Line

Decision Support Tools - IntraNet Version
EPBC Act 1999







EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

You may wish to print this report for reference before moving to other pages or websites.

The Australian Natural Resources Atlas at http://www.environment.gov.au/atlas may provide further environmental information relevant to your selected area. Information about the EPBC Act including significance guidelines, forms and application process details can be found at http://www.deh.gov.au/epbc/assessmentsapprovals/index.html

Search Type:	Area
Buffer:	5 km
Coordinates:	-35.07873,150.64141, -35.09525,150.64141, -35.09525,150.67081, -35.0787,150.67081

Report Contents:

Summary
Details
- Matters of NES
- Other matters protected by the EPBC Act
- Extra Information

Caveat
Acknowledgments

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see http://www.deh.gov.au/epbc/assessmentsapprovals/guidelines/index.html.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Significance: (Ramsar Sites)	None
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	None
Threatened Species:	38

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Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at http://www.deh.gov.au/heritage/index.html.

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at http://www.deh.gov.au/epbc/permits/index.html.

Commonwealth Lands:	3
Commonwealth Heritage Places:	2
Places on the RNE:	5
Listed Marine Species:	47
Whales and Other Cetaceans:	11
Critical Habitats:	None
Commonwealth Reserves:	2

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	3
Other Commonwealth Reserves:	None
Regional Forest Agreements:	1

Details

Matters of National Environmental Significance

Threatened Species [Dataset Information]	Status	Type of Presence
Birds		
Dasyornis brachypterus * Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Diomedea antipodensis * Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea gibsoni * Gibson's Albatross [64466]	Vulnerable	Species or species habitat may occur within area

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Lathamus discolor * Swift Parrot [744]	Endangered	Species or species habitat may occur within area
Macronectes giganteus * Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli * Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Neophema chrysogaster * Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area
*Pterodroma neglecta neglecta** Kermadec Petrel (western) [64450]	Vulnerable	Species or species habitat may occur within area
Rostratula australis * Australian Painted Snipe [77037]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri * Buller's Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta * Shy Albatross [64697]	Vulnerable	Species or species habitat may occur within area
Thalassarche impavida * Campbell Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini * Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi * White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area
Xanthomyza phrygia * Regent Honeyeater [430]	Endangered	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus * Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea * Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Litoria littlejohni * Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri * Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
*Dasyurus maculatus maculatus (SE mainland population)** Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Eubalaena australis * Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
*Isoodon obesulus obesulus** Southern Brown Bandicoot [68050]	Endangered	Species or species habitat may occur within area
Megaptera novaeangliae * Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Petrogale penicillata * Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
*Potorous tridactylus tridactylus** Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus * Grey-headed Flying-fox [186]	Vulnerable	Species or species habitat likely to occur within area
Ray-finned fishes		

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Prototroctes maraena * Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Dermochelys coriacea * Leathery Turtle, Leatherback Turtle, Luth [1768]	Vulnerable	Species or species habitat may occur within area
Hoplocephalus bungaroides * Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area
Sharks		
*Carcharias taurus (east coast population)** Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat may occur within area
Carcharodon carcharias * Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area
Rhincodon typus * Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Plants		
Caladenia tessellata * Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area
Cryptostylis hunteriana * Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Melaleuca biconvexa * Biconvex Paperbark [5583]	Vulnerable	Species or species habitat likely to occur within area
Prasophyllum affine * Culburra Leek-orchid, Kinghorn Point Leek-orchid, Jervis Bay Leek Orchid [2210]	Endangered	Species or species habitat likely to occur within area
Syzygium paniculatum * Magenta Lilly Pilly, Magenta Cherry, Pocket-less Brush Cherry, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe * Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Migratory Species [Dataset Information]	**Status**	**Type of Presence**
Migratory Terrestrial Species		
Birds		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]	Migratory	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Migratory	Species or species habitat may occur within area
Merops ornatus * Rainbow Bee-eater [670]	Migratory	Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]	Migratory	Breeding may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]	Migratory	Breeding likely to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Migratory	Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]	Migratory	Breeding may occur within area
Xanthomyza phrygia Regent Honeyeater [430]	Migratory	Species or species habitat likely to occur within area
Migratory Wetland Species		
Birds		

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Ardea alba Great Egret, White Egret [59541]	Migratory	Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]	Migratory	Species or species habitat may occur within area
Gallinago hardwickii * Latham's Snipe, Japanese Snipe [863]	Migratory	Species or species habitat may occur within area
Rostratula benghalensis s. lat. Painted Snipe [889]	Migratory	Species or species habitat may occur within area

Migratory Marine Birds

Apus pacificus Fork-tailed Swift [678]	Migratory	Species or species habitat may occur within area
Ardea alba Great Egret, White Egret [59541]	Migratory	Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]	Migratory	Species or species habitat may occur within area
Calonectris leucomelas Streaked Shearwater [1077]	Migratory	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Migratory	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Migratory	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Migratory	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Migratory	Species or species habitat may occur within area
Puffinus leucomelas Streaked Shearwater [66541]	Migratory	Species or species habitat may occur within area
Sterna albifrons Little Tern [813]	Migratory	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross [64460]	Migratory	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [64697]	Migratory	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross [64459]	Migratory	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Migratory	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Migratory	Species or species habitat may occur within area

Migratory Marine Species

Mammals

Balaenoptera edeni Bryde's Whale [35]	Migratory	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]	Migratory	Species or species habitat may occur within area
Eubalaena australis * Southern Right Whale [40]	Migratory	Species or species habitat known to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]	Migratory	Species or species habitat may occur within area
Megaptera novaeangliae * Humpback Whale [38]	Migratory	Species or species habitat known to occur within area

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Orcinus orca Killer Whale, Orca [46]	Migratory	Species or species habitat may occur within area
Reptiles		
Dermochelys coriacea * Leathery Turtle, Leatherback Turtle, Luth [1768]	Migratory	Species or species habitat may occur within area
Sharks		
Carcharodon carcharias Great White Shark [64470]	Migratory	Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Migratory	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Dataset Information]	Status	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift [678]	Listed - overfly marine area	Species or species habitat may occur within area
Ardea alba Great Egret, White Egret [59541]	Listed - overfly marine area	Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]	Listed - overfly marine area	Species or species habitat may occur within area
Calonectris leucomelas Streaked Shearwater [1077]	Listed	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Listed	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Listed	Species or species habitat may occur within area
Gallinago hardwickii * Latham's Snipe, Japanese Snipe [863]	Listed - overfly marine area	Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]	Listed	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Listed - overfly marine area	Species or species habitat may occur within area
Lathamus discolor * Swift Parrot [744]	Listed - overfly marine area	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Listed	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Listed	Species or species habitat may occur within area
Merops ornatus * Rainbow Bee-eater [670]	Listed - overfly	Species or species habitat may occur within area

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	marine area	
Monarcha melanopsis Black-faced Monarch [609]	Listed - overfly marine area	Breeding may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]	Listed - overfly marine area	Breeding likely to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Listed - overfly marine area	Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]	Listed - overfly marine area	Breeding may occur within area
Rostratula benghalensis s. lat. Painted Snipe [889]	Listed - overfly marine area	Species or species habitat may occur within area
Sterna albifrons Little Tern [813]	Listed	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross [64460]	Listed	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [64697]	Listed	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross [64459]	Listed	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Listed	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Listed	Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri New Zealand Fur-seal [20]	Listed	Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]	Listed	Species or species habitat may occur within area
Ray-finned fishes		
Acentronura tentaculata Hairy Pygmy Pipehorse [66187]	Listed	Species or species habitat may occur within area
Cosmocampus howensis Lord Howe Pipefish [66208]	Listed	Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish [66227]	Listed	Species or species habitat may occur within area
Hippocampus abdominalis Eastern Potbelly Seahorse, New Zealand Potbelly, Seahorse, Bigbelly Seahorse [66233]	Listed	Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]	Listed	Species or species habitat may occur within area

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Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Listed	Species or species habitat may occur within area
Histiogamphelus briggsii Briggs' Crested Pipefish, Briggs' Pipefish [66242]	Listed	Species or species habitat may occur within area
Kimblaeus bassensis Trawl Pipefish, Kimbla Pipefish [66247]	Listed	Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]	Listed	Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]	Listed	Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]	Listed	Species or species habitat may occur within area
Phyllopteryx taeniolatus Weedy Seadragon, Common Seadragon [66268]	Listed	Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]	Listed	Species or species habitat may occur within area
Solenostomus cyanopterus Blue-finned Ghost Pipefish, Robust Ghost Pipefish [66183]	Listed	Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish [66276]	Listed	Species or species habitat may occur within area
Stigmatopora nigra Wide-bodied Pipefish, Black Pipefish [66277]	Listed	Species or species habitat may occur within area
Syngnathoides biaculeatus Double-ended Pipehorse, Alligator Pipefish [66279]	Listed	Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]	Listed	Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]	Listed	Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]	Listed	Species or species habitat may occur within area
Reptiles		
Dermochelys coriacea * Leathery Turtle, Leatherback Turtle, Luth [1768]	Listed	Species or species habitat may occur within area

Whales and Other Cetaceans [Dataset Information]

	Status	Type of Presence
Balaenoptera acutorostrata Minke Whale [33]	Cetacean	Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]	Cetacean	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]	Cetacean	Species or species habitat may occur within area
Delphinus delphis Common Dolphin [60]	Cetacean	Species or species habitat may occur within area
Eubalaena australis * Southern Right Whale [40]	Cetacean	Species or species habitat known to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]	Cetacean	Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]	Cetacean	Species or species habitat may occur within area

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Megaptera novaeangliae * Humpback Whale [38]	Cetacean	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]	Cetacean	Species or species habitat may occur within area
Tursiops aduncus Spotted Bottlenose Dolphin [68418]	Cetacean	Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]	Cetacean	Species or species habitat may occur within area

Commonwealth Lands [Dataset Information]

Communications, Information Technology and the Arts - Telstra Corporation Limited

Defence - Defence Housing Authority

Environment and Heritage

Commonwealth Heritage Places [Dataset Information]

Jervis Bay Territory ACT

Royal Australian Naval College ACT

Places on the RNE [Dataset Information]

Note that not all Indigenous sites may be listed.

Historic

Royal Australian Naval College ACT

Indigenous

Jervis Bay Territory ACT

Natural

Gurumbi Nature Reserve NSW

Jervis Bay Nature Reserve (former) ACT

Jervis Bay and Surrounds NSW

Commonwealth Reserves [Dataset Information]

Booderee National Park, COM

Booderee National Park, NSW

Extra Information

State and Territory Reserves [Dataset Information]

Jervis Bay Marine Park, NSW

New South Wales Jervis Bay National Park, NSW

Woollamia Nature Reserve, NSW

Regional Forest Agreements [Dataset Information]

Note that all RFA areas including those still under consideration have been included.

Southern RFA, New South Wales

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

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This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the *Environment Protection and Biodiversity Conservation Act 1999*. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Commonwealth land mapping is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under "type of presence". For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the migratory and marine provisions of the Act have been mapped.

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites;
- seals which have only been mapped for breeding sites near the Australian continent.

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgments

This database has been compiled from a range of data sources. Environment Australia acknowledges the following custodians who have contributed valuable data and advice:

- New South Wales National Parks and Wildlife Service
- Department of Sustainability and Environment, Victoria
- Department of Primary Industries, Water and Environment, Tasmania
- Department of Environment and Heritage, South Australia Planning SA
- Parks and Wildlife Commission of the Northern Territory
- Environmental Protection Agency, Queensland
- Birds Australia
- Australian Bird and Bat Banding Scheme
- Australian National Wildlife Collection
- Natural history museums of Australia
- Queensland Herbarium
- National Herbarium of NSW
- Royal Botanic Gardens and National Herbarium of Victoria
- Tasmanian Herbarium
- State Herbarium of South Australia
- Northern Territory Herbarium
- Western Australian Herbarium
- Australian National Herbarium, Atherton and Canberra
- University of New England
- Other groups and individuals

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ANUCLIM Version 1.8, Centre for Resource and Environmental Studies, Australian National University was used extensively for the production of draft maps of species distribution. Environment Australia is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

See log of system/dataset changes

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REFERRAL DECISION BRIEF – HERITAGE ESTATE REZONING & ASSOCIATED PUBLIC WORKS, WORROWING HEIGHTS, NSW (EPBC 2007/3448)

DEW Brief: N/A
Public Affairs Consulted: Yes
DEW File: 2007/05065

For: Vicki Middleton, AS, EAB **Deadline and reason:** 25 June 2007

Recommended Decision	**NCA** ☐ **NCA(pm)** ☐ **CA** ☒ **NO** ☐
Designated Proponent	Shoalhaven City Council / **NA** ☐
Controlling Provisions	World Heritage (s12 & s15A)☐ National Heritage (s15B & s15C)☐ Wetlands (Ramsar) (s16 & s17B)☐ Threatened Species (s18 & s18A)☒ Migratory Species (s20 & s20A)☐ C'wealth marine (s23 &24A)☐ Nuclear actions (s21 & 22A)☐ C'wealth land (s26 & s27A)☒ Commonwealth actions (s28)☐ See Attachment A for ☒ list
Public Comments	Yes ☒ No ☐ Number: 32 See Attachment D
Ministerial Comments	Yes ☐ No ☒
Assessment Approach Decision	Yes ☒ No ☐ What: Public Environment Report (PER) Bilateral Applies ☐
Legal Considerations	-The referred action is not considered by the Department to be a component of a larger action pursuant to section 74A of the Act. -There are secondary or consequential impacts expected as a result of the proposed action. See Attachment A for details.
SPRAT	Has data been provided to NESWS? Yes ☐ No ☒ NA ☐

Recommendations:

We recommend that you:

1. consider your legal obligations for decision-making at Attachment A	1. Noted / Please discuss
2. agree with the recommended decision	2. Agreed / Not agreed
3. agree with the designated proponent	3. Agreed / Not agreed
4. agree that the action should be assessed on PER	4. Agreed / Not agreed
5. agree that the notice is correct at Attachment B	6. Agreed / Not agreed
6. sign the letter(s) at Attachment C	7. Signed / Not signed

Vicki Middleton
AS EAB
/ 06 / 2007

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Key Issues:

- The matters protected are listed threatened species and ecological communities, and Commonwealth land (Booderee National Park).
- The proposed development of the Heritage Estate is politically sensitive. Landowners, who purchased Rural-zoned allotments within the Estate in the late 1980's and early 1990's, have since been applying pressure to various levels of government to seek development of the land. However, many local residents are opposed to development of the area.
- There were 32 public submissions (Attachment D). 7 submissions supported the proposal and 25 opposed it. Those who support the proposal are landowners who wish to develop individual allotments within the Heritage Estate, and those who oppose it wish to protect the conservation values of the area and the water quality of St Georges Basin.
- Internal advice from the Parks Australia Division (Attachment E) is that the Heritage Estate land provides a vital habitat link to the Booderee National Park, and that development of the area would have a significant impact on the biodiversity of the Park. It is Parks' view that the proposed action is unacceptable in accordance with Division 1A of Part 7 of the EPBC Act.
- A report provided by the proponent (BES 2007) concluded that the site had high conservation values and should not be rezoned for residential development (Attachment F). The Department sought advice from two independent experts on the findings of the BES report (Attachment G), who both agreed with the findings.

Background:

- The proposal involves rezoning and associated public infrastructure works, including bushfire protection and hazard reduction requirements, to facilitate residential development of the Heritage Estate. Based on Recommendation 5 from the NSW Commission of Inquiry (Attachment H), the referral proposes development of 730 residential lots, of a possible 1,200 lots on 179.6ha.
- On 9 May 2007 a referral (Attachment F) was received from the Shoalhaven City Council, who stated their belief that the proposal is a controlled action for the purposes of the EPBC Act, for likely significant impacts on listed threatened species, migratory species and Commonwealth land.
- The public comment period closed on 8 June 2007. This was extended from 20 to 30 business days in response to a request from a member of the public, because the BES report was not initially made available to the public. The Shoalhaven City Council subsequently agreed to extend the decision date by 10 business days, until 25 June 2007.

Discussion of potential impacts:

- The proposal will result in the clearing of vegetation that is known to provide habitat for listed threatened species (Attachment A), including the endangered Eastern Bristlebird and Leafless Tongue Orchid. It will also increase the fragmentation of habitat corridors for fauna and flora occurring on the Bherwerre Peninsular, impacting on the viability of species' populations within the Booderee National Park on Commonwealth land. Other potential consequential impacts include degradation of remaining habitat through edge effects, such as weed encroachment and the introduction of pest animals.
- Based on the information available to the Department, significant impacts on listed threatened species and Commonwealth land are considered likely. See findings in Attachment A.

Recommended Assessment Approach:

- Under section 87 of the EPBC Act, you must choose one approach for assessment of the relevant impacts of the proposed action. In making your decision you must consider:
  - information in the referral relating to the action;
  - any other available information about the impacts of the action that you think is relevant;
  - any relevant information received from a State Minister (none received);
  - the matters (if any) prescribed by the regulations; and
  - the guidelines (if any) published under subsection (6).
- The bilateral agreement with NSW is not applicable for this proposal, as the Shoalhaven City Council has not yet referred the proposed action to the NSW Minister for Planning.

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- Given the level of public concern about this proposal, the Department considers it would be beneficial to assess the proposal by a public environment report. This would focus on a small number of key issues, provide further analysis of the relevant impacts on listed threatened species and Commonwealth land, and allow the public to be involved in the decision making process.
- The BES report does not address the potential for significantly modifying the proposal. A public environment report would enable the potential impacts on these species to be considered appropriately.

s. 22(1)(a)(ii)
Director
Government and Transport Section
/ 06 / 2007

Primary Contact
s. 22(1)(a)(ii)

Secondary Contact
s. 22(1)(a)(ii)

PORTFOLIO CONSULTATION:

AAD	AWD	MBD	EQD	HD	ICED	WANRD	NRMPD	PAD	SSD	GBRMPA	SHFT	BoM
								X				

W-o-G Consultation:
The NSW Department of Planning has been consulted.

Attachments:

A Legal considerations, including supporting advice
B Instrument of decision
C Letter to the Shoalhaven City Council advising of your decision
D Summary of public submissions
E Internal advice from PAD, including species of concern to BNP
F Referral, including the BES report
G Independent expert advice
H NSW Commission of Inquiry report

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Public comments summary: EPBC 2007/3448 – Heritage Estate, Worrowing Heights (Jervis Bay) NSW

Submissions FOR:

Total no. (Submission no.)	No. against	Name	Issues
1	1	s. 22(1)(a)(ii)	Disputes level of significance of habitat for species, and the 'concept' of habitat corridors. Seeks consideration of social and economic issues.
2	2	s. 22(1)(a)(ii)	Need for consideration of the social and economic impacts in decision making; Current degradation of the land; Rejects the findings of the consultant's Threatened Biodiversity report.
3	3	s. 22(1)(a)(ii)	Disputes environmental values of the land owing to illegal dumping and motorbike tracks; Govt must allow development or be prepared to compensate landowners.
4	4	s. 22(1)(a)(ii)	Financial and social concerns of landowners
5	5	s. 22(1)(a)(ii)	Questions findings of the Threatened Biodiversity report; Social and economic benefits of development.
6	6	s. 22(1)(a)(ii)	Disputes credibility of significance for threatened species
17	7	s. 22(1)(a)(ii)	Opportunity for 'world's best practice' suburban infrastructure development – 'win-win' for landowners and the environment.

Submissions AGAINST:

Total no.	No. against	Name	Issues
7	1	s. 22(1)(a)(ii)	Listed threatened and migratory species.
8	2	s. 22(1)(a)(ii)	Listed threatened species, Booderee NP & corridors, marine environment, potential impacts to tourism.
9	3	s. 22(1)(a)(ii)	Flora & fauna, wildlife corridors, lack of supporting infrastructure.
10	4	s. 22(1)(a)(ii)	Listed threatened species, habitat corridors, cumulative impacts from this and other localised developments (eg. Stocklands & Baptist Church).
11	5	s. 22(1)(a)(ii)	Wildlife corridor to two National Parks.
12	6	s. 22(1)(a)(ii)	Wildlife corridor value of the Heritage Estate land.
13	7	s. 22(1)(a)(ii)	Clearly unacceptable under Division (1A) of the EPBC Act; Biodiversity. values; Habitat corridor values; Cumulative impacts.
14	8	s. 22(1)(a)(ii)	Biodiversity conservation; Water quality – St Georges Basin; Wildlife corridor.
15	9	s. 22(1)(a)(ii)	Threatened species, Flora and fauna; Wildlife Corridors; St Georges Basin.
16	10	s. 22(1)(a)(ii)	Eutrophication of St Georges Basin; Threatened orchids; Other threatened flora

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			and fauna.
18	11	s. 22(1)(a)(ii)	
19	12	s. 22(1)(a)(ii)	Nutrient loads & potential impacts on St Georges Basin from eutrophication; High conservation values of the area; Cumulative impacts.
20	13	s. 22(1)(a)(ii)	Believes that the action is clearly unacceptable.
21	14	s. 22(1)(a)(ii)	High conservation area – issues that support 'the assessment outcome of clearly unacceptable'.
22	15	s. 22(1)(a)(ii)	Heritage Estate – sensitive site in the St Georges Basin catchment – concerns re nutrient runoff; Cumulative impacts on biodiversity; Believes the action should be classified as 'clearly unacceptable'.
23	16	s. 22(1)(a)(ii)	Recommendations from the Threatened Biodiversity report mean that the proposal is 'totally unacceptable'.
24	17	s. 22(1)(a)(ii)	Options for purchase of the Heritage Estate land – C'mth or State govt, or Bush Heritage Australia; Background re SCC warning potential purchasers that the land could not be developed owing to zoning restrictions; Biodiversity; Habitat corridor & cumulative impacts; St Georges Basin & potential eutrophication.
25	18	s. 22(1)(a)(ii)	Critical wildlife corridor; High conservation values and advise from the Threatened Biodiversity report should be adhered to; Uniqueness of the Bay and Basin area.
26	19	s. 22(1)(a)(ii)	Important bush land environment; Recreational area.
27	20	s. 22(1)(a)(ii)	Habitat for native birds and animals; Corridor between Booderee and NSW National Parks; Pollution of St Georges Basin.
28	21	s. 22(1)(a)(ii)	Deficiencies in the referral document re omission of relevant existing studies, water quality monitoring, ASS & groundwater studies, bushfire hazards, failure to adequately address CoI recommendations; Matters of NES.
29	22	s. 22(1)(a)(ii)	Threatened and migratory species; C'mth land; Degradation of the water quality of St Georges Basin.
30	23	s. 22(1)(a)(ii)	Threatened and migratory species; C'mth land; Water quality St Georges Basin.
31	24	s. 22(1)(a)(ii)	High conservation values; Wildlife corridor; St Georges Basin.
32	25	s. 22(1)(a)(ii)	Threatened biodiversity; lakes; people.
33	26	s. 22(1)(a)(ii) & 6 others (joint submission)	Detailed analysis of the referral including comments on listed threatened and migratory species, impacts on Commonwealth land, species of conservation significance and the heritage values of Jervis Bay and the surrounds. Concludes that the proposal should not be approved and the land acquired and added to the protected-area estate.

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Approval and Controlling Provisions

Under s75 of the EPBC Act, you must decide whether the action that is the subject of a proposal referred is a controlled action and which provisions of Part 3 (if any) are controlling provisions for the action. In making your decision you must consider all adverse impacts the action has, will have, or is likely to have on the matter protected by each provision of Part 3, and you must not consider any beneficial impacts on the matter.

You must also consider any comments received from the public, responsible Commonwealth Ministers and appropriate State or Territory Ministers, to the extent that they are relevant (comments at Attachment D).

The Department has reviewed the information in the referral against the *EPBC Act Administrative Guidelines on Significance* (July 2000) and other relevant material. While these guidelines are not binding or exhaustive, the factors identified are considered adequate for decision-making in the circumstances of this referral, and there is no reason to depart from these guidelines or consider additional factors. Adequate information is available for decision-making for this proposal.

The following summarises the Department's advice against each of the Part 3 controlling provisions. Preliminary advice from relevant specialist areas of the Department, providing their views on likely significance, are also attached. In making your decision, you are required to take account of the precautionary principle (s391). The Department has taken this principle into account in providing its advice.

World Heritage
Not applicable.

National Heritage
Not applicable.

Ramsar Wetlands
Not applicable.

Listed threatened species and communities
The proposed action is likely to have a significant impact on listed threatened species. For more information please see the attached Supporting Advice on this matter.

Listed migratory species
Significant impacts on listed migratory species are not expected or likely.

Commonwealth marine
Significant impacts on the marine environment are not expected or likely.

Nuclear actions
Not applicable.

Commonwealth action
Not applicable.

Commonwealth land
The proposed action is near to Commonwealth land and significant impacts on the environment are likely. For more information please see the attached Supporting Advice on this matter.

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SUPPORTING ADVICE

Controlling Provisions: Subsections 26 & s27A (Commonwealth land)

Significant impacts on Commonwealth land: YES

Shoalhaven City Council/Residential Development/Heritage Estate Rezoning and Associated Pubic Works/Worrowing Heights/NSW (EPBC Reference: 2007/3448)

The Heritage Estate is part of a larger mosaic of native vegetation and fauna habitat that includes the Jervis Bay National Park to the north and Booderee National Park on Commonwealth land to the south. Although the Heritage Estate has been subject to a range of disturbances, including some slashing and tree removal, inappropriate vehicle use, and fire, the site remains generally weed free. The Heritage Estate is represented by a diversity of vegetation types, including Scribbly Gum-Bloodwood Woodland, Gallery Rainforest, Bangalay Swamp Forest, Woollybutt-Paperbark Swamp Forest, Spotted Gum-Woollybutt Woodland, Spotted Gum-Blackbutt Open Forest, Blackbutt-Bloodwood Open Forest, Heathland and Sedgeland-Shrubland, which provide habitat for listed threatened species and species of concern to the Booderee National Park.

The Heritage Estate is located on the narrow Bherwerre isthmus, which forms a narrow land corridor between the water bodies of Jervis Bay and St Georges Basin to the Bherwerre Peninsular and the Booderee National Park. The preservation of linked habitat corridors with diverse habitat values on the Bherwerre isthmus is strategically important to maintain the biodiversity and genetic viability of species populations within the Booderee National Park. The maintenance of effective habitat corridors is particularly important for listed threatened species, including the Eastern Bristlebird, Grey-headed Flying-fox, Giant Burrowing Frog and Leafless Tongue-orchid, and for species of concern to the Booderee National Park, such as the Yellow-bellied Glider, Ground Parrot, Powerful Owl and Eastern Pygmy Possum, among others (refer to Attachment E).

Four regional habitat corridors that connect species population reservoirs in the Jervis Bay region were outlined in the 1992 Shoalhaven City Council discussion paper, *Jervis Bay – Our Heritage Our Future.* Habitat Corridor 4 from this document traverses the Heritage Estate site. Regional habitat corridors were later described in the 1996 *Jervis Bay Regional Environment Plan,* which includes an area of 'Disturbed habitat and vegetation' that traverses the Heritage Estate site. This area is identified as having the potential to continue to provide important regional resources for wildlife as part of the habitat corridor system. The JBREP states that any proposal for this area should be designed to maximise the retention of native vegetation and the rehabilitation of degraded areas. However, the referral states that there is limited scope for alternative options to the proposed development because approximately 1,100 lots are already owned by individuals. The *Jervis Bay Settlement Strategy* also states that land-use planning in the region should explicitly recognise the value of lands as habitat corridors and seek to maintain the structure and composition of native vegetation within these areas.

According to the BES report (Attachment F), the range of species and habitats contained within the study area, its position in the wider landscape, and its connectivity to adjoining lands containing good quality habitat, support the concept that the Heritage Estate land functions as an important habitat corridor.

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Parks Australia North have advised that several species have already been lost in the Booderee National Park, and that contiguous habitat corridors, containing a range of representative vegetation assemblages, are important for maintaining viable populations and allowing for potential recolonisation of species in the Park. Table 1 at Attachment E lists some of the species of concern to the Booderee National Park, and illustrates the sensitivity of the Bherwerre Peninsular to habitat fragmentation.

The Department considers that the Heritage Estate is an important habitat corridor link between the Booderee National Park, Jervis Bay National Park and other natural areas in the broader region. The loss of this habitat corridor would lead to a long-term decline of a number of species occurring in the Booderee National Park, and significant impacts on Commonwealth land are therefore considered likely.

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SUPPORTING ADVICE

Controlling Provisions: Subsections 18 and 18A
(Listed threatened species and ecological communities)

Significant impacts on listed threatened species and ecological communities: YES

Shoalhaven City Council/Residential Development/Heritage Estate Rezoning and Associated Pubic Works/Worrowing Heights/NSW
(EPBC Reference: 2007/3448)

Listed threatened species potentially impacted by the proposal

Threatened Species	Status	Type of Presence
Birds		
Dasyornis brachypterus Eastern Bristlebird	Endangered	Present. The study area represents important habitat for the Eastern Bristlebird, which is a breeding, resident species at the site. Territorial calling indicated at least 5 established territories within the study area. The Eastern Bristlebird occurs in far south-east Queensland, coastal NSW and in eastern Victoria. The range of the species has declined dramatically and is close to local extinction in Queensland and Victoria. SPRAT indicates that the total population of the species is estimated at less than 2000 birds, of which approximately 1500 to 1600 birds are found in the Jervis Bay region. Parks Australia has advised that the Booderee National Park and adjoining Jervis Bay Nature Reserve contain the largest remaining population of the Eastern Bristlebird.
Mammals		
Pteropus poliocephalus Grey-headed Flying-fox	Vulnerable	Present. Although permanent roosting habitat is not present within the study area, the Grey-headed Flying-fox was observed foraging in flowering trees at the site during the survey period.
Frogs		
Heleioporus australiacus Giant Burrowing Frog	Vulnerable	Potentially present. The study area provides suitable habitat for the Giant Burrowing Frog. The species is known from a number of sites in the locality, but was not detected during surveys of the study area. However, given the site's proximity to known habitat, it is considered possible that the species may occur within the study area.

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Threatened Species	Status	Type of Presence
Plants		
Cryptostylis hunteriana Leafless Tongue-orchid	Vulnerable	Present. Targeted surveys recorded 211 individuals across the study area, occurring in woodland and sedgeland. This is a substantial population and the study area contains important habitat for this species. The Leafless Tongue-orchid is reliant on a symbiotic relationship with mycorrhizal fungus found in decaying plant matter. The species is pollinated exclusively by male ichneumon wasps, and flowering and seed production may be dependent upon the opening of the habitat by regular fires (at 5 to 8 year intervals), preferably during autumn when the plants have dispersed their seed. According to SPRAT, this species is rare in NSW, and an estimated total of 500 plants have been recorded within six populations in Victoria. It is poorly represented in conservation reserves, however none of the 211 plants found at the Heritage Estate site are within areas proposed for environmental protection.
Melaleuca biconvexa Biconvex Paperbark	Vulnerable	Present. The Worrowing Waterway riparian and floodplain areas are important habitats for this species.
Prasophyllum affine Jervis Bay Leek Orchid	Endangered	Potentially present. Although the species was not recorded during targeted surveys, potential habitat exists at the site and the species is known to occur 150m north of the study area.

The Heritage Estate proposal is considered likely to have a significant impact on listed threatened species. If approved, the proposal will reduce the area of occupancy of the Eastern Bristlebird, potentially fragment an existing population into two or more populations and, by further reducing the functionality of regional habitat corridors, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. The proposed development would also result in the long-term decrease in the size of an important population of the Leafless Tongue Orchid, which is not located within areas proposed for environmental protection at the Heritage Estate site.

