

**REPORT TO THE HONOURABLE
DR ANDREW REFSHAUGE**

**DEPUTY PREMIER
MINISTER FOR URBAN AFFAIRS AND PLANNING
MINISTER FOR ABORIGINAL AFFAIRS
MINISTER FOR HOUSING**



**837 LOT SUBDIVISION
LONG BOW POINT, CULBURRA**

SHOALHAVEN CITY COUNCIL

**DR MARK CARLETON, COMMISSIONER
COMMISSIONERS OF INQUIRY FOR ENVIRONMENT AND PLANNING**

MARCH 2000

March 2000

The Hon Dr Andrew Refshauge, MP
Deputy Premier, Minister for Urban Affairs and Planning,
Minister for Aboriginal Affairs and
Minister for Housing

Dear Minister

**Proposed 837 Lot Subdivision at Long Bow Point, Culburra,
Shoalhaven City Council**

The former Minister, the Hon Craig Knowles constituted me as a Commission of Inquiry to examine and make recommendations into the environmental aspects of the above proposal.

The Inquiry, which commenced in 1996, was adjourned to enable the Applicant to prepare a Fauna Impact Study. In 1999 the study was completed and the Inquiry was reconvened in November of that year. The final public hearing session concluded on 16th January 2000.

Impacts to habitat and fauna both on the site and within the adjoining Lake Wollumboola are the major concerns raised in submissions. Responsible Government agencies of DUAP, NPWS, EPA, DLWC and Fisheries are opposed to the proposal. Council raises concerns and calls for a staged approval approach commencing with least sensitive portions of the site. To avoid certain habitat the Applicant reduced the extent of development, however Government agencies remain opposed.

The evidence is that high conservation areas should not be cleared or modified based on likely adverse impact to threatened fauna or threatened fauna habitat. Despite the lengthy Fauna Impact Statement adjournment period the Applicant has failed to demonstrate that threatened fauna will not be negatively impacted. Similarly the Applicant has not demonstrated that the development could occur without adverse impact on the environmental values of Lake Wollumboola and its catchment.

I recommend refusal of the proposal due to its likely unacceptable environmental impacts, including loss of water quality of the important Lake Wollumboola and loss of fauna and habitat of conservation value.

Dr Mark Carleton
Commissioner

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Cover Photograph: Long Bow Point (centre)

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ABBREVIATIONS USED IN THIS REPORT

The Applicant Council	Realty Realizations Pty Ltd Shoalhaven City Council
DUAP	Department of Urban Affairs and Planning
EPA	Environment Protection Authority
NPWS	National Parks and Wildlife Service
DLWC	Department of Land and Water Conservation
RTA	Roads and Traffic Authority
EP&A Act	Environmental Planning and Assessment Act 1979
FIS	Fauna Impact Statement
TSC Act	Threatened Species Conservation Act 1995
SEPP	State Environmental Planning Policy
REP	Regional Environmental Plan
LEP	Local Environmental Plan
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
DA	Development Application
ESD	Ecologically Sustainable Development
WPCP	Water Pollution Control Pond
EPZ	Environmental Protection Zone
ha	Hectares
km	Kilometres
m	Metres
m/sec	metres per second
mm	Millimetres
L/sec	Litres per second
mg/L	Milligrams per Litre

EXECUTIVE SUMMARY

The former Minister for Urban Affairs and Planning and Minister for Housing, the Hon. Craig Knowles, established a Commission of Inquiry into the environmental aspects of the proposed subdivision at Long Bow Point, Culburra within the Shoalhaven City Council area. Under Section 101 of the Environmental Planning and Assessment Act 1979, the Deputy Premier and current Minister for Urban Affairs and Planning, the Hon. Dr Andrew Refshauge, becomes responsible for determining the development application.

Basically subdivision into 837 residential lots is proposed (a reduced lot number is now proposed), together with a foreshore environmental protection zone, recreation areas. Future sites for industrial, town centre and educational land uses would require a separate development application.

The Inquiry which was adjourned in 1996 to allow the Applicant to prepare a Fauna Impact Statement, was reconvened on 16 November 1999. In granting the Applicant's requested adjournment the Commission specifically directed that in regard to the extent of the Fauna Impact Statement:

"...consideration is required of the larger or surrounding area, which may include other stages of the associated development and impacts on nearby areas containing significant fauna or habitat."

The final hearing was held on 19 and 20 January 2000 so that parties could respond to supplementary reports to the Fauna Impact Statement and to enable Council to advertise the Fauna Impact Statement, receive submissions and report to the Commission.

Under the Local Environmental Plan, the land has various zoned land uses, mainly comprising Residential and Environmental Protection.

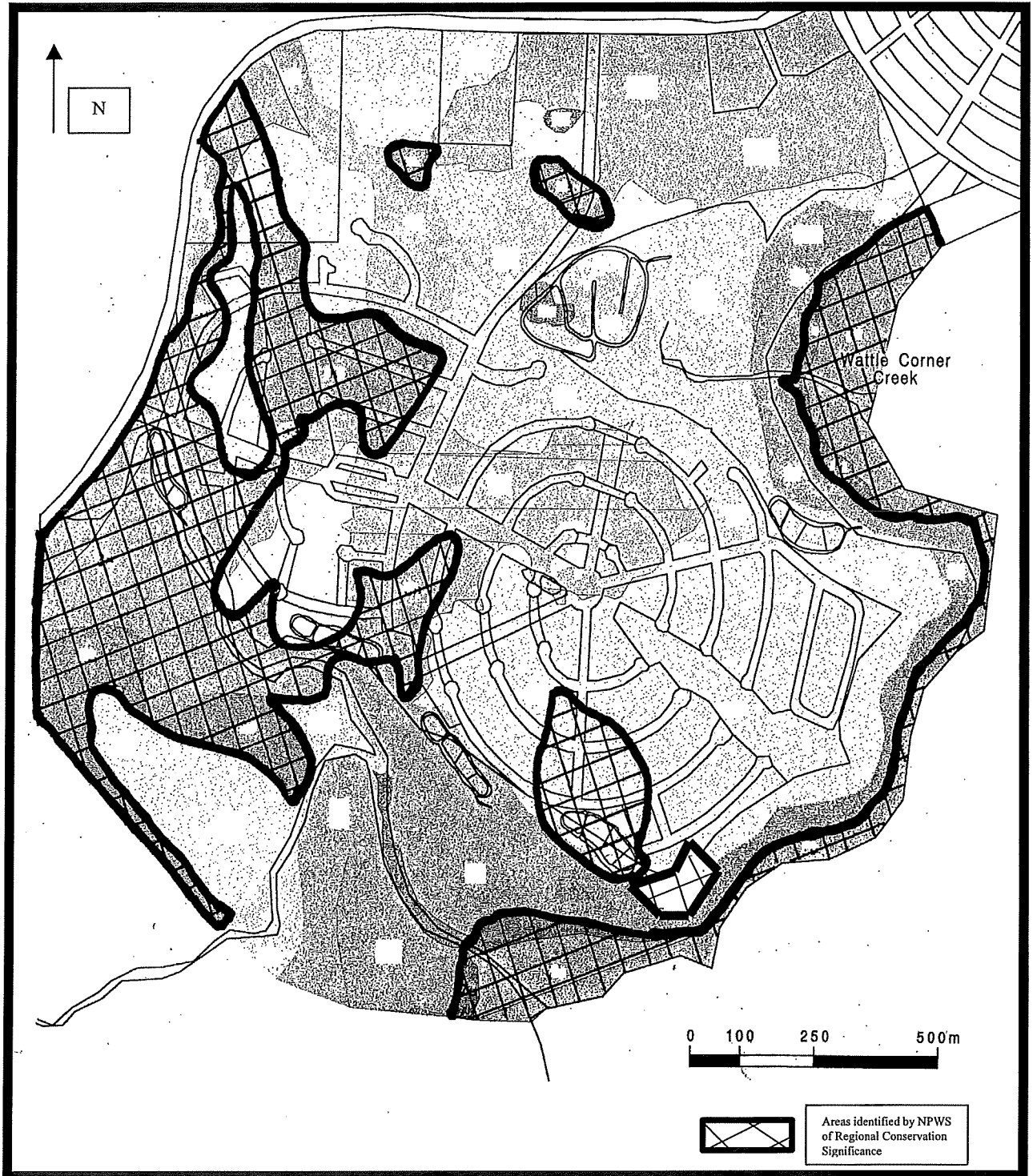
Involved Government agencies are opposed to the proposal. Council suggests a cautious approach involving a staged approval of the least sensitive part of the development. There is a split between community groups that either support or oppose the proposal. A number of environmental groups strenuously oppose the proposal.

Assessment of Issues

Two major concerns are referred to in submissions. One is the proposed clearing of significant fauna habitat and related fauna impacts. The other major issue is potential water pollution to Lake Wollumboola adjoining the site and related fauna and fauna habitat impacts. Other issues include cumulative impacts and occasional offensive lake odours.

Local and regional economic benefits include direct and indirect employment of up to 276 positions during the construction phase and an estimated \$100 million injection into the local civil and housing industry. Additionally, there are intended improvements to the town centre, community facilities, infrastructure, amenities and services. Developer contributions will provide or assist with recreation areas, open space, town centre improvements, and certain community facilities.

Figure A: Habitat of Conservation Significance



Habitat and Fauna Impacts

Conflicting evidence is submitted as to the habitat values of the site. The Applicant arguing that the site has low overall conservation value. The responsible agencies of NPWS, DUAP and Council, as well as several environmental and community groups raise concern as to the likely loss of significant fauna habitat classed as having medium to high regional conservation value.

The site is an area of high biodiversity. Up to 33 threatened fauna species have been found in or near to the proposed development area. The Fauna Impact Statement identifies 10 threatened fauna species that occur or could occur on the site and a further 14 that utilise adjacent wetland habitats. NPWS identifies 17 terrestrial threatened species that occur or could occur on the site.

The Applicant points out that only 125ha of vegetation will be removed, of which approximately 25ha has previously been cleared. Significant habitat and fauna species have been found in the proposed area to be cleared for development. High conservation value areas, which should be excluded from development according to DUAP, NPWS and Council, include stands of swamp mahogany, black she-oak, wetlands and areas with significant densities of hollow bearing trees (see Figure A on page viii).

Opposing agencies and parties consider that the Fauna Impact Statement has not demonstrated that the development could occur without adverse impact on the environmental values of Lake Wollumboola and its catchment. The adequacy of fauna surveys is questioned, as is the resulting assessment and conclusion in the Fauna Impact Statement.

The evidence is that high conservation areas should not be cleared or modified based on potential adverse impact on threatened fauna or threatened fauna habitat. The Applicant has failed to demonstrate that threatened fauna will not be negatively impacted.

Government agencies complain of the late detection of threatened fauna on the site, the lengthy Fauna Impact Statement preparation period, late supplementary reports, and late vegetation mapping. Despite late minor project modifications, the evidence indicates that the proposal has limited regard to preserving or avoiding high conservation value habitat on the site. Proposed mitigation measures and project amendments are unlikely to adequately protect either habitat of conservation value or threatened fauna species.

Water Impacts

There is conflicting evidence as to water quality impacts. The Applicant predicts minimal impacts whilst Government departments are not satisfied that the important ecological and habitat values of Lake Wollumboola will be protected. Arguments that the lake is robust are disputed. Lake processes are not clearly understood and the lake is at its limit regarding catchment pollution according to EPA.

It is not disputed that Lake Wollumboola is of high conservation value. Lake Wollumboola requires the highest level of protection and the catchment and its management are vital to maintaining Lake Wollumboola's significance. A goal of "no net increase in pollution" is required.

The weight of evidence, based on the experience of responsible water agencies such as EPA and DLWC as well as water quality consultants is that the proposal is likely to increase nutrient and other loadings to Lake Wollumboola. Mitigation measures including Water Pollution Control Ponds, an Environmental Protection Zone and other initiatives are unlikely to consistently meet predicted

performance goals of no net increase in pollution. The Applicant's water consultant acknowledges that Water Pollution Control Ponds may take between 3 and 5 years to achieve predicted high performance targets. Essentially long term and consistent high performance needs to be demonstrated to satisfy regulators.

The Precautionary Approach and Staged Development

The proposal is one of six stages of development. The Commission recommends a precautionary approach for intended overall development which would involve development of least sensitive and potentially least impacting stages of development first. Staging of adjacent areas of the Applicant's intended Culburra Release Area (not part of the subject proposal) outside this sensitive and important catchment are recommended by the Commission. If no adverse impacts are caused, then progressively more sensitive stages of development could follow. This approach is supported by involved Government agencies.

Council's suggested staged approval within the subject site does not overcome likely adverse impacts. Council's suggested trialing of water controls represents an unacceptable risk to the important values of Lake Wollumboola.

Odour Impacts

Lake Wollumboola odour problems occur from time to time which adversely impact on existing residents. The rotten egg like odour is basically a result of exposure of mud in the lake shallows following natural draining of the lake and the time taken for natural rainfall to refill the lake.

Odour problems cannot be mitigated. Prevailing wind directions and nearby lake shallow locations are likely to make the site as susceptible, if not more susceptible to odours than the existing township.

The odour problem, whilst infrequent, suggests that development in the vicinity of the lake at Long Bow Point is not favoured, but that any development should be furthest away from Lake Wollumboola.

Cumulative Impacts

Cumulative impacts both for the subject site and for the overall Culburra Release Area (the site being stage 1) are likely to compound adverse lake and habitat impacts.

Recommendation

I recommend refusal of the proposal due to the potential for adverse environmental impacts, including loss of water quality of the important Lake Wollumboola and loss of fauna and habitat of conservation value. Project amendments, mitigation measures and detailed vegetation maps fail to avoid impacts. Review of overall planning controls is warranted to assist both the Applicant and agencies with integrating the Commission's precautionary and staged development approach in this sensitive and important environment.

THE PROPOSAL

Realty Realizations Pty Ltd (the Applicant) proposes a 837 lot residential subdivision on lot 3 DP 836137 and Lot 8 DP 825697 Culburra Road, at Long Bow Point, Culburra. During the Inquiry the subdivision layout was amended and the number of lots was reduced. The proposed development is stage 1 of a 6 stage subdivision involving approximately 3,000 residential allotments.

The subject site is located approximately 12km east of Nowra, adjacent to the western boundary of the existing Culburra urban area (see Figure 1). The Development Application adjoins the northwestern shore of Lake Wollumboola and a small section of the southern shore of Curleys Bay .

Figure 1: Locality Map

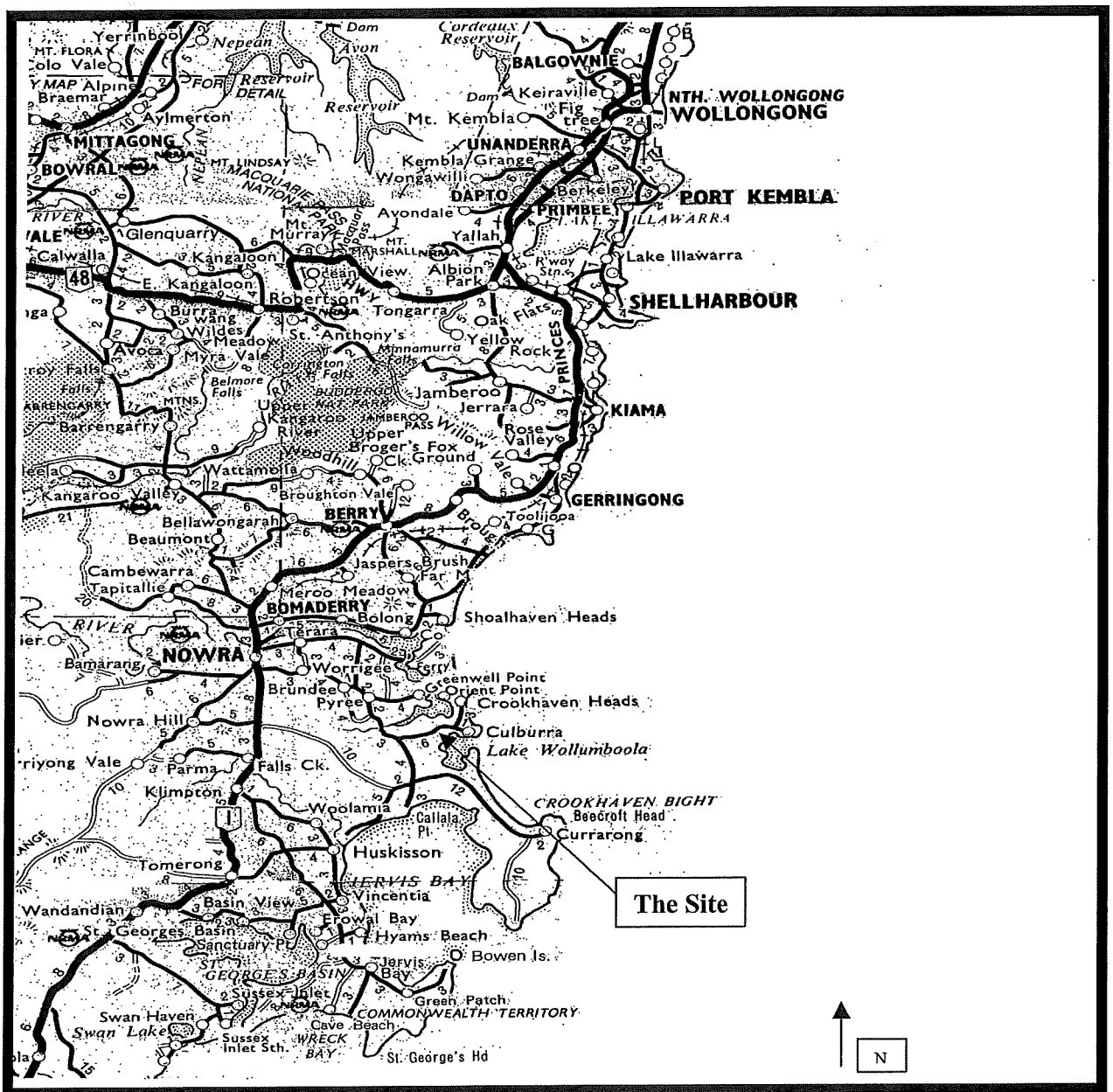
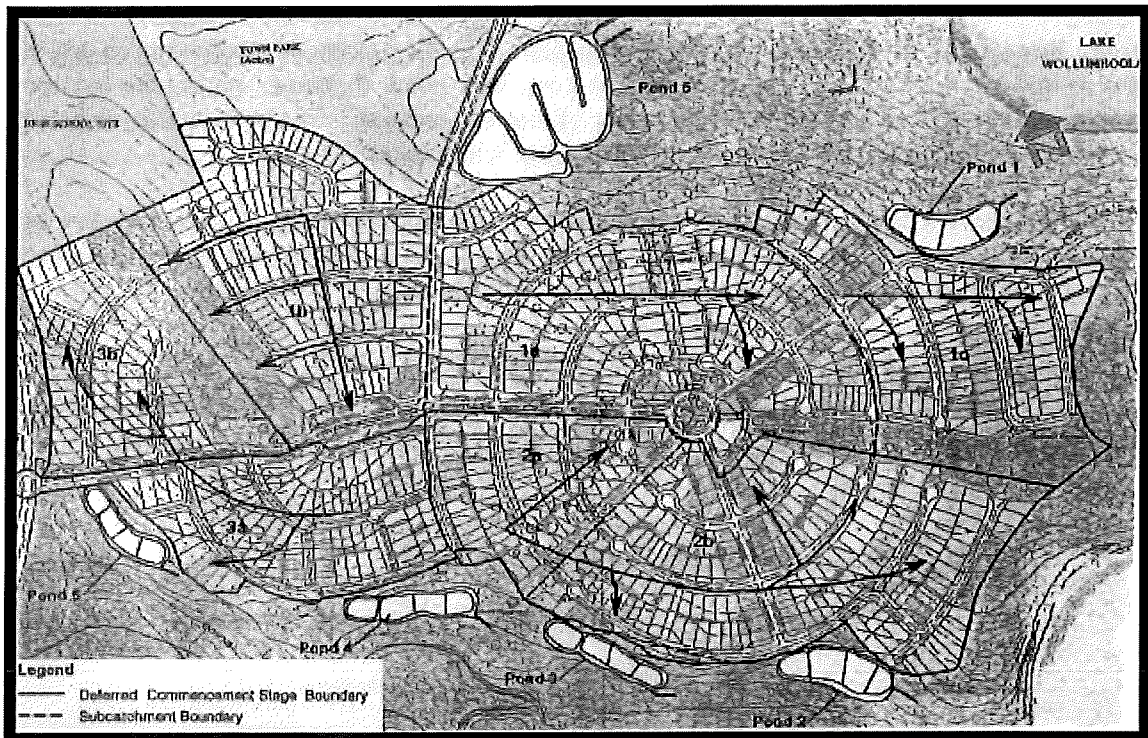


Figure 2: Layout of the Proposed Residential Sub-division



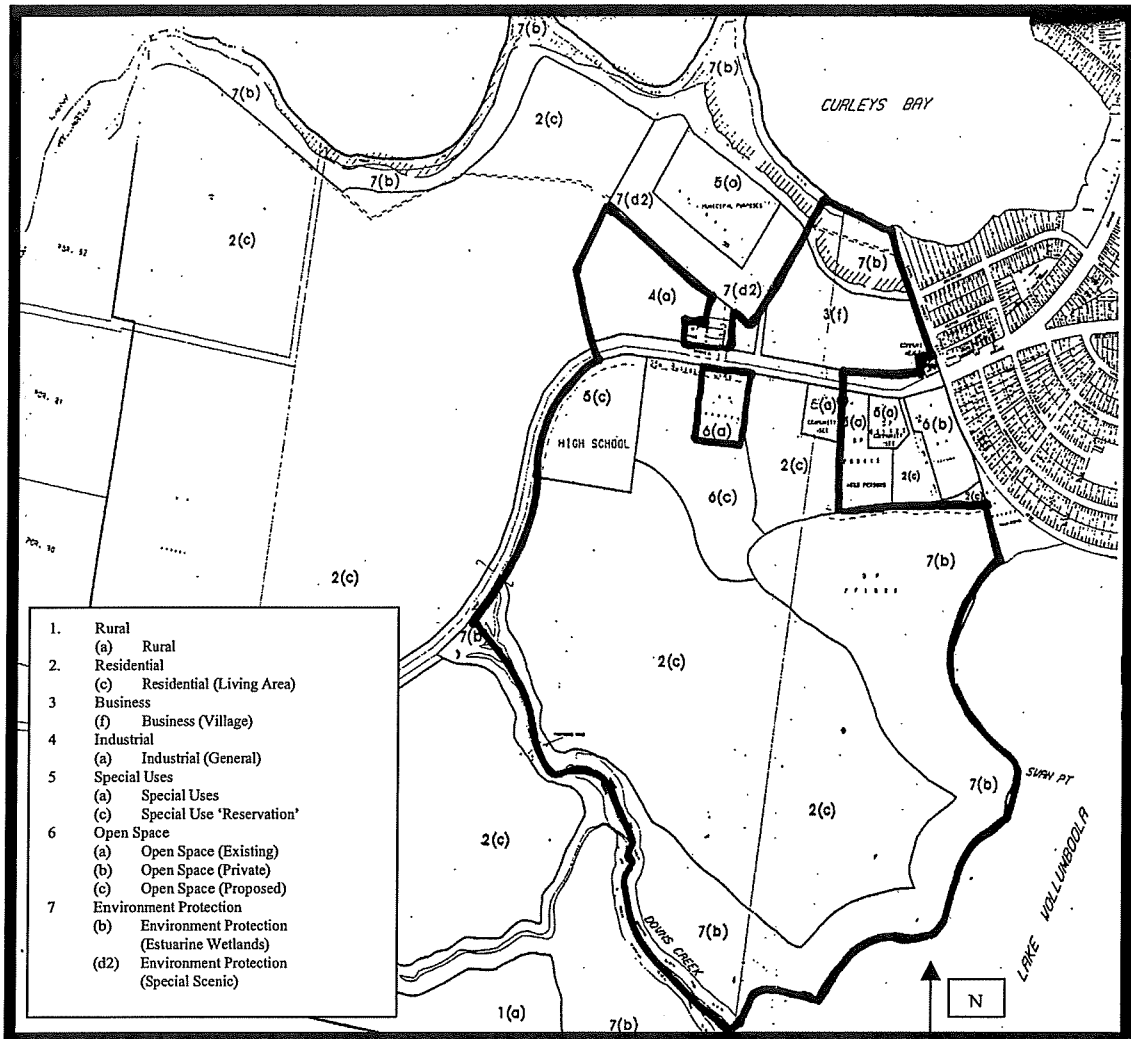
Development Application

Council received the development application in March 1993. The Applicant describes the area subject to the development application as including:

- a foreshore environmental protection zone,
- internal reserves,
- a 9.4 ha flora reserve,
- a district active recreation area,
- district and local community centre sites,
- light industrial expansion area,
- town centre expansion area,
- a high school site, and
- associated development such as pollution control ponds and walkways.

