a significant concern.

The proposed access jetty (and Conveyor) will cross the beach in the vicinity of the existing Brambles Bulk Terminal (north of the Kwinana Beach fishing jetty) but this section of the beach is not heavily used as most people tend to congregate near the fishing jetty and car park areas. Access to the beach in the vicinity of the proposed conveyor is not expected to be restricted.

The access jetty and berthing jetty will intrude in the ocean but will have minimal impact on recreational use due to the distance of the berthing jetty offshore and the fact that the facility is adjoined to an existing jetty rather than being a stand alone structure.

Swimming, and recreational fishing from the Kwinana Beach jetty, shore and boats, can continue.

The location of the proposed export facility, and the survey results, suggest that impacts on recreation will be minimal .

The main concerns in relation to recreational use are those of marine and air pollution. People need to be reassured that the technology to manage, and respond to, environmental issues is adequate and that there will be regular monitoring of emissions.

People in Rockingham
Given the distance factor and the degree of concealment likely to be provided by the CBH jetty, it is not considered that there will be a significant visual impact on users of the beaches and coastal parks in Rockingham.

Due to distance and the presence of the CBH facility (at sea and on land), the export facility will not have a significant visual impact on residents and businesses in Rockingham.

Therefore for people in Rockingham, it is considered that the proposed facility will be a distant element in a view dominated by the CBH facility.

Tourism
The infrastructure for the export facility is considered unlikely to have a significant impact on tourism. The components of the facility are within land zoned for industrial uses, there will be no intrusion into Wells Park, physical impacts on Kwinana Beach are limited to the access jetty (with its conveyor) and the main visual impacts are confined to users of Kwinana Beach.

The survey conducted for this SIA did not indicate that people would stay away from Wells Park or Kwinana Beach if the proposal proceeds.

Most of the concern relating to tourism has come from the Rockingham community. Here there are concerns that the recent and current initiatives to boost tourism will be undermined by the impacts of the proposed export facility. It is important that the tourism industry is not detrimentally affected by the proposed export facility and the CER addresses the environmental issues of concern to members of the Rockingham community.

Economic impacts
Direct employment will be created with employment for two hundred people in the construction phase and six people in the operational phase and there will be spin-off effects for the local economy.

This SIA has not been able to reach a conclusive view but impacts on the Esperance economy of relocating the iron ore export trade are unlikely to be significant.

Public health and safety
These issues are addressed in the CER and a range of preventative and responsive strategies are proposed to ensure acceptable levels of safety and environmental impact.

Noise
Noise is a concern that has been raised by the community for both the construction and operational phases of the project and noise issues and their management are addressed in the CER.

Dust
Dust is also a concern to the community who are looking for reassurance that dust emissions can be managed. The CER addresses dust management issues.

Access
The proposed export facility does not require a change to public access to Wells Park and Kwinana Beach, and to existing industrial land uses.

Heritage
The proposal will not impact upon items of European heritage.

Alternatives to the proposal
This SIA did not have the opportunity to assess the impacts of locating the facility at alternative locations, however, the proposal to locate at the Kwinana Bulk Cargo Jetty should be acceptable from a social impact point of view if environmental safeguards are implemented.

6. SUMMARY OF IMPACT MITIGATION STRATEGIES

Visual impact
Although this was not considered a concern for the majority of users surveyed, visual impact for users of Kwinana Beach and Wells Park can be minimised by:

- Painting structures to harmonise with the local environment
- Providing screening vegetation around the storage shed and along access roads
- Upgrading landscaping within Wells Park (particularly the northern and western portions)

Recreation
For this proposal, measures that could be considered to reduce the impact of the facility and/or enhance recreational enjoyment include:

- Reconstruction of the damaged section of recreational jetty (including the ladder) as current neglect suggests a limited lifespan.
- No operations, or reduced operations over the Christmas/New Year period

Tourism
To ensure that tourism is not adversely affected by the proposal the following could be considered:

- Communication between the proponents and representatives of the local tourism industry to exchange information and address issues

7. SOURCES OF INFORMATION

Reports/publications/Minutes

City of Rockingham. Minutes of Special Council Meeting 2 June 1998 and Minutes of Special Meeting of Electors 20 July 1998

City of Rockingham Statement of Planning Policy No. 7.1 Environmental Protection (Industrial Development)

Dames & Moore (1998) **Environmental Referral Kwinana Export Facility**

Kwinana Industries Co-ordinating Committee (1988) **Kwinana Beach, Wells Park Structure and Land Use Plan**. Prepared by Taylor and Burrell and Tract Consultants.

Kwinana Industries Co-ordinating Committee and Dames & Moore (1991) **East Rockingham Industrial Park Strategic Development Plan. Supporting Technical Document.**

The Local Link. Linking Business with the local community in Rockingham Kwinana 1998-99 (Directory)

Town of Kwinana Town Planning Scheme No. 2

Submissions

Submissions made to the Minister for the Environment (appealing the original level of assessment set by the EPA)

Submissions received for the SIA

Other sources

Town of Kwinana

City of Rockingham

Shire of Esperance

APPENDIX A

PROPOSED KWINANA EXPORT FACILITY

FRAMEWORK FOR A SOCIAL IMPACT ASSESSMENT

Prepared by Alison Day & Associates

November 1998

1.0 INTRODUCTION

A social impact assessment (SIA) is required for the proposed export facility at the Kwinana Bulk Cargo Jetty.

The purpose of the SIA will be to identify and address all relevant social issues associated with the proposed export facility and recommend appropriate impact management strategies.

The SIA will form a component of the Consultative Environmental Review (CER) report being prepared by Dames & Moore on behalf of Koolyanobbing Iron Pty Ltd, Fremantle Port Authority (FPA) and Westrail, in accordance with the requirements of the Department of Environmental Protection (DEP).

The CER will be released for public review and assessed by the DEP under the *Environmental Protection Act 1986.*

The SIA will be undertaken by a consultant with competence in social impact assessment and community consultation: Alison Day of Alison Day & Associates.

2.0 METHODOLOGY

This SIA will follow the traditional approach to SIA which is:

- Scoping of issues
- Identification of stakeholders
- Community involvement
- Collection of data
- Assessment and evaluation of impacts
- Formulation of impact management strategies

2.1 Scoping of Issues

The social issues to be addressed will be primarily identified through a review of relevant documentation, consultation with local government, limited community consultation and site visits. Issues are expected to include:

- The visual impact of the facility (for residents in Rockingham and users of the coast)
- Recreational use of Wells Park, the foreshore and coastal waters
- Tourism
- Access (disruptions to road traffic flow, changes to access)
- Noise (from the facility and trains)

- Dust
- Public health and safety (industrial activity, road/rail interface)
- Economic impacts (employment, impacts for Kwinana/Rockingham and the impacts of relocating the export facility from Esperance)
- Heritage
- Planning and development
- The image of the area/public perceptions
- Social impacts associated with alternatives to the proposal

2.2 Identification of stakeholders

A list of stakeholders will be compiled to identify persons/organisations who need to be consulted at this stage and those who should be targeted during the public review period for the CER.

Stakeholder identification will be largely achieved through liaison with the FPA and Dames & Moore, the local government authorities and Wells Park/beach surveys.

2.3 Community involvement

Given previous community involvement and the future public review period for the CER, it is intended that there be a two-phase consultation process:

Phase 1: Information seeking
Phase 2: Response to the CER

Phase 1: Information seeking

This will involve contact with:

- The City of Rockingham and Town of Kwinana
- The Shire of Esperance
- The City of Cockburn
- Representatives of key community/environmental groups
- Representatives of the local business community
- Wells Park and beach/coastal water users
- Local politicians

The different methodologies to be used are depicted in the following table.