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SUPPORTING ADVICE

Controlling Provisions: Subsections 20 and 20A
(Listed migratory species)

Significant impacts on listed migratory species: No

Shoalhaven City Council/Residential Development/Heritage Estate Rezoning and Associated Pubic Works/Worrowing Heights/NSW
(EPBC Reference: 2007/3448)

Listed migratory species identified as present in the vicinity of the proposed action

Migratory Species	Status	Type of Presence
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle	Migratory	Potentially present. Suitable trees for breeding are present within forest communities, although no evidence of nesting was observed. A small amount of potential foraging habitat is also present at the lower section of the Worrowing Waterway. The species may occur at the site on a regular basis, however the site does not appear to provide important habitat.
Hirundapus caudacutus White-throated Needletail	Migratory	Potentially present. The White-throated Needletail was observed flying over the study area, however the site does not contain important habitat for the species.
Monarcha melanopsis Black-faced Monarch	Migratory	Present. Several individuals were heard calling along Worrowing Waterway. Suitable breeding habitat for the species occurs at the site in gallery forest, swamp forest and dense open forest, mainly along Worrowing Waterway. Although breeding at the site has not been confirmed, it is considered likely.
Rhipidura rufifrons Rufous Fantail	Migratory	Present. The Rufous Fantail was detected in dense vegetation in the southwest and central west of the study area. Suitable habitat is present in forest along the Worrowing Waterway and adjacent areas. Although breeding at the site has not been confirmed, it is considered likely.
Migratory Wetland Species		
Gallinago hardwickii Latham's Snipe	Migratory	Present. The Latham's Snipe was detected within sedgeland vegetation at the site. The species does not breed in Australia, but sedgelands and adjacent vegetation provide suitable shelter and foraging habitat onsite.

The Black-faced Monarch, Rufous Fantail and Latham's Snipe are likely to utilise habitats at the site on a seasonal and regular basis. However, the site does not represent important habitat for these migratory species, as defined by the EPBC Significant Impact Guidelines, and the proposal is not likely to seriously disrupt the lifecycle of an ecologically significant proportion of the populations of these species.

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s. 22(1)(a)(ii)

Fenner School for Environment and Society

The Australian National University

Canberra, ACT., Australia

15 June 2007

Re: Impacts of the Heritage Estates development proposal

To whom it may concern,

I have now carefully read a range of documents associated with the **Heritage Estates development proposal**. Based on 25 years experience as a professional terrestrial ecologist and environmental scientist, coupled with a deep understanding of the Jervis Bay and Booderee National Park areas gained from intensive scientific studies that I have competed in the region in the past five years, I strongly believe that the **Heritage Estates development proposal** is clearly unacceptable given its impacts on the natural environment generally, on biodiversity (including threatened and endangered species) and on the integrity of Booderee National Park. More detailed discussion for this conclusion is outlined in the attached report.

Given my experience, together with background research in the Jervis Bay region, I support the conclusion of the Major Report by Bushfire and Environmental Services for the **Heritage Estates development proposal** which concludes that the project should not proceed. Moreover, I cannot see how the **Heritage Estates development proposal could be** re-designed to mitigate the not inconsiderable negative ecological and environmental impacts that would be associated with it. In addition, further field survey and assessment work like that done in the report by Bushfire and Environmental Services would only increase the definitiveness of my conclusions about the unacceptability of the **Heritage Estates development proposal**. [For example, through identifying additional species for which the proposal would have negative and unacceptable ecological and environmental impacts

I hope this letter will be received favourably and I will be more than happy to further discuss the basis for the conclusions reached.

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Yours Sincerely,

s. 22(1)(a)(ii)

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Impacts of the Heritage Estates development proposal

s. 22(1)(a)(ii)

Fenner School for Environment and Society

The Australian National University

Canberra, ACT., Australia

s. 22(1)(a)(ii)

Given my expertise generally and specific knowledge as it relates to the Jervis Bay region, I strongly believe that the **Heritage Estates** development proposal is clearly unacceptable in terms of:

- Its impacts on biodiversity.
- Its impacts on threatened and/or endangered species.
- The disruption it will cause to the environmental values of Booderee National Park and the key species and environments in that protected area.

Given the nature of the proposed **Heritage Estates** development, I cannot see any way these major negative impacts could be effectively mitigated or appropriately offset.

A brief summary of the impacts of the proposed **Heritage Estates** development is set out below. I am more than happy to provide extensive further information on these issues if requested.

1. The proposed **Heritage Estates** development would take place on an area that supports an extraordinary number of threatened and endangered animals, plants and an endangered plant community. These factors alone, coupled with development

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impacts on these taxa, strongly indicate that the proposed **Heritage Estates** development should not proceed.

2. The proposed **Heritage Estates** development would necessarily involve the construction of a network of roads and powerlines. This will directly destroy habitat for an array of threatened and/or endangered species and significantly undermine the ecological integrity of an endangered plant community that occurs on the site proposed for development. There is considerable precedent for such negative effects of urban expansion in many parts of Australia, including coastal New South Wales. There is no evidence to suggest that the substantial negative effects of the proposed **Heritage Estates** development would be any different or less severe in this regard. As an example, habitat loss for the nationally endangered Eastern Bristlebird – a species known to occur in the areas targeted for the proposed **Heritage Estates** development would likely result in the extirpation of the species from the development area.

3. The construction of a network of roads and powerlines associated with the proposed **Heritage Estates** development would result in weed invasion, this will indirectly destroy habitat for a number of key species and reduce the quality of habitats for others. The construction of a network of roads and powerlines associated with the proposed **Heritage Estates** development would result in increased numbers of feral animals. This will result in direct negative impacts on a range of threatened and/or endangered species. There is considerable precedent for such negative effects of urban expansion in many parts of Australia, including coastal New South Wales. There is no evidence to suggest that the substantial negative effects of the proposed **Heritage Estates** development would be any different or less severe in this regard.

4. If the proposed **Heritage Estates** development were to proceed, a large number of dwellings would be constructed. This would lead to a direct loss of habitat for an array of threatened and/or endangered species. It also would lead to the significant erosion in the ecological integrity of an endangered plant community that occurs on the site. There is considerable precedent for such negative effects of urban expansion in many parts of Australia, including coastal New South Wales. There is no evidence to suggest that the substantial negative effects of the proposed **Heritage Estates** development would be any different or less severe in this regard.

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5. If the proposed **Heritage Estates** development were to proceed, there would be a significant increase in the number of domestic cats and dogs owned as pets in the area. Domestic pets are well documented as having significant negative impacts on populations of native fauna. Predation on threatened and/or endangered fauna in the proposed **Heritage Estates** development would have significant additional negative effects on these important listed species.

6. If the proposed **Heritage Estates** development were to proceed, there would be a significant increase in the number of fires that would occur in the area, including the adjacent peri-urban interface. Altered fire regimes have been shown to be a significant factor threatening a wide range of Australian vertebrates including a suite of threatened and endangered ones. Additional fires would be expected to have negative impacts on key species of conservation concern known to occur in the area targeted for the proposed **Heritage Estates** development. An example is the nationally endangered Eastern Bristlebird (see Baker, 1999, 2000).

7. The proposed **Heritage Estates** development area is actually a mosaic of different vegetation types (*sensu* Bennett *et al*., 2006) comprising not only forest, but also heathland and other key types of native vegetation cover. Functional corridors to provide habitat connectivity (sensu Lindenmayer and Fischer, 2006, 2007) for key elements of the biota will often need to be of the vegetation type which provide suitable habitat for the species of concern. For example, for species such as the Eastern Bristlebird which are primary heathland taxa, wildlife corridors comprised of forest are unlikely to provide suitable habitat connectivity. Indeed, appropriate wildlife corridors for these and other similar species (e.g. Southern Emu Wren) would need to be heathland. Therefore, I do not believe that it would be possible to mitigate the impacts of the proposed **Heritage Estates** development through re-design of the development proposal.

****

We have conducted extensive research and monitoring studies in Booderee National Park since 2002. Two ANU staff (s. 22(1)(a)(ii) work full time in the park as part of the ANU research team. Our research team has quantified the importance of Booderee National Park for an extensive suite of terrestrial vertebrate fauna (birds, mammals, reptiles and frogs) as well as flora. Based

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on our intimate understanding of the biology and ecology of Booderee National Park, the proposed **Heritage Estates** development would be highly likely to have significant negative effects on the ecological integrity of this important protected area.

A. The **Heritage Estates** development area provides significant habitat connectivity (*sensu* Lindenmayer and Fischer, 2006) to Booderee National Park. This is critical for the maintenance of key populations of species such as the nationally endangered Eastern Bristlebird and other key species in Booderee National Park such as the Greater Glider.

B. The importance of the loss of connectivity is reflected by the local extinctions of several key species in Booderee National Park. In the past these local extinctions would have been reversed by dispersal and recolonisation events. However, urban and other developments have reduced habitat connectivity and limited the potential for the reversal of local extinctions. Evidence for the impairment of this key ecological process is reflected by the extinction followed by continued absence from Booderee National Park of species such as the Yellow-bellied Glider (listed as vulnerable in NSW), the Superb Lyrebird and the Common Wombat.

C. Additional urban development that destroy significant areas of native vegetation – as would occur if the proposed **Heritage Estates** development were to proceed would further impair levels of habitat connectivity for Booderee National Park. Local (and subsequently unreversed) extinctions of other species would be expected to occur – effects that have been recorded in a wide range of studies worldwide (reviewed by Lindenmayer and Burgman, 2005, Lindenmayer and Fischer, 2006). Dispersal-limited species (e.g. the nationally endangered Eastern Bristlebird – see Baker, 2000) would be among those taxa likely to be most threatened by the impairment of habitat connectivity associated with the proposed **Heritage Estates** development. Similar effects would be expected to occur for other species of conservation concern with limited dispersal capabilities (e.g. the Giant Burrowing Frog and the Southern Emu Wren).

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In summary, based on my expertise of 25 years together with my direct experience in working in the Jervis Bay area over the past 5 years, I support the conclusion of the major report by Bushfire and Environmental Services for the **Heritage Estates development proposal** which concludes that the project should not proceed. The **Heritage Estates development proposal** would have unacceptable impacts on biodiversity, including a suite of nationally threatened and endangered species. Moreover, I cannot see how the **Heritage Estates development proposal could be** re-designed to mitigate the not inconsiderable negative ecological and environmental impacts that would be associated with it. In addition, further field survey and assessment work like that done in the report by Bushfire and Environmental Services would only increase the definitiveness of my conclusions about the unacceptability of the **Heritage Estates development proposal**. [For example, through identifying additional species for which the proposal would have negative and unacceptable ecological and environmental impacts].

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THE ECOLOGY CENTRE

DIRECTOR
s. 22(1)(a)(ii)

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http://www.uq.edu.au/spatialecology

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Date 15 Jun. 07

s. 22(1)(a)(ii)
Government and Transport Section
Department of the Environment and Water Resources
PO Box 787
Canberra ACT 2600

Dear s. 22(1)(a)(ii),

Re: Review regarding the effects of the Heritage Estates proposal, Worrowing Heights, Jervis Bay (EPBC Referral 2007-3448) on the Eastern Bristlebird and other threatened fauna and flora.

Further to our agreement please find below the findings with regard to this review:

1. The conclusions of this report are based on the information we were asked to assess using our background knowledge of the area and species in question and our expertise in ecological processes.

2. The proposal is to rezone the Heritage Estate land for residential development. Different versions of the development directly affect varying amounts of land. Regardless of the details of the plan, there will be a direct impact on the site where infrastructure is developed. In addition, there will be indirect impact on areas of native vegetation within and near the development causing severely diminished conservation value.

3. The area proposed for development contains a number of EPBC listed species and forms part of a main vegetation corridor connecting Booderee National Park to the rest of Australia.

4. The Eastern Bristlebird is nationally endangered under the federal EPBC Act 1999, endangered in New South Wales and Queensland and threatened in Victoria. Eastern Bristlebirds have a number of isolated populations disjunct from the main populations and in some instances with very little connecting habitat in between. One of the largest populations of this species in the world is in Booderee National Park, which is connected by narrow habitat corridors to other habitat patches in the area of Jervis Bay. The main threats to this species are incremental habitat loss and fragmentation of remaining habitat, such as the conversion of habitat to urban or agricultural land. Other important threats are extensive fire

and the spread of exotic plants, as the species' ideal habitat is dense, low vegetation including heath and open woodland with a heathy understorey. The Eastern Bristlebird has low fecundity and nests on or close to the ground, which makes the bird and its eggs susceptible to introduced predators, such as fox, cat and black rat. The bird is cover dependent and semi-flightless, therefore has poor mobility; however, there is a record of one bird dispersing over four km through adequate and continuous habitat. The Heritage Estate area currently has at least five breeding pairs of Eastern Bristlebird, which could be higher if the habitat was restored.

5. The proposed development would locally impact the Eastern Bristlebird by direct destruction of the birds and their habitat within the area and have broader-scale negative effects by impairing the corridor function of the area. Removing habitat would cause the loss of breeding Eastern Bristlebirds from the area of development. Replacing Bristlebird habitat with urban dwellings is likely to increase edge effects in remaining habitat, leading to an increase in the number of cats and other introduced predators, as well as enhance weed invasion. The development is also likely to change fire regimes in the area and increase transport activities and other human-related disturbance. This direct impact will be the loss of at least five pairs, but indirectly and potentially many more birds.

6. The study area is an important habitat corridor and the proposed development would negatively impact the long-term viability of the Eastern Bristlebird in two ways. First, increased isolation reduces genetic exchange between populations and decreases population viability. Second, the Eastern Bristlebird exists as isolated populations, each of which is prone to local extinction through catastrophic events, such as fire or disease. Consequently, long-term persistence of the species depends on connectivity through continuous habitat that enables individuals to recolonise areas of local extinction and to colonise new areas.

7. The Heritage Estates area contains diverse vegetation communities and fauna habitat, and it has a high level of conservation value based on its relatively high species richness and the relatively high number of species of conservation significance. Besides the Eastern Bristlebird, the area contains 16 other threatened fauna species and three threatened flora species.

8. The Ground Parrot is listed as vulnerable under the TSC Act and it has similar life history and threats to the Eastern Bristlebird. Therefore the effects of the Heritage Estate development would be similar on both species. Arboreal mammals would also suffer from the loss of habitat and corridor function. The Giant Burrowing Frog was not recorded during surveys but it could potentially inhabit the area. The development would negatively influence this species by removing habitat, changing fire regimes and impairing water quality downstream from the development. Two threatened orchid and a threatened paperbark species were also found during surveys, which would be negatively affected by the development.

9. In our opinion there is sufficient information currently available to conclude that the proposal would have a wide range of impacts on all threatened species.

10. The proposal has two sets of impacts on the Eastern Bristlebird: it would lead to the direct loss of individuals and prohibit movement between suitable habitat patches. These two impacts of the development in theory could be mitigated, however, these measures would have to go on indefinitely, they would be very expensive and their results not guaranteed.

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The loss of individuals could be mitigated by improving habitat elsewhere, the loss of connectivity by regular translocations. These measures would need to be accompanied by regular monitoring of numbers and genetic diversity.

11. Similar measures would be necessary for the other threatened birds, mammals and the frog. Given a lack of basic ecological knowledge, mitigation measures for the endangered orchid species would be extremely difficult and require further information.

12. Qualifications:

s. 22(1)(a)(ii)

s. 22(1)(a)(ii)

Yours sincerely

s. 22(1)(a)(ii)

s. 22(1)(a)(ii)
Postdoctoral Research Fellow

s. 22(1)(a)(ii)

s. 22(1)(a)(ii)

Director of The Ecology Centre
Professor of Mathematics
Professor of Ecology
ARC Professorial Fellow (Research)

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Australian Government

Director of National Parks

Vicki Middleton
Assistant Secretary
Environment Assessment Branch
John Gorton Building
Parkes ACT 2600

Referral by Shoalhaven City Council of a proposed action, Worrowing Heights (Heritage Estates)

Background

Booderee National Park is land and water owned by the Wreck Bay Aboriginal Community, leased to the Australian Government Director of National Parks and jointly managed by the Community and the Director through a joint Board of Management.

The Booderee National Park Management Plan, a statutory instrument under the EPBC Act 2000, identifies development or activities which are likely to pose a direct threat to the habitat corridors linking the Park and the larger Jervis Bay region, and requires me to pursue with appropriate agencies the maintenance of these corridors (prescription 9.11.5).

Booderee National Park is rich in natural resources with 625 native plant, 26 mammal, 200 bird, 17 reptile, 14 amphibian, and 308 fish species recorded. It is on the Commonwealth Heritage List.

For many of the park's species, contiguous habitat is important in maintaining viable populations because it allows the free flow of individuals between the Park and the broader Jervis Bay environment, allowing for example for recolonisation of the Park after major disturbances such as wildfire. Furthermore, the free flow of individuals through contiguous habitat helps to maintain healthy levels of genetic diversity within the Parks fauna and flora. Contiguous habitat is also important because individuals of some species have a large home range requirement and the park is not big enough on its own to sustain a viable population of some species.

Habitat corridors are designed to maintain contiguous habitats. The usefulness of these habitat corridors is affected by factors including their length, width, habitat type, the management regime in the corridors and adjacent disturbance. Adjacent disturbance might include factors such as the presence of foxes and other pests, domestic cats, introduction of weeds, pathogens, changes in fire and hydrology regimes, changes to the ground water table from drainage works, or large volumes of traffic along nearby roads. Taken together these factors form a complex set of interacting variables, which will affect different species in different ways.

It is very likely that the inadequate nature of existing habitat corridors has contributed significantly to the local extinction of some species and continues to contribute to some species being unable to reoccupy suitable habitat in the park. Several species have been lost in the Park in recent times such as yellow-bellied glider, and tiger quoll. Table 1 lists some of the species of concern, and illustrates the sensitivity of the Bherwerre Peninsular to fragmentation.

The corridors identified in the local Jervis Bay Regional Environment Plan 1996 are inadequate. Corridors need to contain the range of representative vegetation assemblages as habitat for species which occur in the area. Within the development site this includes rainforest, swamp forest, sedgeland, open forest and heathland

Issues

The Heritage Estates, a subdivision dating from 1915, was sold as 1200 individual lots in the late 1980's and 1990's. The blocks are zoned rural, and clearing and building are currently not permitted. This land is located on

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the northern end of the narrow isthmus of land of the Bherwerre Peninsula, which connects Booderee National Park to NSW Jervis Bay National Park and surrounds. These Parks collectively and cooperatively protect much of the biodiversity of the region, including a variety of important threatened species.

The Estates border the NSW Jervis Bay National Park on their southern boundary, and then extend as a contiguous area of native coastal bushland a further 3 kms southwards to the border of the Jervis Bay Territory and Booderee National Park. The area has been identified by the Commonwealth Government as a vital link to maintaining biodiversity in Booderee and the region since zoning discussions commenced in the late 1980's, and there has been numerous correspondence with NSW State agencies on the issue. Booderee National Park commissioned a study by CSIRO scientist Judy Caughley in 1993 which identified the very high conservation value of the Estates.

The Heritage Estates Commission of Inquiry in 1999 (COI) into possible rezoning recommended that the land identified as having ecological significance be zoned for environmental protection and remaining lands, an estimated 800 lots, be subject to further investigation.

The subsequent investigations commissioned by the Shoalhaven City Council and undertaken by local environmental consultants Bushfire and Emergency Services (BES) into threatened biodiversity found all habitats as having high environmental value. They reported "the study area contains diverse vegetation communities and fauna habitats, and is considered to hold a high level of conservation value due to the high species richness and diversity, high number of threatened, migratory and other species of conservation significance and occurrences of an endangered ecological community. The landscape position of the study area, its connectivity to adjoining areas of habitat and function as a wildlife corridor increase its conservation significance. In considering the sum of the values and extent of ecological constraints, it was concluded that none of the study area should be rezoned for residential development."

The BES study is comprehensive, detailed, and rigorous, although the true range and extent of threatened species is likely to be underestimated due to the relatively short period of data collection. Nevertheless the results are unequivocal, and therefore there is no requirement for further research in order to arrive at a definitive conclusion that the entire area should be conserved.

Many of the species identified by the consultant can be found in Booderee in similar habitat types, some are very restricted in distribution, some have been rediscovered after a long period of absence, and many are reliant on maintenance of connectivity outside the Park.

The Estates is uniquely sited in the neck of the Bherwerre Peninsular, and unacceptable impacts on matters of National environmental significance would occur should the development proceed.

I do not consider that these impacts can be mitigated against, because of the proximity of the Estates to, and the nature of the connection with, several National Parks, the vital corridor role played by this area, and the individual ownership of blocks.

The rezoning, supply of infrastructure, and subsequent development of the sites will have an impact on the following matters of significance:

1. *Listed Migratory Species (EPBC Section 20 (1))*

The area contains important habitat for migratory species, and five species have been recorded by BES (2007) within the relatively short time frame of their assessment. These are the Black-faced Monarch, Latham's Snipe, Rufous Fantail, White-bellied Sea eagle, and White-throated Needle tail. Two species are reported by BES as likely to breed in the area. These species are particularly susceptible to changes in drainage, which would be unavoidable to accommodate a large residential housing development.

2. *EPBC Listed threatened species and Communities (Section 18 (3))*

Two species of threatened flora, *Malaleuca biconvexa, and Cryptostylis hunteriana* and three species of threatened fauna, *Eastern Bristlebird, Giant Burrowing Frog, and Green and Golden Bell Frog (*not found by BES*)* have been recorded at the site.

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The Eastern Bristlebird is of particular concern, and the direct impacts on this species alone (direct loss of habitat) would be considerable. Booderee National Park and the adjoining Jervis Bay Nature Reserve contain the largest remaining population of the Eastern Bristlebird (approximately 50%), but this population is under pressure through development in the area. Recent research indicates loss and fragmentation of habitat and the fox, particularly after fire, are principal endangering processes for the species. The entire development site contains important habitat for this species including heath, sedgeland, and woodland. The site provides vital contiguous habitat for Bristlebird populations in Booderee, NSW Jervis Bay National Park, and populations to the west as far as Tomerong. Without effective habitat corridors, the largest remaining population of the species within Booderee and the adjoining NSW Jervis Bay National Park will become fragmented and be under significant threat.

The Giant Burrowing Frog has been recorded and has potential primary habitat over a large percentage of the development site. Current status of the Green and Golden Bell Frog in the development site is unknown. This species has not been located in Booderee National Park for 2 years, but was previously recorded in a range of wetland sites in the Park and in adjacent wetland areas including within the development site. Both species are in serious decline, and the destruction of very limited ephemeral wetland habitat is likely to contribute to the local extinction of these species.

3. *Listed NSW species and Communities*

Four Rare Or Threatened Australian Plants (ROTAP) occur on the site.

The site contains TSC Act 1995 NSW Endangered Ecological Community Swamp Sclerophyll Forest.

The entire development area is exceptional in containing primary habitat for a wide range of NSW threatened fauna, most of which occur in Booderee National Park. This primary habitat needs to be conserved for future conservation of the species. Notable fauna species include the Greater Glider, Yellow Bellied Glider, Sugar Glider, Eastern Pigmy Possum, White-footed Dunnart (found recently in Booderee after a long period after it was thought locally extinct), Ground Parrot, Powerful Owl, Masked Owl, Glossy Black Cockatoo, Black Bittern, Rufous Fantail, Black-faced Monarch, Latham's Snipe, Southern Emu Wren, Beautiful Firetail, Giant Burrowing Frog, and a range of microchiropteran bats. The Yellow bellied glider and white-footed dunnart are particularly susceptible to local extinction through loss or degradation of habitat, and increasing predation. The collective primary habitat of these species cover the entire site, and BES conclude and I concur there is no area remaining for development.

4. *Impacts on Commonwealth Land (EPBC Section 26 (2b))*

Development of the site will have a significant impact on the biodiversity of Jervis Bay Territory (Commonwealth Land) including Booderee National Park as outlined above.

Recommendation

There is clear evidence from the biodiversity survey that the site and adjoining landscapes have exceptional regional and national environmental values, and that this development would lead to significant impacts on matters of national environmental significance.

In my view, the proposed action is unacceptable in accordance with Division 1A of the EPBC Act (1999)

Peter Cochrane
Director of National Parks

12th June 2007

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TABLE 1 SPECIES OF CONCERN OR LOCALLY EXTINCT IN BOODREE NATIONAL PARK

SPECIES	COMMON NAME	CONSIDERATIONS
Phascolarctos cinereus	Koala	LOCALLY EXTINCT 1920'S- POSSIBLE REINTRODUCTION TO BNP
Sminthopsis leucopus	White-footed Dunnart	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST
Dasyurus maculatus	Spotted-tailed Quoll	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST – PROBABLY EXTINCT 1990`S
Vombatus ursinus	Common Wombat	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST – PROBABLY NOW EXTINCT
Isoodon obesulus (sub-fossil record)	Southern Brown Bandicoot	LOCALLY EXTINCT 1970'S- POSSIBLE REINTRODUCTION TO BNP
Perameles nasuta	Long-nosed Bandicoot	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST
Petauroides volans	Greater Glider	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST. NOTE THIS SPECIES IS IN SHARP DECLINE SINCE THE 2003 WINDERMERE FIRES
Petaurus breviceps	Sugar Glider	LONG TERM VIABILITY OF JBNP POPULATION IF NO HABITAT LINKS EXIST.NOTE THIS SPECIES IS IN SHARP DECLINE SINCE THE 2003 WINDERMERE FIRES
Petaurus australis	Yellow-Bellied Glider	LOCALLY EXTINCT 1980`S- POSSIBLE REINTRODUCTION TO BNP
Cercartetus nanus	Eastern Pygmy-possum	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST
Acrobates pygmaeus	Feathertail Glider	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST
Macropus rufogriseus	Red-necked Wallaby	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST
Wallabia bicolor	Swamp Wallaby	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST
Rattus lutreolus	Swamp Rat	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST

BIRD SPECIES OF MOST CONCERN FROM JBNP PERSPECTIVE -

Ninox strenua	Powerful Owl*	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST
Ninox connivens	Barking Owl	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST
Pezoporus wallicus	Ground Parrot	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST

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Stipiturus malachurus	Southern Emu Wren	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST
Stagonopleura bella	Beautiful Fire Tail	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST

REPTILE SPECIES OF MOST CONCERN

Morelia spilota	Diamond Python	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST
Veranus varius	Lace monitor	LOCALLY EXTINCT- POSSIBLE REINTRODUCTION TO BNP
Litoria aurea	Green and Golden Bell Frog	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST. LOCALLY EXTINCT 2006
Heleioporus australiacus	Giant Burrowing Frog	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST

EPBC SPECIES LISTED

Dasyornis brachypterus	Eastern Bristlebird	LONG TERM VIABILITY OF BNP POPULATION IF NO HABITAT LINKS EXIST

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LEX 83485 Document 15

REPORT TO THE HONOURABLE
DR ANDREW REFSHAUGE

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



HERITAGE ESTATE, JERVIS BAY

SHOALHAVEN CITY COUNCIL

KEVIN CLELAND, DEPUTY CHAIRMAN
COMMISSIONERS OF INQUIRY FOR ENVIRONMENT AND PLANNING

AUGUST 1999

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August 1999

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

Dear Minister

Heritage Estate, Jervis Bay

In accordance with section 119 of the Environmental Planning and Assessment Act 1979 the former Minister directed an Inquiry be held into the Heritage Estate, Jervis Bay and appointed me to conduct the Inquiry.

The first session of the Inquiry was held from 31 May to 3 June 1999 including an inspection of the site and locality in the company of interested parties on 1 June. The second Inquiry session was held on 30 June and comments on new material received up to 15 July 1999. Submissions to the Inquiry were made by 45 parties, 11 of whom appeared.

My report canvasses the issues arising from the terms of reference. The two major issues which are fundamental in assessing the potential of the land for residential development are the ecological values of the site and maintenance of the water quality of run-off from the site. The Heritage Estate land should also be appropriately considered by Council during preparation of the Jervis Bay Settlement Strategy, subject to the findings and recommendations of this report.

If the Heritage Estate land is included in the Jervis Bay Settlement Strategy the evidence supports limited development of the land generally according to Option 4 as a maximum development option. Option 4 provides for the development of 730 lots from a total of 1,232 lots. Option 4 also has the support of Government Agencies as it maintains and protects the important ecological values of the site. However, it may be subject to amendment following further studies required to ensure the quality of surface water run-off and sedgeland drainage does not increase pollutant levels leaving the site.

KEVIN CLELAND
Deputy Chairman

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Cover Photograph: A view through the Heritage Estate east of The Wool Road

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ABBREVIATIONS

Council	Shoalhaven City Council
DLG	Department of Local Government
DLWC	Department of Land and Water Conservation
DUAP	Department of Urban Affairs and Planning
EPA	Environment Protection Authority
NPWS	National Parks and Wildlife Service
Alliance	Jervis Bay Regional Alliance Inc.
SLA	Shoalhaven Landowners' Association
EP&A Act	Environmental Planning and Assessment Act 1979
DCP	Development Control Plan
LEP	Local Environmental Plan
LES	Local Environmental Study
REP	Regional Environmental Plan
ha	hectare
m	metre
Patterson Britton Report	Report by Patterson Britton and Partners Pty Limited (April 1998) titled *Heritage Estates, Jervis Bay: Total Water Cycle Management, Land Capability and Infrastructure Study.*

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EXECUTIVE SUMMARY

The Heritage Estate is located 30km south of Nowra near Erowal Bay. The Estate was created in 1915 and 1,232 lots are registered but do not have dwelling entitlements. There are also 3 reserves. It was largely marketed and sold to over 1,100 individual landowners in the late 1980s. These 'estates' are often referred to as 'paper subdivisions' but the Inquiry was not an Inquiry into paper subdivisions generally.
The Minister directed the Inquiry specifically to:

(a) determine the suitability for, and scale and density of, residential development on the land;
(b) examine the environmental issues raised by, and the feasibility of providing the necessary infrastructure to support, any residential development; and
(c) consider the seven options identified in the report by Patterson Britton and Partners Pty Ltd of April, 1998 titled "Heritage Estates, Jervis Bay - Total Water Cycle Management, Land Capability and Infrastructure Study" as well as any other options that might meet the appropriate environmental and development objectives for the land.

Before I address the issues raised by the terms of reference it is necessary to clearly set out the basic context of my consideration of the potential for development, including no development, of the land in the Heritage Estate. In addressing the context and canvassing the issues relevant to the terms of reference I have had regard to all submissions tendered to the Inquiry.

The land is zoned Rural 1(a) and Rural 1(b) under the provisions of Shoalhaven Local Environmental Plan (LEP) 1985. The erection of dwelling houses on individual allotments less than 40 hectares is not permissible under the relevant provisions of Shoalhaven LEP. These facts were clearly spelt out by Council at the times the land was being marketed and purchased. The land was advertised as "no dwellings allowed". Landowners who bought Heritage Estate land following the necessary enquiry prudent before such commitment would have been in no doubt as to the development status of the land.

The land was not included in the Jervis Bay Regional Environmental Plan (REP) 1996 as land having opportunities for urban development despite its known subdivision and ownership status at the time the REP was made. Nor is it included in a Settlement Strategy. Nevertheless, the planning legislation allows for the land to be considered for uses other than for which it is planned or zoned if there is "good argument" for that to occur. As submitted by Council it is a case by case evaluation process for these 'estates'. In the present case I accept the advocacy of the Government Agencies that if any development is to occur on the land it should not pre-date the Jervis Bay Settlement Strategy being prepared by Council.

The land should be assessed within this strategic planning framework and I support the Heritage Estate land being appropriately considered by Council in developing the Settlement Strategy subject to the findings and recommendations of this report. Nevertheless, such consideration does not ensure the Heritage Estate land will be included in the Settlement Strategy, preparation of which is a separate process to this Inquiry.

I recognise that the landowners' social and economic situation has formed part of the argument for development of this particular land. However, a more basic planning requirement must take precedence over the landowners' social and economic situation in the circumstances. On the evidence provided to the Inquiry this more basic planning requirement is a thorough assessment of the fundamental attributes of the land and its development capabilities in a locational context. These fundamental attributes are the land's wildlife habitat/corridor values and its existing water quality, particularly run-off water quality. They must be maintained in the first instance to ensure there is consistency with local and regional land use planning objectives and no significant adverse impacts

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on important environmental values. There should be no expectation on the part of the landowners that any significant ecological values or the water environment downstream of the Heritage Estate land would be compromised in the interests of development.