The development application only relates to creation of the boundary allotments for the light industrial area, town centre expansion area and high school site. Any subdivision or development of these areas would be subject to a separate development application. Figure 2 shows a layout of the proposed residential subdivision and Figure 3 shows the land use zones on or near the site.

Figure 3: Land Use Zones



Parties such as DUAP and the Lake Wollumboola Support Group raise uncertainty as to the extent of the site or the extent of development, particularly north of or in the vicinity of Culburra Road. Questions are raised as to applicable planning provisions.

The Commission notes that the development application refers to "*Residential development plus community use areas*" and the Applicant's primary submission notes that any subdivision or development of the industrial area, town centre expansion area and high school site would be subject to a separate development application. It is noted that the Applicant did not include these areas or in fact any areas north of Culburra Road with updated maps of vegetation communities, or the Fauna Impact Statement or with proposed layout, water ponds, etc. Accordingly parties did not specifically address the industrial area, town centre expansion area and high school site or the area north of Culburra Road. The NPWS noted the likely presence of habitat of conservation significance in such areas warranting detailed studies, and the Commission requested the Applicant to consider the wider area when agreeing to adjourn the Inquiry in 1996 so that the Applicant could prepare a Fauna Impact Statement.

Residential Lots

The proposed range of lot sizes is:

Allotment Term	Size Range (m ²)	Approximate Proportion of Total Residential Allotments ¹
Traditional Allotment	500 – 750	58%
Plaza Allotment	500	10%
Courtyard Allotment	400- 500	18%
Garden Allotment	300 – 350	14%

1. Changes to the proposal mean that the above percentages are slightly varied.

The Plaza, Courtyard and Garden Allotments occupy less area than the minimum residential lot size of 650m² specified in Council's current subdivision code. The residential subdivision is proposed to be conducted in a series of substages. The rate of development will depend on market demand, however, the average lot take up rate is estimated to be approximately 35 lots per year.

The Long Bow Point residential subdivision incorporates the following additional features:

- A central ridgeline reserve within the residential subdivision area;
- Sites for five children's playgrounds;
- A central local community facility for Long Bow Point residents; and
- Construction of water pollution control ponds.

Environment Protection Zone

The Environmental Protection Zone (EPZ) is proposed to provide a vegetative buffer between urban development and Lake Wollumboola. It is designed as a means of preventing the entry of non-point source pollutants to waterbodies. The EPZ for the Culburra Urban Expansion was determined on the basis of areas identified as having *Melaleuca* and *Casuarina glauca* (which are plant species that indicate the area is subject to flooding) mangroves and tidal flats and 20 metres of land adjoining dry sclerophyll forest for filtering.

The EPZ which is zoned Environmental Protection 7(b) varies in width from 110 metres to 240 metres around the shoreline of Lake Wollumboola and covers an area of 55.6 hectares.

The zone is supplemented by public reserves within the central southern portion of the zoned residential area, adjacent to Downs Creek and in the central northern portion of the zoned residential area near the proposed water pollution control pond No.6.

The EPZ will include:

- Designated picnic areas with no large trees removed to establish the picnic areas;
- Pedestrian access to the foreshore by formed tracks;
- Construction of a boardwalk along a section of the waterfront;
- Wheelchair access to the boardwalk from the northeast by a purpose built graded section on the boardwalk;
- A small carpark (10 cars) adjoining the road in the residential zone with service vehicle access only permitted to the foreshore reserve; and
- Provision of a low demand natural launching ramp for canoes, sailing dingys or sail boards.

The EPZ will be progressively dedicated to Council as adjacent subdivision is developed. A management plan would be required to be prepared in consultation with the National Parks and Wildlife Service.

Flora Reserve

The Applicant proposes 9.4 hectares for a flora reserve. The reserve comprises 4.3 hectares on the southern side of Culburra Road and 5.1 hectares on the northern side of Culburra Road. The reserve will connect the foreshore reserve on Lake Wollumboola and the shoreline reserve on Curleys Bay.

The proposed flora reserve area north of Culburra Road is currently traversed by a number of walking tracks. The reserve is currently zoned 3(f) Business and 2(c) Residential.

District Active Recreation Area

The Development Application includes dedication to Council of 11.1 hectares of land for creation of a Town Park for active recreation purposes. Facilities within this area will be constructed by Council and are proposed to include a number of playing fields to meet projected local and district demand for such facilities. This land is located adjacent to Council's former water disposal site and it is understood that Council's land will also be developed for this purpose.

Community Centre

A local community facility site will be established within the Long Bow Point residential area. A district community centre is proposed to be established adjacent to Culburra Road. Subject to development consent, the land will be dedicated to Council for construction of district community facilities to serve existing and proposed urban areas of Culburra, Orient Point, Callala Bay, Callala Beach, and Currarong Beaches. Facilities proposed in Council's section 94 plan include:

- A Culburra Community Centre consisting of four separate buildings – a youth and recreation centre, community health centre, multipurpose hall and childcare and baby health centre; and
- A Home and Community Care Centre for aged persons and those with disabilities with rooms for dining, recreation, craft, lounge and kitchen.

Light Industrial

The light industrial expansion area is located between Culburra Road and the sewerage treatment plant works. A total of 9.2 hectares of land is allocated for the proposed future development of light land uses permitted within Council's 4 (a) Industrial Zone. Future development within the light industrial area will be subject to a further subdivision application.

Town Centre Expansion Area

The Town Centre expansion area is located immediately adjacent to the western extent of the existing Culburra urban area and occupies 6.4 hectares. The area is opposite existing Town Centre activities on the southern side of Culburra Road. Any development within the allocated Town Centre will, however, be subject to a further development application.

High School Site

An area of 8.4 hectares will be provided for the future construction of a high school on the southern side of Culburra Road. A further development application would be required for any such future high school development.

Site Description

The proposed Long Bow Point Development Application area occupies a total of 195 hectares. Approximately 27 hectares has been cleared. The majority of the remainder of the site is occupied by forest and woodland with relatively small areas of Casuarina forest and Melaleuca heath land throughout the site.

The topography of the area is flat to gently undulating, apart from a small section of steep lake shoreline. The site has a number of sub-catchments that drain either south to Lake Wollumboola or north Curleys Bay. Downs Creek forms the southern boundary of the Development Application whilst Wattle Creek drains through the area north of the Long Bow Point ridgeline.

SEPP 14 Wetland No.364 is located at the outlet of Wattle Corner Creek, on the shoreline of Lake Wollumboola. SEPP 14 Wetland No.363 is located at the outlet of Downs Creek, also on the shoreline. Jervis Bay National Park is located south of the site.

The southern boundary of Lake Wollumboola is located 3km north of Jervis Bay. Lake Wollumboola is a large semi-saline coastal lake that is intermittently connected to the ocean. The lake is recognised as an important habitat for waders and migratory birds. National Parks and Wildlife Service has identified Lake Wollumboola as a potential Marine Reserve Park.

HISTORY AND PUBLIC CONSULTATION

The history of development on the site extends back to the 1970's when Council resolved to commence a city wide rezoning process and identified Culburra as a potential urban expansion area. In 1979 Council prepared and exhibited a draft planning policy and zoning plan for Culburra. However, the urban expansion plan for Culburra was not incorporated into the city wide plan because Council considered further investigation was necessary.

In October 1982 Council resolved to prepare a separate LEP for the expansion area. Council undertook a study of the area and placed the report on exhibition. Subsequent to comments received from the community, Council commissioned two supplementary reports to address water quality and odour issues. Council submitted Culburra LEP to the Department of Planning in January 1991.

Subdivision Application

Following gazettal of the LEP in 1992 the Company submitted its subdivision application to Council in March 1993. The application was initially advertised in the local press seeking submissions for a period of 14 days from 28 April 1993. This was later extended to 28 days.

A public meeting was conducted on 9 March 1995, following which the proposal was further advertised for a period of 14 days. A petition containing 200 signatures requested Council to extend the 14 days and Council subsequently agreed to a further 5 weeks. The Applicant had a shop front at Culburra after the above public meeting to answer further questions from the community. Council received 95 letters of objection and one letter of support.

In August 1995, the then Minister for Urban Affairs and Planning decided to use his powers, under section 101 of the Environmental Planning and Assessment Act 1979, to become the consent authority for the proposed subdivision. The Minister's decision was based on his concern regarding the potential impacts of the subdivision and development on Lake Wollumboola and the flora and fauna communities of the Lake and its catchment. The Minister subsequently directed a Commission of Inquiry into the proposed development.

Commission of Inquiry

Primary Session

On 15 August 1996 the then Minister for Urban Affairs and Planning and Minister for Housing, the Hon. Craig Knowles, appointed me to conduct an Inquiry into the environmental aspects of the proposed development application (DA No. SF 7477).

The Commission of Inquiry was advertised in the Sydney Morning Herald on 31 August 1996, the Nowra News Chronicle and Nowra South Coast Register on 30 August 1996 and in the Government Gazette on 6 September 1996.

Background documents were placed on public exhibition at the Office of the Commissioner's of Inquiry for Environment and Planning, Shoalhaven City Council and Culburra Community Centre from 22 August 1996. These documents included a Statement of Environmental Effects, related environmental reports and government agency submissions to the Department of Urban Affairs and Planning (Appendix 6). Submissions to the Inquiry were due on 3 October 1996 and placed on public exhibition at the above locations from 8 October 1996.

Submissions to the primary session of the Inquiry (Appendix 3) were received from 28 Parties and 12 parties presented submissions to the Inquiry (Appendix 5).

The primary submission session of the Inquiry was held at Shoalhaven City Council Chambers on 16, 17, 18, 21 and 22 October 1996. A site inspection was held in the company of interested parties on 23 October. The second session of the Inquiry was scheduled on 27 November 1996 at Shoalhaven City Council. However, on the first day of the second session the Applicant requested an adjournment to allow itself time to prepare a Fauna Impact Statement for the proposed development.

Reconvened Inquiry

The Inquiry was adjourned indefinitely awaiting preparation of the Fauna Impact Statement. After approximately three years, copies of the FIS were submitted to the Commission on 6 September 1999. Receipt of the FIS allowed the Inquiry to resume.

Letters were sent to parties who had made submissions to the primary session informing them of the Inquiry reconvening. Notices were also placed in the Shoalhaven Independent on 15 September 1999, Wollongong Illawarra Mercury and Nowra Shoalhaven News on 16 September 1999, the Nowra South Coast Register and Government Gazette on 17 September. All documents submitted to the Inquiry, including the FIS, were placed on exhibition at the Office of the Commissioners of Inquiry and Shoalhaven City Library. Parties who had not made a submission before had the opportunity to make a submission to the reconvened Inquiry.

Submissions to the reconvened Inquiry (Appendix 4) were received from 55 Parties of which 17 parties presented their submission at the public hearing (Appendix 5). Submissions are summarised in the "Summary of Submissions" section of this report.

The first session of the reconvened Inquiry was held at Shoalhaven City Council Chambers on 15, 16 and 17 November 1999 and the final session of the Inquiry was held on 19 January 2000.

Site Inspections

On 23 October 1996 I conducted an inspection of the site and surrounding areas in the company of interested parties. We travelled Culburra Road and visited the proposed subdivision site and future stages. We also visited parts of Culburra township and the foreshores of Lake Wollumboola. On the site inspections we observed the Little Tern colony on the spit between Lake Wollumboola and the Pacific Ocean. Parties also were able to observe several bat species captured on the site by the Applicant's bat consultant.

On the site inspection parties were shown the proposed Environmental Protection Zone, existing wetland areas and various habitat areas, some of which are disputed as having conservation value.

During the 1999 re-convened public hearing I revisited the township of Culburra and Orient Point, the foreshores of Lake Wollumboola and the surrounds of the site on my own.

- (c2) the effect of that development on critical habitat;
- (c3) whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats;
- (c4) any relevant recovery plan or threat abatement plan;
- (c5) the effect of that development on any other protected fauna or protected native plants within the meaning of the National Parks and Wildlife Act 1974;
- (d) the social effect and the economic effect of that development in the locality;
- (e) the character, location, siting, bulk, scale, shape, size, height, density, design or external appearance of that development;
- (f) the size and shape of the land to which that development application relates, the siting of any building or works thereon and the area to be occupied by that development;
- (g) whether the land to which that development application relates is unsuitable for that development by reason of its being, or being likely to be, subject to flooding, tidal inundation, subsidence, slip or bush fire or to any other risk;
- (h) the relationship of that development to development on adjoining land or on other land in the locality;
- (i) whether the proposed means of entrance to and exit from that development and the land to which that development application relates are adequate and whether adequate provision has been made for the loading, unloading, manoeuvring and parking of vehicles within that development or on that land;
- (j) the amount of traffic likely to be generated by the development, particularly in relation to the capacity of the road system in the locality and the probable effect of that traffic on the movement of traffic on that road system;
- (k) whether public transport services are necessary and, if so, whether they are available and adequate for that development;
- (l) whether utility services are available and adequate for that development;
- (m) whether adequate provision has been made for the landscaping of the land to which that development application relates and whether any trees or other vegetation on the land should be preserved;
- (m1) whether that development is likely to cause soil erosion;
- (n) any representations made by a public authority in relation to that development application, or to the development of the area, and the rights and powers of that public authority;
- (o) the existing and likely future amenity of the neighbourhood;
- (p) any submission made under section 87;
- (p1) without limiting the generality of paragraph (a), any matter specified in an environmental planning instrument as a matter to be taken into consideration or to which the consent authority shall otherwise have regard in determining the development application;
- (q) the circumstances of the case;
- (r) the public interest; and
- (s) any other prescribed matter.

NSW Coastal Policy 1997

In 1997 NSW government released a new Coastal Policy: *NSW Coastal Policy 1997 - A Sustainable Future for the New South Wales Coast*. The policy replaces *The New South Wales Coast - Government Policy* issued in 1990 and the *Draft Revised Coastal Policy for NSW* released in 1994.

The policy applies to the whole of the NSW Coast except for the urban areas of Sydney, Newcastle, Illawarra and Central Coast regions. The policy defines the coastal zone as:

ENVIRONMENTAL PLANNING CONSIDERATIONS

This section briefly describes planning and environmental legislation, policies, plans and guidelines that have either direct or indirect relevance to the Inquiry. Reference is only made to relevant sections of these documents as raised in submissions or background documents. To place the documents completely in context the full version of each should be consulted. The "Issues" section of this report generally discusses matters more fully.

LEGISLATION

Environmental Planning and Assessment Act 1979 (EP&A Act)

Amendments to Part 4 of the EP&A Act came into effect from 1 July 1998. As the development application for the Long Bow Point Subdivision was submitted to Council prior to 1 July 1998 it is therefore subject to the previous provisions of Part 4.

In March 1993 the Applicant submitted to Council its development application to subdivide the subject site. In August 1995, the then Minister for Urban Affairs and Planning decided to use his powers, under section 101 of the Environmental Planning and Assessment Act 1979, to become the consent authority for the proposed subdivision. The Minister's decision was based on his concern regarding the potential impacts of the subdivision and development on Lake Wollumboola and the flora and fauna communities of the Lake and its catchment.

Section 90(1) of the unamended EP&A Act lists matters for consideration when a consent authority is determining a development application under Part 4. These include:

- (a) the provisions of -
 - (i) any environmental planning instrument;
 - (ii) any draft environmental planning instrument that is or has been placed on exhibition pursuant to section 47(b) or 66(1)(b);
 - (iii) any draft State environmental planning policy which has been submitted to the Minister in accordance with section 37 and details of which have been notified to the consent authority; and
 - (iv) any development control plan in force under section 51A or 72 that applies to the land to which the development application relates;
- (a1) the provisions of -
 - (i) any conservation agreement entered into under the National Parks and Wildlife Act 1974 and applying to the whole or part of the land to which the development application relates; and
 - (ii) any plan of management adopted under that Act for the conservation area to which the agreement relates;
- (b) the impact of that development on the environment (whether or not the subject of an environmental impact statement) and, where harm to the environment is likely to be caused, any means that may be employed to protect the environment or to mitigate that harm;
- (c) the effect of that development on the landscape or scenic quality of the locality;
- (c1) the effect of that development on any wilderness area (within the meaning of the Wilderness Act 1987) in the locality;

- (c2) the effect of that development on critical habitat;
- (c3) whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats;
- (c4) any relevant recovery plan or threat abatement plan;
- (c5) the effect of that development on any other protected fauna or protected native plants within the meaning of the National Parks and Wildlife Act 1974;
- (d) the social effect and the economic effect of that development in the locality;
- (e) the character, location, siting, bulk, scale, shape, size, height, density, design or external appearance of that development;
- (f) the size and shape of the land to which that development application relates, the siting of any building or works thereon and the area to be occupied by that development;
- (g) whether the land to which that development application relates is unsuitable for that development by reason of its being, or being likely to be, subject to flooding, tidal inundation, subsidence, slip or bush fire or to any other risk;
- (h) the relationship of that development to development on adjoining land or on other land in the locality;
- (i) whether the proposed means of entrance to and exit from that development and the land to which that development application relates are adequate and whether adequate provision has been made for the loading, unloading, manoeuvring and parking of vehicles within that development or on that land;
- (j) the amount of traffic likely to be generated by the development, particularly in relation to the capacity of the road system in the locality and the probable effect of that traffic on the movement of traffic on that road system;
- (k) whether public transport services are necessary and, if so, whether they are available and adequate for that development;
- (l) whether utility services are available and adequate for that development;
- (m) whether adequate provision has been made for the landscaping of the land to which that development application relates and whether any trees or other vegetation on the land should be preserved;
- (m1) whether that development is likely to cause soil erosion;
- (n) any representations made by a public authority in relation to that development application, or to the development of the area, and the rights and powers of that public authority;
- (o) the existing and likely future amenity of the neighbourhood;
- (p) any submission made under section 87;
- (p1) without limiting the generality of paragraph (a), any matter specified in an environmental planning instrument as a matter to be taken into consideration or to which the consent authority shall otherwise have regard in determining the development application;
- (q) the circumstances of the case;
- (r) the public interest; and
- (s) any other prescribed matter.

NSW Coastal Policy 1997

In 1997 NSW government released a new Coastal Policy: *NSW Coastal Policy 1997 - A Sustainable Future for the New South Wales Coast*. The policy replaces *The New South Wales Coast - Government Policy* issued in 1990 and the *Draft Revised Coastal Policy for NSW* released in 1994.

The policy applies to the whole of the NSW Coast except for the urban areas of Sydney, Newcastle, Illawarra and Central Coast regions. The policy defines the coastal zone as:

- Three nautical miles seaward of the mainland and offshore islands;
- One kilometre landward of the open coast high water mark;
- A distance of one kilometre around:
 - all bays, estuaries, coastal lakes, lagoons and islands;
 - tidal waters of coastal rivers to the limit of mangroves and defined by NSW Fisheries (1985) Maps or the tidal limit whichever is closer to the sea;
- With the line on the maps being taken to the nearest cadastral boundary and/or easily recognisable physical boundary, in consultation with local councils.

The policy sets a framework for decision making by local councils and State agencies in relation to the coastal zone and is designed to ensure a more integrated approach to coastal management and planning. Its goals are:

- To protect, rehabilitate and improve the natural environment.
- To recognise and accommodate natural processes.
- To protect and enhance the aesthetic values of the coast.
- To protect and conserve cultural heritage.
- To promote ecologically sustainable development and use of resources.
- To promote ecologically sustainable human settlement.
- To provide for appropriate public access and use.
- To provide information to enable effective management.
- To provide for integrated planning and management.

The policy is divided into two parts. Part A contains the policy itself and an overview of how it will be implemented, monitored and reviewed. Part B contains the detailed strategic actions to implement the policy.

PLANS AND POLICIES

State Environmental Planning Policy No. 44 (SEPP 44)- Koala Habitat Protection

This policy aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline:

- (a) By requiring the preparation of plans of management before development consent can be granted in relation to areas of core Koala habitat;
- (b) By encouraging the identification of areas of core Koala habitat;
- (c) By encouraging the inclusion of areas of core Koala habitat in environmental protection habitat.

Potential Koala habitat is defined as areas of native vegetation where Koala feed trees constitute at least 15% of the total number of trees in the upper or lower strata of the tree component. Some SEPP 44 feed trees (Grey Gum, blackbutt, ironbark, scribbly gum, redgum and Swamp Mahogany) occur on the site. However, there are too few to be considered suitable habitat. While Koalas have been sighted at Myola/Callala Beach, recent surveys have not detected Koalas on the site.

State Environmental Planning Policy 14 – Coastal Wetlands

This policy ensures coastal wetlands are preserved and protected for environmental and economic reasons. The policy applies to local government areas outside the Sydney metropolitan area that front the Pacific Ocean. Land clearing, levee construction, drainage work or filling may only be carried out within these wetlands with the consent of the local council and the agreement of the Director-General of the Department of Urban Affairs and Planning.

The proposed subdivision adjoins areas subject to SEPP14 and they require protection according to certain parties, including Government agencies.

State Environmental Planning Policy No.11 – Traffic Generating Developments

Under this SEPP the application is required to be referred to the RTA as it involves the creation of more than 200 lots and the opening of a public road. The RTA has raised concern with the subdivision application in their letter to Council 28 January 1994 and in its primary submission to the Inquiry.

Illawarra Regional Environmental Plan No.1

The REP only applies to the land north of Culburra Road. This includes land proposed to be zoned for light industrial, a flora reserve, town centre expansion and public reserve. Illawarra Regional Environmental Plan requires that the aims and objectives of the plan be considered by Council when preparing a Draft Local Environmental Plan.