Phase 2: Response to the CER

Following the public review period the Department of Environmental Protection will summarise the submissions made by the general public and relevant government agencies. The proponent will have an opportunity to respond to these submissions before the EPA provides it advice to the Minister for the Environment. The SIA consultant will assist with the preparation of any responses to submissions made regarding the social impact of the project.

Approach to community consultation

Techniques

Stakeholder group	Meeting	Telephone	Correspondence	Survey
City of Rockingham/Town of Kwinana	*	*	*	
Shire of Esperance		*	*	
City of Cockburn			*	
Community/environmental group representatives	*	*		
Business community representatives	*	*		
Wells Park and beach/coastal water users				*
Local politicians			*	

2.4 Collection of data

Data collection will be achieved through contact with the FPA, Dames & Moore, the local government authorities, community and business representatives, relevant government departments and the survey.

Details of Wells Park/coastal users survey
The suggested survey methodology is as follows:

- 7 visits to the park/coastal strip, particularly focusing on warmer days on weekends and during the week, at different times of the day (am, pm and evening), over a three week period

- A count of park/beach/coastal water users (and identification of their activities)

- Interviews with a sample of users using a short questionnaire . The sample size will depend on usage rate but would be a maximum of 40 persons if user numbers are 200 or less (ie. a rate of 20%). If overall user numbers are above 200, then the survey should probably be extended.

  Questions will identify usage of area, views about proposal, how the proposal might affect users etc.

2.5 Assessment and evaluation of impacts

This phase will involve the identification of all potential social impacts associated with the proposed export facility and will indicate the significance of the impacts (ie. the degree of effect) and whether they will be beneficial or adverse impacts on communities. This phase will rely on the results of the public input as well as on the expertise of the SIA consultant.

2.6 Formulation of impact management strategies

Recommendations will be made to avoid or reduce adverse social impacts and to enhance beneficial impacts.

3.0 TIMEFRAME

The timeframe currently allocated to the SIA consultant is 7 weeks commencing on November 2 1998 and concluding on December 18 1998.

APPENDIX B

WELLS PARK/BEACH/COASTAL OBSERVATION SURVEY

Date of visit----------

Day of week M T W TH F S S

Time of day----------to----------

Weather conditions----------

Number of persons observed and activities:

	Park		Car park		Fishing jetty		Beach		Coastal waters	
Sitting in car										
Sitting										
Picnic/bbq										
Walking dog										
Recreation										
Children at play										
Youth activities										
Fishing										
Swimming										
Boating										
Skiing										
Other (identify)										
TOTAL COUNTS										

WELLS PARK/KWINANA BEACH INTERVIEW

Survey no.----

1. Address? (Suburb)----------

2. Number in group? **1 2 3 4 5 5+**

3. Interview location

Wells Park (grass area)	
Car park	
Fishing jetty	
Beach	
Coastal waters (interviewed when people going out to sea/returning from sea)	

4. What have you come here for today?

Sitting in car	
Sitting	
Picnic/bbq	
Walking dog	
Recreation	
Children at play	
Youth activities	
Looking at ships	
Fishing	
Swimming	
Boating	
Skiing	
Other (identify)	

5. How often to do you come here?

More than once/day	
Daily	
More than once/week	
Weekly	
More than once/month	
Monthly	
A few times/year	
Annually	
On an infrequent basis	
First time here this year	
First time ever	

6. Do you intend to come here over the Christmas/new year week?

Yes No

7. If yes, how many times?

Once	
Twice	
Three times	
More	
Not sure	

8. Are you aware of the Kwinana Export Facility proposal?

Yes No

[If no, will need to briefly describe the proposal, showing photos]

9. Would the facility affect your use of this area?

Yes No

10. If yes:

How?

What should be done to minimise this effect on your use?

---

11. What is your opinion about the proposal at this stage?

Support	
Don't know	
No opinion/don't care	
Object	

Thank you for your cooperation.