The evidence to the Inquiry clearly indicates that the ecological and water quality values of the site, even though it is partly degraded, are the pre-eminent values. Intrinsic ecological values are largely due to the presence of a number of threatened species and the likelihood more would use the site. The Government Agencies consider that while the intrinsic habitat values of the site are important its predominant value is its value as a wildlife corridor. The areas along the Worrowing Waterway and across the southeastern section of the site, the latter of which is considered to be of critical importance to the long-term biodiversity of the Bherwerre Peninsula, were strongly recommended for protection. Jervis Bay Regional Alliance also strongly argued that the site has intrinsic and wildlife corridor values. Shoalhaven Landowners' Association contended there was insufficient evidence to support the position of Government Agencies, Jervis Bay Regional Alliance and other parties. It sought further justification. Notwithstanding the desirability of further information I am not persuaded it is necessary given the relevant ecological studies and reports available to the Inquiry.

I find a precautionary approach is essential given the protected lands in the locality and region which are home to an extensive range of native species. The long-term survival of these lands as important habitat for threatened and protected species must be assured. Wildlife corridors need to be set aside to protect biodiversity on these lands. Option 4 would provide reasonable surety in this regard and I find it is the maximum development option which should be implemented. Even so, further restrictions may need to be applied following additional investigation of water quality aspects.

The site drains to Worrowing Waterway then to Erowal Bay, a small embayment of St Georges Basin which is an important water body requiring protection of its water quality. Inadequate monitoring data for the quality of water run-off from the site is currently available. Consequently, it is not possible to determine with sufficient certainty the water pollution controls necessary to ensure the agreed water quality goal of "no net increase in key pollutants" leaving the site following development is met. A comprehensive monitoring program conducted to the requirements of the EPA is required. Only then can the feasibility of providing water pollution control ponds and water sensitive urban design be fully assessed. It is necessary for this to occur before any rezoning is contemplated. Moreover, there is uncertainty as to the level of efficiency likely to be achieved by the proposed water pollution control strategy given the results from operating systems elsewhere. I find a staged approach to development must apply given the importance and the need to protect downstream water bodies. A suitable first stage is Stage 1 indicated in Figure 7.6 of the Patterson Britton Report adjusted to comply with the development restrictions imposed by adopting Option 4. This would allow initial development of about 135 lots. Further development beyond Stage 1 should be dependent on the assessment of monitoring results from Stage 1.

If areas of the site are developed for residential use by stages in accordance with Option 4 the broader planning aspects including the provision of community facilities and services will not be unduly stressed. Section 94 contributions will be payable to assist Council in providing the necessary additional facilities and services. Other community concerns, for example, public transport, may improve if additional residents move to the area. Moreover, landowners moving to the area will do so in full knowledge of the locality's social issues including high unemployment rates and distance to services. The area's charm is due to its geographical setting, its lower population density, its village atmosphere, and its relative remoteness from larger urban/commercial centres. As the evidence indicates the Jervis Bay/St Georges Basin locality is also a developing area to which Council is committing significant monies to improve facilities and services. I do not accept that the stated deficiencies in community facilities and services are such as to warrant refusal of all development on the site, particularly if development is staged. Furthermore, any development on the Heritage Estate land would be part of planned regional development through the Settlement Strategy.

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There is no supportable argument that the physical provision of infrastructure to the Heritage Estate land including water supply, sewerage, power, telephone, roads and drainage cannot be undertaken to satisfy environmental considerations using well proven construction methods. Economic/financial feasibility is another matter but it cannot be taken further at this stage with any finality. A firm development proposal is required before financial feasibility could be reasonably considered by Council and the landowners. However, the cost of developing the land should be wholly borne by the landowners who obtain development rights. Compensation for those landowners who do not obtain development rights is a matter for the landowners themselves to resolve.
Council will also need to carefully consider its exposure to financial risk if it is to 'manage' the funding for development of the Heritage Estate land. Council is of the view that the provision of urban services to the Heritage Estate lands is only viable if a threshold of development can be achieved. Its minimum stance position is stated as Option 5 although I note that residential development of smaller subdivisions (less than 100 lots) is occurring in Council's area. Staged development of the Heritage Estate lands would contain Council's financial exposure.

My findings and recommendations relating to the Terms of Reference are included in the report. I am satisfied that staged development to accord generally with Option 4 provides an appropriate level of residential development while protecting the important ecological and downstream water environment values of the Heritage Estate land. On the balance of evidence there are no environmental or feasibility issues which require that no residential development occur on the site. However, before Council could proceed with residential development of the Heritage Estate land, the land would need to be included in a current Settlement Strategy. I support Council's appropriate consideration of the Heritage Estate land for residential development when Council is preparing the Jervis Bay Settlement Strategy, subject to the findings and recommendations in this report.

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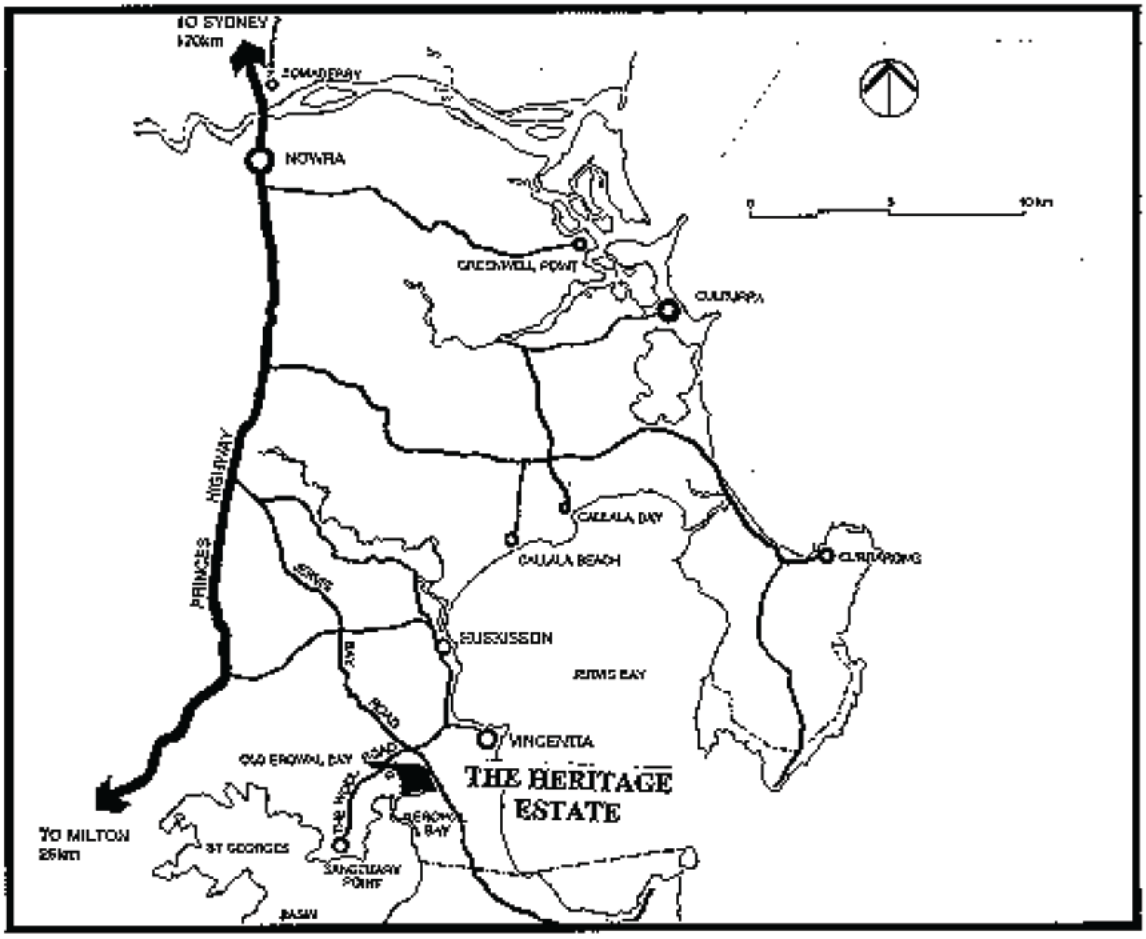
BACKGROUND TO THE HERITAGE ESTATE INQUIRY

The Heritage Estate (Figures 1 and 2) is one of the many paper subdivisions created in NSW before planning controls were introduced. It epitomises the challenges of developing and managing paper subdivisions in NSW and other States. Over the last ten years there has been a concerted effort by the landowners to have their land rezoned for residential development. Over the same period, Shoalhaven City Council has on several occasions unsuccessfully sought to prepare and exhibit draft local environmental plans to enable the majority of the Estate to be developed for residential purposes.

A number of strategic planning and environmental management studies and reports have been prepared about the suitability, need, timing and infrastructure provision for the Estate. These studies and reports include:

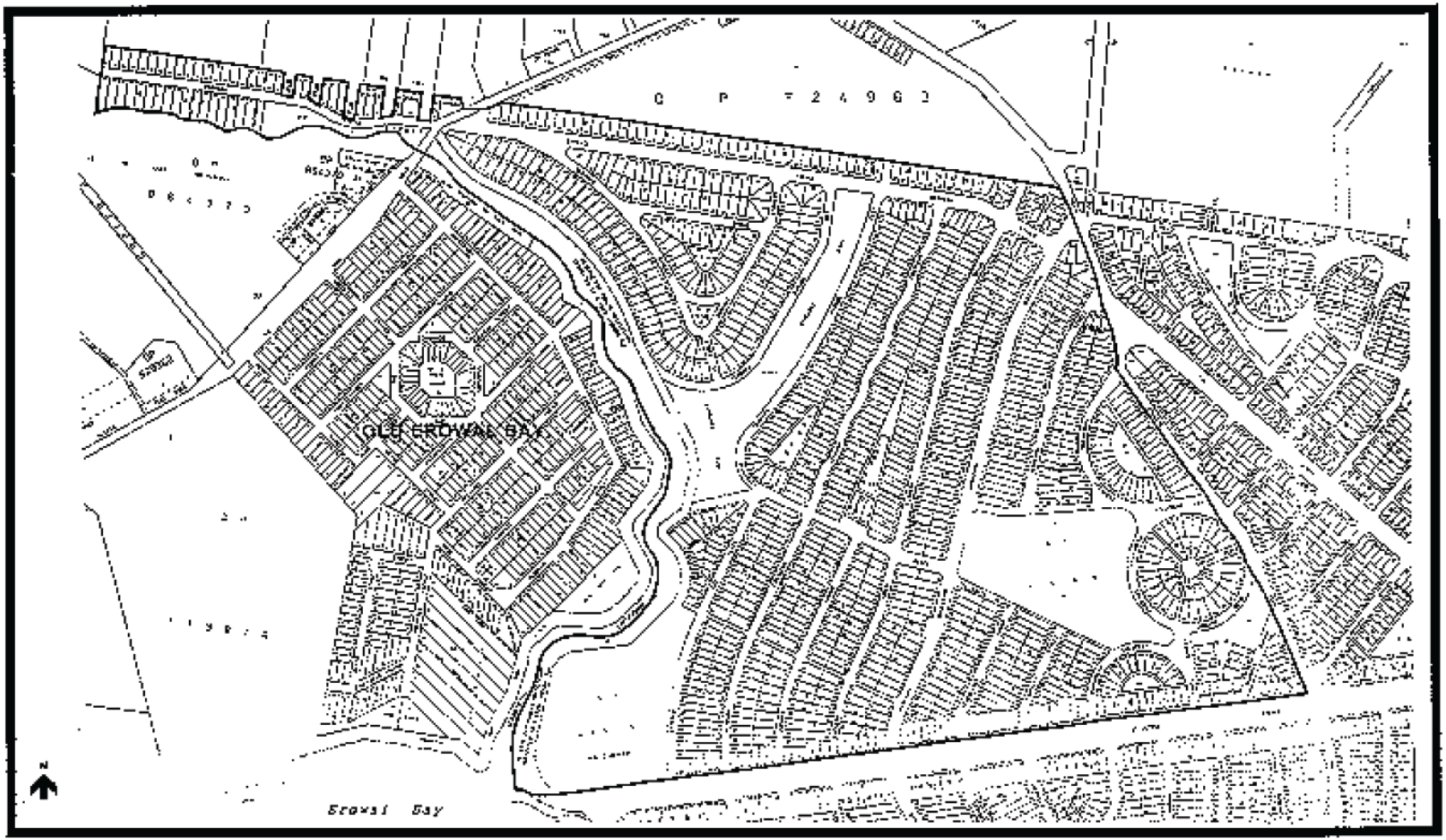
- Local Environmental Study and supplementary flora and fauna report prepared in 1994;
- Strategic flora and fauna study prepared in 1995;
- Patterson Britton Report dated April 1998; and
- Report by a Government/Landowner Taskforce prepared in mid 1998 (Appendix 6).

Figure 1: Locality Map



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Figure 2: The Heritage Estate



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No agreement was reached between the Government Agencies, Council and the landowners on the Taskforce as to the most appropriate development scenario for the land. A "no development" option was excluded from the considerations of the Taskforce.

LOCALITY AND SITE

The Heritage Estate is located within the local government area of Shoalhaven City Council (Figures 1 and 2). The main townships in the vicinity of the Heritage Estate are from the south, St Georges Basin, Sanctuary Point, Old Erowal Bay, Erowal Bay, and Vincentia. There are also other small communities nearby. Heritage Estate is bounded by the Worrowing Waterway, land fronting Birriga Avenue both west and east of The Wool Road, Jervis Bay Road and Erowal Bay Road. Jervis Bay National Park is to the east of Jervis Bay Road and to the south of Erowal Bay Road. Rural zoned land abuts the site to the north.

The Heritage Estate was created in the early years of this century and registered in paper form in 1915. The land is comprised of 1,232 residential allotments and 3 reserves totalling 166 hectares. There are over 1,100 individual owners. The site is approximately 28 kilometres south of Nowra immediately to the north of Erowal Bay which is a small embayment of St Georges Basin.

The land is currently zoned Rural 1(a) and Rural 1(b) under the provisions of the Shoalhaven Local Environmental Plan (LEP) 1985. The erection of dwelling houses on individual allotments less than 40 hectares is not permissible under the relevant provisions of the LEP.

TERMS OF REFERENCE AND OPTIONS

The then Minister for Urban Affairs and Planning directed that an Inquiry be held into the Heritage Estate at Jervis Bay as described in the attached map (Figure 2) in January 1999. Specifically the Inquiry was directed to:

a) determine the suitability for, and scale and density of, residential development on the land;

b) examine the environmental issues raised by, and the feasibility of providing the necessary infrastructure to support, any residential development; and

c) consider the seven options identified in the report by Patterson Britton and Partners Pty Ltd. of April 1998 titled "Heritage Estates, Jervis Bay - Total Water Cycle Management, Land Capability and Infrastructure Study" as well as any other options that might meet the appropriate environmental and development objectives for the land.

The seven options identified in the Patterson Britton Report are:

Option 1 Maximum possible development within the physical constraints of the site confined by the recommended ecologically significant areas but no water pollution controls and yielding 937 lots;

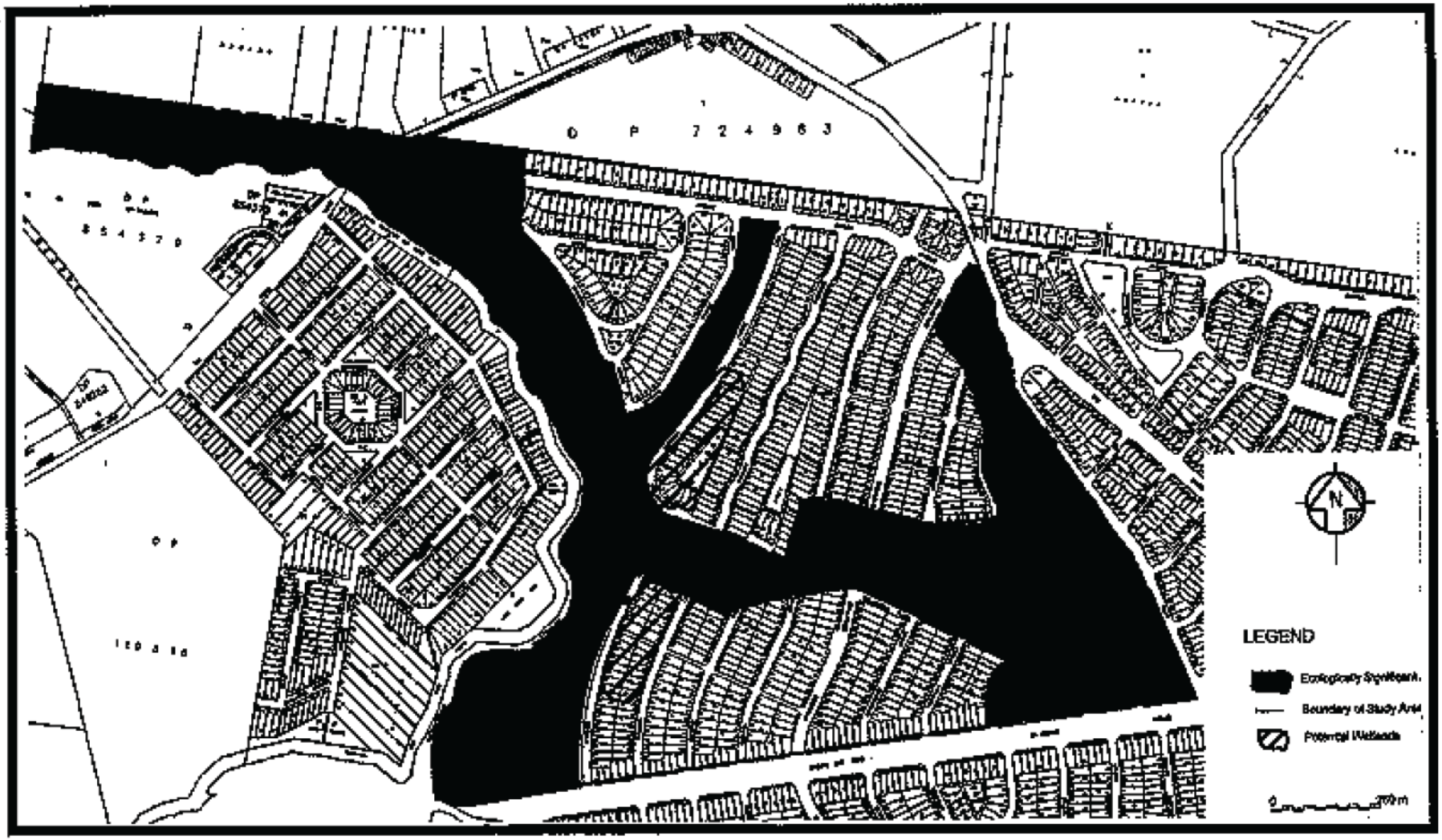
Option 2 Refinement of Option 1 including wetlands to reduce the average pollutant export back to existing levels and yielding 876 lots;

Option 3 Refinement of Option 2 with relevant water sensitive urban design techniques incorporated into the development and yielding 844 lots;

Option 4 Development option based on the reserve/corridor design proposed by the National Parks and Wildlife Service and yielding 730 lots (see Figure 3);

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Figure 3: Development Option 4



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Option 5 Development option based on the ecologically significant areas proposed by Allen, Price & Associates, on behalf of the existing landowners and yielding 995 lots;

Option 6 Similar to development Option 2, except that areas with potential drainage problems have been excluded from the development and yielding 670 lots;

Option 7 Similar to development Option 4, except that areas with potential drainage problems have been excluded from development and yielding 510 lots.

Three other options were also canvassed at the Inquiry:

Option 8 Similar to Option 5 but with modified allowances for drainage areas and water pollution control ponds yielding 1,060 lots (see Figure 4);

Option 9 Derived from Option 5 with modified allowances for drainage and water pollution control ponds following further assessment yielding 1,140 lots;

Option 10 No development yielding nil lots.

The options for which additional information was provided to the Inquiry were Options 4, 5, 8, 9 and 10. Option 8 was proposed by Council, Option 9 by Shoalhaven Landowners' Association and Option 10 by Jervis Bay Regional Alliance together with some community groups and residents. Option 5 is the stated minimum stance position of Council and the Shoalhaven Landowners' Association.

COMMISSION OF INQUIRY

Following receipt of the Minister's Direction and the Instrument of Appointment (Appendices 1 and 2) the Inquiry was publicly advertised in The Sydney Morning Herald, Wollongong Illawarra Mercury and Nowra Shoalhaven News Chronicle on 4 March 1999, and in the Government Gazette on 5 March 1999.

Background documents were exhibited from 8 March 1999 at Shoalhaven City Council, Sanctuary Point Library and the Commissioners of Inquiry Office. Submissions to the Inquiry were due on 3 May and exhibited at the above locations from 17 May 1999.

Submissions were received from 47 parties (Appendix 3). A brief summary of these is provided in the "Summary of Submissions" section of this report.

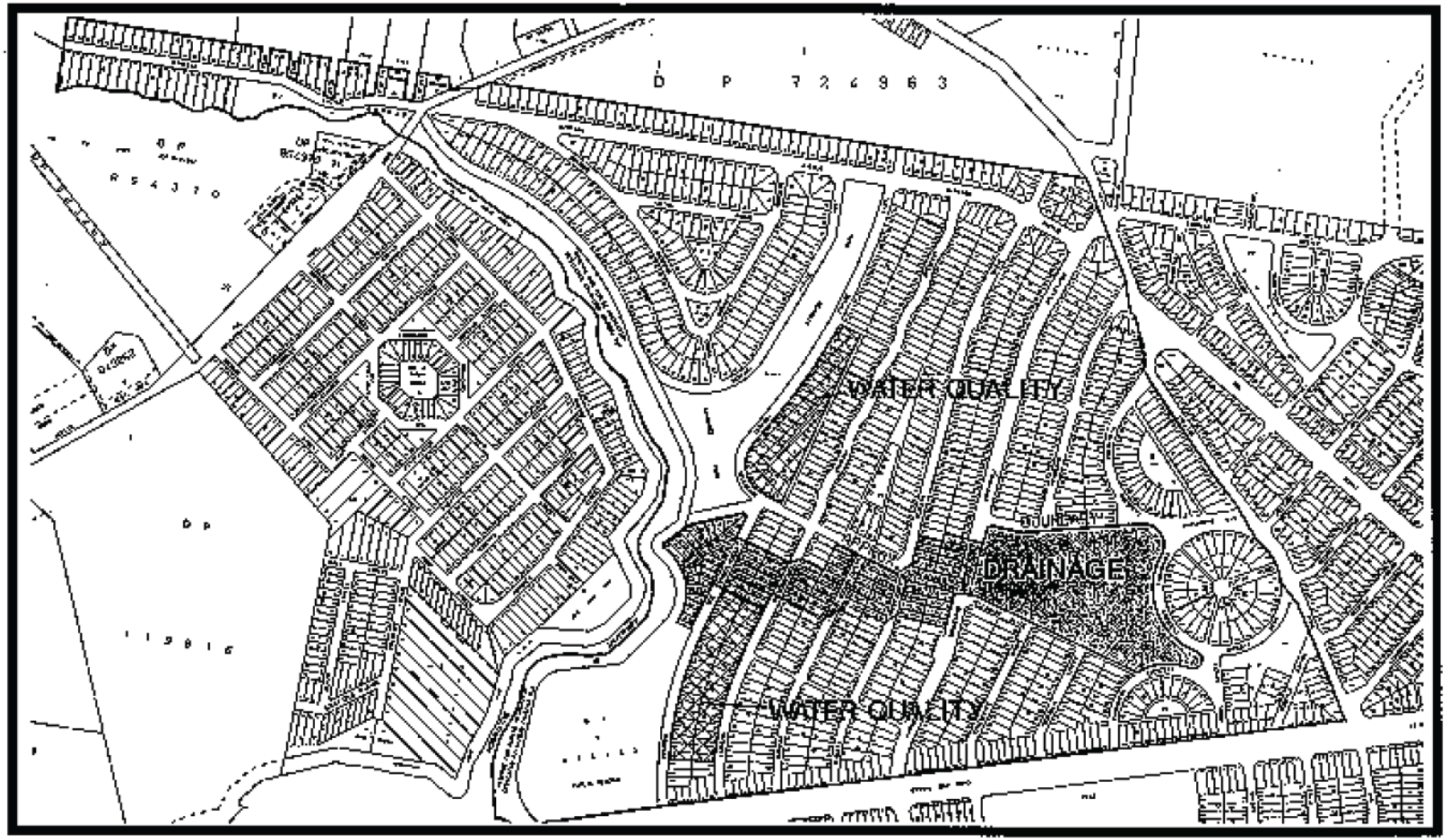
The primary submission session of the Inquiry was held at Shoalhaven City Council Chambers from 31 May to 3 June 1999. Eleven parties made appearances at the Inquiry. A site inspection was held in the company of interested parties on 1 June. I also undertook two further inspections of the site and surrounding areas on my own. The second session of the Inquiry was held on 30 June and comments on new material received up to 15 July 1999.

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Figure 4: Development Option 8



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SUMMARY OF SUBMISSIONS

Submissions were received from 47 parties including assessments by Shoalhaven City Council, combined NSW Government Agencies (DLWC, DLG, DUAP, EPA and NPWS), Shoalhaven Landowners' Association and Jervis Bay Regional Alliance Inc. Other submissions detailed planning issues relating to 'paper subdivisions', the plight of the landowners, local social 'problems', and concerns for preservation of the environmental attributes of the land. A brief summary of all submissions follows.

Shoalhaven City Council
Council's submission included a history of the Heritage Estate, an assessment of its ecological values and consideration of urban settlement strategies, services and financial issues.

Council submits that provision of urban services to the Estate is only viable if a threshold of development can be achieved. Since neither State Government nor Shoalhaven City Council are in a position to purchase lots from owners which may be required to preserve the site's ecological values, Council believes the only financially viable option is maximum development. Council's preferred position now is development of 1,060 of the 1,232 lots with the remaining lots used for water quality control. If this option is unacceptable to the Department of Urban Affairs and Planning, Council indicates that Option 5 for development of 995 lots is its minimal stance position.

Council concludes that economic practicality is very much the determining factor as to whether part of the Estate is developed or whether it remains with ongoing potential for degradation.

NSW Government Agencies
The Department of Urban Affairs and Planning, National Parks and Wildlife Service, Environment Protection Authority, Department of Land and Water Conservation, and Department of Local Government made a joint submission to the Inquiry. Their submission included a history of the site; consideration of relevant planning controls; financing development of the Estate; and consideration of environmental constraints such as nature conservation, aboriginal artefacts, water and air quality, access, transport and waste disposal. It also discussed some of the broader implications Heritage Estate may have for all paper subdivisions in NSW.

The Government Agencies concluded that uncertainty about the effectiveness of environmental management and the provision of infrastructure strengthen the argument against rezoning and development of the Estate in the short term. Any decision on the future of the Estate should await the finalisation of the Jervis Bay Settlement Strategy. Issues that Government Agencies consider still need to be resolved are whether adequate water quality controls can be developed to meet environmental objectives for St Georges Basin, the affordability of infrastructure development and the fact that development of the site would not comply with present State, regional or local policy planning frameworks. The position of the Government Agencies is:

- Any decision to change landuse controls for paper subdivisions must form part of the regional and/or local strategic planning policy framework identifying need, timing and suitability;
- By virtue of their general locations and designs, not all lots in subdivisions will be capable or suitable for development and so proposals for landuse change must be accompanied by detailed environmental studies;
- Appropriate infrastructure must be provided at minimal cost to the community; and
- In cases of fragmented holdings, any compensation for land unsuitable or incapable of development must be the responsibility of the constituent landowners.

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The Government Agencies prefer Option 4 in the Patterson Britton Report as a maximum if development was to be recommended. This option represents a compromise position and involves the development of about 730 lots with the rest set aside for environmental protection and infrastructure.

Australian Conservation Foundation (Shoalhaven Branch) is concerned should the outcome be full development of the land, asks at what 'price' development would occur, refers to the context of the Patterson Britton Report and the Heritage Estate Taskforce (1996 to 1998), and concludes that "the due process of planning has been sabotaged at a number of stages". In regard to the latter point the Foundation contends need has not been established, landowners' wishes have taken pre-eminence, the public has been excluded, there has been little objective assessment of the land by Council, the Task Force's role was slanted towards development, the Patterson Britton report has limitations, Council should not take financial responsibility, the zoning needs to be reconsidered in any case, and the land should eventually be publicly acquired.

Booderee National Park is located in the Jervis Bay Territory. The Commonwealth Government and the Wreck Bay Aboriginal Community Council are committed to the conservation and protection of the park which is a population reservoir for native species. They strongly argue that it is important for reservoirs in the region to be linked by a system of habitat corridors to maintain species diversity and genetic viability as increased gaps and fragmentation of corridors will adversely affect Booderee National Park. The background water quality used in the Patterson Britton Report for design of water quality control ponds is also questioned having regard to background water quality for streams in Booderee National Park.

The Bay and Basin Community Resources Inc. is the sole provider of community services in the area. The Group detailed the existing community infrastructure and the needs of the local community pointing out that demographic changes in the region (it was traditionally a retirement and holiday area) are exerting significant pressures on social infrastructure. It considers unemployment, low household incomes and hidden homelessness are significant issues. Furthermore, residents need additional community facilities including more medical services, better public transport, additional police, better access to shopping and recreational facilities, and improved education establishments and services. A large development at the Heritage Estate would further stress social and community services and infrastructure.

Coast and Wetlands Society Inc. views premature subdivisions as a serious environmental and planning problem contending that the Heritage Estate raises significant general issues of wider applicability. Development of the land must not adversely impact on the conservation and heritage significance of the region and if development were to occur further studies will be required. The Society does not accept economic and social factors outweigh ecological and other concerns. In its view the Heritage Estate is not suitable for development given the land's conservation significance.

Helensburgh Land Pooling Inc. is an association whose members own land similarly affected to that of the Heritage Estate. The Association's submission supports the Heritage Estate landowners, addresses and analyses the problem caused by paper subdivisions, and suggests two methods by which the land could be developed for residential purposes, namely "Land Pooling" and "Agreed Debt Repayment to Council".

Hyams Beach Villagers Association objects to any development of the Heritage Estate as it believes development would be contrary to local, regional and State environmental planning requirements; negatively affect community confidence in government's commitment to environmental planning objectives; would over-stress infrastructure; increase unemployment; reduce property values;

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adversely affect tourism and the aesthetic qualities of the locality; pollute watercourses; and remove necessary wildlife corridors and significant fauna habitat.

The Jervis Bay Regional Alliance Inc. is a community group whose goal is to ensure that the region survives in the long-term as a wonderful place for people to live, visit and work. Their position is that Scenario 0 of the Patterson Britton report (no development) ought to be adopted and the land rezoned 7(f1)(Environmental Protection F1 (Coastal)) Zone in the Shoalhaven Local Environmental Plan 1985. The Alliance argues that:

- Development of the Heritage Estate would bring the whole planning system into disrepute and promote anarchy in the property industry. The land is unsuitable for release for residential development because it was expressly excluded from development by the Jervis Bay Regional Plan 1996; includes land identified as having the potential to provide an important regional resource for wildlife within a habitat corridor system; and neither a catchment management plan nor an overall settlement strategy for the region have been prepared.
- The environmental impact on flora and fauna and the potential for sedimentation and pollution are such that the land ought not to be developed. It makes a mockery of Government policies to protect water quality and the coastal bushland environment and to promote sustainable development and urban consolidation, if they are not rationally and responsibly considered when determining re-zonings.

Shoalhaven Landowners' Association represents about 1,000 people who own land in the Heritage Estate. The Association's submission detailed a history of the land and initially stated its support for Option 8 with Option 5 as its "minimal stance position" provided compensation for land not developed was paid by the State. It questions the basis of Option 4 which it considers too restrictive and based on doubtful arguments relating to wildlife corridors. Moreover, Option 4 has a "potential terminal effect on the likelihood of a resolution being obtained". A recent review has resulted in Option 9 now being the Association's preferred option.

The Association is critical of the conclusions drawn in earlier consultants' reports relating to the significance of flora and fauna on the land, indicates that satisfactory water quality can be obtained for run-off from the Heritage Estate by constructing water pollution control ponds, considers the Heritage Estate will replace potential residential land now included in Jervis Bay National Park, reassesses development costs, and comments on the planning, social and economic contexts.

Social Economic Environmental Group considers the Heritage Estate should be placed in the overall context of the area's development and be zoned residential. The Group poses 8 questions relating to local residents', Council's and government agencies' rights and roles in land use planning.