The aim of this plan is to maximise the opportunities for the people of the region and the State to meet their individual and community economic and social needs with particular reference to the way in which these needs are related to the allocation, availability, accessibility and management of the region's land resources having regard to the objectives specified in Parts II - XVI, by:

- (a) identifying regional planning issues and provisions applicable or potentially applicable:
 - (i) to actual development which may be carried out on land within the region, and
 - (ii) to the overall planning of the region consistent with the policies for draft local environmental plan preparation specified in Parts II - XVI,
- (b) advising Government, public authorities and other persons in determining the way in which they may:
 - (i) manage their land resources,
 - (ii) exercise their functions,
 - (iii) order their priorities and allocation of their funds in relation to the planning of the region, having regard to the principles specified in Parts II - XVI, and
- (c) establishing parameters and controls relating to development, particularly as they relate to the environmental quality and social well-being of residents of the region, having regard to the principles specified in parts II – XVI; and

The objectives of the plan in relation to the coastal lands, wetlands and other bodies are:

- a) to protect beach system sand and conserve their scenic, recreation and natural values;
- b) to maintain and improve public access to waterways, lakes and the sea front; and
- c) to protect the productive ecosystems and natural habitats of the region's estuaries, wetlands, lakes and lagoons and their scenic attributes.

The objectives of the plan in relation to living areas are:

- a) to ensure that urban expansion is orderly and efficient having regard to the constraints of the natural environment and that sufficient land is available to prevent price rises resulting from scarcity of land;
- b) to ensure that new residential land or land for higher density development is only developed where there are adequate utility and community services available or there is a commitment from the relevant authorities or developer to provide those services;
- c) to provide for a range of lot sizes, dwelling types and tenure forms to cater for varying household needs in all local government area; and
- d) to minimise bushfire risk to urban development.

The objectives relating to recreation and tourism are:

- a) to promote a wide range of leisure opportunities,
- b) to conserve and promote the region's natural, historical and cultural teaches which are the basis of the tourist industry, and
- c) to preserve access to natural resources and public lands which have recreational value.

The DUAP submits that the DA is generally consistent with the objectives that require orderly and efficient development with a range of lot sizes and dwellings, the availability of adequate services and development which avoids hazard or flood prone lands. However, the Department submits that the DA is unlikely to "protect the productive ecosystems and natural habitats of the regions estuaries, wetlands, lakes and lagoons and their scenic attributes."

Relevant issues raised in Illawarra REP No.1 are addressed in the 'Issues' section of this report.

Jervis Bay Regional Environmental Plan 1996

This plan was gazetted after the development application was submitted, but as it does not contain any savings provisions this plan therefore must be considered by the consent authority. Importantly it removes the operation of Illawarra Regional Environmental Plan No 1 from that part of the subject site south of Culburra Road, which is the location of the proposed residential subdivision.

The relevant provisions include:

Clause 9-How to use this plan

If you wish to carry out, or are the proponent of, a proposal, you must show why the proposal should proceed, using the following steps:

- a) describing natural and cultural values of the site affected by the proposal,
- b) evaluate the significance of these values within the Jervis Bay context,
- c) assess the impact of the proposal on those values identified, both within the site and the Jervis Bay context,
- d) provide details of how the immediate and cumulative impacts of the proposal will be managed, to achieve the aims of this plan.

Clause 11-Catchment protection

A proposal must:

- a) for the water quality in any water body it may affect, either:
 - sustain uses identified on map 2 and as defined by the Australian National Water Quality Guidelines for Fresh and Marine Water 1992, or
 - demonstrate how the water quality will be maintained or improved, if the water quality in those water bodies does not at that time sustain the use as identified on map 2, and

- b) outline a water quality management strategy for surface water to demonstrate how paragraph (a) will be achieved, and
- c) rehabilitate and restore any degraded areas along a water body on the site,
- d) provide sewerage for all new development (unless the development is within an existing unsewered area). If alternative systems of sewerage disposal have been approved by health and environmental protection authorities, they may be provided, and
- e) protect ecosystems and natural habitats, including water bodies, from degradation.

Map 2 of the REP classifies Lake Wollumboola as requiring protection of aquatic ecosystems and protection for recreational primary contact.

Clause 12-Landscape quality

A proposal must:

- a) maintain the visual quality of a water body, a wetland, or a foreshore dune, and
- b) maintain distinct urban communities that have an individual identity, and
- c) let the landscape, not the structures, be the dominant feature outside the settlements, and
- d) allow the existing tree canopy, on or around the site, to dominate.

The "Issues" section of this report includes consideration of significant matters.

Local Environmental Plan 1992

The minor Local Environmental Plan was gazetted on 28 August 1992 as Amendment No 41. Relevant aims and objectives of this Plan include:

The aim is to rezone land to provide for the orderly and efficient expansion of the Culburra urban area. The objectives are:

- to provide for a variety of uses to service the residential expansion,
- to provide for the protection of the water quality of the adjacent water bodies and water courses,
- to protect the wetlands,
- to provide for the efficient servicing of the new residential areas,
- to provide for safe and efficient access to the existing commercial area,
- to provide for the social, cultural and recreational needs of the community; and
- to protect significant items of Aboriginal heritage.

Additionally, Clause 40b(3) of Council's LEP also provides that Council shall not consent to an application to subdivide land within the Culburra expansion area unless:

- a) plans and documentation showing the development staging have been submitted to the Council, which shows the areas of soils exposed at anyone time; and
- b) plans and documentation showing the proposals for erosion and sedimentation controls satisfactory to the Council are to be submitted to the Council with the application; and
- c) designs for surface drainage works and proposals for isolation of potential contaminants during the construction phase are submitted to the Council with the application.

Shoalhaven Local Environmental Plan 1985

The aims of the LEP are:

- a) To provide guidelines in accordance with the objects of the Act for orderly and timely development and management of land use in the city,
- b) to enhance individual and community well-being and welfare by following a path of economic development that does not impair the welfare of future generations, and

- c) to work towards an ecologically sustainable future through the proper management, development, protection, restoration, enhancement and conservation of the environment of the City.

The relevant objectives of the LEP are:

- f) to ensure that development and expansion of coastal villages are sympathetic to the coastal environment; ...
- o) to ensure the protection of important natural and cultural environments;
- p) to protect and enhance scenic and landscape qualities;
- r) to ensure that development that achieves the water quality or river flow objectives of ground water, rivers, estuaries, wetlands and other water bodies;
- s) to avoid, mitigate or remedy the adverse effects of development on the environment; ...
- w) to minimise the clearing of native vegetation especially those local species which are fully represented in conservation reserves.

Clause 9

Under this clause the subject site is predominantly zoned residential 2 (c). The object of this zoning is to provide for new residential areas with a range of housing types with provision for urban facilities is to serve the local community.

Clause 26

This clause relates to soil, water and effluent management and provides objectives that must be considered in determining the adequacy of such management.

Clause 27

This clause refers to danger from bushfire.

Clause 40b

This clause relates specifically to the extension of the Culburra urban area, which includes the subject site. It includes provisions that required matters relating to staging/soil exposure, erosion and sedimentation controls and removal of contaminants during construction stage, are to be addressed prior to the granting of subdivision consent.

STRATEGIES AND OTHER MATTERS

Draft Lake Wollumboola Estuary Management Plan

The management objectives include:

- Ensure that environmentally sensitive work practises are undertaken on the foreshores and within the catchment.
- Minimise changes to land use patterns that adversely affect the environment of the lake.
- Ensure that the existing high environmental quality of the lake is not degraded by future development in the catchment and initiate changes to land use patterns that are beneficial to the land.
- Minimise the impact of flooding to individual properties adjoining the land.

Draft NSW Biodiversity Strategy

The goal of the draft NSW Biodiversity Strategy is:

“To protect the native biological diversity of NSW and maintain ecological processes and

Core objectives of the draft Strategy are to:

- 1) Ensure the survival and evolutionary development of species, populations and communities of plants, animals and micro-organisms native to NSW;
- 2) Strengthen management on a bioregional basis, including the integration of biodiversity, conservation and natural resource management, consistent with the principles of ecologically sustainable development;
- 3) Identify, prevent and attack at source the threats to biodiversity through timely implementation of target action;
- 4) Build on the success of existing initiatives to develop a coordinated and cost-effective biodiversity conservation program involving the community, industry and all levels of Government, and ensure that the rights, knowledge and values of local and Aboriginal communities are properly recognised and reflected;
- 5) Strengthen actions to inform, motivate, and achieve the support of the community, including local and Aboriginal communities, industry, State Government agencies and Local Government, in conserving biodiversity; and
- 6) Increase our understanding of the ecological systems and processes required to conserve biodiversity through scientific research, survey and monitoring, taking into account the knowledge and values of Aboriginal and local communities.

The Strategy is divided into seven sections. Sections 1 to 5 contain a series of objectives and performance targets and detail specific actions relating to community consultation and involvement; conservation and protection of biodiversity; threatening processes and their management; biodiversity conservation and natural resource management; and improving our knowledge. Section 6 deals with a framework for implementation and Section 7 provides a summary of actions.

SUMMARY OF SUBMISSIONS

Submissions were received from 55 parties of whom 17 appeared at the primary session (1996) and/or at the reconvened Inquiry. Submissions were received from Shoalhaven City Council, eight Government bodies, fifteen community groups and thirty individuals. A number of submissions support the proposal on the basis that the development will assist the area and impacts can be managed. Conversely a number of residents, community or conservation groups and Government agency submissions raise concern over potential impacts, including fauna, habitat and flora of conservation significance, and water impacts to Lake Wollumboola.

Realty Realisations Pty Ltd

The Company relied on its primary submission from Allen, Price and Associates submitted in October 1996, a Fauna Impact Statement submitted in September 1999 and specialists reports on water quality and water pollution controls, soils, archaeology, social effects, infrastructure development and the aquatic environment of Lake Wollumboola.

The Company submits that development of Long Bow Point is in accordance with long term strategic planning for the area and with government policies. The proposal will increase the population for Culburra, attract further services to the area, and provide a range of housing and development of the land. No adverse effect on the surrounding environment is predicted. The Applicant submits evidence to suggest that Lake Wollumboola is robust and the environmental values of the lake will not diminish as a consequence of slight increases in runoff.

The Applicant urges that there is sufficient information to support approval of the proposed subdivision.

COUNCIL AND GOVERNMENT AGENCIES

Shoalhaven City Council

The background documents and Council's submission provide a history to the preparation of the LEP and details of the planning process. The documentation refers to the Local Environmental Study and addresses the NSW Government's requirements in legislation, plans and policies.

Council supports a staged development of the proposed development. Each stage would be contingent upon the previous stage demonstrating that it can meet a no net increase in water pollutants from the site. Council submits that there has been a long history of studies for the site which have resulted in it being included in Council's residential strategy and being rezoned to residential.

After reviewing the FIS, Council's Threatened Species Officer expressed some concern over potential impacts on endangered species and their habitat. The adequacy of environmental protection zones, location of water pollution control ponds and wetland buffers, and compatibility of environmental protection zones with recreational uses was also questioned. The submission suggests retention of endangered species habitat such as stands of swamp mahogany and black she-oaks, together with wetlands and areas with high hollow-bearing tree densities in conjunction with a series of habitat links. Water pollution control ponds and under-scrubbing for fire hazard reduction should be excluded from environmental protection zones.

Council recommends development of the site should be staged and development of each stage should be contingent upon the previous stage meeting no net increase of water pollutants to Lake Wollumboola. Council provided conditions of consent which it recommends be attached to any approval of the development application.

Department of Urban Affairs and Planning (DUAP)

The Department is opposed to the proposal. It considers the major issues are:

- The potential adverse impacts on Lake Wollumboola and its catchment;
- water quality management; and
- potential impacts on fauna and flora.

DUAP submits that Lake Wollumboola and its catchment represents one of the most significant and fragile environments along the New South Wales coast. The lake supports 23 internationally protected bird species, six species listed as vulnerable and one listed as endangered under the Threatened Species Conservation Act.

The Department also raises concerns as to cumulative impacts and potential odour impacts. The proposed subdivision is the first of a 6-stage expansion of the township with around half of the proposed lots within the catchment of Lake Wollumboola.

DUAP points out that it is not opposed to residential development provided it is guided by clear environmental management principles and meets relevant environmental goals. Four key principles that should guide the town expansion generally and development on the site specifically are:

- a) The lake and its catchment must be planned and managed for environmental protection with clear environmental objectives to be met;
- b) the staging must occur from the less, to the more sensitive parts of the proposed extension and the lake's catchment;
- c) the success of the environmental management measures should determine the progress of subsequent stages; and
- d) identified significant fauna and flora communities must be protected in their own right and as part of the wider landscape conservation initiatives.

On the basis of evidence from NPWS, the Department is of the view that certain land is not suitable for development because of its potential impact on endangered fauna species and habitat.

National Parks and Wildlife Service (NPWS)

NPWS does not support the proposal. The Service raises concern over the assessment of the site as well as the habitat value of Lake Wollumboola. These concerns extend to potential adverse impacts on endangered fauna using the site or the lake.

Fauna survey adequacy and failure to identify habitat for endangered fauna is questioned. The importance of old growth areas, and stands of Swamp Mahogany as habitat for endangered species is pointed out.

NPWS notes that the Culburra Urban Expansion Area, and specifically the Long Bow Point development area, contains several areas of high conservation significance. These areas are not well represented in the National Park and need to be adequately protected through local planning and assessment processes.

Additionally, the submission notes that Lake Wollumboola is of national significance being listed on the Commonwealth Directory of Important Wetlands and supports a population of nationally endangered Little Tern and many water birds subject to international agreement such as JAMBA/CAMBA. Parts of the site should remain free of development in order to protect the values of Lake Wollumboola according to the submission.

Environment Protection Authority (EPA)

The EPA considers that the proposal may adversely impact on the water quality and ecology of Lake Wollumboola.

The EPA raise concern as to the following possible impacts, increased nutrient loads to the lake, changes to the ecology of the lake, water quality impacts brought about by increased nutrients, and possible subsequent changes to the wildlife which inhabit the lake.

The EPA is not satisfied that water quality predictions, especially the computer modelling, are sufficiently rigorous. The performance of proposed water pollution control ponds have not been verified for a similar situation. The EPA having regard to the sensitivity of Lake Wollumboola recommends a nil pollutant increase. EPA's concern is that the lake may be near its critical point as there is evidence of water quality problems at present including, macro-algal blooms within the lake, de-oxygenation of lake waters, fish kills and odorous conditions.

Department of Land and Water Conservation (DLWC)

The Department objects to the proposal on the basis of likely long-term impacts on receiving waters. A "no nett increase in pollutant loading" principle is supported.

Lake Wollumboola is cyclic, complex, sensitive and poorly understood. The Applicant has not demonstrated the effectiveness of water pollution control structures and environmental protection zones according to the submission. The precautionary principle is a major consideration in respect of the need for prevention of environmental degradation where there are threats of serious or irreversible damage.

NSW Fisheries

NSW Fisheries made a presentation to the primary session of the Inquiry in 1996. The Department submits that there is a significant risk that the fish habitats in Lake Wollumboola will be impacted indirectly by the mechanisms of water decline. The fact that the Lake is an intermittently opening lagoon that is frequently isolated from tidally driven oceanic flushing, significantly increases the risk of initiating irreversible change.

Allowing development to proceed will cause greater pressure to be exerted upon government agencies to address the odour problem by adopting measures that alter the fundamental nature and natural condition of the lake. The department is keen to prevent these pressures from developing in the first instance.

NSW Fisheries concludes that due to the potential impacts and associated uncertainty that Stage 1 should not proceed. However, Stages 2 and 3 (which drain to the flushed Crookhaven River) could be developed.

NSW Coastal Council

The NSW Coastal Council was established in 1997 after the primary session of the Inquiry. However, the Council made a presentation at the reconvened session of the Inquiry. The Council opposes the proposed subdivision.

The Council is generally concerned about any residential development on the NSW Coast in the catchments of intermittently closed and open lakes and lagoons. It submits that there is significant uncertainty surrounding the management of intermittent lakes. Given the uncertainty, the Council would prefer development to occur and be monitored within the catchments of the Crookhaven River and for subdivision involving larger allotments of land.

Roads and Traffic Authority

The Authority's initial concern at the primary session of the Inquiry was the impact of increased residential development on the wider road network. The RTA considered that predicted traffic flow will be much greater than the estimated capacity of Culburra Road. The RTA were also concerned about the impact increased traffic will have on the performance of the Culburra Road / Princes Highway intersection. The RTA did not make a further submission to the reconvened Inquiry.

Environment Australia's concerns are the potential for the proposal to impact on the birds utilising the lake due to habitat modification or removal, increased human activity on and around the lake, increased pressures from domestic pets and foxes, and increased water pollution.

CONSERVATION AND ENVIRONMENTAL GROUPS

Australian Conservation Foundation

The ACF submits that subdivision and development of Long Bow Point is incongruent with current thought and government policy on biodiversity. They consider that increased runoff from the site will detrimentally impact Lake Wollumboola. The Foundation states that assumptions for water pollution export rates, interception rates and confidence limits are not conservative and the lake will experience increased pollution. The ACF conclude that the residential zoning of the land should be reconsidered. The ACF also provided detail analysis of the inadequacies it found with the FIS.

Birds Australia is a community ornithology organisation. They are strongly opposed to development at Long Bow Point because the impact nutrient in runoff would have to the habitat of migratory and local birds that utilise Lake Wollumboola.

Coast and Wetlands Society Incorporated is concerned about the impact on the habitat and wildlife values of such a significant Lake. Lake Wollumboola supports one of the largest populations of Black Swans, contains *Wilsonia rotundifolia* around its shores, and is utilised by migratory waders which are protected by international agreements. Urban development of sensitive areas of the coast is contrary to NSW Coastal Policy.

Earth Repair Action is concerned about the threat of this development and adjacent developments to the surrounding area's uniqueness, biodiversity and natural beauty. It is submitted that often the inherent value of the environment is ignored because it can not be quantifiably measured unlike economic and employment benefits.

Jervis Bay Regional Alliance lists inadequacies that they identify with the FIS. The Alliance is alarmed at the prospect that much of the present vegetation will be cleared, thereby destroying the habitat links with adjacent vegetated lands, destroying the intrinsic natural values, affecting the lake and introducing new systems, plants, animals and drainage.

Lake Wollumboola Support Group

Lake Wollumboola Support Group strongly opposes the proposed subdivision. In support of their opposition they provided extensive submissions and technical reports on flora and fauna, social and economic issues, water pollution control ponds and water quality.

Issues raised generally relate to:

- That Lake Wollumboola has international, national and regional conservation values which will be adversely impacted by the proposal;
- That parts of the site have high conservation values;
- The adequacy of fauna and habitat surveys is questioned;
- Uncertainties and variables associated with lake chemistry and biota;
- Habitat modification likely to result from human activity around the lake;
- The adequacy of the environmental protection zone around the lake;
- The unproven nature and predicted efficacy of pollution control ponds;
- The importance of old growth and blackbutt forest;
- The failure to take into account cumulative impacts;
- That enforcement of dog and cat controls (to protect fauna) is impractical;
- Lake odour control will require intervention thereby changing the natural lake processes and impacting on the ecosystem;

Lake Wollumboola provides a feeding habitat for certain endangered species, a breeding habitat for Little Tern (a nationally endangered species), habitat for the endangered (in NSW) Green and Golden Bell frog, a refuge or habitat for up to 42 water bird species listed under JAMBA/CAMBA and up to 19 species listed as threatened in NSW.

The group submits that Long Bow Point and Lake Wollumboola have high regional and State conservation values. Development at Long Bow Point would have serious, adverse and irreversible damage to Lake Wollumboola and to the fauna that currently utilise the site. They conclude that the proposed development is not consistent with the social and economic character of Culburra Beach and recommend that the proposed subdivision be refused.

National Parks Association submits that development of Long Bow Point would make a mockery of the Government's recent Coastal Policy and affect the adjoining Jervis Bay National Park.

Nature Conservation Council of NSW is against development of Long Bow Point because of its potential impact on Lake Wollumboola, the adjoining Jervis Bay National Park and the intrinsic values of the site. The Nature Conservation Council sees no justification for the development since there is no shortage of land in the City of Shoalhaven and it will bring few economic benefits.

Ocean Watch submit that Lake Wollumboola is a nursery for finfish and shellfish. Seventy percent of finfish and shellfish catches spend some time of their cycle in estuaries. The Lake has significant economic value as its seagrasses constitute habitat for at least 26 commercially important fish species and is argued as being one of the most lucrative estuaries for prawns along this section of coast. Lake Wollumboola is more productive than many permanently opened estuaries. Development of Long Bow Point could destroy Lake Wollumboola and important aquatic nurseries.

Total Catchment Management Committee submitted to the Inquiry in 1996 that the lake was under stress from high nutrient levels and does not consider it reasonable that Water Pollution Control Ponds be tried out in the catchment of Lake Wollumboola. The Committee also expressed concern that Long Bow Point residents will be affected by odour from the lake.

Total Environment Centre submit that the proposed development should not be approved because of its damaging effect on water quality in the lake and catchment, natural vegetation, biodiversity and threatened species. The size and location of the development is also inconsistent with the social and economic needs and village style character of Culburra.

SUBMISSIONS FROM GROUPS SUPPORTING THE PROPOSAL

Combined Pensioners Superannuants Association of NSW Inc.

The association supports the proposed subdivision because development of Long Bow Point will bring the possibility of better roads, more shops, additional playing fields, better bus services and more local jobs. Improved services to Culburra and Orient Point would make pensioners living in the area feel less isolated.

Culburra Beach Chamber of Commerce

The Chamber is the principle organisation representing the interests of businesses in Culburra and strongly supports the proposed subdivision. Attached to its submission is a petition with 468 signatures supporting the proposal.

The Chamber submits that the threatened species found on the site are mobile and wide ranging, that the ecological communities on site are adequately represented in Jervis Bay National Park and that modern water pollution control ponds will protect the ecological attributes of Lake Wollumboola. The Chamber considers that the subdivision should proceed to help alleviate the spiralling of land prices, to enable a local high school and sporting facilities to be built, to create demand for additional services, create employment and to prevent the stagnation of Culburra Beach.

Culburra Beach Community United Group submits that the future economic and social well being of Culburra Beach/Orient Point communities is at the cross roads. Approval to the Long Bow Point will give the people an opportunity for a future with proper community and recreational services, economic improvement and much-needed jobs. It will give their children hope for being able to live and work in the area where they are brought up.

Culburra Beach Progress Association

Between the primary session in 1996 and the reconvened Inquiry in 1999 the Association changed membership and altered its position from opposing the proposed subdivision to supporting it. The Association believes that odours from the lake do not affect the site, that unmitigated runoff from the existing Culburra urban area is evidence that the lake is robust, that water pollution control ponds will provide Green and Golden Bell Frog habitat and that refusal of the subdivision will allow local land prices to continue increasing.

INDIVIDUALS

Ms M Ash is concerned that development of Long Bow Point will have serious negative impact on the catchment. She submits that the housing estate development is totally incompatible with maintaining and protecting this special environment.

Mr J and Mrs N Baker object to the development because of the potential threat it poses to wildlife habitat and Lake Wollumboola. They consider development should occur first in the catchments of the Crookhaven River and further monitoring of Lake Wollumboola should continue.