APPENDIX C

WELLS PARK/ KWINANA BEACH USER COUNTS

Survey	Date	Time	Max no. of people observed*	Number surveyed
1	Weds Nov 18	5-7 pm	28	5
2	Sat Nov 21	4.30 -6.30 pm	67	12
3	Tues Nov 24	12.45 - 2.30 pm	22	5
4	Sat Nov 28	10.15 - 12.15 pm	29	12
5	Sun Nov 29	1.30 - 3.30 pm	62	15
6	Thurs Dec 3	1.15 - 3 pm	21	5
7	Sat Dec 5	1.15 - 3.15 pm	57	11
Total			**286**	**65**

* Two counts were undertaken each survey visit. The maximum number of people observed at any one time is recorded here.

Persons counted: 286
Adults: 210 (73%)
Children: 76 (27%)

Maximum number of people counted at key locations

Location	Maximum number counted over 7 visits
Beach	124
Wells Park	114
Fishing Jetty	59

WELLS PARK/KWINANA BEACH INTERVIEW RESULTS

Number of people surveyed: 65

1. Origin of people interviewed

Local

Locality given by respondents	No.
Kwinana	8
Parmelia	5
Leda	2
Orelia	2
Wellard	1
Rockingham	6
Hillman	2
Rockingham Park	1
Rockingham City	1
Shoalwater	1
Port Kennedy	1
Waikiki	1
Warnbro	1
Spearwood	1
Coogee	1
Yangebup	1
	35

Local:

Town of Kwinana - 18
City of Rockingham - 14
City of Cockburn - 3

Non-local (metropolitan Perth)

Locality given by respondents	No.
Balga	4
Thornlie	3
Armadale	3
Highgate	1
Osborne Park	1
Subiaco	1
Belmont	1
Dianella	1
Manning	1
Queens Park	1
Stirling	1
Kelmscott	1
Palmyra	1
Leederville	1
South Guildford	1
Roleystone	1
Duncraig	1
Maylands	1
Mundijong	1
	26

Non-local (Country)

Harvey	1
Boddington	1
Brookdale	1
Bunbury	1
	4

2. Number of persons in group of each person interviewed

Number of persons in Group	Frequency
1	19
2	14
3	10
4	8
5	8
5+	7

3. Interview location

Location	Persons interviewed
Wells Park	11
Car park	11
Fishing jetty	20
Beach	22
Coastal waters	1
	65

4. What have you come here for today?

Activity*	No. of persons
Sitting in car	4
Sitting	8
Picnic/bbq	12
Walking dog	3
Recreation	19
Children at play	4
Youth activities	0
Looking at ships	0
Fishing	24
Swimming	16
Boating	3
Skiing	1

* Table indicates prime activities cited by respondents

5. How often to do you come here?

Response	Frequency
More than once/day	0
Daily	2
More than once/week	18
Weekly	6
More than once/month	9
Monthly	6
A few times/year	6
Annually	0
On an infrequent basis	1
First time here this year	9
First time ever	8
	65

6. Do you intend to come here over the Christmas/new year week?

Response	Frequency
Yes	31
No	32
Not sure	2
	65

7. If yes, how many times?

Response	Frequency
Once	11
Twice	13
Three times	4
More	2
Not sure	1
	31

8. Are you aware of the Kwinana Export Facility proposal?

Response	Frequency
Yes	15
No	50
	65

9. Would the facility affect your use of this area?

Response	Frequency
Yes	18
No	47

10. If yes, How?

Reason	Response rate*
Pollution (marine, air)	12
Impact on fishing	4
Impact on beach use	2
Visual impact	2
Ship traffic	2
Don't want industry at all/more industry	2
Concerned about existing facility	1
Noise	1
Would not use area	1

* Some people gave more than one reason

What should be done to minimise this effect on your use?