South Coast Conservation Society Co-operative Limited believes development of the Heritage Estate would be a "devastating blow" to national planning and to the regional environment. It would destroy much natural vegetation which is habitat for threatened species, prevent a proper wildlife corridor, pollute watercourses, reduce public confidence in planning as the development conflicts with the Regional Plan, and show government's failure to protect the environment.

Total Environment Centre and National Parks Association oppose development of the Heritage Estate due to the potential to "destroy the natural and recreational values of Jervis Bay". Development impacts would include water pollution of Erowal Bay and St Georges Basin; destruction of bushland and vital fauna habitat; increased litter, vandalism, weeds and feral animals; and adverse impacts on scenic quality. Development would also be counter to stated local and State planning objectives which seek to prevent adhoc urban sprawl, question the integrity of the planning system, encourage land speculation, and involve Council in a substantial financial venture.

Worrowing Progress Association supports Council's preferred option as it provides the maximum number of blocks having regard to drainage requirements as well as adequate concessions to ensure

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environmental integrity. Development of the Heritage Estate will provide work and the opportunity for better community services.

JM Adams does not believe Council is acting competently or objectively in the interest of all ratepayers in advocating development of the Heritage Estate. Ms Adams refers to the unsuitability of much of the land for development, the need for substantial financial resources for its development (as well as the attendant risk) and provides detail of the land dealings on the Heritage Estate. She is of the view the land should be purchased for inclusion in a national park.

EM Atkinson considers development of the Heritage Estate would not be good town planning, will disrupt the wildlife corridor, confirm public dissatisfaction with Council, confirm that State policies can be circumvented, and it is not a government responsibility for buyers' mistakes.

J Bange objects to development of the Heritage Estate as there will be potential for water pollution, it will add to suburban sprawl, the buyers were aware the land could not be built upon, and because of the risks for ratepayers questions whether Council should arrange finance for the development.

WR and BL Blackall state development of the land will destroy natural vegetation and fauna, prevent a proper wildlife corridor, and set a precedent for inappropriate development.

AB Blake objects to development of the Heritage Estate as it will adversely affect tourism and the local economy as well as damaging the ecological values of the land including corridor values. Dr Blake notes the land was purchased with the knowledge it could not be built upon and that approval for development could set a precedent for other similar lands.

R Bosdyk objects to development of the land as it will require Council to help finance development as well as risking destruction of the natural environment.

JE and AM Brown-Sare believe development of the Heritage Estate will cause water pollution, result in rate default, lower property values, destroy environmental and ecological values, reduce public confidence in planning procedures, set a precedent for inappropriate development, and adversely affect employment and tourism.

A Bunyan objects to development of the Heritage Estate but supports sensible development. He refers to the lack of services in the area, the high unemployment, that the current plan of villages separated by bush will be destroyed, and the amount of money Council needs to borrow to help finance the development.

M Dennaoui wants the land zoned residential so he is able to build on his land.

E Drew refers to the number of native animals he has seen on the Heritage Estate land.

M Duvollet opposes residential use of the land due to the money Council will need to borrow to finance development, that the land when bought did not allow building, and the negative environmental, ecological and aesthetic impacts residential development will cause.

L Erwin supports development of the Heritage Estate as it will allow building on her land and create many needed jobs.

J and M Forster do not want the existing unique local environment destroyed by development of the Heritage Estate. Development will affect water-courses and the many birds in the locality as well as bringing more people to an area which lacks services.

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D Gill supports residential zoning of the Heritage Estate because he has been paying rates, maintaining his block, and is willing to contribute to the provision of services.

JE Hatton (former MP for South Coast) detailed his involvement with addressing the issue of "early subdivision" and notes the problem remains unresolved. He provided extensive file copy of letters to and from Government Ministers, Council and landowners. Mr Hatton considers any recommendation by the Commission will have far-reaching consequences and concludes that "full and final responsibility for, and all consequences attached to purchase of land can only and must remain solely with the purchasers and vendors, according to law".

HR Hill considers the Heritage Estate should not be developed as it will pollute watercourses and Erowal Bay as well as destroying native vegetation, animals and birds.

M-A Hutton refers to development costs and the validity of habitat corridors across the land as well as commenting on the nature of "paper sub-divisions" and landowners' rights. Ms Hutton refutes claims the development of the Heritage Estate will increase other residents' rates, detailing the extent to which she has had to pay rates for her undeveloped land within the Heritage Estate. Ms Hutton considers that if land within the Heritage Estate is required for corridor purposes the owners should be compensated.

S and C Janevski propose the Heritage Estate should become residential.

R and L Keen strongly oppose the development of the Heritage Estate for environmental and economic reasons. Mr and Mrs Keen are concerned that Council will not protect important trees and vegetation communities, storm water controls are likely to be inadequate, Council will be forced to borrow money to pay for infrastructure to the detriment of other facilities, Council and other ratepayers will assume the financial risk and responsibility for a $30 million loan, there is no need to develop the land given the existing land bank, development of the land could have a negative social and economic impact on the area by affecting the natural environment and hence tourism, and construction will provide only a short term boost to employment. The Keens wish to see the special environmental attributes of the land and the area preserved for future generations.

R Lattari and E Marangoni pay rates on land they own in the Heritage Estate and consider they should be allowed to develop it in the future for residential use.

J Naumovski owns 3 portions of land within the Heritage Estate and states he would be subject to significant financial loss if he were to be denied the right to development his land unless adequately compensated. He questions the justification provided for the claimed conservation value of the land.

M Rand and J Hugentobler oppose further residential development in the area given the existing land surplus, lack of infrastructure, environmental concerns, and the potential to increase Council rates for other landowners.

G and R Mahon consider the land should not be developed as it is in a sensitive location and requires high expenditure to provide infrastructure. Furthermore, the land borders Booderee and Jervis Bay National Parks and contains valuable flora and fauna, it drains to St Georges Basin and is likely to pollute these waters if developed, and the cost to fund infrastructure will be more than the value of serviced land.

Mr C Martin seeks to broaden the Inquiry from a 'local' focus through to encompassing global issues. He considers ideas are the hope of the future. Specifically, Mr Martin is concerned that development of the Heritage Estate is at variance with the overall aims of Government, development should be managed within nature's resilience, flushing within St Georges Basin is limited,

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development of the Heritage Estate would upset the delicate environmental balance of the Basin as water pollution will increase, and native vegetation will be cleared.

V Merkuloff refers to delays in rezoning and developing the Heritage Estate that are increasing costs to landowners and to the interference by some to stop development. Mr Merkuloff argues that development of the Heritage Estate would provide investment opportunities and assist in generating a healthy environment and vibrant economy in the area.

S Minglis through Minter Ellison argues that a level of residential development on the Heritage Estate is supported by studies of the environmental and development potential of the land. Land owned by Ms Minglis is capable of development under Options 1 to 5 inclusive in the Patterson Britton Report and should not be precluded from development having due regard to the findings and recommendations of that report.

JG Morgan does not object to an acceptable level of development on the site but opposes Council borrowing money to fund infrastructure as that will adversely affect all ratepayers.

DT Phelps referred to past actions relating to the Heritage Estate. He considers the land should not be rezoned as it has environmental qualities and is proximate to two National Parks, there is plenty of zoned land available, run-off water quality will be difficult to control, development would prevent a proper wildlife corridor across the land, a precedent would be set for other areas, it would be contrary to sound planning principles, and would give support to land speculators.

D Reynolds contends the future of the region is threatened by poor planning and inappropriate development and also refers to youth unemployment and the minimal provision of community services in the area. As issues of concern Mr Reynolds raises the cost and methods for financing development of the Heritage Estate, the social costs of further urban development, setting a precedent for other paper subdivisions, the effect on potential new businesses, the effect on tourism, and the damaging environmental impacts. He concludes there is no justification for the development of the Heritage Estate.

C Rigg is concerned development of the Heritage Estate would raise unemployment, reduce property values, set a dangerous precedent, penalise other ratepayers, and support land speculators.

M Sari wants to be able to build on his land.

K Sheen considers development of the Heritage Estate would affect the area's quiet lifestyle which he does not want to change. Mr Sheen questions the ability of community facilities to cope without upgrading, the cost to ratepayers of any necessary upgrading, and the effect development would have on wildlife corridors.

H Woolley objects to development of the Heritage Estate as the land was sold as rural land, it is not suitable for residential use, and Council should not bow to pressure to rezone the land.

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STRATEGIC PLANNING CONSIDERATIONS

The Heritage Estate land is one of the many paper subdivisions created in NSW before planning controls were introduced. Over the past 10 years the Heritage Estate landowners have been seeking to have their land rezoned for residential development. Council supports a level of residential development on the land because of the social and economic factors. The Government Agencies position is that State, regional and local policy frameworks suggest that there are no strategic planning benefits from rezoning and developing the land in the short term. Jervis Bay Regional Alliance and others opposed to residential development on the Heritage Estate land want strict application of existing planning strategies and controls to prevent any residential development of the land at all.

Past studies and reports have demonstrated that parts of the Heritage Estate land have environmental values. These studies and reports have concluded that the most appropriate method of conserving these values is by precluding certain areas of the land from development. Landowners generally do not accept the Heritage Estate land has the level of environmental value claimed by the Government Agencies and those parties opposed to its development. The landowners argue for a high level of residential development.

The Government Agencies consider the Heritage Estate epitomises the challenges facing government, landowners and the community in developing a long-term solution to the land use planning, development and management of paper subdivisions.

This Commission of Inquiry has been set specific terms of reference (Appendix 1). But the Inquiry must also have regard to the planning context. Any proposal to develop the Heritage Estate land must be consistent with the aims and objectives of the Environmental Planning and Assessment Act 1979 (EP&A Act). Apart from the overarching requirements of the EP&A Act and the Local Government Amendment (Ecologically Sustainable Development) Act 1997 there are regional and local policy and planning frameworks. The two more specific regional policy and planning frameworks are the NSW Coastal Policy 1997 and the Jervis Bay Regional Environmental Plan 1996.

Environmental Planning and Assessment Act 1979

The objects of the Act are:

a) To encourage –
   i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment.
   ii) the promotion and co-ordination of orderly and economic use and development of land;
   iii) the protection, provision and co-ordination of communication and utility services;
   iv) the provision of land for public purposes;
   v) the provision and co-ordination of community services and facilities; and
   vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities and their habitats; and
   vii) ecologically sustainable development, and

b) To promote the sharing of the responsibility for environmental planning between the different levels of government in the State; and

c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.

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NSW Coastal Policy 1997

This Policy sets directions for coastal zone management, planning and conservation. It concerns itself with providing a balance between population growth, economic development and the natural cultural and heritage values. A central focus is the ecologically sustainable development of the NSW Coast.

A goal of the Policy is to provide for ecologically sustainable human settlement. A key strategic action is the requirement for local government to prepare land release/settlement strategies prior to major rezoning of rural land or to ensure that any such rezonings are consistent with an endorsed regional strategy. Council has commenced preparation of a Jervis Bay Settlement Strategy. The DUAP argues that any decision to rezone the Heritage Estate land ahead of completion of the Settlement Strategy for the Jervis Bay region being prepared by Council would be premature and inconsistent with the Coastal Policy.

Jervis Bay Regional Environmental Plan (REP)

The aims of the Jervis Bay REP are:

(a) To protect the natural and cultural values of Jervis Bay, and
(b) To allow proposals that contribute to the natural and cultural values of the area.

Jervis Bay REP identifies objectives and strategies for land uses in the Jervis Bay Region.

The REP does not identify the Heritage Estate as an area having opportunity for urban development under Clause 16. Also, when the REP was gazetted the Minister placed a moratorium on major land use changes in the region until Council had prepared and exhibited a draft settlement strategy. The moratorium was based on the premise that demand at the time indicated there was an adequate supply of urban land in the short to medium term and that any additional demand could be meet at least in the short term from the areas identified in the REP.

Clause 15 identifies parts of the Heritage Estate land as containing disturbed habitat and vegetation which has the potential with active management to continue to provide important regional resources for wildlife. The REP requires that any proposal on this land must be designed to maximise retention of native vegetation and rehabilitation of degraded areas.

Certain waterways within the Jervis Bay Region are identified in Clause 11 of the REP. Worrowing Creek is not identified in the plan but the EPA submits that the water quality of Worrowing Creek should be of a standard to meet protection of aquatic ecosystems. Clause 11 of the REP requires that a proposal must:

- Demonstrate how the water quality will be maintained or improved to sustain uses identified in the REP;
- Outline a water quality management strategy for surface water to demonstrate how water quality goals will be sustained or achieved;
- Rehabilitate and restore any degraded areas along waterbodies on the site;
- Provide sewerage for all new development. If alternate systems of sewage disposal have been approved by health and environment protection authorities, they may be provided; and
- Protect ecosystems and natural habitats, including waterbodies, from degradation.

Clause 12 refers to maintaining visual qualities and distinct urban communities, Clause 13 to cultural heritage, and Clause 14 to maintaining designated habitat corridors.

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Shoalhaven Local Environmental Plan (LEP)

The Heritage Estate land is currently zoned Rural 1(a) and Rural 1(b) under the provisions of the Shoalhaven Local Environmental Plan (LEP) 1985. The erection of dwelling houses on individual allotments less than 40 hectares is not permissible under relevant provisions of the LEP. The landowners seek the current Residential 2(a1) zoning to apply to their land.

Land within 100 metres of The Wool Road, Jervis Bay Road and Erowal Bay Road is in a Scenic Preservation Area which requires Council approval for development as well as for the clearing of vegetation or trees.

Draft Rural Plan

The draft Rural Plan amends and enhances the previously gazetted aims and objectives of Shoalhaven LEP. New objectives in the draft Rural Plan referred to by Jervis Bay Regional Alliance include:

n) To maintain the rural character of non-urban areas;
o) To ensure the protection of important natural and cultural environments;
p) To protect and enhance scenic and landscape qualities;
r) To ensure that the Council gives due regard to the direct and cumulative impact of development on the water quality of rivers and other water bodies;
s) To avoid, mitigate or remedy the adverse effect of development on the environment;
w) To minimise the clearing of native vegetation especially those community types which are poorly represented in conservation reserves.

Shoalhaven Beyond 1990 - Policies for Planning and Development

The relevant policy from this document is Policy No.2 which requires that new development:

(a) Conform with the "Main Centre Strategy";
(b) Must be extensions to existing towns and villages provided the character of settlement is maintained;
(c) Completely new settlements when population pressures and other circumstances warrant; and
(d) In either case decisions must be guided by the ability to provide public infrastructure in an economic manner, no impact upon sensitive natural environments, and fit within an overall social and communication structure for the city.

Commissioner's Comments

Evidence to the Inquiry from the Government Agencies and some other parties strongly advocated that whatever the outcome for the Heritage Estate land it must be consistent with strategic planning and policy frameworks at the State, regional and local level. Notwithstanding this advocacy for consistency a wide range of values and arguments were presented to the Inquiry as to the appropriate interpretation to be placed on the evidence in relation to relevant planning documents and their aims and objectives. An outcome clearly requires a weighing and balancing of the often conflicting interpretations of the evidence whilst ensuring overall consistency with the wide ranging aims and objectives of the State's planning system. This includes promotion of the principles of ecologically sustainable development.

The most direct reference in a planning instrument to development of future residential land in the region is in Clause 16 (Map A) of Jervis Bay REP. The Heritage Estate land is not included in Clause 16 of Jervis Bay REP as having opportunity for urban development. Nevertheless, as submitted by the Government Agencies the fact that the land is not included under Clause 16 does not prohibit consideration of the land for residential use provided there is good argument to support a change in land use. Planning arguments both strongly for and strongly against a change in land use were put to the Inquiry.

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A consistent approach to planning for future residential land requirements in the Jervis Bay region is essential. The Government Agencies conclude that rezoning and development of the Heritage Estate land "cannot be justified at least until the Jervis Bay Settlement Strategy is finalised". I concur with the Government Agencies that the Heritage Estate land could be considered by Council during preparation of the Jervis Bay Settlement Strategy having regard to the findings and recommendations of this Inquiry. As Council has already noted, normal supply and demand models will need to take into account the land being all individually owned together with likely take-up and occupancy rates given the holiday and retirement character of the area. The fact that the land is all individually owned and infrastructure will need to be paid for by the current landowners introduces a further social and economic consideration not usual for the normal land release scenarios. Some recognition by Council of these circumstances is warranted in its deliberations relating to the Settlement Strategy. However, I reiterate my earlier statement that regard must be given to the findings and recommendations of this Inquiry.

The Heritage Estate landowners do not currently have rights to develop their land for residential use. Moreover, the land has been previously assessed to have limited residential development potential due largely to its fauna, fauna habitat and wildlife corridor values. There may well be other restrictions as the following sections of this report indicate. Before any residential development on the Heritage Estate land could occur due regard must be given to the fundamental values of the land. It is only then that an appropriate level of development, which includes the possibility of no development, can be determined. The following sections of this report canvass the fundamental values of the land and relates them to the Inquiry's Terms of Reference.

Even if areas of the land are considered suitable for development, development could only occur following the provision of services. Although the physical construction and installation of services is feasible as I canvass under "Terms of Reference" the financial feasibility remains to be resolved once a firm development proposal is adopted.

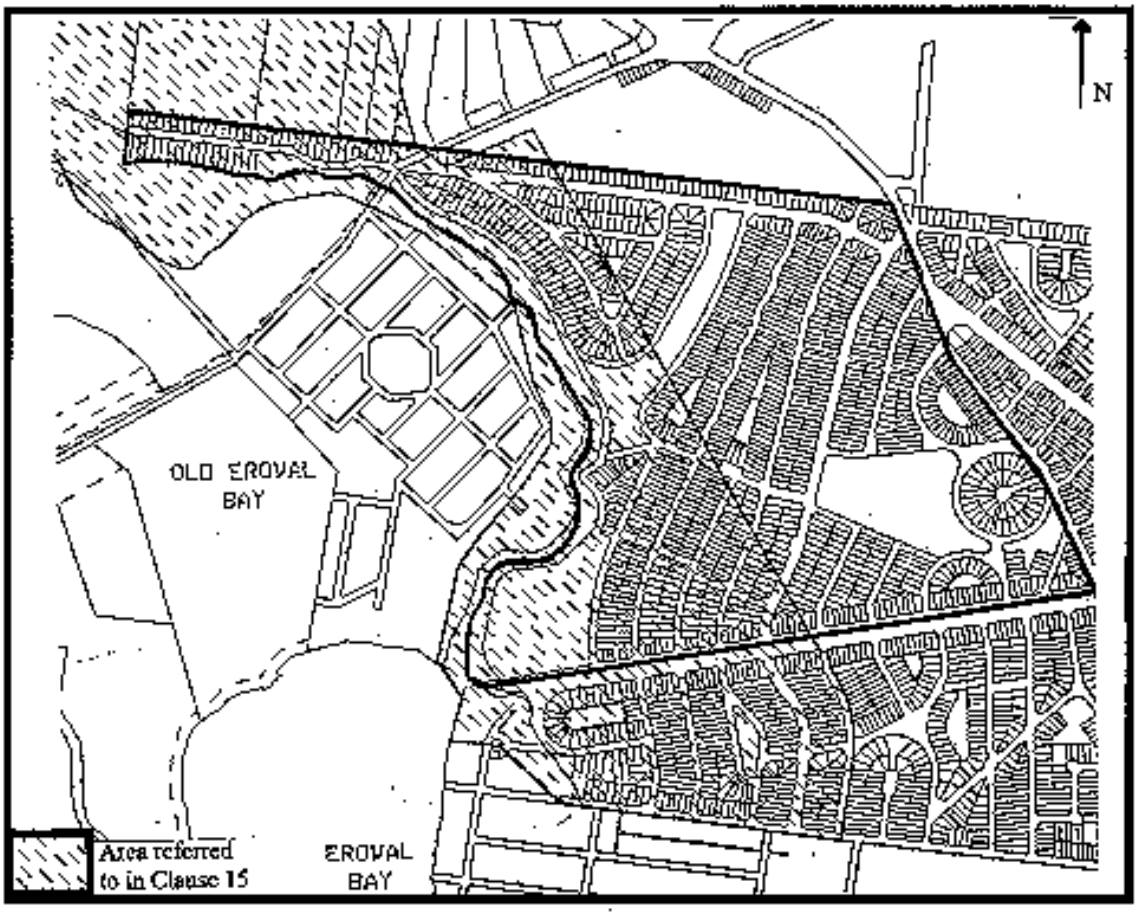
I find that preparation of a Draft Local Environmental Plan for the Heritage Estate land at the present time is premature and should only be considered by Council after its Jervis Bay Settlement Strategy is finalised. Moreover, while this Inquiry supports Council giving serious consideration to including the Heritage Estate land in the Settlement Strategy it cannot be assumed at this time that the land will definitely be included in the Settlement Strategy.

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FUNDAMENTAL ATTRIBUTES OF THE HERITAGE ESTATE LAND

The location and lot layout of the Heritage Estate land are shown in Figures 1 and 2. The cover photograph was taken from near The Wool Road looking southeast. The land is adjacent to Jervis Bay National Park along Jervis Bay Road and Erowal Bay Road. Heritage Estate land and adjacent lands subject to Clause 15 of Jervis Bay Regional Environmental Plan as disturbed habitat and vegetation are shown flecked on Figure 5. Previous fauna and flora studies conducted on the land for a Local Environmental Study in 1994 recorded the presence of threatened species and concluded the land has flora, fauna, and fauna habitat/wildlife corridor values.

Figure 5: Clause 15 Lands of The Heritage Estate



The Heritage Estate land must initially be assessed as to its development capability having due regard to its fundamental attributes in its locational context. This applies whatever level of development may eventually be contemplated, including no development, of the currently rural zoned land. What then are the fundamental attributes of the Heritage Estate land?

The evidence is clear in this regard. There are two fundamental attributes of the land. The first is the ecological value of the site in its own right and in relation to important conserved and vegetated lands in the area. The second is its location within the catchment of St Georges Basin and the maintenance of water quality, particularly in relation to the quality and quantity of run-off from the site. Parties to the Inquiry placed differing interpretations on the values to be given to these attributes.

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ECOLOGICAL VALUE OF THE SITE

Studies and assessments of the flora and fauna of the Heritage Estate have been conducted by Andrews Neil in 1993 for the Local Environmental Study and by AES in 1995. National Parks and Wildlife Service (NPWS) states these two major studies together provide sufficient information to determine the nature conservation values of the site, to assess the potential impacts of rezoning of the site for residential development, and to examine options for protecting significant nature conservation values.

These two studies indicate there are four main vegetation communities on the Heritage Estate. They are riparian forest along the Worrowing Waterway, open forest dominated by Blackbutt, Scribbly Gum woodland, and closed sedgelands (see Figure 6). The four communities are described in the Andrews Neil and AES studies. The structure and attributes of each community are given by Andrews Neil:

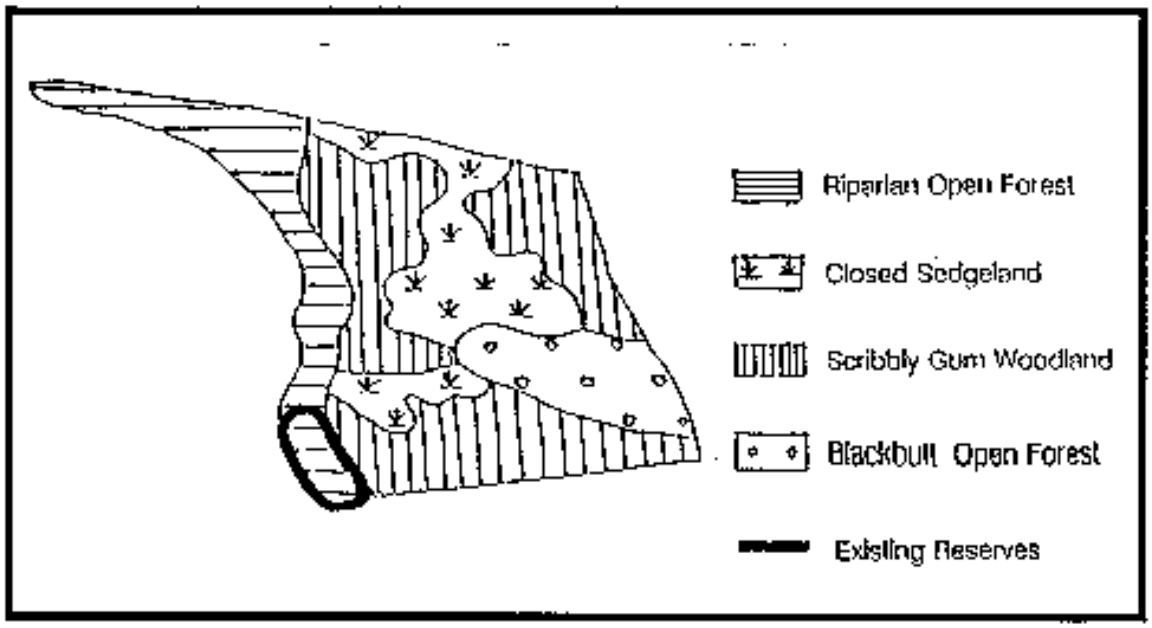
Riparian Open Forest: Dense to mid dense cover of vegetation occurring as a narrow band along-side tidal streams. Trees up to 30 metres high with old growth forms and crowns generally touching. A prominent dense low tree strata is present with vines, scramblers and climbers. A shrub and ground vegetation layer is generally sparse or absent and when present comprises grasses, ferns and occasional monocotyledons (grass trees).

Fallen logs are generally present. Yellow gravelly podsolic sandy clay soils occur alongside tidal streams.

Blackbutt Open Forest: Dense to mid dense cover of vegetation occurring along a freshwater stream. Trees up to 30 metres high with old growth forms and crowns generally touching. A prominent dense ground cover of ferns, grasses and other monocotyledons are present with a sparse shrub and lower tree strata.

Fallen logs and pockets of sedges occur, suitable for small mammal habitat. The soil is deep brown to white gravelly alluvial sands.

Figure 6: Vegetation Communities on the Heritage Estate



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Scribbly Bark Woodland: Sparse to mid dense cover of trees up to 20 metres high with crowns well separated. Understorey cover is variable ranging from moist to dry with a dense cover of lower trees, taller shrubs, shrubs, grasses, sedges and other monocotyledons.

Hollows prominent in young trees. Nectar producing flowering shrubs prominent with some ground litter and fallen log cover. Deep grey to yellow sands are underlain by a yellow clay. Gravelly intrusions are present. A lower impervious soil layer is present in some areas leading to saturated moist organic sands and peats.

Closed Sedgelands: Dense cover of reeds and sedges up to two metres high with occasional pockets of isolated shrubs. Occasional trees up to five metres high and other monocotyledons present around the western periphery.

Ground litter and logs are present in low quantities. Inundated water conditions exist over moist organic sandy soils and peats.

The Scribbly Gum Woodland and Closed Sedgeland are considered by the AES study to be important to botanical conservation but also occur on conserved public lands in the area. Within the four communities are a number of rare or botanically significant plant species which are near the geographic limit of their distribution. One threatened flora species, *Melaleuca biconvexa* has been recorded in the Riparian Open Forest on the Greek Orthodox Church site.

Three endangered fauna species have been recorded on the site and another seven are considered likely to occur given their regional distribution and habitat preference. The three endangered species recorded are the Glossy-Black Cockatoo, Common Bent-wing Bat and the Yellow-bellied Glider. Of the endangered species likely to occur the Eastern Bristlebird and the Ground Parrot were referred to in the evidence more than other species.

Given the extent of the information in the two major fauna and flora reports and other regional reports, as well as the additional information tendered to the Inquiry, I am satisfied I have sufficient information to reasonably address the intrinsic and the corridor values of the Heritage Estate lands.

Intrinsic Values of the Site

Specialist comment on the intrinsic ecological values of the site was given to the Inquiry by the Government Agencies (Mr Hood - NPWS), Shoalhaven Landowners' Association (Mr Fanning) and Jervis Bay Regional Alliance (Mr Daly). Differing emphases were placed on the information by these specialists. Some community and resident submissions strongly supported full conservation of the Heritage Estate land for its ecological values. Others considered development should occur given the large areas in conservation zonings in the locality and region, or that they had bought the land for residential use.

The NPWS considers the site has inherent wildlife and habitat values worthy of protection and on which development of even part of the site will detrimentally impact. The most significant intrinsic value of the land is as habitat for a number of threatened species. In summing up its assessment NPWS in part stated that:

> In terms of those species recorded or with a high potential to occur on the site, the two forested communities (riparian open forest and blackbutt open forest) are of greater value for the conservation of significant fauna species, whilst the scribbly gum woodland, and to a lesser extent closed sedgeland, sample more of the significant flora species. If the conservation of threatened

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species is deemed most important, then the two forested communities would be most significant as they provide habitat for eight of the eleven threatened species expected to occur on the site.

In addition NPWS points out that conservation of the floristic values of the area and of potential habitat for the Eastern Bristlebird would be achieved if the Closed Sedgeland communities were protected. Such protection would also meet the intention of the NSW Wetlands Management Policy.

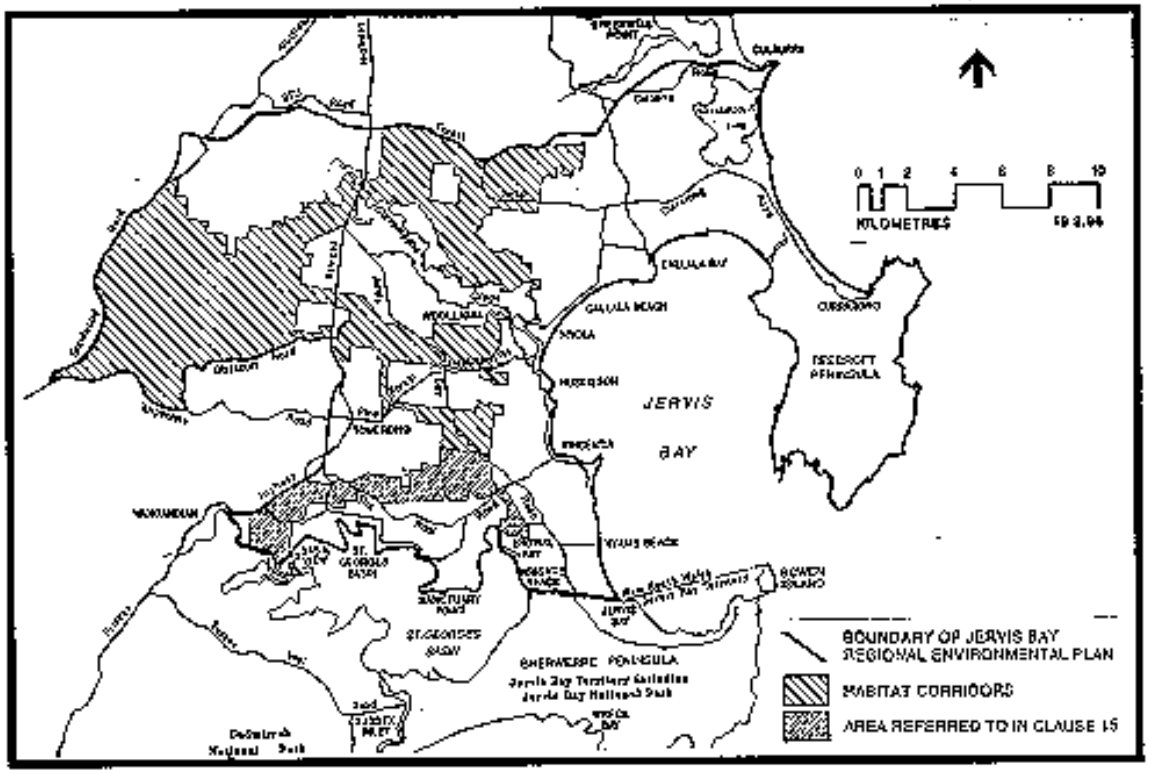
Jervis Bay Regional Alliance considers the Heritage Estate land has high conservation significance and that the habitat is suitable for many more threatened species than have been recorded on the site. With proper management the site will become of greater conservation value whereas development "would have a significant effect on threatened fauna and flora". For example the site may become suitable as habitat for the threatened Eastern Bristlebird in time as the closed sedgeland communities "mature". According to the Alliance the Heritage Estate lands ought to be protected.