Mrs M and Mr J Boland

Mr and Mrs Boland are concerned about the impact of the proposed subdivision. Mrs Boland disputes that development will create local employment but rather provide employment for people outside Culburra. She also submits that development of the shopping centre will disadvantage existing retail outlets, and that a covenant of no pets at Long Bow Point can not be regulated. Mr J Boland is concerned about the impact of odour and destruction of Lake Wollumboola. He supports the idea of development first occurring in the Crookhaven River Catchment.

Ms P Cormick sees no real need for the development and therefore opposes it because of its potential risk to Lake Wollumboola and local tourism.

Mr J Flynn is concerned about the growth of small coastal villages in the Shoalhaven area and their destruction of unique coastal environments. He considers that the subdivision is unnecessary, adversely impacting areas of high biodiversity and brings few benefits to the area.

Mrs M and Mr Gatt submit that they support development of Long Bow Point.

Mrs B and Mr R Hughes strongly object to the proposed subdivision. They feel a development of this magnitude can only have detrimental affect on the village of Culburra, due to the inevitable increase in population. Increased population will increase crime, violence, pollution and destroy rare and threatened fauna habitats.

Mr and Mrs Gavagna and Mrs Aguggia submit that there is no commercial need for the development and the environmental costs far outweigh any benefits.

Ms N Grootenboer opposes the subdivision because development of Long Bow Point will threaten the ecological importance of Lake Wollumboola.

Ms R Harvey is against development of Long Bow Point because of the ecological effect it will have on Lake Wollumboola, it will generate few local jobs and will place additional burden on existing services.

Mr Lewis is the Company Director of HOME Culburra Beach Timber and Hardware. He submitted to the primary session in 1996 that the supply of vacant land in Culburra is almost exhausted and since Culburra is surrounded by water to its east, north and south the only direction to expand is west.

Ms S McCarthy, Ms Y Bowers and Mr W Graham submit that Lake Wollumboola is an important recreational area and habitat for waders and water birds. Development at Long Bow Point will destroy the lake's qualities.

Mr A Martin is opposed to development of Long Bow Point because of its destruction of the aesthetic value of the lake; damage and pollution to the lake; destruction of the natural habitat for wildlife; overdevelopment of Culburra Beach; and additional noise, rubbish, sewage, traffic, crime and pollution problems. He recommends that NP&WS purchase the land.

Mr JG Morgan details in a submission to the primary session numerous concerns raised at community meetings. He believes that the provision of adequate infrastructure will be a real problem for Shoalhaven City Council, which has many other commitments in one of the fastest growing areas of Australia.

Ms K Miller states that it is inevitable that the construction of a large estate and increase in population will destroy the catchment and destroy the village character of Culburra.

Mr D Phelps is concerned about the environmental danger that he believes would inevitably follow the construction of an 837 lot subdivision in the catchment of such a fragile lake and ecosystem. He also submits economic and employment benefits espoused by the developer are flawed.

Mrs H Plowman provides an anecdotal history of Lake Wollumboola since she first visited the area in 1939. In her view the lake has noticeably degraded since Culburra was developed in the 1950's. She opposes development of Long Bow Point because it will only further degrade the lake.

Mr H Ray believes the development should proceed because it will facilitate the growth of the existing township and attract better services; the proposal includes best available environmental protection; residential subdivision would be better than rural subdivisions and other people should have the opportunity to move to Culburra.

H & B Rogerson are against development of Long Bow Point as proposed in its present form. They submit that residential allotment sizes should all be larger and equal size. They are also concerned about the provision of services and support development of the other stages in the Crookhaven River catchment first.

Mr R Shimmen operates a local business and made a submission to the primary session. He considers that development of Long Bow Point should occur because Culburra is in real need of a major injection into the economy for both employment and capital.

Mr B Slarke points to various authorities that have identified the importance of Lake Wollumboola. Mr Slarke is opposed to development that could potentially destroy such an important lake.

Mr A Stephenson is concerned about the clearing of habitat for endangered fauna and considers the FIS to be flawed. He cites the omission of orchids from the FIS as an obvious flaw.

Mr J Symonds

Mr Symonds opposes the proposed development. He poetically spoke of the natural beauty of the area and argued that the proposed development would damage the fragile ecosystem of Lake Wollumboola, destroy the village atmosphere of Culburra, create an additional strain on services already stressed, clear native flora and destroy habitat and food sources for native fauna (including threatened species). Development of Long Bow Point would significantly affect Culburra and Lake Wollumboola.

Ms J Tuner opposes development of Long Bow Point because of the impact it would have on Lake Wollumboola, the subdivision lots are too small and the area would be affected by odour from the lake.

Mr J Wilson is a local fisherman and is concerned about some members of the community denigrating the aquatic importance of Lake Wollumboola and advocates that the natural processes of the lake not to be disrupted.

Mr A Wright is not against development but is concerned about the impact development will have on existing over stretched services. Mr Wright is also concerned about impacts upon Lake Wollumboola and whether Conditions of Consent would be properly implemented and regulated.

Dr J Wright submits that Culburra needs to grow to attract services such as doctors, solicitors, police, ambulance and dentists. The subject site is mostly degraded rural land and the only endangered

species it contains are highly mobile. Development of the site will generate employment and provide a variety of quality households for the area.

Ms N Wright

Ms Wright expresses concern about the divisiveness this development has had on the community and deception by some members of the community. Ms Wright remains strongly opposed to the proposed development because there is no guarantee that runoff will not irretrievably damage Lake Wollumboola, the value of the EPZ will be eroded by people clearing trees, dumping rubbish and introducing domestic pets and Culburra will lose its holiday resort attraction. She also submits that long term employment does not accompany housing estates.

ASSESSMENT OF ISSUES

FLORA IMPACTS

A major issue raised by parties is the proposed clearing of vegetation communities that serve as fauna habitat and the resulting adverse impacts on fauna of conservation significance. Related issues or concerns include:

- Extent of proposed clearing;
- Significance and relative loss of specific areas of conservation value; and
- Overall conservation value of certain areas proposed for clearing.

NPWS, DUAP and a number of conservation groups recognise that the site and the surrounding area support a number of plant and animal species of regional, State or National significance.

The NPWS submission raises concern over proposed clearing of medium to high value vegetation and fauna habitat. Such areas should be protected based on the diversity of species, including threatened species, using these habitats and the acknowledged natural and cultural heritage significance of the area. The Service notes the importance of certain feed plants and old growth forest, which includes hollows for dependent threatened fauna.

Flora Significance

The DUAP submission states that the impacts on flora and fauna from vegetation clearing and the destruction of fauna habitat are key environmental issues concerning the proposal.

The Applicant's detailed vegetation maps, which were submitted at the final hearing, show one plant species of conservation significance, round leaved *Wilsonia rotundifolia* on the site foreshore. This plant species is nominated for threatened status and previously was only identified off site on the lake foreshore. The plant species occurs at four locations on the site's foreshore adjacent to Lake Wollumboola in areas proposed as the Environmental Protection Zone. A proposed walkway is intended close to one specimen and Council and government agencies argue that no construction should occur in the Environmental Protection Zone.

The Applicant's flora consultant considers that the site has low conservation significance and that nearby areas contain habitat for endangered or threatened fauna.

Government agencies, Council and several environmental groups oppose the proposal due to intended clearing of vegetation communities of conservation value. The following section "Fauna Impacts" discusses the significance of the vegetation communities and likely impacts in respect of habitat value for fauna.

The Applicant's detailed vegetation maps, Fauna Impact Statement and related submissions do not address the area north of Culburra Road near Curley's Bay.

FAUNA IMPACTS

Issues or concerns raised in respect of fauna include:

- The site and catchment contains habitat and fauna listed as endangered or threatened;
- The loss of high conservation significance habitat with the proposal;
- The likely disturbance of adjoining habitat and fauna by edge effects;
- Likely fragmentation and isolation of certain significant habitat;
- Claimed inadequate fauna surveys and impact assessment;
- Uncertain mitigation measures;
- Need for greater environmental buffers and a wider Environmental Protection Zone near the lake;
- Lake Wollumboola supports fauna, particularly birds, of International, National, State and regional significance;
- Likely water impacts on Lake Wollumboola and resulting adverse fauna and habitat impacts.

The DUAP submission states that impacts on fauna habitat from vegetation clearing and destruction of fauna habitat are key environmental issues concerning the proposal. The Department considers that Lake Wollumboola and its catchment represent one of the most significant and fragile environments along the NSW coast.

Opposing parties claim that Long Bow Point supports over 300 native vertebrate species and around 300 flora species within an area less than 200ha.

Threatened Fauna Species

Up to 33 threatened fauna species have been found in or near to the proposed development area. The FIS identifies 10 threatened fauna species that occur or could occur on the site and a further 14 that utilise adjacent wetland habitats. NPWS identifies 17 terrestrial threatened species that occur or could occur on the site and argues that impacts on wetland species should also be considered.

Threatened fauna species found within the site include the Green and Golden Bell Frog, the Eastern Little Mastiff Bat, the Large Footed Mouse Eared Bat, the Large Bent Wing Bat and the Glossy Black Cockatoo. The fauna consultant for the Lake Wollumboola Support Group claims a further 15 threatened species are identified in adjacent environments.

The Applicant states that most of the endangered fauna species known from the subject site or regarded as likely to be present, such as the Glossy Black Cockatoo and microchiropteran bats, are not likely to be adversely affected to any significant extent. Additionally, there are substantial habitat areas in conservation reserves in the locality and region for endangered species.

The Applicant's fauna consultant notes that whilst threatened fauna have been found on the site, in most instances the habitat for such species will not be completely cleared or that the specific location is outside the proposed clearing area.

The Fauna Impact Statement (FIS)

The FIS considers that the site has low conservation value for threatened fauna and their habitat because:

- it has been previously cleared;
- there are no habitat features or resources on the site which are not well conserved elsewhere in the Jervis Bay Regional Area or Shoalhaven Local Government Area;
- the threatened fauna known from the site are generally wide-ranging and highly mobile, and not confined to the site;
- extensive areas of National Park, State Forests and Nature Reserves exist in the locality and region.

Several parties including NPWS, Council's Threatened Species Officer and the fauna consultant for the Lake Wollumboola Support Group claim that the FIS is inadequate. In particular the FIS surveys were insufficient in terms of the length of survey given the number of potentially threatened species, the surveys were not carried out during the appropriate season/s and that general conclusions are made instead of detailed assessment based on thorough and rigorous investigation.

The adequacy of 13 days of fauna survey needs to be seriously questioned according to the NPWS submission given that the proponent was specifically required to survey for 24 endangered fauna, some of which are cryptic and need considerable survey effort to detect. The Service considers that there is the potential for some species of endangered fauna to have gone undetected on the subject site. These include the Australasian and Black Bitterns, White Footed Dunnart, Squirrel Glider, Tiger Quoll, and the Southern Brown Bandicoot. The FIS fails to consider to the fullest extent reasonably practical the requirements of NPWS. Many issues are dealt with in a superficial way according to the Service.

In particular the NPWS note that the FIS fails to identify the Green and Golden Bell Frog on the site (Wattle Creek) despite this information being available on the NPWS database. Additionally it is unclear whether the requested further survey of breeding colonies has been undertaken.

Council also raise concern that the FIS appears inconsistent in stating some endangered species may depend on the site and resources thereon but the FIS then states that the site does not contain essential habitat for endangered species. Council considers that mitigation measures to minimise impacts on natural habitat and on Lake Wollumboola's bird life need to be substantiated.

The Applicant responds that the FIS complemented extensive site surveys and work already carried out. Many of the species required to be surveyed by NPWS have not been recorded within 10km of the site for many years and the fauna consultant considers that it is unreasonable to survey for such species. In respect of specific species, the Applicant's fauna consultant considers that:

- The White Footed Dunnart is unlikely to inhabit Long Bow Point as its preferred habitat is not in abundance;
- The Southern Brown Bandicoot and the Tiger Quoll have not been recorded within 10km of the site for over a decade;
- The Australasian and Black Bittern have not been observed or heard during three inspections, although the consultant accepts that they may utilise the site on occasions; and
- The Regent Honeyeater, Squirrel Glider, and Swift Parrot have not been recorded on the site so the significance of swamp mahogany on the site as a food resource is irrelevant.

The Applicant's consultant accepts that the Powerful Owl and Masked Owl are likely to use the site for foraging purposes, however there is no evidence of nesting trees of either owl.

The FIS identifies that a Section 120 License under the National Parks and Wildlife Act 1974 would probably be required for the "taking" of some endangered fauna, particularly bats. The Service states

that it would be unlikely to issue such license, as the Applicant has not considered matters to the fullest extent reasonable.

Habitat of Conservation Significance

The Applicant points out that 70ha of the site will be conserved in the Environmental Protection Zone and only 125ha of vegetation will be cleared, of which approximately 25ha have been previously cleared. The NPWS raises concern over the loss of significant areas of high value habitat, and potential impacts on threatened species. According to the NPWS, the area contains habitat for a high number of threatened species. The area and the site contain habitat of both state and regional significance due to the diversity and condition of plant communities and the number of fauna species present according to NPWS.

The NPWS identifies a number of areas proposed to be cleared for development purposes, which the Service considers to have regional conservation significance (see Figure 4). These include old growth communities important for hollow dependent fauna and areas of winter flowering eucalypts such as swamp mahogany. Stands of this eucalypt species represent a significant food resource for at least three of the endangered fauna (Regent Honeyeater, Squirrel Glider and Swift Parrot).

Similarly Council's Threatened Species Officer considers locations containing high concentrations of endangered species habitat should be excluded from development. Such areas include stands of swamp mahogany, stands of black she-oak, wetland vegetation, and hollow bearing trees. Additionally there needs to be adequate buffers and habitat links.

The fauna consultant for the Lake Wollumboola Support Group agrees with NPWS and Council, noting that at least 8 threatened species utilise the study area and a further 15 threatened species have been identified in nearby habitat. Swamp mahogany is considered to have high regional significance. It is feed habitat during certain times of the year for the Swift Parrot, a species difficult to detect because its spatial distribution differs each winter. Similarly the Glossy Black Cockatoo relies almost exclusively on black she-oak seed with several birds observed in the study area.

With the Applicant's initial vegetation map, the consultant considers that the community, dominated by *Eucalyptus sclerophora* and *Eucalyptus gummifera* is considered important habitat for the endangered Yellow Bellied Glider. Though not recorded on the site the Yellow Bellied Glider is recorded in adjacent habitat and this suggests the site habitat could be used by this species. Similarly, the community dominated by tall rainforest is not protected elsewhere, and the community dominated by tall forest is habitat for threatened bat species and the Powerful Owl, and is not located or protected in surrounding areas. Both these areas are not recommended or partially recommended for protection by NPWS.

The fauna consultant for the Lake Wollumboola Support Group notes that some 12 bat species, of which 4 are threatened species, were recorded in a short survey period, indicating high biodiversity of this relatively small site. The site contains habitat for Ring Tailed Possum and Sugar Glider (the study area has one of the highest population densities of Sugar Gliders in NSW). The site is within the feeding area of a pair of Powerful Owls, the diet of which is dominated by medium sized arboreal mammals such as the Sugar Glider. The consultant states that it would be environmentally inappropriate to remove habitat that provides food for at least one breeding pair of a threatened species and their offspring. And that it is not appropriate to assume that owls or other threatened species would move elsewhere as these other areas are most probably already occupied or populations are not able to support additional species.

The Applicant's flora and fauna consultant classifies the development areas of the site that are proposed to be cleared as having low local, regional and state conservation value. The basis for the low conservation designation is:

- a history of previous clearance and disturbance of significant portions of the development area;
- a significant area of the site is to be protected in the proposed Environmental Protection Zone;
- habitats, resources and vegetation communities within the development site occur in conservation reserves in the locality;
- endangered fauna present on the development site are highly mobile and wide-ranging with alternative habitats available in the locality are well conserved.

According to the Applicant the NPWS accept that the development site is not of state conservation value based on the conclusions of NPWS's own report titled "*A Regional Assessment of the Natural Heritage Values of the Proposed Culburra Urban Expansion Area and Environs*". It is stated that the report notes that habitats are adequately protected in nearby National Parks and Government should not acquire the lands.

NPWS notes that the Applicant has selectively quoted the report out of context and that full paragraph referred to is:

"The vegetation communities which have regionally significant conservation values and provide habitat for threatened species occurring in the Culburra Urban Expansion Area are adequately represented and conserved in the protected lands of the proposed Jervis Bay National Park. Several small areas of high conservation significance have been identified which are not well represented in the National Park, but that other planning instruments can protect these adequately and effectively. The SEPP 14 Wetlands and Lake Wollumboola are also of regional significance.

It is therefore recommended that:

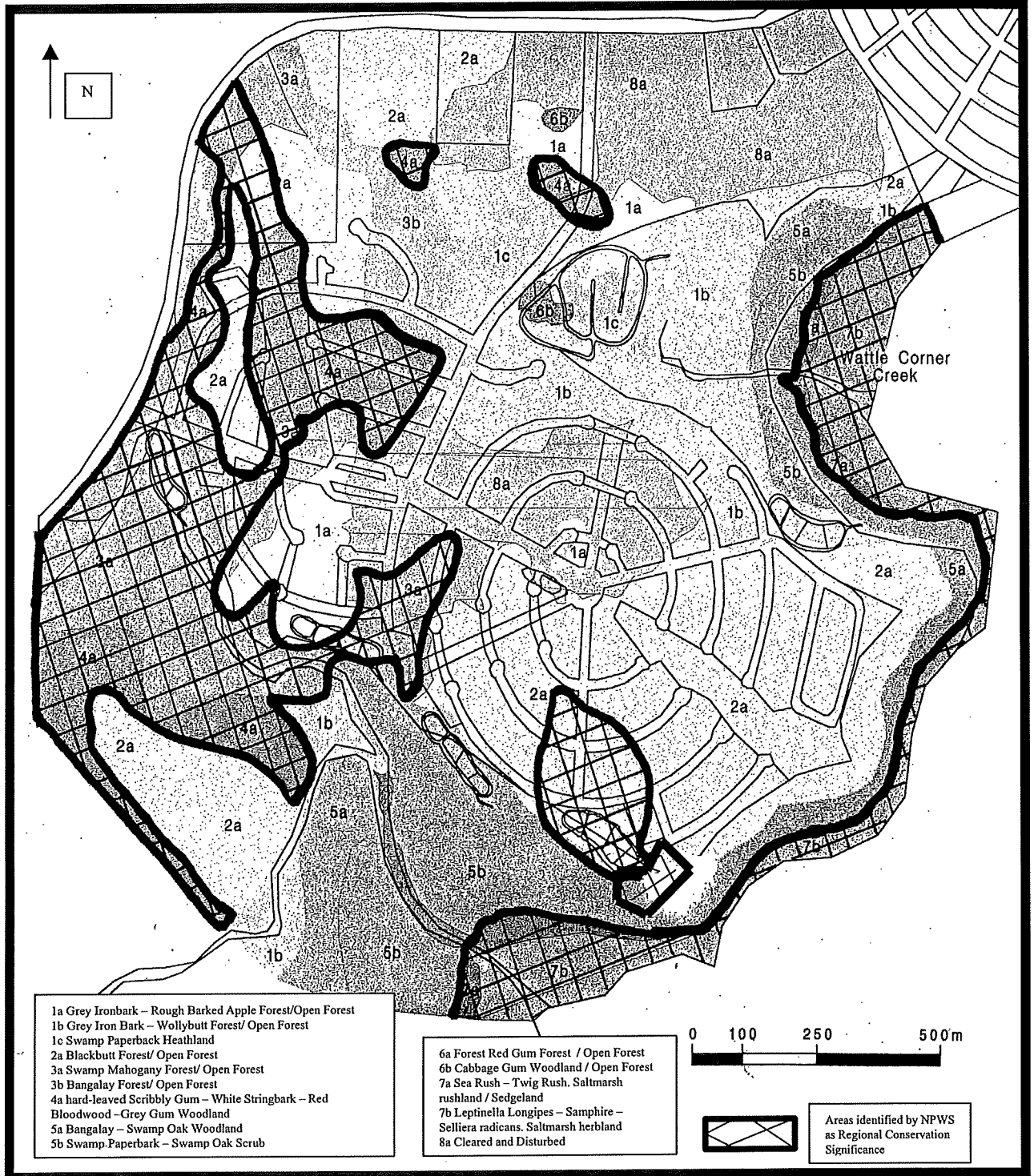
1. the lands of the Long Bow Point area not be acquired by the Government, and
2. the protection of these lands be pursued through Local Government planning instruments."

The Applicant's fauna consultant considers that there are no significant swamp mahogany stands on Long Bow Point, that hollow bearing trees are abundant in nearby National Park and State Forest and that at a regional scale, the patches of vegetation containing an abundance of hollow bearing trees are not significant. Additionally the proposed WPCPs will provide habitat for the threatened Green and Golden Bell Frog and the proposed EPZ provide a possible wildlife corridor.

The Applicant supplied a detailed vegetation map at the final public hearing. The NPWS questions the late production of such map. The new mapping alters the Service's assessment that one of the previously identified high conservation value areas no longer is so identified. The previous assessment was based also on the Applicant's initial vegetation map, which was significantly different, raising concern as to the adequacy of the Applicant's survey. Additionally three other new areas are now identified as having high conservation value by NPWS based on the new vegetation map. Accordingly the new map does not alter the NPWS opposition to the proposal.

NPWS consider that the long-term value of WPCPs as frog habitat is questionable and the likely value of the EPZ for a possible movement corridor may be diminished over time through human activities. A wider EPZ is called for up to 500m wide to provide for wildlife movement as well as to incorporate significant habitat for other threatened species. NPWS point out the need for wildlife corridors as identified in Council's environmental study.

Figure 4: Vegetation Communities Considered To Have Regional Conservation Significance By NPWS



Impact Mitigation Measures

The FIS claims that the environmental management and impact amelioration measures include:

- No relevant habitat or resources are to be retained in the development area;
- The EPZ and WPCPs will provide some resources for certain endangered fauna but their value as habitat and resources for endangered species is generally regarded as limited, with the possible exception of the microchiropteran bats and Green and Golden Bell Frog;
- Environmental management and impact amelioration measures associated with the proposed development are intended to minimise adverse impacts upon the extensive areas of natural habitat and vegetation in the vicinity and locality, and on Lake Wollumboola. It is these resources which ensure the continued survival of endangered fauna (and other species) in the locality; and
- The extensive areas of open forest and woodland, and the substantial areas of wetland in the locality, adequately provide for the conservation of endangered fauna and other species. The FIS claims that substantial areas of these vegetation communities and habitats are protected in dedicated conservation reserves;
- Appropriate landscaping and habitat rehabilitation measures.

However, the FIS impact mitigation measures are noted as being different if not at odds with the Applicant's submission, which proposes:

- Reduction in the total area of vegetation removed for the proposed development;
- Retention and management of substantial areas of native vegetation and habitats for native biota (including endangered fauna species);
- Provision of a barrier between the development area and Lake Wollumboola;
- Provision of movement corridors of retained vegetation for native fauna around the shores of Lake Wollumboola.