Response	Frequency
Do not build facility	10 (from local and non-local persons)
Nothing can be done	2
Retain in Esperance	1
Position jetty in other direction	1
EPA impose restrictions	1
Prevent dust and noise	1
Take care of environment	1
Opportunity to fish from new jetty	1

11. What is your opinion about the proposal at this stage?

Response	Frequency
Support	24
Don't know	5
No opinion	18
Object	18

Origin of objectors

Origin	Number
From Kwinana or Rockingham	10
Elsewhere in metropolitan area	7
Country	1
	18

APPENDIX D

Alison Day & Associates

Town Planning Social Planning Public Consultation
Social Impact Assessment Integrated Local Area Planning

PO Box 1150 Subiaco WA 6008 Tel/Fax: (08) 9201 0686

Dear

PROPOSED KWINANA EXPORT FACILITY

I have been contracted by the Fremantle Port Authority to undertake a social impact assessment (SIA) for the proposed export facility at the Kwinana Bulk Cargo Jetty.

The purpose of the SIA will be to identify and address all relevant social issues associated with the proposed export facility and recommend appropriate impact management strategies.

The SIA will form a component of the Consultative Environmental Review (CER) report being prepared by Dames & Moore on behalf of Koolyanobbing Iron Pty Ltd, Fremantle Port Authority (FPA) and Westrail, in accordance with the requirements of the Department of Environmental Protection (DEP). This CER will be assessed by the DEP under the *Environmental Protection Act 1986.*

The SIA will be addressing a range of social issues including:

The visual impact of the facility
Users of Wells Park, users of Kwinana beach and coastal waters, users of fishing jetty, residents/businesses in Rockingham, visitors to Rockingham (tourists)

Recreational use of Wells Park, the foreshore and coastal waters
Users of Wells Park, users of beach and coastal waters, users of fishing jetty, users of coast to the south

Tourism
Impact on Kwinana Beach, impact on Rockingham businesses

Environmental issues (social perspective): noise, dust, impact on coastal environment
Noise associated with the facility, noise from trains, dust associated with the facility, impact on coastal environment (fishing)

Access
Changes to road traffic flow due to trains, any changes to road access

Economic impacts
Employment impacts for Kwinana/Rockingham and the impacts of relocating the export facility from Esperance, effect on tourist industry, effect on fishing

Public health and safety
Industrial activity, shipping, road/rail interface

Heritage

Planning and development
Councils intent, compliance, image of area/public perceptions

Social impacts associated with alternatives to the proposal

A number of organisations, groups and individuals have raised social issues in relation to the proposed export facility. Social issues previously communicated to Dames & Moore, the Minister for the Environment (through the appeal process), the Town of Kwinana and the City of Rockingham will be taken into account in this SIA. However, should you/your organisation wish to provide comment on any of the social issues identified above, or wish to identify additional social issues, you may contact me on phone/fax 9201 0686 or via PO Box 1150 Subiaco WA 6008.

As the SIA study will conclude by December 18 1998, it would be appreciated if any comment on social issues could be received as soon as possible and before Friday December 11 1998.

Stakeholders, and the general community, will have an opportunity to comment on the whole proposal with the release of the CER for public review in early 1999.

Yours sincerely

Alison Day
Principal
Alison Day & Associates

November 25 1998

KEY STAKEHOLDERS ADVISED OF SIA

Local Government

City of Rockingham
Town of Kwinana
City of Cockburn
Shire of Esperance

List of persons/organisations who appealed level of EPA assessment

Kwinana Watchdog Group
Ms D Hesse
Chairperson
67 Westbrook Street
Calista WA 6167

Hope Valley Progress Association
Jeff McGinniss
Lot 2 McLaren Avenue
Hope Valley WA 6165

Spearwood District Residents' Association
511 Rockingham Road
Munster WA 6166

Cockburn Power Boats Association (Inc.)
PO Box 293
Kwinana WA 6167

Wattleup Citizens' Association (Inc.)
Ms H Duggan
President
12 Marban Way
Wattleup WA 6166