Shoalhaven Landowners' Association questions that sufficient flora and fauna study of the Heritage Estate land has been conducted for NPWS to draw the conclusions it has. While recognising it is preferable to protect additional habitat for threatened species the Association contends consideration of the relative values and quality of the habitat in its geographical context is essential. The Association points to the extensive conserved lands in the area and argues that other parties have not established a determining need to retain and rehabilitate vegetation on the land.

Habitat Corridor Values of the Site

The Government Agencies clearly state that habitat corridor values are "the pre-eminent nature conservation value of the site". They consider the underlying principle for the management of the area should be to maintain viable linkages from Booderee National Park (NP) and the southern section of Jervis Bay National Park (NP) to vegetated areas to the north and west including the central and northern sections of Jervis Bay NP. Important linkages are habitat corridors and disturbed lands referred to in Clauses 14 and 15 of Jervis Bay REP respectively. These lands are shown on Figure 7.

Figure 7: Clauses 14 and 15 Lands – Jervis Bay REP



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Booderee NP is regarded as an environmentally significant area. Booderee NP contains more than 200 species of birds, 27 species of land mammals, 15 frog species, 23 species of reptiles and 650 species of land plants. It protects a high concentration of rare and threatened plant and animal species. Because of its secured protection and rich diversity of species Booderee NP is considered a population reservoir. Other reservoirs in the area include Beecroft Peninsula to the north and Morton National Park to the west.

The Mills Report (1991) recommended four regional habitat corridor systems to connect population reservoirs in the Jervis Bay Region. Habitat Corridor 4 (HC4) which transects the Heritage Estate was identified as a possible east-west link to forests north of St Georges Basin, Yerringyong State Forest and the proposed Parma Creek Nature Reserve.

In 1995 DUAP prepared a report following public input to the "Jervis Bay – Our Heritage Our Future" discussion paper which was a precursor to the draft Jervis Bay REP. The report concluded that HC4 should be omitted from the finalised habitat corridor system on the basis there were several choke points along it and it was comprised of large areas of private land. The report also excluded the northeast corner of the Heritage Estate land from the corridor system on the basis that it had not been included in the Jervis Bay National Park. HC4 was given the status of "Disturbed Habitat and Vegetation" (see Figure 7) in the Jervis Bay REP.

Lands identified in the Jervis Bay REP as "Disturbed Habitat and Vegetation" are areas of vegetation which still have the potential, with active management, to continue to provide important regional resources for wildlife. The objectives for these areas are to maximise the retention of native vegetation and the rehabilitation of degraded areas.

Vegetation mapping prepared by the Government Agencies on and in the vicinity of the Heritage Estate land is shown on Figure 8. Mapping has been simplified by splitting native vegetation into treed (forest and woodland) and non-treed (heathland and sedgeland) communities.

The Government Agencies contend that the Heritage Estate land is at a critical point in the corridor system. The land offers "the only opportunity to retain a treed link" between important vegetated areas as Jervis Bay National Park in this location is predominantly comprised of heathland and sedgeland communities, especially east of the Heritage Estate. Treed communities around Hyams Beach further to the east again have no direct link to the central and northern sections of Jervis Bay National Park as they abut urban development at Vincentia (see Figure 8).

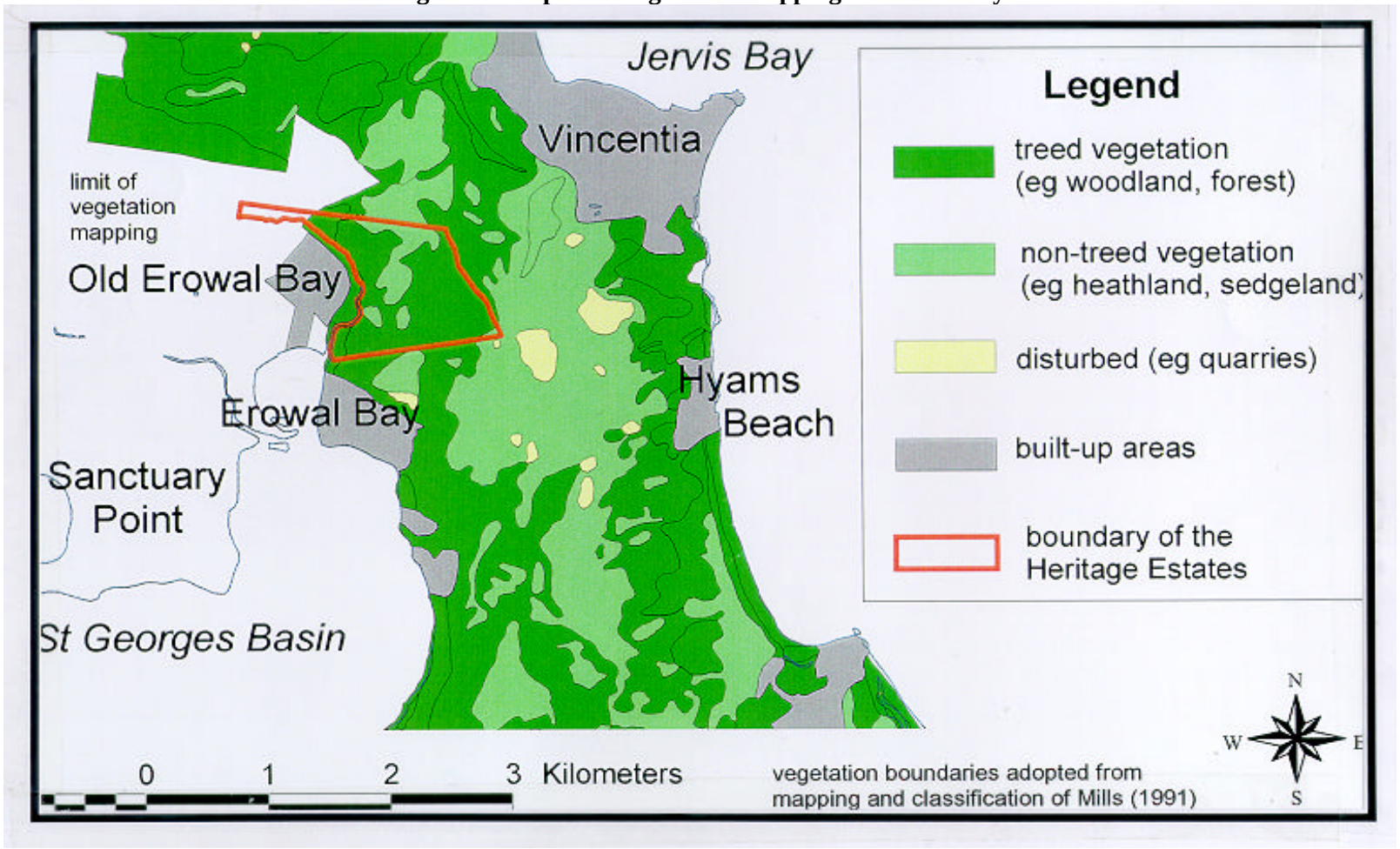
The Heritage Estate land thus provides for a dual treed corridor link comprising different vegetation types. One is along the Worrowing Waterway in Riparian Open Forest and the other to the east through Scribbly Gum Woodland and Blackbutt Open Forest.

In summary the Government Agencies state:

> Given the conservation value of the Bherwerre Peninsula and the NSW Jervis Bay National Park, it is critical that viable corridors are allowed to continue to function. These will permit the natural processes of wildlife movement and genetic flow to operate, maximising the probabilities for the ongoing survival of species in these areas.
>
> To achieve this, the development of the Heritage Estate site should only be permitted on the basis that a retained habitat system provides for:
>
> - Wider rather than narrower corridors to reduce edge effects, allow for a greater diversity of habitat, and to increase the suitability of the corridors for sensitive species.
> - Reliance on more than one corridor to minimise the risk from disturbance or catastrophic events; and
> - Corridors which sample the range of habitats.

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Figure 8: Simplified Vegetation Mapping in the Locality



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> Option 4 is considered the maximum level of development which could be permitted within the above constraint. Even this level of development will include a significant degree of risk in that indirect impacts associated with the development may bring the long-term viability of the corridors into question.

In regard to the vegetation in the eastern section of the Heritage Estate land, Shoalhaven Landowners' Association contends that the NPWS "provides no evidence for any species using that corridor" nor any detailed mapping of the vegetation communities.

Jervis Bay Regional Alliance argues strongly for the retention of habitat corridors through the Heritage Estate land noting that the only known route to Booderee NP for the threatened Yellow-bellied Glider passes through the land. According to the Alliance, Habitat Corridor 4 which in part would use Heritage Estate land and despite several pinch points, is significant in the regional context linking the Bherwerre Peninsula with other large habitat areas in the region.

Corridor Width

Some discussion occurred as to the width and configuration required for an effective wildlife corridor. Evidence to the Inquiry indicated that corridor width is important to minimise edge effects from exotic plants and predatory and aggressive fauna including native avifauna. Minimum effective widths of 250 metres to 500 metres were referred from the literature. The need for corridors without sharp turns because of the behaviour of some species was also noted.

It can be inferred from the evidence that a corridor width of 50 metres will have a very restricted effectiveness due to edge effects and that in general the wider the corridor the better. Nevertheless, even a narrow corridor is better than no corridor at all.

Corridors in the Jervis Bay region also have other restrictions on their effectiveness such as being cut by roads, vegetation clearing or thinning, and urban intrusions. Main roads such as The Wool Road and Jervis Bay Road are such restrictions adjoining the Heritage Estate land. At these locations culverts and wider treed areas increase the effectiveness of corridors. On the evidence it will be particularly important to maintain and reinforce timbered areas and corridor widths at the intersection of The Wool Road and Birriga Avenue. Development of roads within the Heritage Estate even with a reduced number of residences will also affect corridor values but with sympathetic road design affects can be minimised.

Although opposed by the Government Agencies and the Jervis Bay Regional Alliance I consider that Water Pollution Control Ponds could be at least partially incorporated into corridor areas provided they are designed and located to address corridor and fauna habitat issues.

Commissioner's Comments

Intrinsic Values of the Site

The Heritage Estate land has significant intrinsic ecological values. However, these values do not apply to the whole of the site, nor uniformly across those areas of the site which have them. If the site were to be rehabilitated the lower ecological values which occur in some areas would undoubtedly increase. For other areas their higher ecological values would also increase over time.

Shoalhaven Landowners' Association acknowledges the site has certain ecological significance. However, it challenges the level of significance given to the site by the Government Agencies and the Alliance having regard to its geographical location near to large areas of publicly conserved lands.

The relevant consideration in determining the more important areas on the Heritage Estate land are the flora and fauna studies of the subject land, the locational context of the land, and the flora and fauna habitat conserved on adjacent and nearby public lands. Furthermore, although the Heritage Estate land is not in a wholly natural state some consideration of the ecological significance of a regenerated site is also relevant in the present circumstances where there are no current dwelling entitlements.

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Having due regard to these considerations I find the Riparian Open Forest and the Blackbutt Open Forest can be used to delineate the more important areas of the Heritage Estate land. It is these areas on the Heritage Estate which should be largely conserved for their intrinsic ecological value.

Habitat Corridor Values of the Site

The Heritage Estate land undoubtedly has corridor value as evidenced by the information in the earlier studies referred to above, and even in the reports and matters considered for the Jervis Bay REP notwithstanding the REP's downgrading of the relevant lands to "Disturbed Habitat and Vegetation". Moreover, the position of the Government Agencies now is that sections of the Heritage Estate land, particularly the area along Worrowing Waterway and in the timbered portions in the east of the site, have significant corridor values. They consider the corridor value of the Heritage Estate land as being of greater significance than its intrinsic ecological values. In this they are generally supported by the Jervis Bay Regional Alliance and other parties opposed to residential development but strongly challenged by the Shoalhaven Landowners' Association.

What then are the corridor values of the Heritage Estate land?

Substantial areas in the Jervis Bay region have been dedicated as National Parks and there are other significant areas of relatively intact native vegetation in State Forests and Nature Reserves as well as on private lands. A Habitat Corridor system is also delineated in the Jervis Bay REP. In light of this it is indisputable that the Jervis Bay region is an important natural resource. It should be accepted that the maintenance of linkages between significant conserved and other public lands is essential to preserve biological diversity within those lands. The Government Agencies contend the southeastern corner of the Heritage Estate land is critical for the long-term viability of the diversity of the Bherwerre Peninsula. Given this claimed level of significance it cannot reasonably be argued that private lands should be excluded (either wholly or in part) as a natural resource in the region without relevant assessment and consideration.

There have been two flora and fauna studies of the Heritage Estate land as well as other studies on nearby lands. The area has an abundance of threatened and protected species and this is not challenged in evidence before the Inquiry. What is challenged and has not been specifically studied is the corridor function of the lands in the area and the importance to be placed on the corridor value of lands not included in the Jervis Bay REP as habitat corridors.

That the Heritage Estate land has some corridor value is not seriously disputed as it is evident certain arboreal species move through timbered areas of the site. But the Shoalhaven Landowners' Association argues that before effectively sterilising private land for a regional corridor sound scientific evidence of the need for another regional corridor is required. It argues that this evidence has not been produced in relation to habitat corridors by either the Government Agencies or the Jervis Bay Regional Alliance. Without the required evidence the Shoalhaven Landowners' Association contends the position of the Government Agencies and Jervis Bay Regional Alliance is not supportable and would result in expansion of the conservation estate by stealth and at the personal expense of individual owners. Moreover, on two previous occasions when the State Government had the opportunity to nominate the Heritage Estate land as habitat corridor it did not do so.

It is true that neither the Government Agencies nor the Jervis Bay Regional Alliance have provided conclusive scientific evidence of significant regional corridor usage or values on the Heritage Estate land. But the evidence is that the land could very well be used as a regional corridor given the relationship of the vegetation on the Heritage Estate land to that on surrounding lands and on other conserved lands in the region. This is despite the Heritage Estate land not being as fully timbered as may be suggested by evidence from the Government Agencies shown on Figure 8. However, I inspected the site and adjacent lands on several occasions and am satisfied that Figure 8 is a reasonable interpretation of the forest and woodland areas, notwithstanding the presence of some heathland within those areas.

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The Jervis Bay region has significant areas of conserved lands and habitat corridors are established in the Jervis Bay REP (see Figure 7). The evidence of the Government Agencies and the Jervis Bay Regional Alliance while not being conclusive, nevertheless establishes a reasonable case for consideration of protecting additional habitat corridors across the Heritage Estate land, specifically along the Worrowing Waterway and in the timbered section in the southeast of the site. To do otherwise in this area would not have due regard to the conservation status of large areas of land in the area or to the threatened and protected species living and moving within, and over time very likely moving between these lands. A precautionary approach is clearly needed in these circumstances to accord with the principles of ecologically sustainable development. This is provided by Option 4 which gives protection to regional corridor linkages as well as known significant fauna habitats. Option 4 is also generally consistent with Clause 15 of the Jervis Bay REP.

Options 8 and 9 preferred by Council and the Shoalhaven Landowners' Association respectively are not sufficiently precautionary and in relation to regional corridor values do not provide adequate corridor linkages. The corridor linkages under these options will be either too narrow (even if lot depths along the Worrowing Waterway are reduced) or non-existent as in the southeast of the Heritage Estate land. Furthermore, Options 8 and 9 would require the removal of many older and larger trees in disturbed habitat and vegetation areas to accommodate residential development. Consequently these options are also unlikely to be consistent with Clause 15 of Jervis Bay REP which requires that any proposal for Clause 15 lands must be designed to maximise the retention of native vegetation and the rehabilitation of degraded areas.

DISCHARGE WATER QUALITY

The Heritage Estate land is located in the water catchment of St Georges Basin. The site drains to Worrowing Waterway which flows into Erowal Bay, a part of St Georges Basin. Heritage Estate forms approximately 27 percent of the catchment draining into Worrowing Waterway. The existing settlement of Old Erowal Bay comprises 8 percent of the Worrowing Waterway catchment.

Parties agree that St Georges Basin is an important waterbody. It is a nursery for estuarine fish with extensive seagrass beds and the seagrass grows in depths of water which suggests water quality is of a high standard. The Basin is listed in the "Directory of Important Wetlands in Australia".

The Basin is connected to the ocean through Sussex Inlet, a 6.6km long sinuous shallow tidal channel. The St Georges Basin Estuary Management Plan estimates that the Basin's flushing time is 88 days but dynamic modelling indicates times in the order of 500 days or longer. Government Agencies and some community groups argue that St Georges Basin is sensitive to pollution because it is a poorly flushed system. Shoalhaven Landowners' Association state the evidence does not support the notion that Erowal Bay is sensitive.

Jervis Bay Regional Alliance claims that Erowal Bay is already experiencing stress. It cites evidence of recent algae blooms due to increased nutrient within the Bay. The Alliance also contends that the flushing time for Erowal Bay is greater than that of St Georges Basin as it is distant from the tidal influences through Sussex Inlet and it has a restricted mouth to St Georges Basin. Its capacity to maintain water quality is consequently overestimated.

Jervis Bay Regional Environmental Plan identifies water quality goals for catchments within the Jervis Bay Region but no goal is stated for Worrowing Waterway. However, the plan does set a goal for Tomerong Creek which flows into St Georges Basin near the mouth of Erowal Bay. The goal for Tomerong Creek is protection of aquatic systems.

Government Agencies consider the same goal should apply to Worrowing Waterway since it flows to Erowal Bay. Protection of the aquatic ecosystem would mean no net increase in the average annual load of key pollutants above current loads from the Heritage Estate land. Parties to the Inquiry generally accepted this goal if development were to occur.

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Urban Run-off and Mitigation Measures

The key pollutants of urban run-off from the Heritage Estate land are sediment, nitrates and phosphates. A number of parties raised concern as to whether the no net increase goal is achievable. The Patterson Britton Report and the Shoalhaven Landowners' Association submissions both include provision for water pollution control systems which aim to meet the Government Agencies' objective of no net increase in pollutants leaving the site. The background water quality data used for the preliminary designs of control structures was considered to be inadequate by parties.

Water Pollution Controls

The Patterson Britton Report proposes a water pollution control strategy which incorporates Water Pollution Control Ponds (WPCPs) and Water Sensitive Urban Design Principles. The WPCPs would be designed to met the "no net increase in key pollutants" goal. They could vary in size from 2.5ha to 8.5ha depending on the extent of urban development permitted. Rock bars, minor weirs, grass swales and filter strips are also proposed within the Heritage Estate to maximise infiltration, minimise run-off, and filter pollutants. Government Agencies and Jervis Bay Regional Alliance oppose including water sensitive urban design features within designated habitat corridors.

The Shoalhaven Landowners' Association claims the ponds proposed in the Patterson Britton Report are designed for passing high rainfall run-off through the ponds. This has the effect of flushing nutrients from the WPCPs and requiring large ponds to contain significant volumes of water. Also, the ponds do not optimise the land to be served, they are not well located to minimise loss of lots, and there has been no consideration of peripheral areas. The Government Agencies share Shoalhaven Landowners' Association concern that the Patterson Britton Report proposed no WPCPs for the catchment in the northwest sector of the site. Smaller WPCPs in each sub-catchment are now proposed by the Shoalhaven Landowners' Association. The WPCPs would be designed to store a 1 in 1 year run-off and bypass the balance.

Background Water Quality

Background water quality levels are needed to determine what requirements are needed for no net increase in the average annual load of key pollutants above the current load from the site. The background water quality data relied upon in the Patterson Britton Report (1998) was obtained by Council . This data is acknowledged by all parties to be insufficient and that further monitoring is required. This is reinforced by the discrepancies between Council's data and data from Booderee National Park. A comprehensive monitoring program developed by Council in consultation and to the satisfaction of the EPA and DLWC is required to provide design data for the WPCPs.

Performance of Water Pollution Control Measures

The Government Agencies state that few examples of WPCPs in service have provided the long residence times necessary to achieve 75 percent removal of pollutants. They are concerned that the "no net increase goal" may not be achievable based upon the use of WPCPs alone which consequently places some reliance on water sensitive urban design.

Given that water sensitive urban design principles such as grass swales can have high failure rates, Best Management Practices for water pollution controls include regular ongoing maintenance. The Government Agencies' experience is that this is rarely achieved in practice. It submits that Management Plans need to be prepared to ensure that there is a routine mechanism for the ongoing maintenance of water pollution controls.

Prior to any approval for construction preparation of a Water Pollution Control Management Plan is proposed by Council. It would be to the satisfaction of the EPA and the DLWC. The plan would include design details of proposed pollution controls, maintenance programmes, and soil erosion management strategies for both construction and operation phases.

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Uncertainty

The Government Agencies have a number of concerns with the modelling of potential urban run-off. The modelling used makes a number of assumptions which creates uncertainty as to whether the water quality objectives can be met. Assumptions in the modelling include the volume of run-off and likely pollutant export as a result of the development.

Given the uncertainty in the proposed water pollution controls and the significance for the marine ecology of Erowal Bay and St George's Basin if the controls fail to meet expectation, the EPA advocates a cautious approach in the development of the Heritage Estate land. It believes that concerns for the performance of the proposed water pollution control facilities and features should be largely resolved before downstream water quality is placed at risk. Further monitoring before rezoning to allow design refinements, then staging of the development and post-approved monitoring would allow for ongoing assessment and review of the effectiveness of the proposed controls.

Weed Infestation

Jervis Bay Regional Alliance points to the inevitability of weed infestation aided by high nutrient levels downstream of residential areas. Seeds are spread by run-off, particularly at times the WPCPs are bypassed during high flows and when watercourses overflow. It will be recurring.

Subsurface Drainage

Before the Closed Sedgeland areas shown in Figure 6 could be developed subsurface drainage would be required. Notwithstanding the geotechnical constraints, physical drainage of these areas could be undertaken over time as the Patterson Britton Report and evidence tendered by the Shoalhaven Landowners' Association indicates. Concern was expressed by Government Agencies and the Jervis Bay Regional Alliance for potential impacts on downstream water quality, depending on the water quality of the subsurface drainage. Further testing of the quality of subsurface drainage is clearly required before development of sedgeland areas could be considered. It could well be that portions of the Heritage Estate land in Closed Sedgeland areas are unable to be developed. Drainage of the Closed Sedgeland areas will also cause changes in nearby vegetation as soil moisture levels adapt to the changed conditions.

Acid Sulphate Soils

The Patterson Britton Report identifies Potential Acid Sulphate Soils in some of the Closed Sedgelands areas of the Heritage Estate land. DLWC Acid Sulphate Soil Risk Maps suggest that overall there is low risk of encountering acid sulphate soils within the area, except in the vicinity of Worrowing Waterway where no development is proposed. Acid Sulphate Soils are formed when pyritic material in the soil is exposed to oxygen and then oxidises to produce sulphuric acid. The acid can release metals such as aluminium and iron from the soil in concentrations which may be toxic to aquatic life.

The Patterson Britton Report recommends that if development in the Closed Sedgeland areas is proposed, more detailed sampling and testing will be required at the detailed design stage. However, the EPA considers that the existence of acid sulphate soils should be determined earlier because it could potentially affect the number of lots developed and hence infrastructure costs to landowners.

Commissioner's Comments

Surface water run-off and sub-surface drainage from developed areas of the Heritage Estate land has the potential to adversely affect Worrowing Waterway, Erowal Bay and the St Georges Basin if not properly controlled and managed. Jervis Bay REP requires that water quality in these waterways must be protected and maintained. If development of the Heritage Estate land is contemplated an appropriate criterion generally agreed by parties including Shoalhaven Landowners' Association is "no increase in the average annual load of key pollutants above the current load from the site".

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It is also necessary to minimise changes to the hydrogeological characteristics of the land including wet weather and low flows. Water pollution control measures will be required for all developed sub-catchments. They should not intrude significantly into wildlife corridor areas but be developed to complement wildlife corridor values.

Furthermore, there is insufficient monitoring data available to determine the annual average current load of key pollutants from the site. A comprehensive monitoring program is required to collect the appropriate information. This program should be undertaken by Council in consultation with, and to the satisfaction of the EPA and DLWC. It is only following interpretation of the monitoring results and modelling of run-off that the water pollution control measures can be assessed for feasibility and compliance with the "no net increase in key pollutants" goal. Even so there will remain uncertainties as modelling is not an exact science.

Uncertainty clearly remains in relation to maintaining the quality of water leaving the Heritage Estate land. Monitoring and assessment of the results could indicate that development should be further restricted from that available under Option 4. However, I am not persuaded by the Jervis Bay Regional Alliance and others opposed to the development that water quality issues are such to preclude all development on the site but their evidence did highlight areas requiring further information and resolution. A cautious approach is required given the uncertainties.

I find that if the water pollution control strategy ensures discharges from the Heritage Estate lands meet the "no increase in key pollutants" goal to the satisfaction of the EPA then important downstream water bodies will be suitably protected. However, there is uncertainty as to the effectiveness of the proposed water pollution control strategy using WPCPs and Water Sensitive Urban Design. Notwithstanding their widespread implementation in recent times, and proven ability to significantly improve the quality of water run-off in many situations, there remains doubt as to the level of treatment those methods are able to consistently provide in different and untested field conditions. Cautious implementation must prevail. I consider a staged approach to development of the Heritage Estate land necessary to limit potential adverse water quality impacts. It will also allow the effectiveness of the strategy to be determined before development of any subsequent stage of the Heritage Estate land is approved. A staged approach would also limit Council's financial risk.

Development of the Closed Segdeland areas requires greater attention to drainage and acid sulphate soils may be present. While further studies will be needed to accurately identify any affected areas local experience indicates remedial works can be physically constructed subject to protection of downstream water quality. An approved management plan would be required and a further reduction in lot yield could result.

Ongoing management of the water pollution control strategy should also include removal of exotic weeds downstream of the control structures and distribution of relevant educational material to residents to limit the use of garden and household chemicals including fertilisers and pesticides. Changes to naturally revegetated areas particularly in wildlife corridors should also be monitored to assess the affects of subsurface drainage, although the majority of the Closed Sedgeland area likely to be drained is removed from the main wildlife corridor areas.

I recommend a water pollution control strategy which uses Water Pollution Control Ponds and Water Sensitive Urban Design Principles implemented through a Soil and Water Management Plan. This must follow comprehensive water quality monitoring of run-off and potential subsurface drainage from the Heritage Estate land. A review mechanism will be necessary to ensure the "no net increase in key pollutants" goal is being achieved and maintained. I also recommend the initial area for development be the area referred to as Stage 1 in Figure 7.6 of the Patterson Britton Report adapted to comply with the additional restrictions of Option 4. Initial development is then restricted to about 135 lots substantially limiting the likelihood of significant water quality impacts on downstream waterbodies and ecosystems. Any subsequent residential development would be dependent of previous development meeting environmental goals.

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TERMS OF REFERENCE

The Terms of Reference for the Inquiry are as set out by the then Minister who directed that:

> "…. an Inquiry be held into the Heritage Estate at Jervis Bay as described in the attached map. Specifically the Inquiry is to:
>
> a) determine the suitability for, and scale and density of, residential development on the land;
>
> b) examine the environmental issues raised by, and the feasibility of providing the necessary infrastructure to support, any residential development; and
>
> c) consider the 7 options identified in the report by Patterson Britton and Partners Pty Ltd of April, 1998 titled "Heritage Estates, Jervis Bay – Total Water Cycle Management, Land Capability and Infrastructure Study" as well as any other options that might meet the appropriate environmental and development objectives for the land."

A copy of the direction and map is included as Appendix 1.

The Heritage Estate land is currently zoned Rural 1(a) or Rural 1(b) and as such Council has stated it will neither permit the erection of buildings on lot sizes less than 40 hectares nor will it permit camping on the land. This was further advised when applications for Section 149 Certificates were received by Council. Moreover, when the land was marketed in 1992 it was advertised as being zoned rural with no dwellings allowed, notwithstanding what purchasers may have inferred then (or earlier or later as the case maybe) from other sources.

In relation to future urban release areas Jervis Bay Regional Environmental Plan (REP) 1996 does not include the Heritage Estate land as having the opportunity for urban development. However, according to the Department of Urban Affairs and Planning (DUAP) rezoning of the land could be considered subject to strong argument for that to occur. I note also that Council is currently undertaking a Settlement Strategy for Jervis Bay in conjunction with DUAP and is developing community infrastructure reasonably adjacent to the subject land.

At the time of purchase of their 'cheap' land the landowners, although having expectations that the land may at some future time be rezoned to allow development, had no certainty that this would occur. It was not planned to occur and the environmental values and development capability of land had not been thoroughly assessed. No services were readily available to the site. Nevertheless, a social issue now exists given the multiple ownership of the urban sized allotments on the Heritage Estate and this is a matter of relevance. But how relevant? Social issues flowing from the marketing and sale of the land have an appropriate moderating effect on the extent of, and weight to be given to other environmental values. However, they cannot be interpreted to affect the more significant core values without the high likelihood of the assessment being inconsistent with, and possibly compromising local and regional strategic planning principles and objectives.

As noted in "Strategic Planning Considerations" some parties sought to strictly apply the planning system as it currently classifies the Heritage Estate land. The issues of paper subdivisions to date has not been resolved through strict application of the planning system. Moreover, the planning system as stated by the Government Agencies allows for merit based determination of land use changes outside of current planning instruments depending on the circumstances. This is in fact what some parties opposed to residential development on the Heritage Estate land want in seeking an Environmental Protection zoning for the land. To argue for 'strict' adherence to the planning system or to only accept argument to move a zoning to a more restrictive regime is to take too narrow a view of the planning system and of the Heritage Estate land. As submitted by Council there is no one standard solution to resolving the issues of paper subdivisions, it is a case by case evaluation process.

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TERM OF REFERENCE (a): Determine the Suitability for, and Scale and Density of, Residential Development on the Land

This Term of Reference is appropriately considered in two parts, namely:

- Determine the suitability for residential development on the land; and
- Determine the scale and density of residential development on the land.

The Suitability for Residential Development on the Land

Two basic positions were put to the Inquiry in relation to the suitability of the Heritage Estate land for residential development. These were that:

- The land is suitable for a level of residential development; and
- The land is inherently unsuitable for residential development.

As canvassed by parties to the Inquiry suitability is a broad concept with elements of time and space. It has strategic planning implications in terms of State, Regional and Local Plans and Policies. It needs to be assessed having regard to ecologically sustainable development, to important ecological values of the land, and to environmental protection in general.

The Heritage Estate is not presently included in strategic plans and policies as having opportunity for urban development. However, subject to good argument it could be considered either for inclusion or exclusion. Council is currently preparing the Jervis Bay Settlement Strategy and consideration will be given to all lands in the region with potential for urban development. These lands could include the Heritage Estate land. Clearly the land is unsuitable for residential development at the present time in terms of strategic planning but it is not precluded from consideration by Council in preparing the Jervis Bay Settlement Strategy. Subject to the final Settlement Strategy the Heritage Estate land may then have suitability for residential development in relation to strategic planning matters.

In the previous section I addressed issues relating to the ecological values of the site and maintenance of run-off water quality from the site. The wildlife habitat and corridor value, particularly the regional corridor values unequivocally indicate that some sections of the site have important ecological values. A precautionary approach is also required in relation to regional corridor values given the locational context of the Heritage Estate land in relation to significant conserved lands in the region. These regional corridor values should not be compromised even though there is not full scientific certainty of their ecological value. The cost and time in obtaining such confirmation would be prohibitive and would likely delay any decision on residential development of the land indefinitely. There was certainly no substantive contrary evidence presented to the Inquiry.

A balanced assessment of the ecological worth of specific sections of the Heritage Estate land for wildlife habitat and regional corridor values limits development to Option 4 as the maximum for residential development. Outstanding questions relating to acid sulphate soils and the quality of groundwater drainage from Closed Sedgeland areas require further investigation and could further limit the potential for residential development of the land towards Option 7.

Elsewhere I concur with Government Agencies and Council that staged development, if any residential development is to occur, would limit any adverse risk to downstream water quality. Further development being dependent on previous stages performing to the satisfaction of the Environment Protection Authority.

Suitability also raises issues relating to the broader environment including social and economic considerations, financial considerations, and need and demand which I consider under Term of Reference (b).