The Applicant's fauna consultant states that old growth forest is very well conserved within existing reserves in the locality. The old growth forest on the site is an extremely minor occurrence and can not be regarded as of significance. This is at odds with the Applicant's bat consultant who found several threatened bat species on the site triggering the need for a Fauna Impact Statement. The bat consultant states that six endangered bat species are known or likely to occur on the site. These bat species utilise mature tree hollows and stags for diurnal roosting purposes, including raising their young, and will initially face mortality due to clearing. These bats will also be impacted through loss of foraging habitat according to the consultant. He states that except for one bat species, none are likely to survive in urban situations due to cat predation, motor vehicle collisions and air, noise and water pollution which extends for kilometres around urban development sites.

The Applicant argues that alternative old growth forest habitat exists nearby in National Parks and reserves. The Applicant's bat consultant accepts that this may be so, but found no endangered bat species in two such areas to the west of the development.

NPWS disagrees that old growth blackbutt and swamp mahogany communities are well represented in National Parks in the region. The Applicant's FIS notes that removal of habitat may impact upon individuals of some species but are not critical to endangered species. The Service notes that while similar habitats are available elsewhere in the surrounding landscape, the Applicant has not shown that such habitat is available for endangered fauna. Similarly, the NPWS disagrees with the FIS assessment that there is no breeding or wetland habitat for Green and Golden Bell Frogs on the site. The Service

claims there is no evidence to support this FIS conclusion. NPWS has a record of multiple frogs at Wattle Creek on the site.

The Applicant's approach underestimates the impact according to the NPWS. The Service recommends that:

- Areas of old growth blackbutt and swamp mahogany communities have high habitat value for threatened and endangered fauna and should be excluded and buffered from disturbance;
- Wetland areas include habitat for the Green and Golden Bell Frog, and whilst movement corridors between breeding corridors is debatable, the Service recommends an extension to the width of the EPZ to a nominal width of 500m to avoid disruption to Green and Golden Bell Frog movements as well as to provide a broader band of forested area around the Lake;
- Proposed WPCP's be located outside the EPZ;
- Black she-oak communities are a critical food resource for the Glossy Black Cockatoo and while the Service would not be advocating protection of all such areas, the more important stands of black she-oak should be identified for protection.

Council's Threatened Species Officer and the fauna consultant for the Lake Wollumboola Support Group generally agree with the NPWS's recommended measures to avoid adverse impacts.

The DUAP submission considers that the Applicant and the Applicant FIS have not satisfactorily addressed their initial concerns.

DUAP, NPWS and Council conclude that appropriate mitigation of potential impacts relies on excluding high conservation value areas from development. These include stands of swamp mahogany, black she-oak, wetlands and areas with significant densities of hollow bearing trees. These responsible organisations consider that the site may be capable of development if such areas are excluded. A staged approach is suggested commencing in less environmentally sensitive areas away or outside of the Lake Wollumboola catchment area.

An amended subdivision layout plan was submitted at the final hearing to conserve black she-oak identified as a secondary food source for the Glossy Black Cockatoo (after the Applicant's consultant observed three of this threatened bird species feeding in that area of the site). The modification results in a reduction of 12 lots and an increase in the reserve linkages. It is noted that the dense stand of black she-oak runs through the proposed high school site (part of the site but requiring a further development application), raising questions as to the overall layout and future staging.

The amendment is minor and does not alter the concerns raised by DUAP, NPWS and Council.

Mapping Accuracy

Concern is raised at the accuracy of vegetation community maps supplied.

Council considers that the NPWS regional assessment maps are not of sufficient detail to determine regional significance. Council claims to have found inaccuracies with mapped boundaries of swamp mahogany communities. Validation and ground truthing is required according to the Applicant and Council.

NPWS accepts that vegetation community boundaries have not been mapped at fine scale on their regional maps. Pen lines on the supplied maps can be approximately 15m wide and transposing of aerial photos can be displaced approximately 20-25m, adding up to 40m inaccuracies. However, the Service relied on the on-ground vegetation surveys supplied by the Applicant.

The Applicant claims that the medium and high conservation areas identified by NPWS are inaccurate and supplied detailed vegetation maps at the final hearing. The provision of detailed vegetation mapping is the Applicant's responsibility according to the NPWS and of more importance than inaccuracies with vegetation boundaries is the fact that significant vegetation communities exist on the site which are proposed to be cleared.

The NPWS accepts that the Applicant's detailed vegetation map produced at the final hearing session is the most accurate, using detailed site inspection, quadrats and a differential Geographic Position System. It shows 8 different communities divided into 14 sub-communities and NPWS argues that this scale and level of detail should have been provided at the start rather than at the end of the assessment process. However the Service is concerned that:

- a non standard vegetation classification different to what Council and NPWS accepts is used on the new map;
- this new map bears little resemblance to the Applicant's initial vegetation map raising questions as the initial map was used as the basis for the FIS.

The NPWS now accepts that, based on the new mapping, one of the two areas of high conservation value (the northern area of swamp mahogany) is no longer considered to have high conservation value. Conversely the new mapping has highlighted additional areas of high conservation value:

- area 3a - swamp mahogany in the west of the site proposed to be developed into 50 lots;
- area 6a - open forest - red gum forest between Lake Wollumboola and the patch of old growth forest;
- several stands of *Wilsonia rotundifolia*, proposed for inclusion as a threatened plant species, have been mapped along the Lake fringe within the site, and the Service considers that the fringe area has high conservation value due to its habitat value for this species.

Other areas identified as having conservation values remain unchanged according to NPWS and the new vegetation mapping does not change the NPWS conclusions or the conclusions of the Regional Assessment Report. The Service states that it used the Applicant's initial vegetation map in part for validation.

Lake Wollumboola Fauna Significance and Impacts

Concern is raised that the proposal will pollute adjoining Lake Wollumboola and/or affect bird and aquatic species due to proximity to the lake. Water quality issues are discussed in the following section.

NPWS, DUAP, Council and several other submissions from conservation groups point out that the lake has high conservation value. It is listed on the Commonwealth Directory of Important Wetlands in Australia, listed on the Register of the National Estate and the NPWS are seeking to include the lake in the RAMSAR list of Wetlands of International Importance. Sections of the lake have also been identified as SEPP 14 Wetlands. Lake Wollumboola supports a population of the nationally endangered Little Tern as well as other endangered species and many waterbirds subject to international treaties.

The NPWS have an ongoing Little Tern breeding program on the eastern shore of the lake which involves electric fencing and warning signs to keep humans, domestic pets and predators from the breeding area selected by the endangered Little Terns. The success of the Little Tern breeding program at Lake Wollumboola increases the lake's significance according to NPWS.

The FIS notes that 108 avifauna species are recorded in the vicinity of the site of which 40 are migratory birds and nine are endangered wading or lake and wetland dependent bird species.

Endangered species include the Australasian Bittern, Pied Oystercatcher, Sooty Oystercatcher, Greater Sand Plover, Lesser Sand Plover, Great Knot, Black Tailed Godwit, Sanderling and Little Tern. The NPWS avifauna consultant considers that the FIS should have mapped locations of sightings to enable critical habitat to be identified.

NPWS notes that the FIS omits one species visiting the lake. The Buff Breasted Sandpiper, which breeds in Northern America, is particularly rare only being recorded a handful of times in Australia according to the NPWS. Extremely low water levels at the lake earlier this year resulted in an uncommonly high 20,000 birds being recorded on the lake, which comprise over 50 species such as Black Swans and Pelicans as well as waders such as Plovers, Sandpipers, Godwits, Greenshanks and Snipes.

The lake is acknowledged as a foraging site for several of the endangered bird species. However, the FIS states that the Little Tern nesting site is one of 31 nesting sites in NSW used by the species. The NPWS avifauna consultant raises concern and/or disagrees with the FIS in respect of no mention of roosting sites for several endangered species such as the Pied Oystercatcher, Greater Sand Plover, Lesser Sand Plover, Black Tailed Godwit, Sanderling and Little Tern. The NPWS consultant considers that contrary to the FIS, the lake provides foraging habitat for the Great Knot and the lake is one of the four most important breeding sites in NSW for the Little Tern species.

Most of the foraging habitat is located in the north eastern part of the lake according to the FIS. This is refuted by the NPWS avifauna consultant who states that waterbirds utilise all the lake, especially when the lake is low and mudflats are exposed.

The Lake Wollumboola Support Group notes that 60% of the NSW coastal wetland resource has disappeared in the past 200 years and this has reduced aquatic bird habitat. The lake is important for migratory bird habitat along the Eastern Australian coast and the two other shore bird RAMSAR sites are impacted by heavy industry (Kooragang Nature Reserve and Towra Point). Concerns are raised as to water pollution resulting in changes to seagrass/algae, fish and other aquatic life.

The Service and Council are concerned as to likely increased human and domestic pet disturbance from the proposal, which may adversely affect the Little Tern breeding program. The NPWS avifauna consultant considers that certain sensitive bird species such as Grey Teal react as far as 300-400m to human disturbance whilst repetitive disturbance places limitations on the foraging opportunities and intake of food. The consultant is unable to conclude on all likely impacts on the various bird species from the proposal but states that the FIS inaccurately identifies no significant impacts.

Concern is raised that runoff and/or intervention in opening of the lake may affect waders. The Applicant's consultant considers that waders are opportunistic species and ample opportunities exist elsewhere in several nearby lakes for wader foraging. Similarly, the Applicant's consultants considers that the lake is not critical habitat for other threatened species including the Black Swan and Grey and Chestnut Teal. The fauna consultant for the Lake Wollumboola Support Group disagrees stating that the lake is a major secure feeding area for the Black Swan and a drought refuge for other species. The lake is claimed to be one of the most important sites for the Little Tern in NSW.

Adequacy of the Environmental Protection Zone

Government agencies raise concern as to the adequacy and width of the proposed Environmental Protection Zone (EPZ). They also argue that WPCPs, walking trails, recreation facilities and fire hazard reduction measures should be excluded from the EPZ.

The Applicant's FIS states that creation of the EPZ is one of the endangered species impact amelioration strategies and that resources for endangered species are present within the EPZ. A degraded wetland on Wattle Corner Creek is proposed to be modified to a WPCP which will act as habitat for the threatened Green and Golden Bell frog.

The EPZ is expected to perform a multitude of environmental functions according to DUAP, including protection of vegetation, protection of fauna habitat and water quality management for the lake. Two SEPP 14 Wetlands at Wattle Creek and Downs Creek are noted as being within the EPZ. The Department considers that recreation facilities, water pollution controls, and bush fire hazard reduction measures such as fire trails, must all be provided outside a buffer of at least 100m from wetland boundaries. And that the same principle should apply to areas of significant vegetation and fauna habitat.

The DLWC and Council agree that passive recreation areas, fire hazard reduction measures and WPCPs within the EPZ may lower its ecological integrity and should be excluded. A perimeter road along the development/EPZ boundary is recommended. The proposed replacement of a degraded wetland by a WPCP is questioned as a suitable environmental outcome as Council normally requires buffer set backs of around 20 metres to wetlands. A wider buffer around threatened fauna habitat is suggested by Council and DLWC, the Department stating that a minimum buffer of 40m is required.

The NPWS submission calls for the EPZ to be increased to 500m wide to provide greater buffer to impacts from urbanisation and human disturbance, as well as to enable the EPZ to contain known threatened species habitat and provide greater corridor and linkage attributes.

The Applicant responds that as the EPZ is a buffer zone, then an additional buffer zone to abutting urban development is not a planning principle and is unnecessary. Similarly SEPP 14 wetlands are within the EPZ and do not require an additional 20m buffer. Certain areas of black she-oak and swamp mahogany are within the EPZ according to the Applicant. The loss of other areas of black she-oak are not considered to have an adverse impact on the glossy black cockatoo population and swamp mahogany is claimed to exist elsewhere in the locality.

Additionally the Applicant points out that the function of the EPZ is to protect waters and the wildlife of Lake Wollumboola from development, and is not primarily habitat conservation. Hence, WPCPs within the EPZ are considered acceptable as they fulfil an "environmental protection" role. Further the WPCPs do not require the removal of any vegetation community according to the Applicant. The proposed EPZ is a minimum of 100m wide, greater than any known elsewhere, and around 750m wide at the northern part of the development near the proposed WPCP location.

If WPCPs are required to be outside the EPZ, the Applicant complains that substantial layout redesign is required, around 120 to 150 lots will be lost and redesign of WPCPs would be required. The WPCPs would perform best in the currently proposed locations, they will likely provide habitat for the threatened Green and Golden Bell frog and there is little difference in affected vegetation if relocated.

The Applicant's bat consultant considers that the proposed EPZ does not retain all significant areas of suitable roosting habitat, in particular old growth forest in the southern section of the site which contains high densities of mature hollow bearing trees suitable for endangered and protected bat species. Disruption of understorey vegetation up to 100m from water bodies is likely to affect certain bats, whilst this may extend to 400m with others.

Domestic Dog and Cat Impacts

A number of submissions raise concern as to potential impacts from future resident's cats and dogs given the diversity and numbers of threatened fauna species and habitats near the site. Such parties call for the control or prohibition of cats and dogs.

The FIS suggests that domestic animal impacts will be reduced through a program of education rather than prohibitive measures. NPWS argues that no details are provided of how such a program will be conducted, by whom, and with what effectiveness. According to the Applicant some attempts at restricting domestic cats and dogs have been undertaken in NSW and Victoria, although none of these measures appear to have been investigated to any notable extent.

The NPWS submission states that actual enforcement of dog and cat free areas often falls down in administration, as local authorities often do not have the resources or the will to ensure compliance. It requires the commitment of all residents to succeed, and this is yet to be achieved in NSW in a subdivision of this size, according to NPWS. According to the fauna consultant for NPWS, any remnant populations of Bandicoots, Koalas, Squirrel Gliders, Phascogales, Tiger Quolls, Long Nosed Potoroos and White Footed Dunnarts on the development site, or within a radius of more than five kilometres from the site, would be at risk of local extinction from cat and dog predation if the development proceeds.

Council's Threatened Species Officer states that restrictions on the keeping of domestic pets need to be considered as well as measures to ensure their exclusion from the Environmental Protection Zone. Council suggests that a prohibition on domestic animals might be considered but recognises practical difficulties in its implementation. Certain Council areas have such prohibition. It is noted that the Applicant's then fauna consultant stated in 1996 that there would be a significant impact on threatened species from domestic animals, however this is refuted by the Applicant's current consultant.

The Applicant considers that Council's draft condition of consent requiring a management plan to control pets cannot be enforced. However, that the EPZ Management Plan will provide for control of pets in that zone. Control measures are not stated or described.

Commissioner's Comments

Briefly the evidence is that:

- the site is an area of high bio-diversity;
- several threatened and endangered fauna species have been found on the site;
- development of the site will require clearing of 100ha of vegetation;
- substantial areas proposed to be cleared are of conservation value being significant habitat for several threatened fauna species;
- unacceptable impacts including loss of significant habitat, displacement of threatened fauna and likely loss of certain individual specimens of threatened species are likely with the proposal;
- mitigation measures do not fully protect habitat of conservation value or threatened species;
- habitat of conservation value should be protected and preserved by exclusion from clearing and development.

Up to 33 threatened fauna species have been found in or near to the proposed development area. The FIS identifies 10 threatened fauna species that occur or could occur on the site and a further 14 that utilise adjacent wetland habitats. NPWS identifies 17 terrestrial threatened species that occur or could occur on the site.

Conflicting evidence is given on fauna and habitat impacts. The Applicant claims that most of the site has low conservation value. Several parties including NPWS, Council and the fauna consultant for the Lake Wollumboola Support Group claim that significant areas of the site have high and medium conservation values.

Government agencies also consider that the Fauna Impact Statement (FIS) has not demonstrated that the development could occur without adverse impact on the environmental values of Lake Wollumboola and its catchment. The adequacy of FIS surveys is questioned, as is the resulting assessment and conclusion in the FIS. Responsible Government agencies (NPWS, DUAP) and Council consider that inadequate surveys were conducted for 24 endangered fauna species, and the times or seasons of the surveys are seriously questioned. Many issues are dealt with in a superficial manner and the FIS is argued as not meeting the requirements to investigate to the fullest extent reasonably possible.

The evidence is that high conservation areas should not be cleared or modified based on potential adverse impact on endangered fauna or endangered fauna habitat. The Applicant has failed to demonstrate that endangered fauna will not be negatively impacted. Similarly, mitigation measures as proposed by the Applicant are not accepted by responsible Government agencies. Inclusion of salvaged tree hollows and logs to enhance habitat is unproven and undermines accepted habitat conservation objectives. The adequacy of the proposed Environmental Protection Zone, the construction of WPCPs in this zone, and the adequacy of SEPP 14 buffer zones are all questioned or considered unacceptable by responsible agencies. Fauna impacts from dog and cat predation and control measures are uncertain and likely to require greater buffer distances to significant habitat. Specific threatened species impacts need to be identified together with effective controls.

The proposal appears to have limited regard to preserving or avoiding high conservation value habitat on the site, and mitigation measures are unlikely to adequately protect either the habitat's conservation values or endangered fauna species. Late vegetation surveys have found additional habitat of conservation value and four locations of a rare plant species requiring conservation. Further survey may well indicate additional rather than lesser conservation value areas on the site.

It is unfortunate that detailed vegetation mapping followed by detailed fauna assessment were not carried out initially in the planning stage. Late detection of threatened species on the site, late preparation of a FIS and late vegetation mapping may have been avoided which in turn may have avoided delay and additional review by the Commission, Government agencies, Council and involved parties.

WATER IMPACTS

The water issues raised in submissions include:

- Potential storm water runoff impacts on Lake Wollumboola and wetlands;
- Importance and sensitivity of Lake Wollumboola, its habitat and bird life;
- Need for no net increase in nutrients and solids to Lake Wollumboola;
- Predicted performance of Water Pollution Control Ponds (WPCPs) for water quality control;
- Construction stage impacts;
- Cumulative impacts of other later stages of the development;
- Claimed lack of rigorous assessment and optimistic predictions.

The proposal includes an Environmental Protection Zone and Water Pollution Control Ponds (WPCPs) specifically designed to avoid imposing adverse impacts on the water quality of Lake Wollumboola and to provide habitat for native biota.

Significance of Lake Wollumboola

The lake and associated wetlands have high conservation value particularly for water birds. As stated in the "Fauna Impacts" section, the lake is identified as having International, National, State and regional conservation values. Briefly:

- It is listed on the Commonwealth Directory of Important Wetlands in Australia;
- It is listed on the Register of the National Estate;
- NPWS are seeking to include the lake in the RAMSAR list of Wetlands of International Importance;
- The NPWS Regional Assessment Report recommended the lake's inclusion in the reserve system;
- Up to 20,000 birds of 50 species use the lake;
- It provides habitat for threatened bird species some being especially rare;
- The lake provides habitat for at least 24 bird species protected by JAMBA and/or CAMBA migratory bird agreements;
- It is an important fish and prawn estuary with 41 fish species recorded of which 26 are of commercial importance;
- One threatened plant species, *Wilsonia rotundifolia* is found on the fringe of the lake.

Government agencies of NPWS, DUAP, Fisheries, DLWC and EPA, as well as Council, Environment Australia, the Lower Shoalhaven Catchment Management Committee, Ocean Watch, the Australian Conservation Foundation, the Coastal Council, the Coast and Wetlands Society and several environmental groups all consider that the lake has high conservation value.

NSW Fisheries note that 70% of the commercial, recreation finfish and shellfish catch spend some part of their lifecycle in coastal estuaries such as Lake Wollumboola. In comparison with other lakes polluted by urban runoff (such as Tuggerah Lake and Lake Illawarra) the lake is in relatively good condition.

Water Quality Goals and Requirements

The EPA having regard to the sensitivity of Lake Wollumboola recommends a nil pollutant increase. This is consistent with interim objectives for the protection of Lake Wollumboola's aquatic ecosystem. The Authority considers that the lake may be near its critical point as there is evidence of water quality problems at present including macro-algal blooms within the lake, de-oxygenation of lake waters, fish kills and odorous conditions.

The Applicant states that the proposed water pollution control strategy achieves the EPA requirement of no net increase in pollutant load to the lake ecosystem such that existing water quality is always maintained and, under some conditions improved. It is stated that the development as proposed would not have a significant impact on the ecology of the lake.

DUAP considers that Lake Wollumboola has significant environmental values requiring protection. To achieve an appropriate balance between development and environmental protection the Department considers that four environmental management issues must be considered, namely:

- The impact on Lake Wollumboola;
- Water quality;
- The impact on fauna and flora including fauna protected under the endangered fauna (Interim Protection) Act; and
- The cumulative impacts.

Impacts

The Applicant predicts that the proposal will not result in an increase in net nutrient export and will not have a significant, adverse or detectable impact on the hydrological and hydraulic regime of Lake Wollumboola.

The EPA raises concern as to the following possible impacts:

- Increased nutrient loads to the lake;
- Water quality impacts brought about by increased nutrients, e.g. reduced dissolved oxygen;
- Changes to the ecology of the lake;
- Possible subsequent changes to the wildlife which inhabit the lake both permanently and intermittently;
- Loss of natural amenity and ecological values of the lake.

The Applicant's marine consultant states that the lake is characterised by large and rapid changes in water quality, hydrology and aquatic ecology over short time periods following lake break out, interspersed with periods of slow but constant change when the lake is closed. The aquatic ecology is not critically sensitive to small variations in lake water quality provided these changes are within the wide and natural variation already experienced by biota.

The EPA is concerned that computer modelling is not sufficiently rigorous, that the construction stage has not been modelled, and that the performance of proposed WPCP's has not been verified for a similar situation. EPA considers that the Applicant's predictions over-estimate pre-development nutrients export and under-estimate the proposal's nutrient contribution. Urban developments have consistently demonstrated an inability to meet high levels of soil and water management performance according to the EPA. DUAP considers that the Applicant's environmental assessment underestimates impacts or is inconclusive of impacts to Lake Wollumboola and its catchment.

The NPWS points out that Lake Wollumboola is of national significance being listed on the Commonwealth Directory of Important Wetlands and because it supports a population of nationally endangered Little Terns and many water birds subject to international agreements such as JAMBA/CAMBA.

Given the potential for activities within the catchment of Lake Wollumboola to impact upon the ecological values of the lake, NPWS considers that all of Lake Wollumboola has potentially high conservation value. Parts of the site should remain free of development in order to protect the values of Lake Wollumboola according to the submission. The NPWS avifauna consultant considers that indirect impacts from the proposal have not been adequately addressed including hydrological, chemical and odour management impacts on the lake.

The consultant for the Lake Wollumboola Support Group argues that the development will increase sediment and turbidity thereby smothering or affecting benthic organisms and seagrasses. Also there will be changes to oxygen and nutrients resulting in changes to habitat and fauna.

Aquatic Ecological Change and Aquatic Bird Impacts

The Applicant's aquatic fauna consultant states that waders make use of the lake on an opportunistic basis, chiefly when the lake breaks open and benthic organisms are exposed. When the lake level is high few weed eating water birds may be present, and a number of freshwater swamps in the area provide alternative foraging. Fishing birds that use the lake such as the Little Tern, Osprey, Australasian Bittern and Black Bittern, hunt on the wing, swoop from cliffs and trees, or chase prey through the shallows. According to the consultant, the Little Tern is opportunistic, feeding on a wide variety of aquatic fauna, winged insects and ground dwelling insects. They can range up to 6km and 1.5km offshore and are not critically dependent on food availability in Lake Wollumboola. Nevertheless the Applicant's consultant acknowledges that the Little Tern is probably dependent on availability of safe breeding sites in the area but considers that changes to Lake Wollumboola's aquatic ecology would not impact the species at the regional or local level.