K. A. B. Z. Action Group
Brian Vidovich
Chairperson
43 Moylan Road
Wattleup WA 6166

Western Australian Naturalists' Club (Inc)
Mr Bob Goodale
Environment Officer
PO Box 479
Rockingham WA 6168

Ms R Siewert
Co-ordinator
Conservation Council of Western Australia Inc
79 Stirling Street
Perth WA 6000

Mrs E Quinn
179 Kent Street
Rockingham WA 6168

Ms W Durant
150 Willmott Drive
East Waikiki WA 6169

Mr W Corser
191 Rockingham Road
Rockingham Beach WA 6168

Ms L Junghans
27 Gloucester Avenue
Shoalwater WA 6169

Mr N Chapman
9 Andromeda Street
Rockingham WA 6168

J Leary
161 Rockingham Road
Rockingham Beach WA 6168

M and A Veal
177 Kent Street
Rockingham WA 6168

A Guy
8 Harley Close
Safety Bay WA 6169

J Stables
9 Clennett Close
Cooloongup WA 6168

Jim Scott MLC
Member for South Metropolitan Region
19 Point Street
Fremantle WA 6160

Other stakeholders

South West Group
C/- City of Melville
Almondbury Road
Ardross WA 6153

Rockingham Chamber of Commerce
Mr M Catherwood
President
33 Crompton Road
Rockingham WA 6168

Kwinana Chamber of Commerce
41 Hope Valley Road
Naval Base WA 6165

Rockingham Foreshore Owners and Traders Association
c/- Mr T Laurance
148 Arcadia Drive
Safety Bay WA 6169

Norm Marlborough MLA (Peel)
Suite 2 Parmelia House
165 Gilmore Avenue
Kwinana WA 6167

Mark McGowan MLA (Rockingham)
Shop 77 Rockingham City Shopping Centre
Read Street
Rockingham WA 6168

Ms J Bignell
Leda Progress Association
21 Djilba View
Leda WA 6170

Com Net
Ms Heather Smedley
511 Rockingham Road
Munster WA 6166

Kwinana Industries Council
Mr M Baker
Executive Officer
PO Box 2195
Rockingham WA 6967

APPENDIX E

Alison Day & Associates

Town Planning Social Planning Public Consultation
Social Impact Assessment Integrated Local Area Planning

PO Box 1150 Subiaco WA 6008 Tel/Fax: (08) 9201 0686

CORRESPONDENCE TO SHIRE OF ESPERANCE

Dear Sir

PROPOSED KWINANA EXPORT FACILITY

I have been contracted by the Fremantle Port Authority to undertake a social impact assessment (SIA) for the proposed export facility at the Kwinana Bulk Cargo Jetty.

The purpose of the SIA will be to identify and address all relevant social issues associated with the proposed export facility and recommend appropriate impact management strategies.

The SIA will form a component of the Consultative Environmental Review (CER) report being prepared by Dames & Moore on behalf of Koolyanobbing Iron Pty Ltd, Fremantle Port Authority (FPA) and Westrail, in accordance with the requirements of the Department of Environmental Protection (DEP). This CER will be assessed by the DEP under the *Environmental Protection Act 1986.*

The SIA will be addressing a range of social issues, including the proposed relocation of the Koolyanobbing iron ore export facility from Esperance to Kwinana.

Should the Shire wish to provide comment on social issues for the SIA, you may contact me on phone/fax 9201 0686 or via PO Box 1150 Subiaco WA 6008.

As the SIA study will conclude by December 18 1998, it would be appreciated if any comment on social issues could be received before Friday December 11 1998.

Stakeholders, and the general community, will have an opportunity to comment on the whole proposal with the release of the CER for public review in early 1999.

Yours sincerely

Alison Day
Principal
Alison Day & Associates

November 25 1998