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I canvass general environmental issues including social and economic matters in Term of Reference (b). I am satisfied none of the environmental issues raised in evidence are such that the Heritage Estate land could be assessed as inherently unsuitable for any residential development.

Argument by Shoalhaven Landowners' Association, Council and other parties for much higher levels of residential development than Option 4 are not supported by the evidence. Similarly argument by Jervis Bay Regional Alliance and other parties opposed to any residential development on the land at all does not substantiate their position. It does however support a significant reduction in residential development from that sought primarily by Shoalhaven Landowners' Association and Council.

I find the Heritage Estate land is suitable for maximum residential development consistent with Option 4 provided it is first included in a current Settlement Strategy. Staging of any development should occur to limit risk to downstream water quality and to Council's financial exposure if Council initially funds development.

The Scale and Density of Residential Development on the Land

Scale and density of residential development on the Heritage Estate land are related to some matters I canvass on suitability. In particular, the appropriate scale of residential development is the level of residential development suited to the land. It should not be influenced by the subdivision and landownership patterns as this would compromise strategic planning principles.

I have concluded above that Option 4 provides for a suitable level of residential development on the Heritage Estate land. This assessment was based largely on the desirability of maintaining the wildlife habitat and regional corridor values of the land. Further investigation of acid sulphate soils and groundwater drainage quality could further restrict residential development. In the circumstances these are the principal matters also determining the scale of development.

The broad social and economic issues and the position of the landowners, while relevant, are appropriately considered in a possible amending role depending on the significance of the relevant issues.

For the landowners I have clearly stated at the front of this section that although they had expectations of building on their land at some future time they had no certainty they would ever have such a right. Potential maximum development must be assessed in relation to the suitability of the land which I find in the previous sub-section is substantially represented by Option 4, but could be subject to further reduction.

In relation to density many lots are in excess of Council's minimum requirements and could be developed at higher densities than the number of lots. Higher density residential development is in fact advocated by Jervis Bay Regional Alliance should some residential development occur as this would be consistent with State Government policy. This is despite higher densities being contrary to the preservation of the village character for settlements in the region. Government Agencies advocate that any residential development should not result in a greater number of dwellings than the lots in the option adopted.

Preservation of the social character of the region which is dependent on small scale village communities is strongly supported in many submission to the Inquiry. Increased residential densities on the Heritage Estate would in all likelihood not 'preserve' the area which is much cherished for its village character and natural beauty. This is despite community claims the area has low socio-economic status, a lack of community facilities and services, low occupancy rates, and unsustainably low residential densities.

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I am persuaded the special character of the area is of fundamental importance to residents and visitors. It should be preserved on the Heritage Estate land by limiting residential densities as proposed by the Government Agencies.

Jervis Bay Regional Alliance and other parties extensively canvassed the potentially adverse social and economic consequences of developing the Heritage Estate land. The Alliance referred to the demography of the area including age profiles, the low average weekly and household income, the unemployment rate, population growth in the area, and dwelling occupancy rate. It also claimed development costs would exceed land value, development will increase unemployment and will not benefit the area, degradation of the area will affect tourism, and the development will not be consistent with the scale and character of the surrounding villages.

I canvass the main social and economic issues in Term of Reference (b). They clearly have relevance in assessing significant land development scenarios in the region. It is then essential for the relevant strategic planning objectives to be given due recognition in this process.

In discussing suitability I refer to the need for the Heritage Estate land to be considered by Council in preparing the Jervis Bay Settlement Strategy. This process is a regional approach to orderly and economic landuse decisions involving areas of land in excess of the level of likely development of the Heritage Estate land. It will have regard to the availability of services and community facilities in the region.

As part of a Settlement Strategy the staged development of the Heritage Estate land, all lots of which are individually owned, will have been provided for by Council. Development of the land under Option 4 will have an impact in the region, most likely both positive and negative, but these impacts will be accommodated within the strategic planning framework.

TERM OF REFERENCE (b): Examine the Environmental Issues Raised by, and the Feasibility of Providing the Necessary Infrastructure to Support, any Residential Development

This Term of Reference is also appropriately considered in two parts, namely:

- Examine the environmental issues raised by any residential development; and
- Examine the feasibility of providing the necessary infrastructure to support any residential development.

Environmental Issues Raised by any Residential Development

Environment is defined in the Environmental Planning and Assessment Act to include “all aspects of the surroundings of humans, whether affecting any human as an individual or in his or her social groupings”. It is a broad definition and includes the relevant biophysical, ecological and social and economic considerations.

The fundamental ecological and biophysical matters to be considered in relation to the residential development of the Heritage Estate land are its wildlife habitat/corridor values and run-off water quality which I have canvassed under “Fundamental Attributes of the Heritage Estate Land”. I canvass matters relating to the physical provision of infrastructure and its associated financial considerations in the following sub-section. I now canvass other relevant environmental issues presented in evidence to the Inquiry.

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Social and Economic Issues

Many parties presented information and argument relating to the social and economic consequences should residential development occur on the Heritage Estate land. Jervis Bay Regional Alliance provided statistics and analysis relating to the area including income profiles, population growth, employment, age profiles, job availability, land supply and demand, and financing. I canvass the more relevant matters below.

Land Supply and Demand

Government Agencies, Council, Shoalhaven Landowners' Association and Jervis Bay Regional Alliance referred to land supply and demand in the locality. Parties opposed to development of the Heritage Estate land contend there is no need to develop the site as there is no pressing demand for land in the area as evidenced by its ready availability. The Government Agencies submission also contends there is doubt as to the need for development of the Heritage Estate land in the short term. Shoalhaven Landowners' Association challenged other parties' perceptions of land supply, demand and development in the region pointing out the unique characteristics which have arisen due to the area being popular for holidays and retirement. For example, landowners often purchase land well before their intention to build so that building on vacant land can be spread over a considerable time.

I am not convinced that the Heritage Estate land fits a conventional supply/demand scenario. The 1,232 lots were purchased by over 1,100 landowners and as such are not creating supply or demand on the evidence before the Inquiry. Nevertheless, should the land be approved for residential development it is reasonable to assume that some lots would become available for purchase. The recommended staged development of Option 4 will restrict the number of lots available for development at any one time.

Demography

I am not persuaded the demography of the region is directly relevant to my terms of reference.

Community Facilities and Services

Community and resident organisations on the whole strongly stated that community facilities and services in the area are inadequate in that they cannot meet the current needs and future demands of natural growth, let alone those from residential development of the Heritage Estate land.

As I canvass under "Statutory Planning Considerations" it is proper for Council to consider the impact of residential development of the Heritage Estate land during preparation of the Jervis Bay Settlement Strategy. This is necessary to ensure the orderly and economic use and development of land in the region.

The Bay and Basin Community Resources referred to the services provided by the only community Health Centre, its lack of staff and building space; the demography of the region; unemployment rates, low household incomes and homelessness; lack of medical services; poor public transport; limited police presence; lack of entertainment/recreational facilities and difficulty in accessing shopping centres without a motor vehicle; the limited capacity of the High School; and that there are no local Higher Education facilities in the immediate area.

Council contended that community facilities will be enhanced and made more viable by additional population in the area. Under Council's Section 94 Contribution Plan the Vincentia District Centre will provide recreational facilities including library, child care facilities and a youth centre.

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It is not unusual for communities to want more facilities and services. In many areas they are stressed as in the case in the Jervis Bay/St Georges Basin area. A sudden large influx in population as would occur if the Heritage Estate land were quickly and fully developed would significantly exacerbate stresses in the provision of community facilities and services. However, this will not happen as any development of the Heritage Estate land will be substantially reduced from full development as well as being staged and subject in many cases to delayed development as indicated by the evidence of Shoalhaven Landowners' Association. Moreover, the Heritage Estate landowners will pay Section 94 Contributions towards community facilities.

I am satisfied that community facilities and services will not be seriously affected if the development of the Heritage Estate land occurs having been relevantly considered by Council when it prepares the Jervis Bay Settlement Strategy. In some cases increased population could result in community benefits, for example improved public transport.

Tourism

Some local residents and community groups argued that tourism in the locality would be affected if the Heritage Estate land were developed. Evidence to confirm their position was not tendered to the Inquiry. The visual impact of any residential development within 100 metres of The Wool Road, Jervis Bay Road, and Erowal Bay Road is in a Scenic Preservation Area and requires Council consent. Council is able to exert strict conditions to control any visual impact on these roads past the site. In the absence of any substantiation I do not accept that development of the Heritage Estate land will adversely affect tourism in the locality. Evidence tendered by Council indicates tourism could well increase.

Visual Amenity

Clause 12 of the Jervis Bay REP states in relation to landscape quality that a proposal must:

a) maintain the visual quality of a waterbody, 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.

Heritage Estate land within 100 metres of The Wool Road, Jervis Bay Road and Erowal Bay Road is within a Scenic Preservation Area under Shoalhaven LEP. Council consent is required for any development and to clear trees or vegetation on these lands.

Residential development of the Heritage Estate land has the potential to conflict with the requirements of Jervis Bay REP and Shoalhaven LEP. Development of the Heritage Estate land for residential dwellings would require removal of vegetation and some tree clearing for safety reasons. Preservation of habitat corridors to accord with Option 4 will significantly reduce the visual impact from water bodies, roads and other vantage points in the area because:

- Residential development will not occur within 100 metres of The Wool Road and Jervis Bay Road (except near the intersection with Wanawong Boulevard);
- Habitat corridor areas and the divided boundary along Erowal Bay Road will screen views to the land from Erowal Bay Road; and
- The most elevated land in the east of the site will be protected in a wildlife corridor.

I am satisfied that the visual amenity and landscape qualities of the Heritage Estate land when viewed from water bodies, main roads and other vantage points will be largely protected.

Aboriginal Archaeology

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Two Aboriginal sites have been recorded on the Heritage Estate land along Worrowing Waterway. No development is proposed near these open campsites. An archaeological study did not locate any further sites on the land but the possibility of further sites being located could not be ruled out. If any other sites are located the National Parks and Wildlife Service (NPWS) must be notified to determine management options. NPWS also considers the Jerringa Local Aboriginal Land Council should again be consulted.

At this time there are no Aboriginal archaeological issues which preclude consideration of the Heritage Estate land for residential development.

Other Environmental Issues

A number of other environmental issues were referred to briefly in submissions to the Inquiry. These included air quality during construction activities, bushfire risk to residential development, compatibility of residential development on the Heritage Estate land with adjoining landuses, agricultural capability of the land, and the potentially dispersive and erosive properties of the Heritage Estate's soils.

These issues have either been considered in assessing the main environmental and development matters before the Inquiry or their potential effects can be controlled and managed should any residential development be approved for the Heritage Estate land. A development control plan is an appropriate mechanism to ensure they are satisfactorily considered at any future development stage.

The Feasibility of Providing the Necessary Infrastructure to Support any Residential Development

The Patterson Britton Report addressed infrastructure availability and costs/funding in Chapters 7 and 8 respectively. Council addressed infrastructure and funding in its submission as did Government Agencies in their submission. Shoalhaven Landowners' Association also provided an updated costing and considers that the necessary infrastructure can be provided using well proven methods. The Association clearly stated that the landowners accept they will be required to meet the full costs of developing their land. Jervis Bay Regional Alliance and several other parties were insistent that the Heritage Estate landowners pay the full cost of the development and that Council not expose itself to financial risk (if development does occur contrary to their opposition).

<u>Infrastructure</u>

Infrastructure necessary for the development of the Heritage Estate land includes water supply, sewerage system, electricity, gas, telecommunications, roads, stormwater drains, subsurface drainage, water pollution control ponds and water sensitive urban design.

Council notes that upgrading of the Huskisson Sewerage Treatment Plant will be necessary but coupled with the Regional Effluent Management Scheme will be adequate. The EPA considers there are no significant environmental problems with the plan. However, as noted by the EPA and Jervis Bay Regional Alliance sewage overflows must be guarded against through, for example, the installation of back-up pumps and powersupply, breakdown telemetry, and provision of adequate overflow capacity as appropriate.

A water supply is available from the existing water main in Birriga Avenue. There is no dispute that the other infrastructure required can be physically provided.
I am satisfied there are no overwhelming physical constraints to the provision of the infrastructure required for residential development of the Heritage Estate land. But high design standards particularly for sewerage reticulation, control, and management are essential.

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Roads and Access

The principal main road access to the Heritage Estate locality is by Jervis Bay Road and The Wool Road. Local access to the Estate from main roads will be restricted to:

- The Wool Road - Birriga Avenue intersection;
- Jervis Bay Road - Wanawong Boulevard intersection; and
- Erowal Bay Road - Wanawong Boulevard intersection.

A divided boundary road parallel to Erowal Bay Road is intended along the southern side of the Heritage Estate which allows a single entrance point to the Heritage Estate from Erowal Bay Road. Wanawong Boulevard which transects the Heritage Estate land from north to south could be used as a bus route. Most residents are however expected to use private motor vehicles for transport.

Provision of road infrastructure raises several matters relating to the ecological values of the Heritage Estate land. Specifically these are:

- The Wool Road – Birriga Avenue intersection is located at a critical point in the Worrowing Waterway wildlife habitat corridor and should be designed to protect wildlife corridor values;
- Wanawong Boulevard bisects the Blackbutt Forest which is habitat for at least one endangered species and road design through the Blackbutt Forest should be such to maintain essential habitat values;
- Birriga Avenue links Jervis Bay Road to The Wool Road and as such could be used by motorists as a 'short cut'. It also currently bisects an area of Closed Sedgeland and this length of Birriga Avenue (about 80 metres) is shown in Figure 7.5 of the Patterson Britton Report as Habitat Corridor, an assessment with which I concur. By preserving this habitat corridor for example by reinstating the Closed Sedgeland and providing a raised walkway/cycleway the 'short cut' is also removed improving residential amenity. The five lots on the northern side of Birriga Avenue shown as Habitat Corridor in Figure 7.5 could not be developed if Birriga Avenue is closed in this area and a habitat corridor implemented.

<u>Financial</u>

Parties including Government Agencies, Council and Shoalhaven Landowners' Association agree that if the Heritage Estate land is to be developed the costs are to be wholly borne by the landowners. Moreover, that the financial risk to Council should be appropriately low to avoid potential costs to other ratepayers. The financial risk to Council and hence to ratepayers generally was of concern to many parties opposed to development on the Heritage Estate land.

Costs estimates per lot for providing infrastructure, the relevant contributions under section 94 of the Environmental Planning and Assessment Act and section 64 of the Local Government Act, and $5,000 per lot compensation to those landowners whose lots are not developed, range from about $26,000 to $35,000 per lot for Option 9 and Option 4 respectively (excluding subsurface drainage costs for individual lots.)

Argument by parties who contend that development costs are unreliable and at variance depending on the source of the costs are not well founded. There is significant information on costs in the documentation before the Inquiry and subject to allowances for variations in assumptions they do not vary unreasonably. I am satisfied these costs can be used to compare options and estimate landowners' potential liabilities.
Notwithstanding that development costs are reasonably known I do not consider the question of financial feasibility can be equitably resolved at this time despite argument from some parties that resolution should occur. I am not persuaded that resolution can occur until landowners are presented with a firm option and timetable for development, including staged development of the Heritage

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Estate land. It is only then they will be able to fully consider their financial position and any decisions regarding their land, as they have previously done with Option 5 and latterly with Option 9.

A consensus landowner decision in relation to Option 4 with staged development is likely to be more difficult given the Shoalhaven Landowners' Association submission that adopting Option 4 has "a potential terminal effect on the likelihood of a resolution being obtained". This is a matter for the landowners to resolve prior to any development occurring, particularly in regard to the provision of water pollution control ponds. However, I note relatively small subdivisions are being developed in the region.

Compensation

Development costs provided in the Patterson Britton Report included an allowance of $5,000 per lot for compensation to those landowners whose lots are required for water pollution control purposes, to preserve wildlife habitat/corridor values, or because they are within Closed Sedgeland areas with potential drainage problems. Shoalhaven Landowners' Association contends that if their lands are to be included in wildlife habitat/corridor areas they should be paid compensation. Their land should not be set aside for the public good at their expense. Government Agencies and Council firmly stated they are not prepared to purchase land. In the circumstances compensation remains a matter for the landowners themselves to resolve. It will be a necessary consideration if any future development of the Heritage Estate land is to be achieved.

An alternative is to not consider compensation a relevant matter. Landowners bought their land zoned rural and Section 149 Certificates indicated that dwelling entitlements did not apply to their allotments. However, some land may be rezoned to permit residential development so that those landowners will be allowed to develop their land for residential use. Based on evidence to the Inquiry there will be no action by government to significantly reduce any landowners' current rights. I note that the most appropriate zoning for land not developed for residential use is environmental protection and that land unsuitable for residential development may be so zoned.

<u>Staging</u>

The Patterson Britton Report investigated staging the construction of infrastructure and consequently of any residential development on the land. The staging concept for Option 3 is shown in Figure 7.6 of the Patterson Britton Report. Although I reject Option 3 as a future development option the concept and general allocation of areas for staging remains valid for Option 4.

Staging also has benefits I refer to in "Discharge Water Quality" by allowing the environmental performance of each stage to be assessed before any subsequent stage is considered for development.

Council also supports staging of infrastructure construction to minimise its exposure to financial risk.

Staging clearly has a number of significant benefits and should any residential development of the Heritage Estate land occur I strongly support staged development. As Stage 2 in Figure 7.6 of the Patterson Britton Report is largely within Closed Sedgeland areas and a level of uncertainty remains as to the ultimate development of these areas I consider Stage 2 should be developed last. This will allow time to fully consider the implications of developing Closed Sedgeland areas as development of Stages 1, 3 and 4 will have each required full assessment of smaller areas of Closed Sedgeland.

TERM OF REFERENCE (c): Consider the Seven Options in the *Patterson Britton Report* as well as any other Options that might meet the Appropriate Environmental and Development Objectives for the Land.

Three options in addition to the seven options in the Patterson Britton Report were canvassed in evidence before the Inquiry. These additional three options, nominated as Options 8, 9 and 10, were

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presented by Council, Shoalhaven Landowners' Association and Jervis Bay Regional Alliance respectively. The ten options before the Inquiry are:

Option 1 Maximum possible development within the physical constraints of the site confined by the *Patterson Britton Report* recommendations for ecologically significant areas but with no water pollution controls. Option 1 yields 937 lots.

Option 2 Refinement of Option 1 including constructed wetlands to reduce the average pollutant export back to existing levels. Option 2 yields 876 lots.

Option 3 Refinement of Option 2 including constructed wetlands as well as relevant water sensitive urban design techniques incorporated into the development. Option 3 yields 844 lots.

Option 4 Development option based on the reserve/corridor design proposed by the National Parks and Wildlife Service including constructed wetlands as well as water sensitive urban design techniques. Option 4 yields 730 lots and is shown on Figure 3.

Option 5 Development option based on the ecologically significant areas initially proposed by Shoalhaven Landowners' Association including constructed wetlands and water sensitive urban design techniques. Option 5 yields 995 lots.

Option 6 Similar to development Option 2, except that areas with potential drainage problems have been excluded from the development. Option 6 yields 670 lots.

Option 7 Similar to development Option 4, except that areas with potential drainage problems have been excluded from the development. Option 7 yields 510 lots.

Option 8 Derived from Option 5 by Council by modifying allowanced for drainage areas and water pollution control ponds. Option 8 yields 1,060 lots and is shown on Figure 4.

Option 9 Derived from Option 5 by Shoalhaven Landowners' Association by modifying allowances for drainage and water pollution control ponds following further assessment. Option 9 yields 1,140 lots.

Option 10 No development. Option 10 yields nil lots.

These ten options must necessarily be considered having due regard to the appropriate environmental and development objectives for the land. What then are the appropriate environmental and development objectives for the land?

I requested parties to specifically address the Inquiry as to the appropriate environmental and development objectives for the land. From their submissions I have derived the following objectives:

a) **Environmental Objectives**

- Protect ecologically significant areas of the land for their flora, fauna, fauna habitat and wildlife corridor values;
- Maintain existing run-off water quality and flows;
- Limit disturbance of soils and preserve groundwater quality,
- Preserve the scenic qualities of the land; and
- Maintain the social character and village atmosphere of the area.

b) **Development Objectives**

- Comply with the statutory planning framework and policies;
- Implement principles of ecologically sustainable development;
- Maximise residential use of the land appropriate to the capability of the land;
- Provide suitable infrastructure prior to any residential building development;
- Stage residential development of the land;

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- Minimise financial risk to Council and the community;
- Maintain the existing subdivision pattern; and
- Promote water sensitive urban design.

Of the seven options set out in the Patterson Britton Report only two of those options received any further canvassing during the Inquiry. They were Options 4 and 5. Options 8 and 9 are derived from Option 5 and propose increased residential development. Option 10 proposes no development.

I canvass the ecological importance of the land under "Fundamental Attributes of The Heritage Estate Land". In that section I conclude that the land has certain flora, fauna, and wildlife habitat/corridor values which should be preserved and that of these values the wildlife corridor value is a fundamental attribute of the land. Being a fundamental attribute it is pre-eminent and in the circumstances is not countered by other considerations such as social and economic matters related to the landowners. This fundamental attribute must be preserved. I find relevant areas for preservation of wildlife corridors are those areas indicated in Figure 3 for Option 4. Option 4 will need to be 'adjusted' so that the boundaries of the ecologically significant areas follow lot boundaries.

Options 5, 8 and 9 (as well as Option 1, 2, 3 and 6) are consequently excluded as these options do not preserve the important wildlife corridor values of the Heritage Estate land.

Further assessment of the existing quality and flows of run-off water from the land is required as generally agreed by parties. A comprehensive water quality and flow monitoring program is essential to obtain adequate information to design water pollution control ponds and implement water sensitive urban design principles. The program will also need to assess acid sulphate soil potential in the Closed Sedgeland areas. It will also need to assess the quality of groundwater which needs to be drained from the Closed Sedgeland areas before any infrastructure or residential development is contemplated in those areas.

The effect of the acid sulphate soil potential and groundwater quality in Closed Sedgeland areas may mean land additional to the wildlife habitat/corridor areas in Option 4 needs to be set aside. Option 4 could be modified towards the lot yield of Option 7 which excludes Closed Sedgeland areas from residential development.

On balance, the evidence in relation to flora, fauna and wildlife habitat/corridors together with that relating to the maintenance of existing run-off water quality and flows does not support the exclusion of all residential development. Jervis Bay Regional Alliance and other parties opposed to any development at all have not justified their position of opposing any residential development at all. A level of residential development on the Heritage Estate land could be undertaken while maintaining the fundamental ecological attributes of the land as well as largely maintaining existing run-off water quality and flows. Option 10, the no development option is consequently excluded.

I find the maximum development option which preserves the fundamental wildlife habitat/corridor attributes of the Heritage Estate land is Option 4. However, Option 4 may need to be further reduced should it be shown that maintenance of existing run-off water quality and flows, or groundwater quality, is not achievable using proven water quality and water flow control strategies.

I also find that proving of the effectiveness of the water pollution control ponds and water sensitive urban design strongly indicates the need for staged development. This will allow time for monitoring and assessment of results. Further stages could not be developed until earlier stage(s) are complying with the "no net increase in pollutants" goal. Staged development will strictly limit the risks to downstream water quality and is an appropriately precautionary approach.

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FINDINGS

My main findings are that:

Term of Reference (a):

1. The Heritage Estate land is suitable in part for rezoning for residential development if the land is included in a current Settlement Strategy for the Jervis Bay region.
2. The evidence before this Inquiry would not preclude Council seriously considering to include the Heritage Estate land in the Jervis Bay Settlement Strategy subject to the findings of this report.
3. The Heritage Estate land is suitable for staged residential development generally according to Option 4 yielding a maximum of 730 lots.
4. The density of development should not be greater than 730 dwellings.

Term of Reference (b):

5. The determining environmental issues are the ecological value of the land as fauna habitat/ wildlife corridor(s) and run-off water quality both of which must be protected.
6. - The physical provision of infrastructure in an environmentally compatible way is feasible; and
   - The economic feasibility of providing the infrastructure must be decided by Council and the landowners once a firm proposal is developed.
7. The environmental issues do not preclude residential development generally according to Option 4.

Term of Reference (c):

8. - Options 1, 2, 3 and 6 do not provide adequate areas for wildlife corridors to protect and maintain effective corridor function and/or quality of water run-off from the site.
   - The staged development of Option 4 provides the appropriate balance between protecting environmental values and residential development;
   - Options 5, 8 and 9 do not have due regard to the ecological values of the land and propose overdevelopment of the land;
   - Option 7 is derived from Option 4 by excluding the Closed Sedgeland areas. While any ultimate residential development on the Heritage Estate land may exclude a part of all of the Closed Sedgeland areas, on the balance of evidence any exclusion is premature at present; and
   - Option 10 proposes no residential development of the land and confers the land with overall ecological values not supported by the evidence.

My more particular findings are derived from matters I canvass in this report and for detail should be read in conjunction with the report.

1. The Heritage Estate land has significant ecological values for flora, fauna, fauna habitat and as an integral part of local and regional wildlife corridor(s).
2. The ecological values are worthy of protection and conservation particularly the wildlife corridor values.
3. In the absence of full scientific certainty and because of the need to conserve biological diversity in the region a precautionary approach to protecting wildlife corridor values is essential given the extent of conserved and protected lands in the Jervis Bay region.

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4. Residential development in wildlife corridor areas would require the removal of a significant number of older and larger trees and the clearing of understorey – it is inimical to the protection of effective wildlife corridor function.

5. The pollutant load in surface water run-off from the Heritage Estate land must meet the "no net increase in average annual pollutant load" goal.

6. There is insufficient run-off water quality data for the Heritage Estate land at present to determine whether the "no net increase in average annual pollutant load" goal can be achieved.

7. A comprehensive surface water quality monitoring program is required to obtain adequate information to determine the water pollution control strategy necessary to achieve the "no net increase in average annual pollutant load" goal.

8. Further assessment of acid sulphate soil conditions and groundwater quality in Closed Sedgeland areas is necessary to determine whether, and if so how, Closed Sedgeland areas can be developed for residential use.

9. Any residential development of the Heritage Estate land -

   - Should accord with Option 4 to conserve and protect the important ecological values of the land.
   - Should be staged with residential development of each subsequent stage dependent on satisfactory environmental performance of the preceding stages, particularly in regard to ensuring the protection of downstream water quality.
   - Should be staged generally in accordance with Figure 7.6 of the Patterson Britton Report adapted to Option 4 excepting that Stage 2 be developed last as it mainly comprises Closed Sedgeland areas for which some uncertainty as to their development remains.

10. Residential densities should not be greater than the number of individual lots approved for development.

11. The Heritage Estate landowners who receive development rights for their land should pay the full cost for providing infrastructure and for developing their land;

12. Individual Heritage Estate landowners should pay for acid sulphate soil management and groundwater drainage provision on their land.

13. Birriga Avenue should not be developed as a through road between Jervis Bay Road and The Wool Road to prevent traffic short circuiting main roads and to reduce potential traffic conflicts at intersections.

14. A raised walkway/cycleway should be provided for about 80 metres across rehabilitated Closed Sedgeland areas in the central section of Birriga Avenue shown as Habitat Corridor in Figure 7.5 of the Patterson Britton Report and the five lots in this area shown as habitat corridor in Figure 7.5 should not be developed for residential use.

16. The intersection of The Wool Road and Birriga Avenue should be designed with due regard to protecting and enhancing the Worrowing Waterway wildlife corridor.

17. The section of Wanawong Boulevard where it passes through the Blackbutt Forest should be designed with due regard to the fauna habitat and wildlife corridor values of the Blackbutt Forest.

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18. The physical provision of infrastructure is feasible using well proven engineering design and construction methods.

19. Council's regional sewage treatment system will have capacity to treat sewage from staged residential development of Option 4 on the Heritage Estate land.

20. Town water supply to the Heritage Estate land is available and adequate.

21. Staged residential development of the Heritage Estate land within the relevant strategic planning framework is unlikely to impact on the social character of the area or on community services and facilities in ways than would otherwise occur with residential development according to a current Settlement Strategy.

22. Due to the required monitoring of water run-off quality from the Heritage Estate land Council's consideration of the land in preparing the Jervis Bay Settlement Strategy is unlikely to significantly delay any relevant residential development of the land.

23. Compensation for Heritage Estate landowners not able to develop their land for residential use is a matter for the landowners themselves to resolve.

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RECOMMENDATIONS

1. Council give appropriate consideration to including the Heritage Estate land in the draft Jervis Bay Settlement Strategy subject to the findings and recommendations of this report.

2. Council delay preparing a draft Local Environmental Plan to rezone part or all of the Heritage Estate land until after Council has prepared and exhibited a draft Jervis Bay Settlement Strategy.

3. Council not prepare a draft Local Environmental Plan to rezone part or all of the Heritage Estate land unless the land is included in a current Jervis Bay Settlement Strategy.

4. Any land on the Heritage Estate considered suitable by Council for residential development and included in a current Settlement Strategy be zoned Residential 2(a1) and any land having fauna habitat and wildlife corridor value as generally set out in Option 4 be zoned for Environmental Protection.

5. The important fauna habitat and wildlife corridor values of the Heritage Estate land be protected by limiting any future residential development on the land generally to Option 4 yielding a maximum of 730 lots with 730 dwellings.

6. Any future residential development on the Heritage Estate land be staged in accordance with Figure 7.6 in the Patterson Britton Report adapted to Option 4 except that Stage 2 be the final stage developed due to its location largely within Closed Sedgeland areas.

7. The discharge of water pollutants from the Heritage Estate land be controlled to the requirements of the Environment Protection Authority (EPA) following a comprehensive monitoring program of current run-off water quality to ensure there is no net increase in the average annual pollutant load leaving the Heritage Estate land compared with the existing pollutant discharge load.

8. Water volume rate discharges from the Heritage Estate land be controlled to the requirements of the EPA to reflect existing water volume rate discharges.

9. Before any residential development in Closed Sedgeland areas is considered for inclusion in a Settlement Strategy:

   - The presence or not of acid sulphate soil be confirmed and appropriate management protocols implemented to the requirements of the Department of Land and Water Conservation (DLWC);
   - The quality of groundwater drainage from the Closed Sedgeland areas be assessed in accordance with the no net increase in pollutants leaving the site goal to the requirements of the EPA in consultation with DLWC.

10. The Heritage Estate landowners pay the full cost of providing infrastructure and developing their land and that individual landowners be responsible for the cost of any groundwater drainage required for their individual lots.

11. Birriga Avenue not be developed as a through road between Jervis Bay Road and The Wool Road.

12. The Heritage Estate landowners themselves be responsible for compensation payable, if any, to those landowners whose land is unsuitable for residential development or required for water pollution control ponds.