In respect of the Osprey, the Applicant's consultant notes that whilst recorded in the area, this species uses the lake opportunistically only for feeding. Other lakes and estuaries are available and it is claimed that changes to Lake Wollumboola's aquatic ecology would not impact the species. Similarly with Oystercatchers which forage opportunistically along the eastern lake shore (Sooty Oystercatcher) or in the lake after levels have dropped (Pied Oystercatcher). Other foraging habitat is argued as being available in the area and this same argument applies to the Australasian Bittern and Black Bittern. It is stated that the lake does not provide these two Bittern species with its preferred feed habitat and their presence would be opportunistic. The consultant notes that the Black Bittern could utilise Wattle Creek and Downs Creek. Alteration to lake aquatic quality or ecology would not affect these Bittern species.

The NPWS disagrees with many of the claimed lack of impacts on threatened and other bird species using the lake. The lake's Little Tern colony is critically dependent on an adequate supply of small fish in close proximity at Lake Wollumboola. The additional distance to alternative food sources would lead to greater mortality of chicks that are left unprotected whilst the parents hunt food. NPWS states that the lake is an important habitat for many birds and central to the utilisation of the Shoalhaven area for species such as migratory waders, contrary to the Applicant's claims. Additionally the Service notes that several international treaties are in place to protect migratory species feeding grounds such as Lake Wollumboola.

According to the NPWS several of the Applicant's claimed alternative wader and waterfowl habitats have been artificially drained and the habitat are only available for short periods. The Service disagrees that the lake offers opportunistic habitat stating that survival of shore birds is dependent on the existence and health of a number of water bodies, each with different hydrology and ecology, and each providing food at different times of the year. Some bird species are totally dependent on certain stages within the cyclical nature of ephemeral lakes for breeding to take place. A reduced habitat will lead to reduced species population according to the NPWS.

The Lake Wollumboola Support Group notes that the destruction of 60% of coastal wetland in the past 200 years has reduced the availability of habitat for aquatic birds such as those found at Lake Wollumboola. Two other RAMSAR sites in NSW (at Kooragang Nature Reserve and Towra Point) are impacted by heavy industry. The Group's fauna consultant agrees with NPWS that the lake plays a vital role together with other water bodies in providing different feeding habitat in a cyclical fashion. The combination of shallow lake levels, nutrient balance, and excellent seagrass/algae growth provides ideal conditions for a diversity of species according to the consultant. In respect of specific species the consultant states:

- the lake is a major secure feeding ground for the Black Swan;
- the lake is a drought refuge for the Black Duck;
- six threatened wader species are supported by the lake as well as a number listed under JAMBA and CAMBA;
- the Little Tern colony is considered to be one of the four most important colonies in NSW.

Changes to Lake Wollumboola and Cumulative Impacts

The Applicant argues that the lake is subject to large and rapid variations in water quality, hydrology and aquatic ecology during large storm events and following lake break-out, interspersed with periods of slow but constant change in these attributes when the lake is closed.

The lake system is robust and able to withstand variations in water quality and water level according to the Applicant's consultant. The Applicant provided data to show that in comparison with other coastal lakes the nitrogen and ammonia levels for Lake Wollumboola are consistently two to three times higher. The EPA has limited data in respect of Lake Wollumboola, but notes that the variations in water quality indicate that the lake is operating outside the bounds of understanding for coastal lakes. Lake Wollumboola is unique in EPA's experience and there is great uncertainty in applying assumptions and understanding from other systems to the lake.

Both the EPA and DLWC consider that the processes of Lake Wollumboola are poorly understood. DUAP refers to Council's Local Environmental Study and the draft Estuary Management Plan for the lake which consider that with urbanisation there are predicted substantial (several fold) increases in runoff, suspended solids, runoff velocities and resulting turbidity. The Department is also concerned that cumulative assessment is lacking including land clearing affects, water quality changes and human settlement intensification.

The consultant for the Lake Wollumboola Support Group agrees that the lake is not well understood. The aquatic plants and animals, nutrient cycling and composition of sediment need to be researched. Similarly sustainable phosphorus, nitrogen and carbon loads should be identified along with whether the lake is nitrogen or phosphorus limited and any changed lake pollutant loading to date. The Applicant's marine consultant notes that the draft Lake Wollumboola Estuary Management Plan could not conclude whether the lake was nitrogen or phosphorus limited but given the wide variation in measured nutrients, the lake could be either nitrogen or phosphorus limited at certain times.

The Applicant argues that:

- the lake is similar to a number of other intermittently opening coastal lakes along the NSW coast in respect of morphology and geology;
- the understanding of lake openings and relationships between water levels, rainfall and runoff are satisfactory (and confirmed with 37 years of rainfall data and 19 years of water level data);
- several sources of water quality data for the lake are available dating back to 1988 with recent studies included by the Applicant;
- lake sediment sampling has occurred at 20 sites with additional sampling recently;
- both the draft Lake Wollumboola Estuary Management Plan together with recent updated material provide an inventory of lake aquatic flora and fauna.

The DLWC considers that the lake is fragile and not robust in light of its nutrient status, limited flushing capacity and geomorphological characteristics. The Department remains concerned over potential impacts to Lake Wollumboola including cumulative and/or long-term impacts. The realistic achievement of no net increase in pollutant loading has not been demonstrated according to the DLWC.

Since early 1999, the DLWC has been involved with Lake Wollumboola water level and water quality testing involving automatic recording of several water quality parameters every 15 minutes. Test results are verified by an accredited laboratory and results supplied to the Lake Wollumboola Estuary Management Task Force. Additionally the Department is involved in co-operative projects on the lake nutrient situation with Coastcare, Council and the Task Force.

The Applicant notes that a significant portion of existing development within Culburra is within the Lake Wollumboola catchment. No WPCPs or other mitigation measures control runoff for the existing Culburra area and this indicates that Lake Wollumboola is able to withstand urbanisation. It is also noted that the lake is neither managed nor protected and yet is regarded as a significant resource for wetland and wading birds.

Mitigation Measures

WPCPs and the environmental protection zone are the principal mitigation measures to protect the water quality of Lake Wollumboola. Other measures include grassed filter strips, grass swales, and gross pollution traps.

Annual phosphorus loads in runoff, phosphorus concentrations, the runoff volumes, lake volumes and water levels vary dramatically for the existing catchment according to the Applicant's water consultant. It is predicted that the proposed development will not significantly alter this natural variation. The consultant states that a conservative approach has been followed in respect of modelling with higher phosphorus concentrations, full development and occupancy, and a higher runoff coefficient adopted.

The Applicant's consultant states that contingency measures available to reduce runoff and nutrients if predicted performance is not being achieved include, potential reuse of stormwater collected in detention basins and constructed wetlands, inclusion of house rainwater tanks also with reuse of stormwater, and flocculant dosing to gross pollutant traps to control dispersible soils.

The EPA has concerns that the fundamental objective of no net increase in nutrients cannot be reliably achieved due to:

- soils on the site being dispersive;
- proposed control of dispersive soils as WPCPs are unlikely to handle this material well;
- latest WPCP performance data indicates worse rather than better performance;
- the Applicant underestimates post development nutrient export rates which underestimates impact;

- in EPA's experience, urban developments have consistently demonstrated an inability to achieve and maintain the high level of soil and water management performance incorporated in their initial design. For the sensitive receiving waters of Lake Wollumboola, sustained high-level performance would be required over the entire life of the development.

According to the EPA the worst case scenario if development proceeds include:

- increased nutrient loads to the lake;
- water quality impacts, eg. reduced dissolved oxygen, macro-algae choking of waterway, and possible micro-algae dominance of the system;
- changes to lake ecology;
- subsequent changes to wildlife communities and populations, eg aquatic species that rely on seed grasses and specific algae;
- loss of natural and ecological values of the lake.

Additionally the understanding of Lake Wollumboola's ecosystem is not sufficiently advanced to allow reliable predictions according to the EPA. A cautious approach is recommended.

The water quality consultant for the Lake Wollumboola Support Group states that where the land being urbanised contains substantially native vegetation it would be extremely unlikely that ponds could achieve a zero net increase outcome. The consultant estimates that urban runoff export rates will be 60, 12 and 20 times greater respectively for suspended solids, total phosphorus and total nitrogen than for native bushland. To meet the objective of no net increase in nutrients and solids would require the WPCPs to achieve removal efficiencies of 92% for total phosphorus and 95% for total nitrogen. The consultant considers that there is no evidence that these rates of efficiency can be achieved. He considers typical removal efficiencies for the proposed WPCPs would be around 60% for total phosphorus and less for total nitrogen.

In response the Applicant's water consultant states that the proposed Long Bow Point design incorporates "best practice" stormwater management principles using constructed wetlands. Also conservative predictions have been made including phosphorus retention rates. Additionally seven levels of control are proposed but only three levels have been modelled; sedimentation basins, wetland basins and filter strips.

In direct response to EPA's criticisms, the Applicant's consultant states:

- that soils have low to moderate dispersibility,
- filter strip lengths are more than adequate,
- phosphorus export rates and run-off rates are appropriate having been verified against lake data (including Kinhill and Lake Wollumboola Task Force data),
- lake sampling and sensitivity analysis confirm event mean concentration of pollutants,
- increased runoff to the lake would be insignificant regarding lake breaching frequencies,
- the wetland macrophyte design allows greater nitrogen removal than considered by EPA.

The Applicant's consultants acknowledge that it would take between 3 and 5 years for WPCPs to achieve predicted performance. It is recognised that the construction phase represents the period of greatest nutrient export at a time when WPCPs are not at their maximum sustainable efficiency and that a high level of care and maintenance would be required. According to the Applicant it is intended to set up and maintain WPCPs for a significant period of time prior to hand-over to Council. The Applicant points out their compliance with several Government guidelines regarding design and implementation of WPCPs.

The Applicant's water quality consultant argues that predicted WPCP performance is not compromised even under a worst case scenario of 2.5 times the modelled phosphorus export rates.

Several parties question how a high level of maintenance will be achieved, especially as such devices will not receive special funding. A number of areas of Council's maintenance program are claimed to have been reduced due to lack of funding. Ocean Watch points out that \$11 million and \$13 million have been spent at Lake Illawarra and Tuggerah Lakes respectively on algal bloom control, odour control and dredging with no measurable improvement in water quality.

NSW Fisheries is not satisfied that fish populations or habitats will be protected despite the Applicant being requested to address this matter.

Involved Government agencies including EPA and DLWC maintain concern that the "no net increase in pollution" to Lake Wollumboola will not be achieved. These Departments consider that development of less sensitive areas outside this catchment to prove performance objectives would be the prudent approach. After reviewing EPA and Council submissions, DUAP concludes that the extent of the potential impact of the proposal is therefore either significantly underestimated or unknown.

Location of Water Pollution Control Ponds Within the Environmental Protection Zone

DUAP, EPA, DLWC and Council consider that the WPCPs should be located outside the EPZ to protect this zone and the lake from impacts. The Applicant responds that the EPZ is an appropriate location for the WPCPs being situated at sufficient distances downstream of proposed development and prior to the lake to intercept pollutants. Locations outside the EPZ would adversely affect WPCP criteria regarding siting, and would alter subdivision layout. Instead of one major WPCP it is likely that three smaller WPCPs per creek would be required.

Commissioner's Comments

There is conflicting evidence as to water quality impacts. The Applicant predicts minimal impacts whilst Government departments are not satisfied that the ecological and habitat values of Lake Wollumboola will be protected.

It is not disputed that Lake Wollumboola is of high conservation value being of International, National, State and regional significance. The lake is subject to International agreements to protect habitat for migratory birds. The sea grasses and algae as well as shoreline provide habitat for rare and threatened avian fauna species. The lake is also an important fish and prawn estuary.

The Applicant claims that proposed mitigation measures will not adversely affect the water quality of the lake, particularly in regard to phosphorus input. The lake is argued as being robust, subject to wide variations in water quality and rapid emptying. The Applicant's consultant states that birds, including threatened species, use the lake opportunistically and alternative habitats exist nearby. Part of developed Culburra drains to the lake with no water quality controls, demonstrating lack of impacts and the robust nature of the lake and lake fauna according to the Applicant.

Lake processes are not well understood, lake variations exceed other comparable lakes and Government agencies and a number of environmental groups recommend a precautionary approach. The loss of lake water quality and lake habitat would be critical to several threatened bird fauna. The NPWS disagrees that the lake offers opportunistic habitat stating that survival of shore birds is dependent on the existence and health of a number of water bodies, each with different hydrology and ecology, and each providing food at different times of the year. Some bird species are totally dependent on certain stages within the cyclical nature of ephemeral lakes for breeding to take place. A reduced habitat will lead to reduced species population. The threatened Little Tern colony on the lake shoreline is dependent on the lake.

The catchment of Lake Wollumboola requires considerable care in its management owing to the potential for adverse impacts to the high conservation values of the lake. The lake is subject to change particularly when opened to the sea, as infrequently occurs. However, for much of the time the lake is closed from the sea, not subject to flushing and hence sensitive to build up of pollutants. Accordingly the lake is cyclic, complex, sensitive and poorly understood. Further, the EPA considers that the lake is at the threshold of potential adverse impacts and requires a limit of no net increase in pollutants.

The ability of mitigation measures to meet the "no net increase in pollutants" goal is disputed.

The weight of evidence, based on the experience of responsible water agencies such as EPA and DLWC as well as consultants with lengthy experience in WPCP design and performance, is that the proposal is likely to increase nutrient and other loadings to Lake Wollumboola. Also that mitigation measures including WPCPs, the Environmental Protection Zone and other initiatives are uncertain and unlikely to consistently meet predicted high performance goals of no net increase in pollutants.

The Applicant's consultant acknowledges that between 3 and 5 years is required before proposed Water Pollution Control Ponds achieve performance goals. Also, that a high level of maintenance and care is required to ensure predicted WPCP performance. Consistent high performance is unlikely and needs to be demonstrated according to the EPA. Contingency measures such as stormwater re-use and flocculent dosing are commendable but still rely on WPCPs. The Commission notes that relocation of WPCPs outside the EPZ as requested by Government agencies and Council may reduce water quality performance.

Having regard to the International, National, State and regional importance of Lake Wollumboola, the Commission supports a precautionary approach. According to certain Government departments the precautionary approach is for the Applicant to consider development outside of the sensitive catchment of Lake Wollumboola, to construct proposed WPCPs and other measures and prove WPCP predictions. After which, parts of the site identified as capable of development away from Lake Wollumboola, such as cleared areas, might be considered in a staged development approach. The development of least sensitive and potentially least impacting stages of the Applicant's overall Culburra Release Area outside the Lake Wollumboola catchment to prove no adverse impacts is warranted in this situation and overrides arguments of proximity to Culburra, servicing and marketing.

ECOLOGICALLY SUSTAINABLE DEVELOPMENT (ESD)

Several Government agencies and environmental groups consider that the proposal fails to meet the principles of ecologically sustainable development, particularly the Precautionary Principle.

Environmental Planning and Assessment Regulations pursuant to the Environmental Planning and Assessment Act (Schedule 2, clause 5) detail matters which an EIS must consider including:

The reasons justifying the carrying out of the development or activity in the manner proposed, having regard to the bio-physical, economic and social considerations and the principles of ecologically sustainable development.

The principles of ecologically sustainable development (ESD) are stated at Clause 8:

- a) The precautionary principle - namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
- b) Inter-generational equity - namely that the present generation should ensure the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;
- c) Conservation of biological diversity and ecological integrity;
- d) Improved valuation and pricing of environmental resources.

Schedule 2 also indicates matters to be taken into consideration in relation to the conservation of biological diversity and ecological integrity as including potential impacts related to:

- soil contamination;
- flora and fauna;
- air, noise and water pollution;
- health;
- hazards;
- traffic;
- local climate;
- social and economic conditions;
- visual amenity;
- soil erosion and siltation; and
- cultural and heritage significance.

Also of relevance, is the Protection of the Environment Administration (PEA) Act 1991 (NSW) which is referred to in the Threatened Species Conservation (TSC) Act 1995 (NSW) for direction in relation to ESD, and states at Clause 6(2):

Ecological sustainable development requires the effective integration of economic and environmental considerations in the decision-making processes.

The principles and core objectives are also discussed in the Australian National Strategy for Ecologically Sustainable Development in which the ESD goal is defined as “development that improves the total quality of life both now and in the future in a way that maintains the ecological processes on which life depends” (Commonwealth of Australia 1992).

The abovementioned regulations under the EP&A Act have the effect of broadening the environmental criteria required to be assessed as part of the Environmental Impact Assessment (EIA) Process.

Thus in the circumstances here, and having regard to the above stated principles, the Commission must consider the proposed development in terms of how it is likely to promote or impair ecological sustainability. In so saying the Commission notes that whilst there exists a reasonable degree of agreement on the core principles of sustainable development there is considerable debate surrounding the practicable implementation of such principles particularly at project level.

The Precautionary Principle

The Applicant states that the proposal is consistent with the Principles of Ecologically Sustainable Development. With regard to the Precautionary Principle, the Applicant notes that their several specialist environmental consultants have examined the existing environment, predicted possible impacts and recommended safeguards to ensure that the level of impact satisfies statutory requirements or reasonable community expectations.

Certain opposing submissions argue that significant parts of the site and surrounds have high conservation value. With the proposed clearing of high conservation areas for development, there is a risk of loss of habitat and/or species of conservation significance, including up to 33 threatened fauna species and their potential habitat. It is argued that the Precautionary Principle should not allow the proposed vegetation clearing as this places significant fauna and fauna habitat at risk. Similarly there is a threat to Lake Wollumboola's high conservation values, which include its diversity and abundance of significant avian fauna including several threatened fauna species. The Applicant maintains that alternative habitat and estuarine lake systems exist nearby for threatened species and most important habitat will be conserved.

The Commission does not accept that this principle enunciates a zero risk scenario. Nor that decisions which may involve a threat of serious or irreversible damage are necessarily to be avoided. Rather, the Commission considers that particular emphasis and attention must be directed to evaluating possible, but uncertain, impacts with other relevant considerations (social and economic benefits).

In respect of the proposal, the Commission's considerations of this principle include:

- the manner in which economic and environmental considerations should in the circumstances here and as associated with the precautionary principle be integrated into the decision making process;
- the need to err on the side of caution when evaluating economic benefits and balancing same with likely environmental cost;
- the scope and scale of ecological risk involved particularly as associated with the proposed clearing of habitat, and associated risk and impact to fauna, including certain threatened species and their habitat. Also, the risk or likely adverse environmental impact on the water quality and aquatic habitat of sensitive Lake Wollumboola, and the potential adverse impact on aquatic and bird species, including threatened species which use the lake;
- the extent of scientific uncertainty associated with outcomes in particular the uncertainty and risks raised by responsible Government agencies in respect of the proposal;
- community values and likely adverse sectional impact;
- the reliability of techniques used to assess the likely environmental impact of the development and scientific uncertainty associated therewith;

- does the development pose a threat of serious or irreversible environmental damage and if so whether proposed contingency measures or whether conditions of consent will prevent such damage;
- the role and value of environmental monitoring and community participation therein; and
- action available to remedy a threat or occasion of environmental damage both during the construction and operational stages.

The above matters have been considered in this report.

Commissioner's Comments

Responsible Government agencies and environmental groups generally agree that the development poses a significant threat of serious or irreversible environmental damage to the high conservation values of Lake Wollumboola, including its habitat and wildlife. There is also a significant likelihood and risk to parts of the site proposed to be cleared which are identified as high conservation value for threatened species. The Applicant argues that impacts can be mitigated by modifications, including a reduced development and high performance water controls.

The evidence is that mitigation measures such as the Applicant's amended development proposal, contingency responses and staged development within this site will not prevent likely serious or irreversible environmental damage. The Applicant's consultant acknowledges that water quality control devices will require 3 to 5 years to achieve predicted efficiency. Another of the Applicant's consultants identifies likely fauna impacts including impacts to threatened bat species. The reliability of initial habitat mapping, fauna surveys and assessment is questioned by responsible agencies.

The Commission has balanced the economic, social and environmental considerations. There are likely economic and social benefits. However, having regard to the Precautionary Principle as to the appropriate balance, the Commission is not satisfied that the overall conservation values of Lake Wollumboola or the site will be protected. In the circumstances here, the prudent approach is for development to occur outside of this sensitive catchment (in one of the Applicant's future Culburra Release Area stages) to demonstrate uncertain predictions and control measures. It is noted that a review of planning controls for the area is suggested by several agencies based on latest habitat mapping and lake data and this would be prudent and likely to reduce uncertainty for the Applicant.

Conservation of Biological Diversity and Ecological Integrity

The Applicant submits that the proposal is consistent with the principle of Conservation of Biological Diversity and Ecological Integrity. The likely short to medium term environmental impacts should be mitigated in the long term by proposed safeguards so that the biodiversity of the Project Site and surrounding area is conserved and maintained.

The Commission acknowledges the risk and uncertainty in environmental management. Environmental changes have natural and/or human origins but the impacts that result may not always be visible in a generational timeframe.

It also recognises the difficulty of accurately assessing the environmental impact of developments. Further that science can only provide a limited insight into the management of the environment and its ecosystems on a sustainable basis as understanding of most ecosystems and related habitat considerations is limited. Thus in matters of this kind, environmental assessment generally involves a qualitative rather than quantitative approach.

Hence once again the Commission has adopted a precautionary approach in its assessment of the proposal.

Such approach has involved testing the proposal against various heads of consideration together with an assessment of whether it will:

- reduce water quality levels;
- pose an unacceptable risk to species or important habitat;
- reduce the capacity for continued evolution of species;
- adversely impact conservation and management of vegetation communities or habitat of high conservation value;
- improve knowledge of natural resources and management of threats;
- increase noise, vibration, or air pollution;
- increase traffic and road damage; and
- affect residential amenity of the area.

Commissioner's Comments

The Commission is not satisfied that the proposal satisfies the objectives of conserving biodiversity and maintaining ecological integrity. The proposal poses an unacceptable risk to threatened species and important habitat and there is a similar unacceptable risk of loss of natural resources including biodiversity and ecological integrity both in Lake Wollumboola and on the site.

STAGING OF DEVELOPMENT

Government agencies and Council suggest a staged approval approach. That is, the success of each stage in meeting determined goals (water quality in this case) is a requirement for the next stage to proceed. If goals were not met, then subsequent stages would not proceed.

Involved Government agencies argue that WPCPs and other mitigation measures should be trialed and proven in other stages of the Culburra Release Area which are located in the less sensitive Crookhaven catchment. Council notes that the Crookhaven catchment contains extensive oyster leases and potential public health implications make Crookhaven more sensitive than Lake Wollumboola. Also infrastructure, economics, and traffic arrangements as well as physical isolation from existing Culburra township mitigate against other stages of the Culburra Release Area being implemented earlier than Long Bow Point.

Council considers that if doubt remains as to the effectiveness of proposed stormwater treatment measures and impacts on Lake Wollumboola then staged development of the proposal could be adopted. The initial stage suggested involves an area to the west of the site near Culburra Road, this area being most distant from the lake. Stage 1 would be limited to the Wattle Creek catchment of the site and would enable validation of the stormwater control ponds' effectiveness before development closer to the lake.