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APPENDICES

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APPENDIX 1
MINISTER'S DIRECTION

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

I, the Minister for Urban Affairs and Planning, in accordance with Section 119(1)(a) of the Environmental Planning and Assessment Act, 1979 direct that an Inquiry be held into the Heritage Estate at Jervis Bay as described in the attached map. Specifically the Inquiry is to:

(a) determine the suitability for, and scale and density of, residential development on the land;

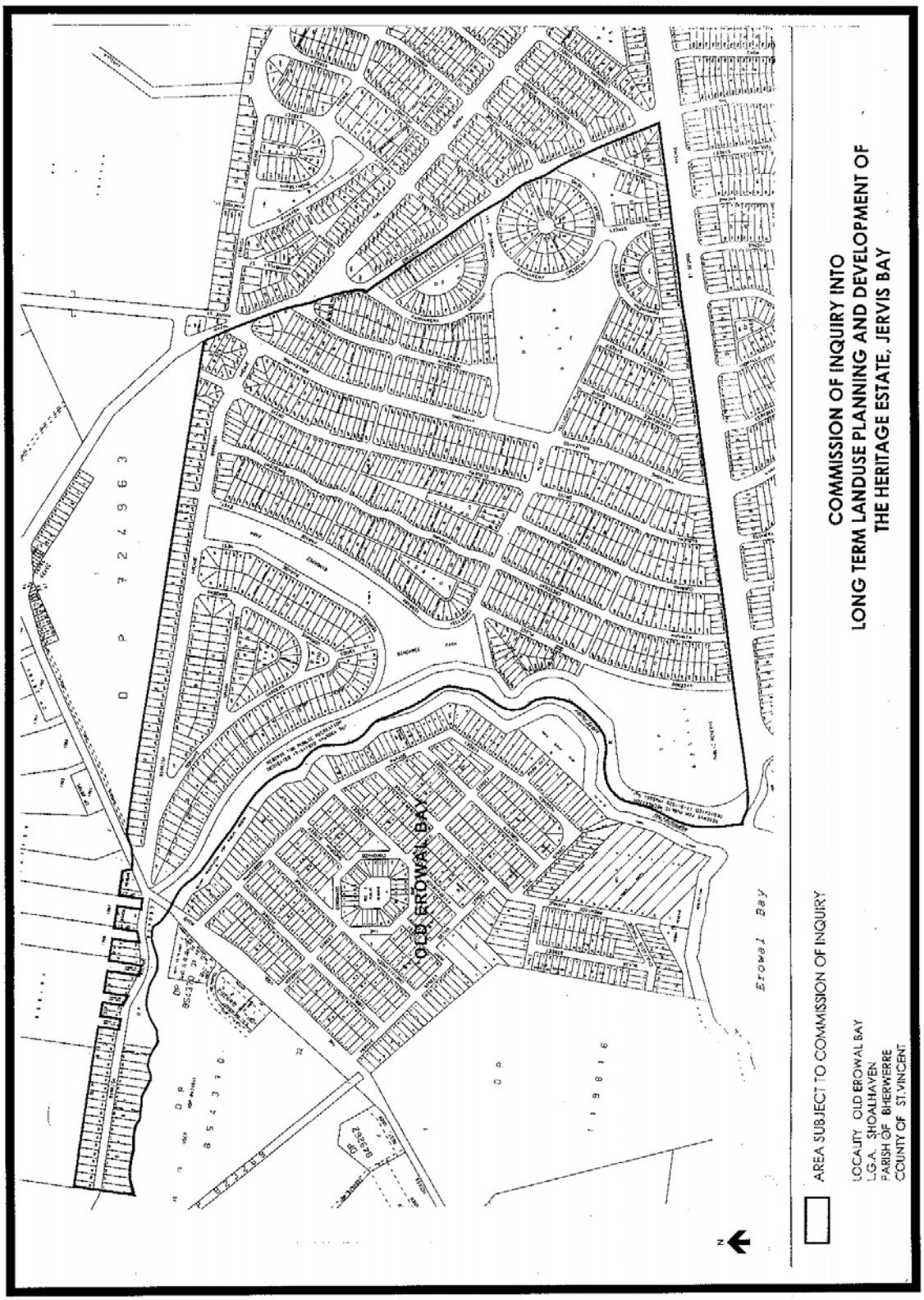
(b) examine the environmental issues raised by, and the feasibility of providing the necessary infrastructure to support, any residential development; and

(c) consider the 7 options identified in the report by Patterson Britton and Partners Pty. Ltd. of April, 1998 titled "Heritage Estates, Jervis Bay – Total Water Cycle Management, Land Capability and Infrastructure Study" as well as any other options that might meet the appropriate environmental and development objectives for the land.

Craig Knowles MP
Minister for Urban Affairs and Planning
Minister for Housing

Sydney, 6-1- 1998

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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 Environmental Planning and Assessment Act 1979, hereby appoint Commissioner Kevin Cleland, being a Commissioner of Inquiry within the meaning of the Act, to constitute a Commission of Inquiry into the Heritage Estate at Jervis Bay in terms of the Direction attached to this Instrument.

Craig Knowles
Minister for Urban Affairs and Planning

Signed at Sydney

On the 18th day of January 1999

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APPENDIX 3
LIST OF SUBMISSIONS

1. Shoalhaven City Council
   - 1.1 Primary Submission
   - 1.2 Attachment A: Environmental Study and Background Information
   - 1.3 Attachment B: Total Water Cycle Management, Land Capability and Infrastructure
   - 1.4 Documents Requested by the Commissioner
     - 1.4a Submission to Shoalhaven City Council by Allen Price and Associates
     - 1.4b Statement by Shoalhaven Landowner's Association
     - 1.4c Evaluation of Habitat Corridors
     - 1.4d Report by DUAP (1995) on the Jervis Bay Habitat Corridors
   - 1.5 Presentation to the Primary Session
   - 1.6 Questions to NPWS and DUAP
   - 1.7 Questions from the Commissioner
   - 1.8 Response to Questions
   - 1.9 Submission In Reply
   - 1.10 Response to Jervis Bay Alliance's Submission

2. NSW Government - Joint Departmental Submission
   - 2.1 Primary Submission
   - 2.2 Documents Requested by the Commissioner
     - 2.2a Flora and Fauna Protection on the Heritage Estates - A proposed reserve/corridor (NPWS)
     - 2.2b Wildlife Corridors in the Jervis Bay Region (Mr K Mills)
   - 2.3 Presentation to the Primary Session
   - 2.4 DUAP's questions to Council
   - 2.5 EPA Presentation
   - 2.6 EPA Questions to Shoalhaven Landowners Association
   - 2.7 Questions from the Commissioner
   - 2.8 NPWS Questions to Shoalhaven Landowners Association
   - 2.9 DUAP's Response to Questions
   - 2.10 NPWS' Response to Questions
   - 2.11 EPA's Response to Questions
   - 2.12 Submission In Reply
   - 2.13 Submission In Reply - Appendix
   - 2.14 ANCA Report; A Wildlife Survey of Bherwerre Isthmus

3. Commonwealth Department of Environment - Booderee National Park
   - 3.1 Primary Submission

4. Australian Conservation Foundation
   - 4.1 Primary Submission

5. Bay and Basin Community Resources Inc
   - 5.1 Primary Submission

6. Coast and Wetlands Society Incorporated
   - 6.1 Primary Submission

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7. Helensburgh Land Pooling Inc
   - 7.1 Primary Submission
   - 7.1a Addendum to 7.1
   - 7.2 Submission in Reply

8. Hyams Beach Villagers Association
   - 8.1 Primary Submission

9. Jervis Bay Regional Alliance Incorporated
   - 9.1 Primary Submission
   - 9.2 Letter re: Terms of Reference
   - 9.3 Questions to EPA, DLWC and Mr B Street
   - 9.4 Questions to NPWS
   - 9.5 Personal Statement from Presenters
   - 9.6 Bibliography to Primary Submission
   - 9.7 Council Sale of Land for Overdue Rates
   - 9.8 Presentation to the Inquiry
   - 9.9 Question from the Commissioner
   - 9.10 Questions to Shoalhaven Landowners Association
   - 9.11 Questions to NPWS
   - 9.12 Questions to EPA
   - 9.13 Questions to DUAP
   - 9.14 Questions to Shoalhaven City Council
   - 9.15 Plea to the Commissioner
   - 9.16 Response to Questions the Commissioner
   - 9.17 Response to Questions from Shoalhaven Landowners Association
   - 9.18 Response to Questions from Lake Wollumboola Support Group
   - 9.19 Submission In Reply
   - 9.20 Response to New Material

10. Shoalhaven Landowners' Association
   - 10.1 Primary Submission - Ms J Esposito
   - 10.2 Primary Submission - Allen Price and Associates
   - 10.3 Primary Submission - Mr J Kossoutas
   - 10.4 Strategy for Conservation and Management of the Ground Parrot and Eastern Bristle Bird
   - 10.5 Presentation to the Primary Session
   - 10.6 Plans for Wright's Beach
   - 10.7 Question from the Commissioner
   - 10.8 Questions to Government Agencies
   - 10.9 Questions to Jervis Bay Alliance
   - 10.10 Consent of Landholders
   - 10.11 Response to Questions - Gunninah Environmental Consultants
   - 10.12 Comment on Commissioner's Questions to Council and Government Agencies
   - 10.13 Response to Questions Jervis Bay Regional Alliance
   - 10.14 Response to EPA's Questions
   - 10.15 Response to Commissioner's Questions
   - 10.16 Submission In Reply - Ms J Esposito
   - 10.17 Submission In Reply - Allen, Price and Associates
   - 10.18 Response to New Material

11. Social Economic Environmental Group

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11.1 Primary Submission
11.2 Submission In Reply

12. South Coast Conservation Society Co-op Limited
12.1 Primary Submission

13. Total Environment Centre / National Parks Association
13.1 Primary Submission

14. Worrowing Progress Group
14.1 Primary Submission

15. Mr D Reynolds (MACHELP)
15.1 Primary Submission

16. Ms JM Adams
16.1 Primary Submission
16.2 Supplementary Submission

17. Ms E Atkinson
17.1 Primary Submission

18. Ms J Bange
18.1 Primary Submission

19. Mr and Mrs Blackall
19.1 Primary Submission

20. Dr A Blake
20.1 Primary Submission

21. Mr R Bosdyk
21.1 Primary Submission

22. Mr and Mrs Brown-Sarre
22.1 Primary Submission

23. Mr A Bunyan
23.1 Primary Submission

24. Mr Dennaoui
24.1 Primary Submission

25. Mr E Drew
25.1 Primary Submission

26. Ms M Duvollet
26.1 Primary Submission

27. Ms L Erwin
27.1 Primary Submission

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28. Mr and Mrs Forster
    28.1 Primary Submission

29. Mr D Gill
    29.1 Primary Submission

30. Mr JE Hatton
    30.1 Primary Submission

31. Ms HR Hill
    31.1 Primary Submission

32. Ms M Hutton
    32.1 Primary Submission
    32.2 Submission In Reply

33. Mrs C Janevski
    33.1 Primary Submission

34. Mr R and Mrs L Keen
    34.1 Primary Submission
    34.2 Presentation to the Primary Session
    34.3 Assessment of Significant Trees (1 copy at COI)
    34.4 Question to Shoalhaven Landowners Association
    34.5 Questions to Shoalhaven City Council

35. Mrs R Lattari
    35.1 Primary Submission

36. Ms M Rand and Mr J Hugentobler
    36.1 Primary Submission

37. Mr G and Mrs R Mahon
    37.1 Primary Submission

38. Mr V Merkuloff
    38.1 Primary Submission
    38.2 Submission In Reply

39. JG Morgan
    39.1 Primary Submission

40. Mr D Phelps
    40.1 Primary Submission

41. Ms C Rigg
    41.1 Primary Submission

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42. Mr M Sari
    42.1 Primary Submission

43. Mr K Sheen
    43.1 Primary Submission

44. Ms H Woolley
    44.1 Primary Submission

Primary Submissions received after 3 May 1999

45. Ms S Minglis (Minter Ellison)
    45.1 Primary Submission

46. Mr C Martin
    46.1 Submission to the Hon. Harry Woods

47. Mr Naumovski
    47.1 Primary Submission

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APPENDIX 4
LIST OF APPEARANCES

Shoalhaven City Council

Mr E Royston — Planning Services Manager

Combined Submission from NSW State Government

Department of Urban Affairs and Planning

Mr D Ouma-Machio — Regional Director, Illawarra and South Coast

National Parks and Wildlife Service

Mr M Hood — Manager, Environmental Planning Unit, Southern Zone

Environment Protection Authority

Mr P Blom — Acting Head of Operations Unit, Southern Regions

Department of Land and Water Conservation

Mr C Page — Projects Co-ordination

Australian Conservation Foundation

Ms M Leatch — Shoalhaven Branch

Bay and Basin Community Resources Inc

Ms Houston — President

Helensburgh Land Pooling

Mr A Bennett

Hyams Beach Villagers Association

M G Gerber — President

Jervis Bay Regional Alliance Inc.

Ms S Gjedsted — Chairperson
Mr D Winterbottom
Mr B Train
Mr G Stevenson
Mr G Daly — Director, Gaia Research Pty Limited

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Shoalhaven Landowners' Association

Ms J Esposito	President
Mr P Price	Director; Allen, Price and Associates

Worrowing Progress Group

Mr R Young	President

Mr R Keen

Mrs L Keen

Mr V Merkuloff

Mr J Naumouski

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APPENDIX 5
LIST OF BACKGROUND DOCUMENTS

A. Instrument of Appointment under s. 119(2) EP&A Act 1979

B. Direction under Section 119(1)(b) EP&A Act 1979

C. Local Environmental Plan 1985 (amended 18/12/98)

D. Jervis Bay Regional Environmental Plan 1996

E Heritage Estates Environmental Study and Background Information (1/97)

F. Total Water Cycle Management, Land Capability and Infrastructure Study (4/98)

G. Final Report of Heritage Estate Taskforce to Shoalhaven City Council and the Department of Urban Affairs and Planning

H. Jervis Bay Our Heritage Our Future - A Discussion Paper prepared by Department of Planning in association with Shoalhaven City Council (1992)

I. Summary of Submissions and Issues from the Environmental Study (4/95)

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APPENDIX 6
FINAL REPORT OF THE HERITAGE ESTATE TASKFORCE

FINAL REPORT OF HERITAGE ESTATE TASKFORCE TO SHOALHAVEN CITY COUNCIL AND THE DIRECTOR-GENERAL OF DEPARTMENT OF URBAN AFFAIRS AND PLANNING

1. Introduction

In August 1996 Shoalhaven City Council resolved to request a section 65 certificate to enable the exhibition of a draft local environmental plan to allow up to 1,200 dwellings on Heritage Estate, an old paper subdivision at Jervis Bay. The Heritage Estate Taskforce was established by the Director-General of Urban Affairs and Planning and Shoalhaven City Council to resolve a number of outstanding issues associated with the future development of the estate. Its role was to develop a strategic approach to the future of the estate which would provide finality and certainty to the landowners while balancing the needs and objectives of the Shoalhaven City Council, the government and the community.

The terms of reference required the taskforce to report on the potential development of the estate, with specific reference to the environmental management of the area, the scale and timing of any development and the funding and timing of infrastructure provision. The taskforce was also required to advise on the future use of any lands found to be unsuitable for development.

Membership of the committee was comprised of representatives from Shoalhaven City Council (SCC), the Department of Land and Water Conservation (DLWC), the National Parks and Wildlife Service (NPWS), the Environment Protection Authority (EPA), the Department of Urban Affairs and Planning (DUAP) and the Shoalhaven Landowners Association (SLA).

Following its initial meeting in 1997 the Heritage Estate Taskforce identified the need for more detailed investigation of the issues associated with water quality management, land capability, and infrastructure provision and funding. Patterson Britton and Partners was engaged in dated 1997 to undertake this work. The findings of the consultant have now been submitted to the taskforce.

This report of the taskforce to Shoalhaven City Council and the Director-General presents the findings of the consultants work, the areas of agreement within the taskforce and any divergence of opinion within the group.

The major issues arising from the work of the taskforce were associated with the extent and design of habitat corridors/areas of ecological significance; water quality and quantity management; the management of potential acid sulphate soils; the environmental impact and economic feasibility of developing the closed sedgeland areas; the future of lands which cannot be developed, issues relating to compensation and the costs of development of the estate.

2. Key findings of the consultants report

The consultant study identified seven possible development scenarios for the estate based on land capability assessment. These were then assessed for water quality control requirements, infrastructure needs, and constraints such as ecological significance and poor drainage. The lot yield and development cost per lot were determined for each scenario.

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The Study identified the need for protection of ecologically significant areas within the estate. The area outlined by NPWS, and represented by scenario 4, was taken as a basis for delineation of these areas and then amended to take into account the existing site layout, physical constraints, and adjacent landuses. The consultant's preferred scenario three was derived from this amended environmental significant area, and incorporated areas required for constructed wetlands and other infrastructure, development of the closed sedgelands and principles of water sensitive urban design.

Lot Yield and Cost per Lot for Each Development Scenario

Development Scenario		Size of Wetland	Number of Lots		Undeveloped Lots			Cost of development
Number	*Description*	*(ha)*	*Developed*	*Remainder*	*Ecologically Significant Area*	*Water Quality Control*	*Other*	
2	Maximum Sustainable Development	7.0	876	341	280	61		31,271
3	Maximum Sustainable Development with Water Sensitive Urban Design	5.0	884	333	280	53	-	30,307
4	Ecologically Significant Areas proposed by the NPWS	6.0	730	487	431	56	-	35,329
5	Ecologically Significant Areas proposed by Allen, Price & Associates	8.5	995	222	135	87	-	29,326
6	Scenario 2 with drainage problem area excluded	5.0	670	547	280	53	214	32,612
7	Scenario 4 with drainage problem areas excluded	2.5	510	707	431	22	254	35,219

As indicated in the table above, the costs of development of the estate range from about $30,000 to $35,000 per lot depending on the number of lots developed. This is affected by the size of the areas designated as being environmentally sensitive, the water quality controls used and the adoption of water sensitive urban design principles. A land acquisition cost of $5,000 per lot has been incorporated into the development costs to allow for compensation for landholders unable to develop their lands.

The consultant has recommended a number of additional studies and further work which may be considered either prior to or after rezoning for residential development. They include additional water quality testing, a drainage trial of the closed sedgelands to determine the feasibility and cost of developing these areas, more detailed sampling and testing for acid sulphate soil conditions, development of an erosion and sediment control strategy prior to the construction phase commencing, further geotechncial investigations prior to development, and additional archaeological studies after rezoning.

The study has identified several possible funding option for the development of the estate. They include general rates, special rates, section 94 contributions, section 64 contributions, and establishment of a development trust.

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3. Areas of Agreement Within the Taskforce

The taskforce agreed that, should a rezoning of the estate proceed, not all landowners would receive a development right due to the need to protect areas having environmental significance and provide for water quality control and other infrastructure needs.

It was recognised that there is an expectation of compensation by landowners whose land could not be developed that will need to be addressed.

The taskforce agreed there was a need for further studies, particularly those relating to a drainage trial of the closed sedgeland areas and assessment of acid sulphate soils potential. Sources of funding for any additional studies to be determined by Council who would commission the studies.

The taskforce endorsed the adoption of water sensitive urban design principles, whatever the final development scenario chosen.

It was agreed that it would be more appropriate to undertake any necessary studies relating to species impacts at the rezoning stage rather than wait until landowners made their individual development and building applications.

4. Areas of Disagreement Within the Taskforce

The extent and design of the environmentally significant areas/habitat corridors within the estate is an issue of which the views of the taskforce diverged. NPWS has stated that it considers that its option (scenario 4) represents a significant compromise to the findings of the earlier environmental studies undertaken by Hassell Planning Consultants and AES, which recommended a much larger protected area. This compromise was based on the need to resolve the future of the estate in order to address the ongoing degradation of the natural heritage values of the land.

The Shoalhaven Landowners Association (SLA) emphasised during the deliberations of the taskforce that it was not supportive of the NPWS position regarding the size and extent of the proposed areas of ecological significance within the estate. The SLA considers that all lots should be rezoned, with the exception of those lots essential to the development of services such as artificial wetlands. It has further stated that the concept of habitat corridors/areas of ecological significance is rejected unless compensation is paid by the State for land required for public purposes. An alternative approach is to regard such land as a contribution of open space by the whole Heritage Estate development that is borne by the development. Issues relating to compensation were not resolved by the Taskforce.

It was unclear at the finalisation of the deliberations of the taskforce whether the landowners would be willing to pay the $30,000 to $35,000 necessary for the development of each lot. It was agreed that this question needed to put to the members of the SLA.

The funding mechanism to be used for the development of the estate was considered to be a matter for the Council given the level of responsibility that it would be required to accept for financing the development.

The question of whether the closed sedgelands should be developed was discussed but could not be conclusively determined without further information resulting from a proposed drainage trial.

Whether water sensitive urban design can be used to reduce the size of the constructed wetlands and therefore increase the potential lot yield was questioned by EPA and not resolved by the taskforce.

5. The Way Forward

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Following the submission of this report of the Heritage Estate Taskforce to the Director-General of Urban Affairs and Planning and the Shoalhaven City Council it becomes a matter for the Council to decide whether to proceed with its original local environmental plan for the estate; whether to proceed with an amended plan which takes into account the work of the taskforce; or whether in view of significant unresolved issues to maintain the existing situation which does not permit residential development of the estate or to defer a decision until those issues are resolved.

It is important to ensure at an appropriate stage that there is community input. Options for delivering this include exhibition of an LEP recognising that this may not result in an LEP being made while studies and issues remain outstanding or by exhibition of studies and the consultants report for a community comment. This process could as an option be supported by an Inquiry conducted by a Commissioner reporting to Council.

Ian Campbell
Executive Director
Regional NSW Planning

Ernie Royston
Planning Services Manager
Shoalhaven City Council

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DEPARTMENT OF THE ENVIRONMENT AND WATER RESOURCES

A/g AS CEB
through: Director, Commonwealth and Territories Section

Division: AWD
Public Affairs Consulted: No

APPROVAL OF FINAL PUBLIC ENVIRONMENT REPORT (PER) GUIDELINES HERITAGE ESTATE REZONING AND ASSOCIATED PUBLIC WORKS WORROWING HEIGHTS, NSW (EBPC 2007/3448)

Timing: Decision due 19 September 2007.

Purpose: To seek approval of the Final PER Guidelines **(Attachment A)**.

Background:

- 9 May 2007 – An EPBC referral was received for the proposed development. The public comment period was extended from 20 to 30 business days, in response to a request from a member of the public, because the consultant's report on threatened species was not initially made available to the public.
- 22 June 2007 – The Minister's delegate decided that the proposal was a controlled action and that assessment would be by PER.
- 20 July 2007 – Draft PER Guidelines were approved by the delegate for the Minister for the Environment and Water Resources, and released for public comment until 21 August 2007. No public comments were received.
- Following the public comment period, the AWD sought internal advice from the Heritage Division (HD) on the Draft PER Guidelines. HD comments (**Attachment B)** have been addressed in the Final PER Guidelines.

Issues/Sensitivities:

- The Shoalhaven City Council (SCC) proposes to rezone and undertake associated public works to facilitate residential development of a 176.9ha site, known as the Heritage Estate, at Worrowing Heights, NSW. Based on a recommendation from the NSW Commission of Inquiry into the proposed development, the SCC proposes to facilitate the development of 730 residential lots, of a possible 1200.
- The controlling provisions are listed threatened species and Commonwealth land (Booderee National Park). The proposed action would result in the clearing of vegetation that provides habitat for listed threatened species, including the endangered Eastern Bristlebird and vulnerable Leafless Tongue Orchid, among others. It would also increase the fragmentation of habitat corridor values for fauna and flora occurring on the neck of the Bherwerre Peninsular, potentially impacting on the viability of species' populations and ecosystems within the Booderee National Park. Other likely impacts include the degradation of remaining habitat at the Heritage Estate site via edge effects, such as weed encroachment and the introduction of pest animals.
- The BES report that was provided with the referral gives a thorough on-site analysis of impacts on listed threatened species, and for this reason no further species surveys are required. However, the SCC is required to provide a desktop analysis of species' distributions within a regional context, and to undertake further analysis of the Heritage Estate's importance as a regional habitat corridor that supports species diversity and ecosystem requirements within the Booderee National Park.

Recommendation/s:

1. Approve the Final PER Guidelines at **Attachment A**; and
2. Sign the letter at **Attachment C** advising the proponent of your decision.

1. Approved / Not approved
2. Signed / Please discuss

Neville Matthew
A/g Assistant Secretary, CEB
/ 09 / 2007

s. 22(1)(a)(ii)
Director
Commonwealth and Territories Section
September 2007

s. 22(1)(a)(ii)

Consultation: HD

Attachments:

A Final PER Guidelines
B HD comments on Draft PER Guidelines
C Letter of Notification to the proponent

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LEX 83485 Document 17

GUIDELINES FOR THE CONTENT OF A DRAFT PUBLIC ENVIRONMENT REPORT (PER)

Heritage Estate Rezoning and Associated Public Works to Facilitate Residential Development, Worrowing Heights, NSW

Environment Protection and Biodiversity Conservation Act 1999
(Reference: EPBC 2007/3448)

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GUIDELINES FOR A PUBLIC ENVIRONMENT REPORT

HERITAGE ESTATE REZONING AND ASSOCIATED PUBLIC WORKS TO FACILITATE RESIDENTIAL DEVELOPMENT, WORROWING HEIGHTS, NSW

PREAMBLE

The Shoalhaven City Council (SCC) proposes to undertake rezoning and associated public infrastructure works to facilitate residential development of the Heritage Estate, a 176.9ha area of land at Worrowing Heights, on the Bherwerre Peninsular, near Jervis Bay, NSW.

In 1999 the Heritage Estate proposal was the subject of a NSW Commission of Inquiry to investigate the potential for development of the site. The inquiry recommended that land with important fauna habitat and wildlife corridor values should be protected and that a maximum of 730 residential lots could be considered for development.

On 9 May 2007 the proposed action was referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The referred proposal was drawn from the Commission of Inquiry recommendation for a maximum development of 730 residential lots. On 22 June 2007 the delegate for the Minister for the Environment and Water Resources determined that the proposed action requires approval under the EPBC Act, and that it will be assessed by a Public Environment Report (PER).

The proposed action has the potential to have a significant impact on the following matters, which are protected under Part 3 of the EPBC Act:

- Sections 18 and 18A (Listed threatened species and ecological communities); and
- Sections 26 and 27A (Commonwealth land).

Information about the action and its relevant impacts, as outlined below, is to be provided in the PER. This information should be sufficient to allow the Minister to make an informed decision on whether or not to approve, under Part 9 of the EPBC Act, the taking of the action for the purposes of each controlling provision.

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GENERAL ADVICE ON GUIDELINES

1 GENERAL CONTENT

The PER should be a stand-alone document that primarily focuses on the matters listed above. It should contain sufficient information to avoid the need to search out previous or supplementary reports.

The PER should enable interested stakeholders and the Minister for the Environment and Water Resources to understand the environmental consequences of the proposed development. Information provided in the PER should be objective, clear, and succinct and, where appropriate, be supported by maps, plans, diagrams or other descriptive detail. However, detailed mapping of the specific locations of threatened species should not be included. Rather, information about threatened species known to occur at the site is required in terms of the species' numbers, distribution and habitat requirements, within a regional context.

The body of the PER is to be written in a clear and concise style that is easily understood by the general reader. Technical jargon should be avoided wherever possible. Cross-referencing should be used to avoid unnecessary duplication of text.

Detailed technical information, studies or investigations necessary to support the main text should be included as appendices to the PER. It is recommended that any supporting documentation and studies, reports or literature, from which information has been extracted and which are not normally available to the public, be made available at appropriate locations during the period of public display of the PER. The proponent should also make the PER and supporting information available on the Internet.

If it is necessary to make use of material that is considered to be of a confidential nature, the Proponent should consult with Department of the Environment and Water Resources (DEW) on the preferred presentation of that material, before submitting the draft PER to the Minister for approval for publication.

The level of analysis and detail in the PER should reflect the level of expected impacts on the environment. Any and all unknown variables or assumptions made in the assessment must be clearly stated and discussed. The extent to which the limitations, if any, of available information may influence the conclusions of the environmental assessment should be discussed.

The proponent should ensure that the PER addresses the matters stated in Schedule 4 of the EPBC Regulations *Matters to be addressed by draft Public Environment Report* at Attachment 1.

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2 FORMAT AND STYLE

The PER should comprise three elements, namely:

- the executive summary;
- the main text of the document, and
- appendices containing supporting technical information and other information that can be made publicly available.

The guidelines have been set out in a manner that may be adopted as the format for the PER. This format need not be followed where the required information can be more effectively presented in an alternative way. However, each of the elements must be addressed to meet the requirements of the EPBC Act and Regulations.

The PER should be written so that any conclusions reached can be independently assessed. To this end all sources must be appropriately referenced using the Harvard standard. The reference list should include the address of any Internet "web" pages used as data sources.

The main text of the PER should include a list of abbreviations, a glossary of terms and appendices containing:

- a copy of these guidelines;
- a list of persons and agencies consulted during the PER;
- contact details for the Proponent; and
- the names of, and work done by the persons involved in preparing the PER.

Maps, diagrams and other illustrative material should be included in the PER where appropriate. The PER should be produced on A4 size paper capable of being photocopied, with maps and diagrams on A4 or A3 size and in colour where possible.

The proponent should consider the format and style of the document appropriate for publication on the Internet. The capacity of the website to store data and display the material may have some bearing on how the document is constructed.

Information about species listed under the EPBC Act should be provided in electronic format to DEW. The provision of this information will help facilitate decision making under the EPBC Act and assist in the protection and recovery of species and communities.

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SPECIFIC CONTENT

1 GENERAL INFORMATION

This should provide the background and context of the action including:

(a) the title of the action;

(b) the full name and postal address of the designated Proponent;

(c) a clear outline of the objective of the action;

(d) legislative background for the proposal, including the NES matters protected under Part 3 of the EPBC Act and any other requirements and approvals needed under the EPBC Act;

(d) the location of the action;

(e) the background to the development of the action;

(f) how the action relates to any other actions (of which the proponent should reasonably be aware) that have been, or are being, taken or that have been approved in the region affected by the action;

(g) the current status of the action; and

(h) the consequences of not proceeding with the action.

2 DESCRIPTION OF THE ACTION

All components of the proposed action, including all areas proposed for development, should be described. This should include:

(a) the number and location of all residential allotments proposed for development; and

(b) a description of public works, such as roads, sewerage, powerlines, bushfire protection and hazard reduction requirements, that would be required to facilitate the proposed development, including areas where public works would be undertaken.

3 FEASIBLE ALTERNATIVES

Any feasible alternatives to the proposed action should be described to the extent reasonably practicable, including:

(a) if relevant, the alternative of taking no action;

(b) constraints and opportunities for alternative development footprints;

(c) a comparative description of the impacts of each alternative on the NES matter protected by Part 3 of the EPBC Act; and

(d) sufficient detail to make clear why any alternative is preferred to another.

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4 DESCRIPTION OF THE ENVIRONMENT

Undertake a desktop study of existing and available information about the environment at the proposal site and in the surrounding region, which may be affected by the proposed development of the Heritage Estate. The study should investigate the relevant matters protected under Part 3 of the EPBC Act, including but not restricted to:

(a) Information about listed threatened species and their habitats that are likely to be present at the site, including:

- a description of the values and extent of the regional ecosystem impacted;
- contextual information about the species' regional status, population and distribution, including mapping of regional distributions; and
- a description of the species' core breeding and foraging habitats, including information about the regional distribution of suitable habitat.

(b) A description of the environment on and adjacent to Commonwealth land (Booderee National Park) that is likely to be impacted by the proposal, including but not restricted to:

- the biological diversity of the environment on Commonwealth land, including:
  - i. listed threatened, rare or geographically restricted species and ecosystems that occur within the Booderee National Park and regional environment;
  - ii. species of conservation significance to the Booderee National Park, including the species' regional status, population and distribution; and
  - iii. any non-threatened species that occur within the Booderee National Park and at the Heritage Estate site, which may be impacted by the potential fragmentation and disturbance of habitat corridor values.
- the context and importance of regional habitat corridors, including:
  - i. the Jervis Bay regional planning framework and identified habitat corridors, including maps;
  - ii. government agencies' views on the adequacy of identified regional habitat corridors;
  - iii. requirements for effective habitat corridors on the Bherwerre Peninsular, including recommended lengths and widths of corridors, and species' requirements for habitat diversity; and
  - iv. an analysis of the context and importance of the site's habitat corridor values.
- the heritage values of adjacent and nearby places listed on the Commonwealth Heritage List (CHL) and Register of the National Estate (RNE).

(c) A discussion of potential impacts on the heritage values of the Jervis Bay Territory (CHL #105394), and places adjacent to Commonwealth land (RNE # 1604 and #1587), where relevant impacts on heritage values have not been addressed as part of 4(a) or (b).