Additionally Council considers that modification of the subdivision layout is required to optimise protection of the significant environmental values of the site as follows:

1. Relocation of WPCPs outside of the EPZ.
2. Widening the EPZ to include a 20m wide buffer to wetland communities.
3. Protection of areas of old growth, swamp mahogany and black she-oak within the open space network.
4. Provision of perimeter roads adjacent to EPZ zones to ensure adequate fire protection.

The Applicant is opposed to both Council and Government staged approval approaches as the project, services, community facility contributions, etc is contingent upon an 800 lot yield. Additionally the Council staging suggestion would require:

1. Two access roads instead of the proposed one;
2. Four pumping stations instead of the proposed one;
3. Three WPCPs instead of the proposed two.

Council proposed an alternative Stage 1 within one sub-catchment (rather than the proposal's two sub-catchments) however the Applicant maintains opposition to a staged approval approach due to additional costs and reduced lot yields. Nevertheless the Applicant accepts the Council's draft conditions of consent if a staged approval approach is adopted but prefers a 410 lot Stage 1 in place of Council's 271 lot Stage 1. The Applicant states that their Stage 1 proposal would involve only two WPCPs, one access road and one pumping station.

Involved Government agencies oppose Council's staged approach as this effectively approves the proposal and does not overcome the unacceptable water and habitat impacts.

Commissioner's Comments

Council and Government agencies suggest a staged approval approach to overcome uncertainty with water quality mitigation measures, to prove predicted performance of water control devices and to avoid impacts to the important values of Lake Wollumboola.

Council's proposal for a staged development, whilst precautionary is not the most environmental cautious option available. Unacceptable habitat and threatened fauna impacts may still result from Council's staged approach. Having regard to the Applicant's intended future stages of development which are outside the sensitive catchment of Lake Wollumboola (not part of this Development Application) there is adequate opportunity to prove the effectiveness of WPCP devices and impact mitigation predictions without risk to Lake Wollumboola's catchment, wildlife or habitat.

The evidence does not support Council's contention that the Crookhaven catchment is more sensitive than Lake Wollumboola. The lake is a closed system, has high conservation value and the highest water quality goals. The Crookhaven catchment is an open (regularly flushed) system and is preferred by Government agencies.

ODOUR IMPACTS

The odour issues raised in submissions include:

- Offensive odour generation from the lake;
- The potential for the proposed development to increase odour generation;
- Potential adverse impacts associated with human attempts to control odour and lake processes.

Odour problems are associated with the normal dynamics of the lake ecosystem. When the lake level falls rapidly, for example when the lake is open to the sea, areas of sulphide producing sediments are exposed in shallow areas and margins of the lake releasing hydrogen sulphide to the atmosphere. Because of its density and potency, local residents at considerable distances from the lake can detect hydrogen sulphide (rotten egg gas).

Odour has the potential to be a major impact on the amenity of the surrounding community according to the EPA. The EPA states that the problem has been long-standing over many years, and will certainly continue to occur. However, the EPA considers that odour control, through structural modifications to the lake's water balance, would probably degrade its natural values in a significant way. A number of environmental and conservation groups support the EPA's concern and consider that the proposed development location near Lake Wollumboola, is inappropriate.

According to the DLWC submission, odour is a serious concern with the proposal. Lake Wollumboola has been breached approximately 25 times in 40 years (an average of 18 months frequency). These events do not include longer term exposure of mud. Odour episodes persist for several days to weeks. Council notes that odour events may last up to one month. The Lake Wollumboola Support Group notes that a secondary odour problem occurs when the lake is full.

By comparison Lake Illawarra experiences approximately 4-5 bad odour periods per year related to decaying seagrasses and algae, not exposed mud. Substantial numbers of odour complaints are received each year. The Lake Illawarra Authority carries out annual algal harvesting costing \$125,000 and foreshore clean up of decaying seagrasses at a cost of \$80,000. The DLWC considers that whilst the scale and frequency of the Lake Wollumboola odour problem would be less than Lake Illawarra, the management of the Lake Wollumboola odour problem is substantially more difficult being related to exposed mud not capable of being collected, covered or treated.

The EPA and the Applicant present conflicting evidence. The Applicant argues that prevailing winds are likely to cause greater impacts to existing Culburra north of the lake than the proposed development area. The EPA accepts that existing Culburra residents experience offensive odours. The lake is the highest source of odour complaints on the south coast and complaints can come from several kilometres away (for example at Calalla) dependent on wind direction. However, EPA states that prevailing north-easterly winds in particular are likely to carry offensive odours to the site directly down wind of and adjacent to the shallow north-easterly bay of the lake. The proximity of this part of the lake and wind direction frequency are likely to exacerbate the odour problem for future residents of the proposed development according to EPA.

The Applicant refers to a Council consultant's 1984 report that found:

- odours were noticeable when winds were from the south (it is noted that Culburra residents are located to the north);
- there appeared to be no correlation between distance from the lake and severity and frequency of odour episodes;
- odour problems occurred frequently in summer and persisted several days;
- odours were described as like rotten vegetation and sewage;
- certain residents were obliged to keep windows and doors closed during occurrences.

The Council consultant's 1984 report states that summer, north-easterly winds are most frequent (28.3%) followed by southerlies (21.4%), whilst for winter, southerlies are most frequent (21%) followed by westerly winds (18.8%). The Applicant estimates that for combined wind directions the proposed development would be less affected by likely odours than existing Culburra in summer (23.5% versus 27.8%) and significantly less in winter (14.8% versus 36%). The DLWC notes that this same 1984 report states in relation to predominant afternoon breezes "*the new site (Long Bow Point) could be slightly more affected by odour*".

The source of odours within the lake is disputed, the Applicant claiming the lake in general contributes thus exposing Culburra to 5.3 square kilometres of odour source. The EPA argues that when the lake is emptying and during refilling, it is the shallow areas and margins such as the north-western bay of the lake adjacent to the site which presents particularly odorous areas. This bay has a 200m wide band of exposed mud and rotting weed adjacent to the site. Summer afternoon north-easterly breezes would carry the odour directly to the site according to EPA.

Odour Mitigation

The Applicant notes that natural processes control odour generation from the lake and the proposed development has negligible potential to influence these processes. It is recognised that odour generation is a process that cannot be directly managed by controls implemented as part of the proposed development. Therefore the Applicant considers that the best approach as part of this development is to ensure that all potential purchasers of the land are aware that the land may be subject to odours at times. Council proposes to notify potential purchasers of the land of likely lake odours by inclusion of this matter on the Section 149 certificates for the land.

The Applicant notes that development controls such as generous buffer zones would not eliminate or substantially reduce odour nuisances and this is reported by a Council consultant in 1984. A buffer greater than the site would be required. However, the consultant's report notes that undulating or elevated terrain and tree cover can reduce odour penetration and the Applicant points out that Long Bow Point is separated from the lake by both elevated land (a cliff exists near the lake) as well as significant vegetation.

The DLWC and EPA consider that there is no known effective solution to managing the Lake Wollumboola odour problem. The odour issue is, unfortunately, both important and intractable according to the EPA.

Environmental groups fear that the proposal will add to existing pressure for human intervention into lake processes. They claim that odour problems have already generated pressure to dredge the lake and this action would irreversibly destroy habitat for diverse and important bird life.

Commissioner's Comments

The evidence is that Lake Wollumboola odour problems occur from time to time which adversely impact on existing residents. The cause is basically a result of exposure of the shallow areas and margins following natural draining of the lake and the time taken for natural rainfall to refill the lake. Odour episodes typically last for several weeks.

Whilst there is conflicting evidence, it is likely that areas furthest west from shallow areas of the lake and not directly downwind of prevailing summer north-easterly winds may experience less odour impact in terms of frequency, duration or extent. The distance, prevailing wind direction, separating vegetation and elevated ridge line may assist in lessening impacts.

Odour problems cannot be mitigated. Prevailing wind directions and nearby locations of shallow lake areas are likely to make the site as susceptible, if not more susceptible to odours than the existing township during summer when most lake emptying episodes occur.

The odour problem, whilst infrequent, suggests that development in the vicinity of the lake at Long Bow Point is not favoured, but that any development should be furthest away from Lake Wollumboola.

ECONOMIC AND SOCIAL CONSIDERATIONS

The Applicant estimated land development costs in 1992 at \$18 million. The Applicant asserts that the other social and economic benefits associated with the proposal include:

- An estimated \$100 million injection into the local civil and housing industry;
- Development of the town centre facilities to boost retail expenditure retained in the local Culburra community by an estimated \$12 million (1996 dollars) per annum within 8 years;
- Improvements to community facilities, infrastructure, amenities, services and recreation areas for existing and proposed Culburra residents;
- Increased population that will likely result is making a high school viable and require rebuilding of the local health centre;
- A larger population will be mostly holiday makers, resulting in more tourist facilities and attracting greater tourism;
- Employment benefits through development and later housing construction;
- Potential for a local Aboriginal building cooperative.

In addition to this, the Applicant asserts, that a number of positive social and economic outcomes will flow to the Council, and to the South Coast Region should the proposal be approved. The local community will also be advantaged through the maintenance of roads funded by the Applicant.

The Local, State and National economies will benefit from financial contributions according to the Applicant. The NSW Government for instance, will benefit from employment of a construction workforce and the associated payroll tax and other charges and flow-ons. Additionally the Applicant points out the benefit to the National economy from ongoing and increased employment and taxation.

The Culburra Beach Chamber of Commerce and Culburra Beach Progress Association note potential benefits of the proposal include:

- increased range of medical and other services;
- long-term improvement to public transport and educational facilities;
- increased sporting and recreational facilities;
- improvement to drainage of the existing township and improvement to lake water quality.

The Lake Wollumboola Support Group raises concern regarding:

- adverse impact and decline of Lake Wollumboola;
- surging population overwhelming facilities and infrastructure;
- loss of seaside village atmosphere;
- tourism may be compromised.

In response, the Applicant points out that population increase will be slow, due to both development being carried out over about 20 years, as well as due to likely retirement purchasers and weekenders

contributing to general low occupancy rates. It is estimated that the population for Culburra may rise from 3,135 (1991) to 4,375 (2016) and the further addition from the Culburra Expansion Area in this time may be 3,560. It is argued that population has increased by 50% in the past decade and that this growth and changing population has not adversely affected the seaside village nature of the area. In fact this is a major factor why the Culburra Expansion Area is identified as being attractive. A greater population is stated as being able to support a larger and more diverse range of shops, services and facilities for existing residents.

The Council intends to provide for the social needs of the Culburra community through the provision of a Culburra and District Community Centre, a Culburra Sporting Complex, a Long Bow Point Village Hall and a number of recreation areas. These services are to be provided through section 94 contributions and the dedication of land by the Applicant. The proposal also allows for the provision of public open space by the Applicant in accordance with Council's Subdivision Code. The proposed development and subsequent stages would create the demand for another primary school and a high school, although the Applicant's study indicates this would take up to 25 years.

If the proposal does not proceed there would be an average of 126 construction jobs and a further 150 indirect construction related jobs lost per annum, or a total of 276 jobs over the 16 year life of the project. The Applicant further predicts loss of \$24.6 million in retail expenditure associated with a new supermarket. The proposal is essential in reaching the necessary 3,500 household threshold to justify the supermarket.

Commissioner's Comments

The proposal would provide local and regional economic benefits, including direct and indirect employment of up to 276 positions during the construction stage and an estimated \$100 million injection into the local civil and housing industry. Additionally there are intended improvements to the town centre, community facilities, infrastructure, amenities and services. Developer contributions will provide or assist with recreation areas, open space, town centre improvements, and certain community facilities.

Opposing submissions question the disbenefits of significant fauna, habitat and flora loss, as well as irreversible impacts including loss of biodiversity and ecological damage to the sensitive Lake Wollumboola.

The weight of evidence as presented in other sections of this report is that the proposal is likely to cause unacceptable impacts to habitat of conservation significance both within the site and within adjoining Lake Wollumboola. Local and regional socio-economic benefits are not such as to outweigh likely environmental impacts involving International, National, State and regionally important fauna or fauna habitat.

Whilst Government agencies oppose the proposal, they do not reject constrained and controlled development of the area, subject to a precautionary approach.

TRAFFIC CONSIDERATIONS

The RTA is satisfied with the proposed means of entry and exit to Culburra Road, provided that certain conditions are met. These include, the timing of construction, design specifications for proposed roundabouts, a requirement of no on-street parking on Culburra Road, no direct access to Culburra Road, satisfactory treatment of intersections with Culburra Road, and access to the proposed school site.

Culburra Road, which connects Nowra to Culburra, is subject to occasional flooding, and Council is considering the need for a new or upgraded flood free road to service this area as well as Currarong, Callala Beach, Callala Bay and Myola. The proposed development will contribute to the need to upgrade Culburra Road.

The RTA is concerned that traffic impacts including road safety and transport efficiency aspects have not been adequately addressed outside the boundaries of the development. Whilst the upgrading of Snowwood Road is suggested as a flood free alternative route to the Highway, the timing and consequences for the proposal including later stages have not been considered according to the RTA. DUAP states that an Environmental Impact Statement of the entire route will be needed. The RTA has also indicated that the connection of the upgraded road and the Princes Highway must be addressed, because the current intersection has only two years capacity remaining.

Council notes that many parts of the Shoalhaven area are subject to flooding. Nevertheless, flood free access is available from Culburra (and Callala and Currarong) via Forest Road. If the Snowwood Road option is not adopted, Council's fall-back position involves the upgrading of Culburra Road. Council points out that one of the two identified most flood prone sections of the road was recently raised (Pyree Lane Bridge). Council notes that certain road upgrading near the site (Culburra Road between Greenwell Point Road and Pyree Lane) to cope with the expected increased traffic would require a financial contribution from the Applicant.

In respect of public transport services, DUAP considers that due to the proposed road pattern it is unlikely that buses will be able to utilise share-ways, potentially preventing a regular and efficient bus service. Additionally there is no information provided as to the adequacy of the existing bus service and any likely impact resulting from the proposed development.

Commissioner's Comments

Arterial road improvements will be required to handle the additional traffic from the proposed development and certain works are likely to involve contributions from the developer. Also upgrading of flood prone sections of Culburra Road or an alternative flood free road between Culburra and Nowra is required. An alternative flood free access road to the Princes Highway via Snowwood Road is likely to involve an Environmental Impact Statement for the entire route. However Council has commenced works to raise sections of Culburra Road above design flood levels. The adequacy of public transport access within the proposed development is questioned and some redesign of roads or share-ways may be required.

CUMULATIVE IMPACTS

Cumulative impacts have not been adequately addressed by the Applicant according to several parties.

The Inquiry was adjourned in 1996 to allow the Applicant to prepare a Fauna Impact Statement. In granting the Applicant's requested adjournment the Commission specifically directed that in regard to the extent of the Fauna Impact Statement:

"... consideration is required of the larger or surrounding area, which may include other stages of the associated development and impacts on nearby areas containing significant fauna or habitat."

DUAP considers there is a lack of cumulative impact assessment. This is the first of a six stage development with potentially 3,000 lots, of which nearly 50% (1,430 lots) will be within the catchment of Lake Wollumboola. Given the ecological values and identified importance of the lake the primary long-term objective must be the environmental protection of the lake according to DUAP. The environmental capacity of the lake limits the catchment's ability to accommodate development.

EPA considers that a critical issue is cumulative impact. EPA and DLWC consider that the lake is already exhibiting short-term eutrophic conditions. These Departments are concerned that in the longer term, massive nutrient loading, stimulated algal growth, and turbidity may cause loss or decline in seagrass, domination by algae, fish kills and loss of diversity. Ultimately resulting in loss of bird species including threatened species.

The NPWS submission identifies habitat of regional significance on adjoining areas, including future stages of the Culburra Urban Release Area and the proposed high school site (part of the subject site but subject to a further development application). The Service states that there is likely to be unacceptable impacts from overall loss of habitat especially for several species of threatened fauna. Detailed assessment of cumulative habitat loss and likely impacts should have been carried out according to the NPWS.

Cumulative destruction of high conservation coastal vegetation will be caused by this and later stages according to the Lake Wollumboola Support Group. The Group's fauna consultant considers that the site has high conservation value due to its diverse and cumulative habitat value which exceeds 300 species of flora and 300 species of fauna (including at least 8 threatened fauna species on the site and a further 15 in the immediate area). The loss of the cumulative habitat represents a loss of State significance. Other cumulative impacts according to the group include impacts to a number of threatened and important fauna species on the site, as well as to migratory birds using the lake, loss of lake ecology, aquatic habitat and fish diversity, and likely domestic animal impacts.

The Applicant states that it is unlikely that the cumulative water quality impacts of any future proposed urban development will detrimentally affect the lake's natural processes, however this would need to be specifically assessed in relation to any future development application.

The Applicant notes that:

- significant portions of the catchment will not be developed being State Forest, National Park or Crown Land;
- further protection of the catchment is likely with the proposed extension of the Jervis Bay National Park (to include some of the Applicant's land);
- existing Culburra urban areas have no water pollution controls and contribute around 12% of the lake's annual phosphorus load despite being 2.2% of the catchment area;

- water fowl excrement and mobilisation of nutrients in bed sediments significantly affect water quality of the lake.

Commissioner's Comments

Cumulative impacts both for the subject site and for the overall area including existing Culburra township (within the lake catchment) and Culburra Release Area (the proposal being stage 1) are likely to compound adverse lake and habitat impacts.

URBAN LAND DEMAND

There is conflicting evidence as to the need for further urban land. The Applicant, the local Chamber of Commerce and Progress Association claim there is a high demand for urban land in the immediate Culburra area and general Shoalhaven Council area. DUAP and the Lake Wollumboola Support Group refute this.

DUAP states that there is ample capacity within the existing housing stock and other zoned land, outside the Culburra Urban Expansion Area, to accommodate significant growth for the township. The absence of major employment opportunities, either in the township or the major centres of the Shoalhaven, is likely to maintain the current low occupancy rates according to DUAP. Additionally there is no evidence that the proposed expansion area will lead to a higher ratio of permanent residents, even with the provision of new and additional social services.

The Culburra Beach Chamber of Commerce and Culburra Beach Progress Association both disagree with DUAP. The Applicant's economic and social consultant states:

- at best there is only 4-5 years supply of vacant residential land in Culburra;
- there is a high demand for land in the Shoalhaven Council area which is not presently satisfied and which if satisfied would yield substantial economic and social benefits to the community;
- the Long Bow Point development will be in high demand and is essential to meet market demand for housing;
- without the Long Bow Point development abnormal price increases have occurred because of lack of new land;
- without the Long Bow Point development there will be growing stress placed on other areas to meet demand.

The Lake Wollumboola Support Group argues that the intended provision of housing lots will be very slow and thus claimed land supply benefits as well as high school and supermarket population threshold requirements will take many years. Additionally it is claimed that population increases will occur in any case and that alternative development areas are available near the proposed site.

Commissioner's Comments

Conflicting evidence is presented as to the need for urban development land at or near Culburra. The Commission concludes that environmental constraints including the protection of important Lake Wollumboola, high value habitat and threatened species outweighs claimed need for, and the predicted social and economic benefits of the proposed urban development. The Commission notes that likely future development of the adjacent Culburra Urban Expansion Area may yield up to 2000 residential allotments, together with community facilities, services and infrastructure. Government agencies generally do not oppose development of the area, subject to a cautious approach.

Accordingly, the Commission's recommended staged development approach if adopted has regard to satisfying residential land demands and recognising substantial environmental constraints.

FINDINGS

Briefly the evidence is that:

- the site is an area of high biodiversity;
- threatened and endangered fauna have been found on the site;
- development of the site will require clearing of 125ha of vegetation;
- substantial areas proposed to be cleared are of conservation value being significant habitat for several threatened fauna species;
- unacceptable impacts including loss of significant habitat, displacement of threatened fauna and likely loss of certain individual specimens of threatened species are likely with the proposal;
- mitigation measures do not fully protect habitat of conservation value or threatened species;
- habitat of conservation value should be protected and preserved by exclusion from clearing and development;
- Lake Wollumboola is of high conservation value being of International, National, State and regional significance and requiring the highest level of protection from pollution or impacts;
- the proposal will significantly increase pollutants in storm runoff draining to Lake Wollumboola;
- mitigation measures including WPCPs, the Environmental Protection Zone and other initiatives are uncertain and unlikely to consistently meet predicted performance goals of no net increase in pollutants;
- the loss of lake water quality and lake habitat would be likely to adversely impact on fauna including important and threatened bird species;
- local and regional economic and social benefits do not outweigh likely adverse impacts to Lake Wollumboola and to habitat and threatened fauna on the site;
- lake odours adversely impact on existing residents and cannot be mitigated;
- prevailing wind directions and nearby lake shallow locations are likely to make the site as susceptible, if not more susceptible to odours than the existing township;
- overall mitigation measures and the Applicant's amended development proposal will not prevent likely serious or irreversible environmental damage;
- the precautionary approach is to demonstrate uncertain predictions and control measures outside of this sensitive catchment (possibly in a stage of the Applicant's future Culburra Release Area).

RECOMMENDATIONS

I recommend refusal of the proposal due to its likely unacceptable environmental impacts, including loss of water quality of the important Lake Wollumboola and loss of fauna and habitat of conservation value.

Areas of the site identified as having conservation value should be protected and not cleared or modified based on likely adverse impacts to threatened fauna or threatened fauna habitat. Similarly, the highest levels of protection from pollution or impacts are required for the important Lake Wollumboola to protect habitat and fauna, including threatened species.

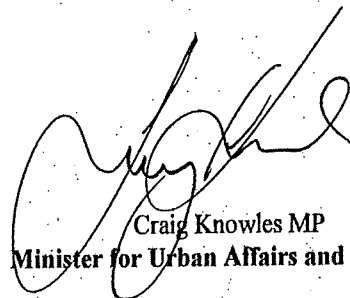
Review of overall planning controls is warranted to assist both the Applicant and agencies with integrating the Commission's precautionary and staged development approach in this sensitive and important environment.

APPENDICES

**APPENDIX 1
MINISTER'S DIRECTION**

**DIRECTION UNDER SECTION 119(1)(a) AND (b)
OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979**

I, the Minister for Urban Affairs and Planning, pursuant to section 119 (1)(a) and (b) of the Environmental Planning and Assessment Act 1979, direct that a Inquiry be held into the environmental aspects of the proposed development that is the subject of the Shoalhaven City Council Development Application No. SF 7477 by Allen, Price and Associates for an 800 lot subdivision at Long Bow Point, Culburra.



Craig Knowles MP
Minister for Urban Affairs and Planning

APPENDIX 2
INSTRUMENT OF APPOINTMENT

**INSTRUMENT OF APPOINTMENT IN ACCORDANCE WITH SECTION
119(2) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT
1979**

I, the Minister for Urban Affairs and Planning, in accordance with Section 119(2) of the Act hereby appoint Commissioner Dr Mark Carleton being a Commissioner of Inquiry within the meaning of the Act, to constitute a Commission of Inquiry into Shoalhaven City Council Development Application No SF 7477 by Allen, Price and Associates.



Craig Knowles
Minister for Urban Affairs and Planning

Signed at Sydney

on the 15th day of August 1996

W91/47

APPENDIX 3

LIST OF SUBMISSIONS TO 1996 INQUIRY

- 1. Allen Price and Associates**
 - 1.1 Primary Submission
 - 1.2 Amendments to presentation by Mr P Howell
 - 1.3 Appendix 4 to Primary Submission
 - 1.4 Overhead presentation by Mr C Menzies
 - 1.5 Questions from Applicant to National Parks and Wildlife Service
 - 1.6 Issues pertaining to fauna and response to NPWS
 - 1.7 Supplement to Primary Submission
 - 1.8 Response to NPWS Supplementary Submission
 - 1.9 Sydney Morning Herald article relating to the Powerful Owl
 - 1.10 Questions by the Applicant to EPA
 - 1.11 Shoalhaven City Council – Report of Community Consultations held in conjunction with development of a Shoalhaven City Social Plan
 - 1.12 Seven Point Test – Fauna Assessment “Long Bow Point” Culburra Shoalhaven City by Mr G Daly
 - 1.13 Culburra Expansion – Water Quality July 1990 – June 1991 – Mitchell McCotter Report
 - 1.14 Soils Investigation of Downs Creek Catchment, Culburra – Mitchell McCotter Report
 - 1.15 Overhead presentation regarding Water Quality and WPCP
 - 1.16 Questions from the Applicant to various Parties
 - 1.17 Verbal Submission by Mr P Jamieson
 - 1.18 Modified Designs WPCP 2 & 6 – Mr Peter Jamieson
 - 1.19 Letter from Applicant requesting adjournment of the Submission in Reply (SIR) Session in order to conduct a FIS
 - 1.20 Additional letter concerning application for adjournment of SIR session
 - 1.21 Preliminary Assessment of Endangered Bat Fauna
 - 1.22 Responses to Question by Parties
 - 1.23 Response to Commissioner’s Questions
 - 1.24 Preliminary Submission in Reply
 - 1.25 Additional information regarding Bat Survey
 - 1.26 Fauna Impact Statement - August 1999 (submitted in 1999)**

- 2. Shoalhaven City Council**
 - 2.1 Letter dated 3/10/96 requesting extension of time to lodge submission
 - 2.2 Primary Submission (4 volumes)
 - 2.3 Draft Jervis Bay Regional Environmental Plan (one copy only)
 - 2.4 Amendments to Submission by Mr J Blom
 - 2.5 Issues regarding fauna and response to NPWS
 - 2.6 Response to Questions by Parties
 - 2.7 Submission in Reply

- 3. Department of Urban Affairs and Planning**
 - 3.1 Primary Submission
 - 3.2 Issues pertaining to fauna and response to NPWS
 - 3.3 Jervis Bay – Our Heritage, Our Future – A Discussion Paper
 - 3.4 Questions from DUAP to EPA
 - 3.5 Questions from DUAP to Mr G Daly Fauna Consultant for the Applicant
 - 3.6 Question from DUAP to Shoalhaven City Council – Mr K Murray
 - 3.7 Submission in Reply and Responses to Questions by Parties

4. **Environment Protection Authority**
 - 4.1 Primary Submission
 - 4.2 Questions from EPA to the Applicant and Various Parties
 - 4.3 Overhead presentation by Mr Peter Jamieson
 - 4.4 EPA – Managing Urban Stormwater – Treatment Techniques – Draft
 - 4.5 EPA – Managing Urban Stormwater – Construction Activities – Draft
 - 4.6 EPA – Managing Urban Stormwater – Strategic Framework – Draft
 - 4.7 Submission in Reply
 - 4.8 Supplementary to Primary Submission
 - 4.9 Supplementary Overhead Presentation – Primary Submission
 - 4.10 Responses to Questions by Parties

5. **Department of Land and Water Conservation**
 - 5.1 Letter dated 3/10/96 requesting an extension of time to lodge submission
 - 5.2 Primary Submission
 - 5.3 Amendments to page 17 of Primary Submission
 - 5.4 Overheads and supplementary presentation
 - 5.5 Questions from DLWC to the Applicant
 - 5.6 Submission in Reply and Responses to Questions by Parties
 - 5.7 The NSW Wetlands Management Strategy
 - 5.8 Technical Report – Riparian Lands Study of the Nepean River System in Wollondilly Local Government Area
 - 5.9 Wollondilly Riparian Lands Study – Ecological Considerations

6. **NSW Department of Fisheries**
 - 6.1 Primary Submission
 - 6.2 Response to Question by Mr P Jamieson (the Applicant)

7. **National Parks and Wildlife Service**
 - 7.1 Primary Submission
 - 7.2 Supplementary Submission
 - 7.3 Issues pertaining to fauna and legal response
 - 7.4 Consideration of the potential impact of the proposed development at Long Bow Point on threatened fauna
 - 7.5 Submission in Reply

8. **Roads and Traffic Authority of NSW**
 - 8.1 Primary Submission
 - 8.2 Supplementary Submission

9. **Total Catchment Management Committee**
 - 9.1 Primary Submission

10. **Ocean Watch**
 - 10.1 Primary Submission

11. **Australian Conservation Foundation**
 - 11.1 Primary Submission
 - 11.2 Supplementary Submission

12. **Lake Wollumboola Support Group**
 - 12.1 Letter requesting that Commission request Council to make documents relating to rezoning of site available to public
 - 12.2 Primary Submission
 - 12.3 Consultants report – Assoc. Prof. B Maher, Mr I Lawrence, Mr C Chafer, Dr R Howitt and supporting documentation

- 12.4 Letter to Mr J Angel – Total Environment Centre from the Minister for the Environment – Ms Pam Allen MP and accompanying map
 - 12.5 Letter from Dr Howitt relating to information requested from the Applicant
 - 12.6 Questions to EPA, NPWS, Shoalhaven City Council, and the Applicant
 - 12.7 Supplementary Submission by Dr R Howitt
- 13. Culburra Beach Progress Association**
- 13.1 Letter dated 1/10/96 requesting extension of time to submit submission
 - 13.2 Primary Submission
 - 13.3 Consultants report – Assoc. Prof. B Maher, Mr I Lawrence, Mr C Chafer, Dr R Howitt and supporting documentation (same as sub no. 12.3)
 - 13.4 Questions from Progress Association to Various Parties
 - 13.5 Map showing alternative proposal
 - 13.6 Submission in Reply
- 14. Ms N Wright**
- 14.1 Primary Submission
- 15. Culburra Beach Timber and Hardware (Mr J V Lewis)**
- 15.1 Primary Submission
- 16. Mr R Gavagna, Mrs F Aguggia & Mrs M Gavagna**
- 16.1 Primary Submission
- 17. Mr J and Mrs N Baker**
- 17.1 Primary Submission
- 18. Mr A Martin**
- 18.1 Primary Submission
- 19. H & B Rogerson**
- 19.1 Primary Submission
- 20. Mr H Ray**
- 20.1 Primary Submission
- 21. Mr R Shimmen**
- 21.1 Primary Submission
- 22. Mrs M R Gatt**
- 22.1 Primary Submission
- 23. Mr J G Morgan**
- 23.1 Primary Submission
- 24. Mr A Wright**
- 24.1 Primary Submission
- 25. Mr R & Mrs B Hughes**
- 25.1 Primary Submission
- 26. Mr J Symonds**
- 26.1 Letter requesting extension of time to lodge submission
 - 26.2 Primary Submission
 - 26.3 Various Documentation and letters pertaining to development
 - 26.4 Supplementary Submission
 - 26.5 Questions to Various Parties

26.6 Submission in Reply

APPENDIX 4

LIST OF SUBMISSIONS TO RECONVENED INQUIRY

- R1. Realty Realizations Pty Limited**
- R1.1 Submission to Reconvened Inquiry
 - R1.2 Water Pollution Control Ponds – Revised Report
 - R1.3 Review of Aquatic Ecological Impacts
 - R1.4 Response to Commissioner’s Questions
 - R1.5 Review of Phosphorous Export – Assoc. Professor Ball
 - R1.6 Aquatic Ecology Linkages
 - R1.7 Questions to DUAP
 - R1.8 Questions to NPWS
 - R1.9 Questions to Coastal Council of NSW
 - R1.10 Questions to Lake Woolumboola Support Group
 - R1.11 Questions to the EPA
 - R1.12 Response to EPA’s request for outstanding information
 - R1.13 Response to Questions
 - R1.14 Collated Response to EPA requests
 - R1.15 Submission to Final Session
 - R1.15a Volume 1
 - R1.15b Volume 2
 - R1.16 Vegetation and Subdivision Mapping
 - R1.16a Report
 - R1.16b Maps
 - R1.17 Comments on Suggested Conditions of Consent
- R2. Shoalhaven City Council**
- R2.1 Submission to Reconvened Inquiry
 - R2.2 Letter re: Additional flora and fauna
 - R2.3 Draft Management Plan for Green and Gold Bell Frog
 - R2.4 Response to DUAP’s Questions
 - R2.5 Submissions to Council re: FIS
 - R2.6 Response to Mr Symonds’ Questions
 - R2.7 Response to Further Questions
 - R2.8 Response to Lake Wollumboola Support Groups Questions
 - R2.9 Response to DLWC Questions
 - R2.10 Submission to Final Session
 - R2.11 Comments on Vegetation Mapping and Conditions
- R3. Department of Urban Affairs and Planning**
- R3.1 Submission to Reconvened Inquiry
 - R3.2 Question to Realty Realization
 - R3.3 Questions to DUAP
 - R3.4 Response to Questions
 - R3.5 Submission to Final Session

- R4. Environment Protection Authority**
R4.1 Submission to Reconvened Inquiry
R4.1a Addendum to 4.1
R4.2 Response to Commissioner's Questions
R4.3 Response to Questions
R4.4 Comments on Technical Reports
R4.5 Submission to Final Session
- R5. National Parks and Wildlife Service**
R5.1 Submission to Reconvened Inquiry
R5.2 Video of Lake Wollumboola
R5.3 Regional Assessment of National Heritage Values of the proposed Culburra Urban Expansion Area and Environs
R5.4 Overhead Presentation
R5.5 Environmental Maps of the Site
R5.6 Additional Comment for Residential Subdivision
R5.7 Letter to NPWS from NSW Fisheries
R5.8 Presentation by Mr M Hood
R5.9 Response to Questions
R5.10 Submission to Final Session
R5.11 Comments on Additional Information
- R6. Department of Land Water Conservation**
R6.1 Submission to Reconvened Inquiry
R6.2 Presentation to the Inquiry
R6.3 Questions to Realty Realization
R6.4 Questions to Council
R6.5 Questions to Culburra Beach Chamber of Commerce
R6.6 Culburra Beach Progress Association
R6.7 Response to Technical Reports
R6.8 Response to Commissioner's Questions
R6.9 Response to Culburra Beach Progress Association's Questions
R6.10 Response to Realty Realization's Questions
R6.11 Response to Lake Wollumboola Support Group's Questions
R6.12 Response to Mr Symonds Questions
R6.13 Submission to the Final Session
- R7. Coastal Council of NSW**
R7.1 Submission to Reconvened Inquiry
R7.1a NSW Coastal Policy
R7.2 Answers to Questions
- R8. Environment Australia**
R8.1 Submission to Reconvened Inquiry
- R9. Australian Conservation Foundation**
R9.1 Submission to Reconvened Inquiry
- R10. Coast and Wetlands Society Inc**
R10.1 Submission to Reconvened Inquiry

- R11. Culburra Beach Chamber of Commerce Inc.**
R11.1 Submission to Reconvened Inquiry
R11.2 Presentation to the Inquiry
R11.3 Questions to EPA
R11.4 Questions to NPWS
R11.5 Response to Questions from DLWC
R11.6 Submission to Final Session
- R12. Culburra Beach Progress Association Inc.**
R12.1 Submission to Reconvened Inquiry
R12.2 Presentation to the Inquiry
R12.3 Questions to Council
R12.4 Questions to DUAP
R12.5 Submission to Final Session
- R13. Culburra Beach Community United Inc**
R13.1 Submission to Reconvened Inquiry
- R14. Culburra-Orient Point Combined Pensioners Superannuants Association of NSW**
R14.1 Submission to Reconvened Inquiry
R14.2 Submission to the Final Hearing
- R15. Earth Repair Action**
R15.1 Submission to Reconvened Inquiry
- R16. Jervis Bay Regional Alliance**
R16.1 Submission to Reconvened Inquiry
- R17. Nature Conservation Council of NSW**
R17.1 Submission to Reconvened Inquiry
- R18. Ms A Hutchinson**
R18.1 Submission to Reconvened Inquiry
- R19. Total Environment Centre**
R19.1 Submission to Reconvened Inquiry
- R20. Ms M Ash**
R20.1 Submission to Reconvened Inquiry
- R21. Mr J and Mrs N Baker**
R21.1 Submission to Reconvened Inquiry
- R22. Mr J Boland**
R22.1 Submission to Reconvened Inquiry
- R23. Mr P Cormick**
R23.1 Submission to Reconvened Inquiry

- R24. Mr J Flynn**
R24.1 Submission to Reconvened Inquiry
- R25. Ms N Grootenboer**
R25.1 Submission to Reconvened Inquiry
- R26. Ms R Harvey**
R26.1 Submission to Reconvened Inquiry
- R27. Ms S McCarthy, Ms Y Bowers and Mr W Graham**
R27.1 Submission to Reconvened Inquiry
- R28. Ms K Miller**
R28.1 Submission to Reconvened Inquiry
- R29. Mr D Phelps**
R29.1 Submission to Reconvened Inquiry
- R30. Ms H Plowman**
R30.1 Submission to Reconvened Inquiry
- R31. Mr B Slarke**
R31.1 Submission to Reconvened Inquiry
- R32. Mr A Stephenson**
R32.1 Submission to Reconvened Inquiry
- R33. Mr J Symonds**
R33.1 Submission to Reconvened Inquiry
R33.2 Questions to Parties
R33.3 Submission to Final Session
R33.3a Amended Submission to Final Session
- R34. Ms J Turner**
R34.1 Submission to Reconvened Inquiry
- R35. Mr A Wright**
R35.1 Submission to Reconvened Inquiry
- R36. Dr J Wright**
R36.1 Submission to Reconvened Inquiry
- R37. Ms N Wright**
R37.1 Submission to Reconvened Inquiry
R37.2 Presentation to the Inquiry
- R38. Lake Wollumboola Support Group**
R38.1 Submission to Reconvened Inquiry
R38.2 Flat Rock Creek Data revised
R38.3 Amendment to Mr I Lawerance's Submission
R38.4 Questions to Parties

- R38.5 Comparison of Conservation Significance
- R38.6 Presentation on Water Quality
- R38.7 Response to Questions
- R38.8 Submission to Final Session
- R38.9 Social and Economic Presentation
- R38.10 Response to Additional Information and
Comments on Suggested Conditions of Consent

R39. National Parks Association of NSW

- R39.1 Submission to Reconvened Inquiry

R40. Mr JC Wilson

- R40.1 Submission to Reconvened Inquiry

R41. Ms M Boland

- R41.1 Submission to Reconvened

APPENDIX 5 LIST OF APPEARANCES

(*) Appeared at the 1996 Inquiry.

(**) Appeared at both the 1996 Inquiry and the 1999 Reconvened Inquiry.

Reality Realizations Pty Limited

Mr M Astell	Partner, Blake Dawson and Waldron
Mr W Dwyer	Solicitor, Blake Dawson and Waldron
Mr P Price	Director, Allen Price and Associates (**)
Mr P Jamieson	Director, Umwelt (**)
Ms A Howe	Environmental Engineer, Umwelt
Assoc. Professor J Ball	Water Specialist, University of NSW
Mr D Fanning	Director, Gunninah Consultants
Mr P Anich	Director, Marine Pollution Research Pty Limited
Mr P Howell	Director, Realty Realisation
Assoc. Professor HJ Bavor	Director, Centre for Water and Environmental Technology
Mr I Whisken	Corporate Advocate, Fifth Estate (*)
Ms B Crossley	Environmental Consultant, Mitchell McCotter(*)
Mr G Leonard	Flora Consultant (*)
Mr G Daly	Ecologist, Gaia Research (*)
Mr P Adcock	Centre for Water and Environmental Technology (*)
Mr C Menzies	Managing Director, The Public Practice (*)
Mr G Hoye	Director, Fly By Night Bat Surveys (*)

Shoalhaven City Council

Mr J Whitehouse	Partner, Minter Ellison (**)
Mr J Blom	Manager, Subdivision and Development (**)
Mr R Russell	Development Manager (*)
Mr D Young	Threatened Species Officer

Department of Urban Affairs and Planning

Mr D Ouma-Machio	Regional Director, Illawarra and South Coast (**)
Ms M Green	Environmental Planning Officer

Coastal Council of NSW

Prof. Thom Chairman, Coastal Committee

Department of Land Water Conservation

Mr M Conlon Resource Assessment Manager (*)
Mr C Page Projects Co-ordination

Environment Protection Authority (4)

Mr P Jamieson Senior Operations Officer (*)
Dr P Scanes Manager, Coastal Council Unit, Environmental Science Branch

National Parks and Wildlife Service

Mr M Hood Manager, Environmental Planning Unit, Southern Zone
Mr M Boaks Conservation Planning Officer (**)

NSW Fisheries

Mr A Lugg Senior Conservation Manager (*)

Roads and Traffic Authority

Mr K Collis Zone Traffic Manager (*)

Australian Conservation Foundation

Ms M Leatch Shoalhaven Branch (*)

Culburra Beach Chamber of Commerce Inc

Mr P Muller Vice President

Culburra Beach Progress Association Inc

Clr J Kerr President
Mr J Wright Publicity Officer (*)

Culburra – Orient Point, Combined Pensioners' Superannuants Association of NSW

Mr CF Power Member

Jervis Bay Regional Alliance

Mr J Suttor President

Lake Wollumboola Support Group

Ms F Bray	Convenor (**)
Mr K Campbell	Member (**)
Mr Rowe	Member
Mr I Lawrence	Co-operative Research Centre for Fresh Water Ecology (*)
Prof. W Maher	University of Canberra (*)
Ms J Pegler	Consultant Ecologist, Macquarie University (*)
Mr C Chafer	Consultant Ecologist, Macquarie University (*)
Dr R Howitt	Senior Lecturer, School of Earth Science, Macquarie University (*)
Prof. P Troy	Australian National University

Individuals

Mr A Stephenson

Mr J Symonds (**)

Ms N Wright

APPENDIX 6
LIST OF BACKGROUND DOCUMENTS

- A. Development Application for Proposed 837 Lot Subdivision at Long Bow Point, Culburra
- B. Correspondence between Government Departments and Various Parties (25 items)
- C. Correspondence between Council and Various Parties (64 items)
- D. Correspondence from the Applicant to Various Parties (45 items)
- E. Council Minutes, Notices, Reports, etc (48 items)
- F. Reports
 - F1 Long Bow Point Culburra – Information Brief (Allen Price & Associates)
 - F2 Long Bow Point Culburra – Report and Statement of Environmental Effects (Allen Price and Associates)
 - F3 Culburra Town Centre – Architectural and Landscape Guidelines February 1995 (Patrick R Mahedy Pty Ltd)
 - F4 Long Bow Point Culburra – Landscape Strategy Report
 - F5 Report – Stage 1 Landscape Principles Plan, Long Bow Point, Culburra (Allen Price & Associates) May 1993
 - F6 Fauna Assessment Culburra Urban Expansion, Stage 1
 - F7 Supplementary Assessment of Protected Fauna, Culburra Urban Expansion, Stage 1
 - F8 Culburra Expansion Area Community Facilities Study (The Public Practice)
 - F9 Culburra District Centre Retail Potential Study, October 1992 (Plan Location International)
 - F10 Culburra Structure Plan Review, February 1993 (Allen Price & Associates)
 - F11 Culburra Traffic Reports, 8 reports (Stapleton & Hallam)

- F12 Design Principles for Special Road Treatments, October 1993 (Allen Price & Associates)
- F13 Report – Investigation of Vehicle and Pedestrian Access. Hierarchy and Layout of Preliminary Traffic Impact of the Culburra Town Centre Expansion, February 1995 (Allen Price & Associates)
- F14 Culburra Town Extension: Snow Wood Road Traffic Assessment and Economic Evaluation September, 1989 (Nairn & Partners Pty Ltd)
- F15 Culburra Expansion Water Quality (Mitchell McCotter) November 1992 – October 1993
- F16 Culburra Village Expansion Water Supply Strategy (Mitchell McCotter), October 1994
- F17 Culburra Village Expansion Water Pollution Control Strategy (Mitchell McCotter), July 1994
- F18 Culburra Village Expansion Water Pollution Control Strategy – Supplementary Report (Mitchell McCotter) December 1994
- F19 Culburra Water Pollution Control Ponds Review of Environmental Factors (Realty Realizations Pty Ltd) January 1993
- F20 Water and Sewer Strategy Report for Long Bow Point and Review of the Erm Mitchell McCotter Water Supply Strategy Study for the Culburra Extension Area (Allen Price & Associates) November 1994
- F21 Report – Stage 1 – Sediment & Erosion Control Plan, Long Bow Point, Culburra, (Allen Price & Associates) July 1993
- F22 Report on Soil and Water Management for a Possible Stage 1 of Subdivision at Long Bow Point, Culburra (Allen Price & Associates) December 1994
- F23 Report on Preliminary Geotechnical Investigation proposed Siltation Control Dams Culburra (DJ Douglas & Partners Pty Ltd) January 1993
- F24 Potential Acid Sulphate Soils Investigation Long Bow Point, Culburra Wattle Corner Wet Basin Site (Allen Price & Associates) July 1995
- F25 Lake Wollumboola Management Study, Stage 1, Report (Kinhill Engineers Pty Ltd) July 1993
- F26 Culburra Town Expansion Deed 1990

- F27 Culburra Village Extension – Draft Environmental Study (Shoalhaven City Council) April 1984
- F28 Culburra Town Expansion – Supplementary Environmental Study No. 2, (Shoalhaven City Council) November 1984
- F29 Lake Wollumboola Estuary Management Study (Shoalhaven City Council & DLWC) April 1996
- F30 Lake Wollumboola Estuary Management Plan – Draft (Summary) (Shoalhaven City Council & DLWC) April 1996
- F31 Shoalhaven City Council Development Control Plan No. 67, Culburra Expansion Area
- F32 Report of the General Manager Policy and Planning Committee – Proposed Subdivision at Long Bow Point, Culburra – Assessment Report
- F33 Local Environmental Plan 1985 (Gazetted 17/5/85)

G. Plans A1 & B1 Sizes

- G1 Zoning Boundaries – Amendment No. 41 to Shoalhaven Local Environmental Plan 1985
- G2 Culburra Town Expansion – Structure Plan (February 1987)
- G3 Contour/Photogrammetric Details
- G4 Recommended Environmental Protection Zone
- G5 Cross Sections along Culburra Road (December 1992)
- G6 Long Bow Point Culburra (January 1993)
- G7 Proposed Boardwalk & Jetty (Sheets 1 and 2) (March 1993)
- G8 Possible Stage 1 of Long Bow Point (May 1993)
- G9 Long Bow Point Culburra (February 1994)
- G10 Draft Water Strategy (May 1994)
- G11 Draft Sewer Strategy (February 1994)
- G12 Culburra Town Centre Expansion Area

G13 Culburra Town Centre Expansion Area

G14 Long Bow Point Culburra – Drainage

G15 Soil & Water Management Plan (December 1994)

G16 Landscape Principles Plan (June 1993)

H. Plans A3 Size (18 sheets)