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5 RELEVANT IMPACTS

The PER must include a description of all the potential relevant impacts of the proposed action, including consequential impacts as defined by Section 527E of the EPBC Act, on the relevant matters of NES protected under Part 3 of the EPBC Act. This must include, but are not restricted to:

(a) potential direct, indirect and consequential impacts on listed threatened species and species of conservation significance from the proposed development of the site;

(b) potential direct, indirect and consequential impacts on regional habitat corridor values and the environment on Commonwealth land from the proposed development of the Heritage Estate site;

(c) potential impacts to hydrology, including from erosion and sedimentation;

(d) potential bushfire property protection and fire management regimes for the site;

(e) potential impacts from feral and domestic animals;

(f) a detailed assessment of the nature and extent of the likely short-term and long-term relevant impacts;

(g) a statement as to whether any relevant impacts are likely to be unknown, unpredictable or irreversible;

(h) an analysis of the relevant impacts; and

(i) any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

6 PROPOSED SAFEGUARDS AND MITIGATION MEASURES

The PER must provide information on mitigation measures, with a particular focus on matters protected under Part 3 of the EPBC Act. Specific measures must be provided and substantiated, based on best available practices, and must include the following elements:

(a) A consolidated list of mitigation measures proposed to be undertaken to prevent, minimise or compensate for the relevant impacts of the action, including:

- a description of proposed safeguards and mitigation measures to deal with relevant impacts of the action, including mitigation measures proposed to be taken by State governments, local governments or the proponent;
- assessment of the expected or predicted effectiveness of the mitigation measures;
- any statutory or policy basis for the mitigation measures; and
- the cost of the mitigation measures.

(b) The name of the agency responsible for endorsing or approving each mitigation measure or monitoring program.

7 OTHER APPROVALS AND CONDITIONS

Information given on any other requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action must include:

(a) details of any local or State Government planning scheme, or plan or policy under any local or State Government planning system that deals with the proposed action, including:

- what environmental assessment of the proposed action has been, or is being, carried out under the scheme, plan or policy; and

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- how the scheme provides for the prevention, minimisation and management of any relevant impacts;

(b) a description of any approval that has been obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the Act), including any conditions that apply to the action;

(c) a statement identifying any additional approval that is required; and

(d) a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.

8 CONSULTATION

Any consultation about the action, including:

(a) any consultation that has already taken place, including with Indigenous communities;

(b) proposed consultation about relevant impacts of the action, including with Indigenous communities with reference to *Ask First,* which can be found at: http://www.ahc.gov.au/publications/ask-first.html;

(c) if there has been consultation about the proposed action, any documented response to, or result of, the consultation.

The proponent should ensure that Clause 2 (i) of Schedule 4 of the EPBC Regulations at Attachment 1 is adequately addressed in the PER.

9 INFORMATION SOURCES PROVIDED IN THE PER

For information given in a draft Public Environment Report, the draft must state:

(a) the source of the information;

(b) how recent the information is;

(c) how the reliability of the information was tested; and

(c) what uncertainties (if any) are in the information.

10 ENVIRONMENTAL RECORD OF PERSON PROPOSING TO TAKE THE ACTION

Details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:

(a) the person proposing to take the action; and

(b) for an action for which a person has applied for a permit, the person making the application.

If the person proposing to take the action is a corporation, also include details of the corporation's environmental policy and planning framework.

11 CONCLUSION

An overall conclusion as to the environmental acceptability of the proposal should be provided.

Measures proposed or required by way of offset for any unavoidable impacts on NES matters, and the relative degree of compensation, should be highlighted.

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ATTACHMENT 1

MATTERS THAT MUST BE ADDRESSED IN A PER (SCHEDULE 4 OF THE EPBC ACT REGULATIONS 2000)

1 General information

1.01 The background of the action including:

(a) the title of the action;

(b) the full name and postal address of the designated proponent;

(c) a clear outline of the objective of the action;

(d) the location of the action;

(e) the background to the development of the action;

(f) how the action relates to any other actions (of which the proponent should reasonably be aware) that have been, or are being, taken or that have been approved in the region affected by the action;

(g) the current status of the action;

(h) the consequences of not proceeding with the action.

2 Description

2.01 A description of the action, including:

(a) all the components of the action;

(b) the precise location of any works to be undertaken, structures to be built or elements of the action that may have relevant impacts;

(c) how the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts;

(d) relevant impacts of the action;

(e) proposed safeguards and mitigation measures to deal with relevant impacts of the action;

(f) any other requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action;

(g) to the extent reasonably practicable, any feasible alternatives to the action, including:

(i) if relevant, the alternative of taking no action;

(ii) a comparative description of the impacts of each alternative on the matters protected by the controlling provisions for the action;

(iii) sufficient detail to make clear why any alternative is preferred to another;

(h) any consultation about the action, including:

(i) any consultation that has already taken place;

(ii) proposed consultation about relevant impacts of the action;

(iii) if there has been consultation about the proposed action — any documented response to, or result of, the consultation;

(i) identification of affected parties, including a statement mentioning any communities that may be affected and describing their views.

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3 Relevant impacts

3.01 Information given under paragraph 2.01 (d) must include:

(a) a description of the relevant impacts of the action;

(b) a detailed assessment of the nature and extent of the likely short term and long term relevant impacts;

(c) a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible;

(d) analysis of the significance of the relevant impacts;

(e) any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

4 Proposed safeguards and mitigation measures

4.01 Information given under paragraph 2.01 (e) must include:

(a) a description, and an assessment of the expected or predicted effectiveness of, the mitigation measures;

(b) any statutory or policy basis for the mitigation measures;

(c) the cost of the mitigation measures;

(d) an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing;

(e) the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program;

(f) a consolidated list of mitigation measures proposed to be undertaken to prevent, minimise or compensate for the relevant impacts of the action, including mitigation measures proposed to be taken by State governments, local governments or the proponent.

5 Other approvals and conditions

5.01 Information given under paragraph 2.01 (f) must include:

(a) details of any local or State government planning scheme, or plan or policy under any local or State government planning system that deals with the proposed action, including:

(i) what environmental assessment of the proposed action has been, or is being, carried out under the scheme, plan or policy;

(ii) how the scheme provides for the prevention, minimisation and management of any relevant impacts;

(b) a description of any approval that has been obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the Act), including any conditions that apply to the action;

(c) a statement identifying any additional approval that is required;

(d) a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.

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6 Environmental record of person proposing to take the action

6.01 Details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:

(a) the person proposing to take the action; and

(b) for an action for which a person has applied for a permit, the person making the application.

6.02 If the person proposing to take the action is a corporation — details of the corporation's environmental policy and planning framework.

7 Information sources

7.01 For information given in a draft public environment report or environmental impact statement, the draft must state:

(a) the source of the information; and

(b) how recent the information is; and

(c) how the reliability of the information was tested; and

(d) what uncertainties (if any) are in the information.

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DEPARTMENT OF THE ENVIRONMENT, WATER, HERITAGE AND THE ARTS

DIRECTION TO PUBLISH BRIEF – PUBLIC ENVIRONMENT REPORT – HERITAGE ESTATE REZONING AND ASSOCIATED PUBLIC WORKS WORROWING HEIGHTS, NSW (EBPC 2007/3448)

DEW Brief: ***N/A***
Public Affairs Consulted: Media Handling note being prepared
DEW File: 2007/6256

For: Vicki Middleton, AS, EAB

Deadline and reason: Shoalhaven City Council is keen to release the document as soon as possible.

Recommendations:

1. Agree the draft Public Environment Report (PER) at Attachment A was prepared in accordance with the PER Guidelines (Attachment B).	1. Agreed/ Please discuss
2. Agree to specify a period of 30 business days for public comment.	2. Agreed/ Please discuss
3. Approve the publication of the draft PER by signing the letter at Attachment C	3. Signed/Not Signed

Background:

- On 9 May 2007 a referral was received for the proposed development and on 22 June 2007 the Minister's delegate decided that the proposal was a controlled action and that assessment would be by PER.
- The controlling provisions are **listed threatened species** and **Commonwealth land** (Booderee National Park). The proposed action would result in the clearing of habitat for listed threatened species and increase the fragmentation of habitat corridor values for fauna and flora occurring in the Booderee National Park.
- On 19 September 2007 the Minister's delegate approved the final PER Guidelines (Attachment B).
- On 25 March 2008 the proponent, Shoalhaven City Council, provided the Department with a draft PER. The Department provided comments on this report on 1 May 2008 and on 14 May 2008 the proponent provided a copy of the revised draft PER (Attachment A) for approval.
- The Department has reviewed the revised draft PER and believes it is consistent with the PER Guidelines approved for the proposal.

Issues/ Sensitivities:

- Approximately 1100 landowners, who purchased rural zoned allotments within the Estate in the late 1980's and early 1990's, have been very vocal in seeking government approval to rezone and develop the land since 1990's. However, many local residents are opposed to the development of the area because of its environmental significance.
- An information brief is being prepared for the Minister and a media handling note.

Vicki Middleton
AS EAB
/ / 2008

s. 22(1)(a)(ii)
Director
Commonwealth and Territories Section
May 2008

Primary Contact
s. 22(1)(a)(ii)

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Consultation: Parks Australia

Attachments:

A Draft PER for Heritage Estates Proposal
B PER Guidelines for Heritage Estates proposal
C Letter to Shoalhaven City Council - direction to publish

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DEPARTMENT OF THE ENVIRONMENT, WATER, HERITAGE AND THE ARTS

ACCEPT DEPARTMENTAL RECOMMENDATION REPORT – HERITAGE ESTATES PROPOSED REZONING AND PUBLIC INFRASTRUCTURE FACILITATING THE DEVELOPMENT OF 730 LOTS FOR HOUSING, WORROWING HEIGHTS, NSW, (EPBC 2007/3448)

Brief No: N/A
Public Affairs Consulted: Yes
DEWHA File: 2007/10740

For: Ms Vicki Middleton, Assistant Secretary, EAB

Deadline and reason: a final decision is due 9 March 2009. We recommend that you accept the proposed decision by 30 January 2008 to ensure a final decision is made on time.

Recommendations:

1. consider the finalised PER at Attachment A	1. Noted/ Please discuss
2. consider all the documents listed in the recommendation report Attachment B	2. Noted/ Please discuss
3. accept the draft recommendation report at Attachment C	3. Accepted/Please discuss
4. agree with the recommended decision on page 1 of the draft recommendation report (Attachment C)	4. Agreed/Not agreed

Controlling Provisions				
	World Heritage (s12 & s15A)	☐	National Heritage (s15B & 15C)	☐
	Wetlands (Ramsar) (s16 & s17B)	☐	Threatened Species (s18 & 18A)	☒
	Migratory Species (s20 &s20A)	☐	Cwealth marine (s23 & 24A)	☐
	Nuclear actions (s21 & s22A)	☐	Cwealth land (s26 & 27A)	☒
	Commonwealth actions (s28)	☐		

Background:

- The proposal involves the rezoning and public infrastructure works, including bushfire protection and hazard reduction to facilitate the development of 730 residential lots within the Heritage Estates (Attachment A). The Heritage Estates occupies approximately 179.6ha of land on the Bherwerre isthmus, a narrow land corridor extending to the Bherwerre Peninsula and Booderee National Park.
- Further details of the proposal are at paragraphs 1, 2, and 10 of the draft Recommendation Report at Attachment B.
- Advice has been sought from s. 22(1)(a)(ii) , Legislation Policy on consistency with international conventions, and paragraphs 115, 116, 119 and 120 reflect her advice.

Issues/ Sensitivities:

- Heritage Estates is a paper subdivision with approximately 1,232 individually owned lots which were sold in the late 1980s and early 1990s. The land has been zoned rural since 1964 when zoning was introduced to the Shoalhaven City Council.
- The project has a long history of public debate and State and local government agency involvement with no resolution, culminating in a Commission of Inquiry in 1999.
- As a result of the outcomes of the CoI 1999 730 lots were given the go ahead to seek permission to be developed. The CoI recommended that development proceed on a staged basis. It was recommended that initial development only occur on stage one (135 lots) of the proposed four stage development, depending on the monitoring results concerning water runoff. This monitoring was recommended to ensure there would be "no net increase on key pollutants" draining into St Georges Basin.
- Issues regarding compensation have been raised in the public submissions.
- The proposal will directly affect the long-term viability of fauna and flora species within Booderee National Park, it will increase fragmentation of habitat corridor values, potentially adding to local extinctions of listed species and impacting on its natural and heritage values.

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- The proposal will result in direct impacts on key populations of the Eastern Bristlebird and the Leafless Tongue-orchid, and long-term impacts on remaining populations in the Bherwerre Peninsula. Note, the proposed decision is to refuse based on unacceptable impacts on key populations of Eastern Bristlebird and Leafless Tongue-orchid; long-term impacts on surrounding populations in the Booderee National Park and Bherwerre Peninsula; and indirect impacts on other listed species through increased predation, fire frequency, and weed encroachment.
- No mitigation or offsets were identified in relation to the affected controlling provisions.
- The proponent is believed to have a sound environmental record, with only one Penalty Infringement Notice on their record.

Public submissions on assessment documents

- Over 400 public submissions were received during the referral and assessment stages of this proposal.
- The submissions received in favour of the proposal were mostly from the affected landowners. There are 1,232 individually owned lots within Heritage Estates. While 730 lots have been considered in this assessment, the 500 or so additional owners have also expressed an interest in developing their land.

Public submissions on assessment documents

Number	421	For	272	Against	149	Not specified	0

Ms Vicki Middleton
Assistant Secretary, EAB
/ / 2009

s. 22(1)(a)(ii)
Director
Commonwealth and Territories Section
/01/2009

Primary Contact
s. 22(1)(a)(ii)

Secondary Contact
s. 22(1)(a)(ii)

Consultation: Heritage Division, Parks Australia Division, Strategic Approval and Legislation Branch

Attachments:

A Finalised PER
B Supporting documents to the Recommendation Report
C Recommendation report

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Public Environment Report (PER)

"Heritage Estates" Worrowing Heights, NSW

Proposed Rezoning and Associated Public Works to Facilitate Residential Development

Prepared by Shoalhaven City Council

January 2009

EPBC reference: 2007/3448

Council reference: 1446-09

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EXECUTIVE SUMMARY

Background

g Estates" are made up of approximately 1,200 mostly urban-sized lots that were subdivided in 1915-1916. The physical development and realisation of the subdivisions did not proceed. The subject land has not been zoned for residential development since 1964, when land use zoning was first introduced in the Shoalhaven. However, the legal paper subdivision of the land previously had created separate land titles and in the late 1980's and early 1990's, the land was marketed for sale by Heritage Real Estate Pty Ltd and potential purchasers believed that the land would be rezoned for residential uses in time.

In 1992, Shoalhaven City Council resolved to investigate rezoning of the subdivision to enable residential development. Several planning and environmental studies were prepared in the mid 1990's and Council unsuccessfully sought to prepare and exhibit draft Local Environmental Plans to rezone the land on a number of occasions. A State Government, Council and landowner taskforce was subsequently also unable to reach agreement on a development scenario, culminating in a NSW Commission of Inquiry (CoI) in 1999.

The CoI recommended a maximum development scenario of 730 dwellings on 730 lots subject to various considerations and conditions including finalisation of the Jervis Bay Settlement Strategy (JBSS), which subsequently occurred in 2003. If the proposed rezoning proceeds on this basis, implementation of the subdivision would need to be coordinated and would involve clearing of native vegetation, road construction, bushfire asset protection, clearing and maintenance and provision of services and infrastructure including sewer, water and electricity.

In 2005, Council commissioned several studies including a Threatened Biodiversity Study by Bushfire & Environmental Services Pty Ltd (BES) to support the proposed rezoning recommended by the CoI. The BES study identified four threatened species and five migratory species listed on the *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*). Correspondence from Booderee National Park (BNP) during the BES study, expressed concerns that the proposal would pose a direct threat to biodiversity in Jervis Bay Territory.

Given the presence of species listed on the *EPBC Act* and the concerns outlined in BNP's correspondence, the proposal was initially referred to the Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA) to clarify the potential ultimate impact of the *EPBC Act* on the proposal. Based on the information provided by Council, which was reviewed by two independent experts, DEWHA subsequently determined that the proposal would be a "controlled action" (*i.e.* requiring the Minister's approval) in respect of:

- Listed threatened species and ecological communities (sections 18 and 18A); and
- Commonwealth land (sections 26 and 27A). Section 26(2)(b) relates to actions taken outside Commonwealth land that are likely to have a significant impact on the environment in Commonwealth land.

Alternatives

A 'do nothing' approach would simply perpetuate the existing situation which is clearly unacceptable for all stakeholders. Any further reduction in development yield would increase the development cost per lot for the benefiting lots and reduce the economic viability of developing the land. Possible options for conservation of the land include joint Government acquisition and biobanking.

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Biodiversity Impacts

A detailed submission provided by BNP during preparation of this report, discussed potential impacts of the proposed development on biodiversity within the Booderee National Park including:

- Impacts on the largest remaining population of the endangered Eastern Bristlebird (*Dasyornis brachypterus*).
- The loss of the vulnerable orchid *Cryptostylis hunteriana* (Leafless Tongue Orchid) characterised by its small distribution and specialised needs.
- The entire development area contains primary habitat for a wide range of NSW threatened fauna, most of which occur in Booderee National Park (BNP).

BNP's submission concluded that development of the subject land will restrict the ability of locally extinct species to re-colonise adjacent areas, and increase the risk of extinction of species of concern in BNP.

A desktop review of biodiversity impacts listed in the PER guidelines provided by DEWHA was completed by Eco Logical Australia Pty Ltd (ELA) on behalf of Council. The following is a summary of ELA's findings:

Listed threatened species and ecological communities (Section 18 of the *EPBC Act*)

Impacts on listed threatened species (Section 18 of the *EPBC Act*) relate primarily to two species: the Leafless Tongue Orchid (vulnerable); and the Eastern Bristlebird (endangered). ELA concluded that virtually all of the 211 Leafless Tongue Orchids found within the subject land would be directly lost. ELA concluded that 7-10% of the Eastern Bristlebird population of Bherwerre Peninsula would be impacted by the proposal.

Commonwealth land (Section 26(2)(b) of the *EPBC Act*)

The subject land is situated within a relatively narrow isthmus[1] between Jervis Bay and St Georges Basin that links BNP (Commonwealth) to the NSW Jervis Bay National Park (JBNP). Habitat links on the eastern side of the isthmus (in NSW Jervis Bay National Park) are dominated by heath and sedgeland, whereas the western side (including the subject land) includes woodland and forest links. The subject land and surrounding area is not formally recognised as a 'habitat corridor' in the Jervis Bay Regional Environmental Plan (JBREP). The western side of the subject land is recognised only as 'disturbed habitat and vegetation' in the JBREP.

Impacts on the biodiversity of BNP (Commonwealth land) (Section 26 and 27A of the *EPBC Act*) were assessed by ELA for key 'surrogate' species with a range of habitat preferences including: heath or wet area species such as the Eastern Chestnut Mouse; gliders such as the Yellow-bellied Glider, Greater Glider and Feathertail Glider; heath and woodland species, particularly the Eastern Pygmy Possum; heath and sedge species such as the Ground Parrot and woodland and forest species such as the White-footed Dunnart and Spotted-tail Quoll. ELA's assessment of potential impacts on these groups of species is summarised below:

Heath or wet area species: Swamp Rat (*Rattus lutreolus*) and the Eastern Chestnut Mouse (*Pseudomys gracilicaudatus*).

- Loss of some habitat, although substantial areas of habitat will still remain on Bherwerre Peninsula.

[1] *Isthmus: a narrow neck of land separating two larger land masses and bordered on its long sides by water.*

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- Significant loss of connectivity through habitat loss and indirectly through introduced predators and competitors.

Owls: Powerful Owl (*Ninox strenua*) and the Barking Owl (*Ninox connivens*).

- Disturbance of known nesting and roosting sites for the Powerful Owl.
- Indirect impacts on prey items and reduced functionality of the subject land as foraging habitat.
- Unlikely to impact on connectivity to BNP.

Gliders: Yellow-bellied Glider (*Petaurus australis*), the Greater Glider (*Petauroides volans*), the Sugar Glider (*Petaurus breviceps*) and the Feathertail Glider (*Acrobates pygmaeus*).

- Major decrease in functionality of the corridor from loss of habitat, increased susceptibility to predators, increased competition from other arboreal mammals and loss of buffering vegetation to the corridor.
- Reduction in available habitat for resident or migrating individuals.

Heath and woodland species: Eastern Pygmy-possum (*Cercartetus nanus*) and the Beautiful Firetail (*Stagonopleura bella*).

- Some loss or modification of habitat, particularly nesting habitat for the Eastern Pygmy-possum.
- Loss of connectivity through the subject land, particularly woodland vegetation. Other heathland corridors exist on Bherwerre Peninsula.

Heath and sedge species: Ground Parrot (*Pezoporus wallicus*).

- Significant loss of breeding habitat.
- Loss of habitat is likely to cause a disruption of connectivity to BNP through the loss of one significant 'stepping stone' of habitat along Bherwerre Peninsula.

Woodland and forest species: White-footed Dunnart (*Smithopsis leucopus*) and Spotted-tail Quoll (*Dasyurus maculata*).

- Significant loss of habitat, particularly for the White-footed Dunnart.
- Significant disruption of connectivity to Booderee NP through loss of habitat and indirect impacts on remaining corridors from introduced predators and weed encroachment.

ELA concluded that the proposed rezoning and subsequent development will result in significant impacts to a range of species that utilise BNP. These impacts include the loss of habitat for these species on the subject land (*i.e.* in an area nearby to BNP) and a substantial loss of connectivity to and from BNP. This loss of habitat and connectivity are likely to reduce the functionality of BNP as habitat for some of these species, and impact on the viability of populations of some of these species within the region.

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Species likely to be significantly affected include the Eastern Chestnut Mouse, Yellow-bellied Glider, Greater Glider, Ground Parrot and White-footed Dunnart.

Based on the analysis of the above surrogate species, ELA concluded that significant impacts to BNP would occur.

Predicted changes to bushfire behaviour associated with climate change (intensity and frequency) would potentially exacerbate any impacts resulting from removal of habitat within the isthmus. The significance of any such impacts on biodiversity in BNP would depend on the degree to which these facets of bushfire behaviour change and are difficult to predict at this early stage.

Mitigation Measures and Offsets

ELA concluded that the impacts cannot be effectively mitigated or offset elsewhere.

Social and Economic Considerations

As required under Section 136(1)(b) of the *EPBC Act*, the Minister must also consider the environmental impacts in light of social and economic considerations. Council engaged Judith Stubbs & Associates (JSA) to research and document the potential social and related economic impacts on the owners of land within the investigation areas should the proposal not proceed. The findings from this work are summarised below.

Generally speaking, JSA found that there are likely to be significant adverse social and economic impacts for landowners if the rezoning does not proceed.

Whilst a small minority may take a pragmatic view, discontinue paying rates and 'cut their losses', a strong majority have invested a great deal emotionally and financially in their hopes of owning a home near the coast, and continue to do so by paying annual rates, which some on fixed incomes increasingly cannot afford. Walking away now would leave them with nothing, and will have cost them dearly, financially and emotionally. Amid the generally negative impacts, an identifiable positive impact of a definitive decision not to rezone the land is that it would allow owners the option to relinquish the land and stop the ongoing financial 'bleed' through payment of Council rates. It may also allow some to move on with their lives and, if young enough or financially able, to make an alternative investment decision that may benefit them in the future.

The economic impacts are perhaps most severe for those who have relied upon this land as their principal future asset for home ownership or for retirement, and whose financial position has not allowed them to make additional capital investments. This group also includes low-income earners who have limited capital in their family home, or whose changed personal circumstances have now left them vulnerable to financial hardship, particularly as they age.

Though perhaps not as tangible, the emotional and psychological impacts on a generally disadvantaged and sometimes vulnerable group of people should not be underestimated. Lost opportunities appear to be an enormous source of grief and stress for some owners, who have sacrificed personal or family life for future benefits that may not be realised.

Though reasonable in some cases to take a "caveat emptor" (buyer beware) approach, case studies of the owners reveal a group of people who were particularly vulnerable to the aggressive marketing strategy of the vendor and their associates. Their lack of understanding of the NSW planning system and rationale for rezoning some land and not other land is understandable in the circumstances.

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Ultimately, if the land is not rezoned, the landowners in the Heritage Estates are left with an asset of no value, a significant economic loss, and ongoing financial liability. However, if the land is rezoned but there is no assistance with development costs or co-ordination, there may still be limited utility to some of the least well-off owners, except that they will some gain some small profit (or principally recoup past losses) if they were to sell their land.

The unfortunate irony is that, without assistance, it is likely that a significant proportion of Heritage Estates owners would struggle to afford the development costs, and may be enticed to sell at below market price to a larger land developer, particularly in the earlier years.

Those who cannot afford to meet the costs of development on the land, are likely to be the least well-off and more vulnerable landowners, who may also feel they have the least bargaining power and be inclined to sell earliest and cheapest.

Correspondence to Council from BNP dated 22nd January 2008, expresses concerns regarding environmental, social and economic impacts related to the subject land's proximity to BNP, including adverse impacts on tourist visitations, employment and social/community values associated with the Park and its environs.

Submissions on the Draft PER opposing the proposed development, received predominantly from residents in nearby communities as well as various organisations, societies and agencies; expressed concerns about a range of potential social and economic impacts. These included: the ability of existing community services and infrastructure, including health and aged care, to meet demand from the proposed development; and potential adverse affects on the area's attractiveness for tourism. Submissions in favour of the proposal, largely from or on behalf of the landowners, suggest that the proposed development would provide economic and related benefits to the local economy.

Additional information has been provided in section 3A of the PER on various social and economic issues raised in the public consultation phase, to enable a decision to be made under the *EPBC Act*.

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1. INTRODUCTION

1.1. Overview & report structure

Shoalhaven City Council is pursuing the rezoning of land known as "Heritage Estates", Worrowing Heights, from rural to residential under Shoalhaven Local Environmental Plan 1985 (SLEP) in accordance with recommendations from a NSW Commission of Inquiry (CoI) in 1999. The proposed rezoning would eventually enable development that will require removal of native vegetation, road construction, maintenance of bushfire asset protection zones, and provision of services and infrastructure including sewer, water and electricity.

Given that the site contains species listed on the *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*) (BES, 2007[1]) the proposal was referred to the Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA). Based on the information provided by Council, which was reviewed by two independent experts (refer to ATTACHMENT 1), DEWHA determined that the proposal is likely to have a significant impact on the following matters protected under the Act:

- Listed threatened species and ecological communities (sections 18 and 18A); and
- Commonwealth land (sections 26 and 27A).

The proposal was determined to be a "controlled action" requiring further assessment and Ministerial approval. Section 26(2)(b) relates to actions taken outside Commonwealth land that are likely to have a significant impact on the environment in Commonwealth land. The Booderee National Park Management Plan (Booderee National Park Board of Management, 2002[2]) is a statutory instrument under the *EPBC Act*. The Management Plan contains detailed management prescriptions which aim to protect, maintain and enhance populations of native plant and animal species in Booderee National Park.

DEWHA determined that Council, as the proponent, is required to prepare a Public Environment Report (PER) which address guidelines prepared by DEWHA. The PER guidelines are provided in ATTACHMENT 2.

The structure of this PER generally follows the structure of the guidelines except that an additional section (section 3) has been added to provide social and economic information. While this information was not required by the PER guidelines, section 136(1)(b) of the *EPBC Act* lists social and economic issues as matters which must be considered by the Minister and Council has chosen to provide this information in support of the proposal.

In terms of both the description of environment (section 5) and assessment of regional environmental impacts (section 6), the report focuses on the isthmus of land that links the Jervis Bay Territory and Booderee National Park and the NSW National Park (Jervis Bay National Park) and other high conservation land north and west of the isthmus.

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1.2. Background

"Heritage Estates", referred to herein as the subject land, is made up of approximately 1,200 mostly urban-sized lots in Deposited Plans 8590, 8591, 8770, 8771 and 8772 within the locality of Worrowing Heights, approximately 28 km south of Nowra on the NSW south coast (see Figure 1. Location map).

The name "Heritage Estates" is derived from a combination of the name of the company that sold the land in the late 1980s and early 1990s; Heritage Real Estate Pty Ltd, a subsidiary of Interpacific Property Corporation Pty Ltd and the 'Estates' that were named when the land was subdivided in 1915/16.

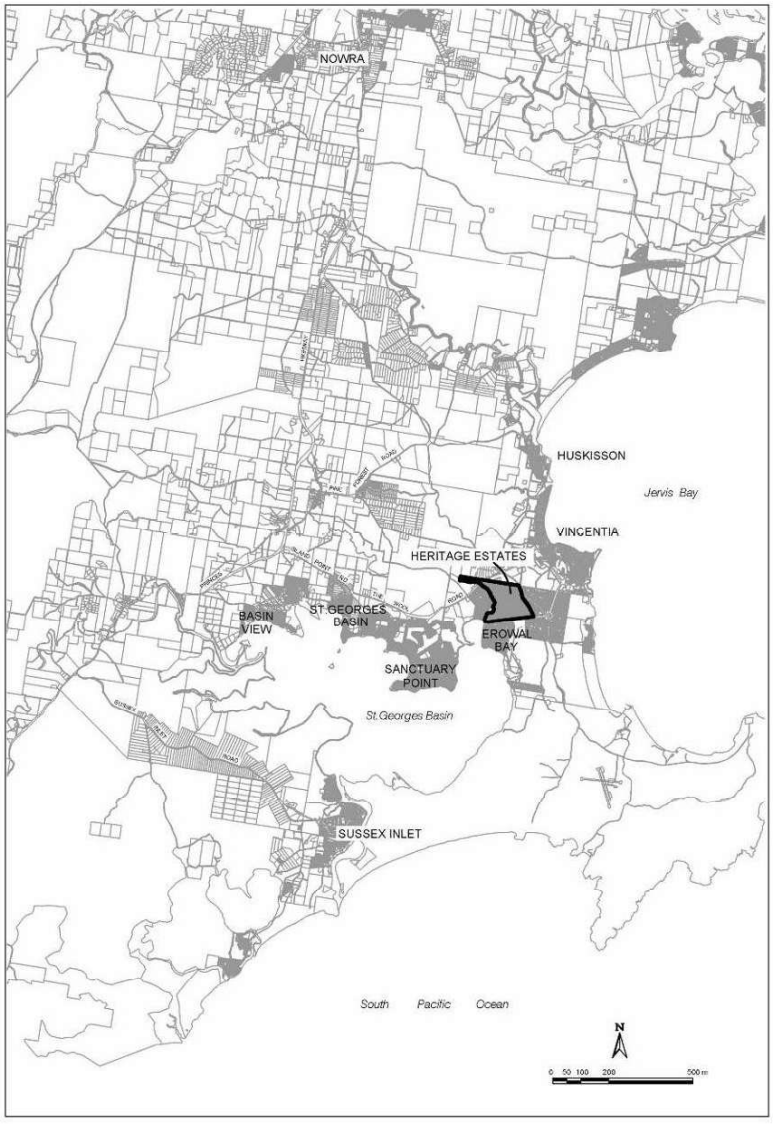


Figure 1. Location map

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1.2.1. When & why the subdivision occurred

Government and private interest in Jervis Bay had escalated early in the 20th century, particularly when Canberra was selected as the site for the nation's capital and Jervis Bay, as it's maritime outlet under the Seat of Government Act 1908. The Federal Government acquired the Territory of Jervis Bay (Bherwerre Peninsula) from the NSW Government in 1915 and when this was occurring, elaborate plans were put forward for the 'port for Canberra' featuring a railway link to, large naval dockyards, industries and commercial wharves (Sant, 2004[3]).

The surveyor and real estate developer, Henry F Halloran originally subdivided the land in 1915/16 as part of the proposed Pacific City. Halloran also purchased and subdivided other land around Jervis Bay including Jerberra Estate near Tomerong, as shown in Figure 2.

In comparison to current planning legislation, there was little control in the early 1900's over where subdivision could occur e.g. land capability issues such as flooding were not adequately considered. Large areas of land subdivided by Halloran around Jervis Bay are flood liable, particularly in "St Vincent City" and "Woollamia". Nor was there any effective requirement to provide appropriate servicing and infrastructure prior to subdivision registration.

The physical development and realisation of the Halloran subdivisions did not proceed initially because of the Great War and then in 1918 the proposed railway link to Canberra was abandoned on economic grounds. In 1925, the Prime Minister's Department became concerned that it did not have the means to develop the Jervis Bay Port and by 1930, the Great Depression had set in. Consequently the Pacific City subdivisions, including the subject land, did not eventuate (Mary Dallas Consulting Archaeologists, 2006). However, the legal paper subdivision of the land had occurred and separate land titles existed over the subdivided areas.

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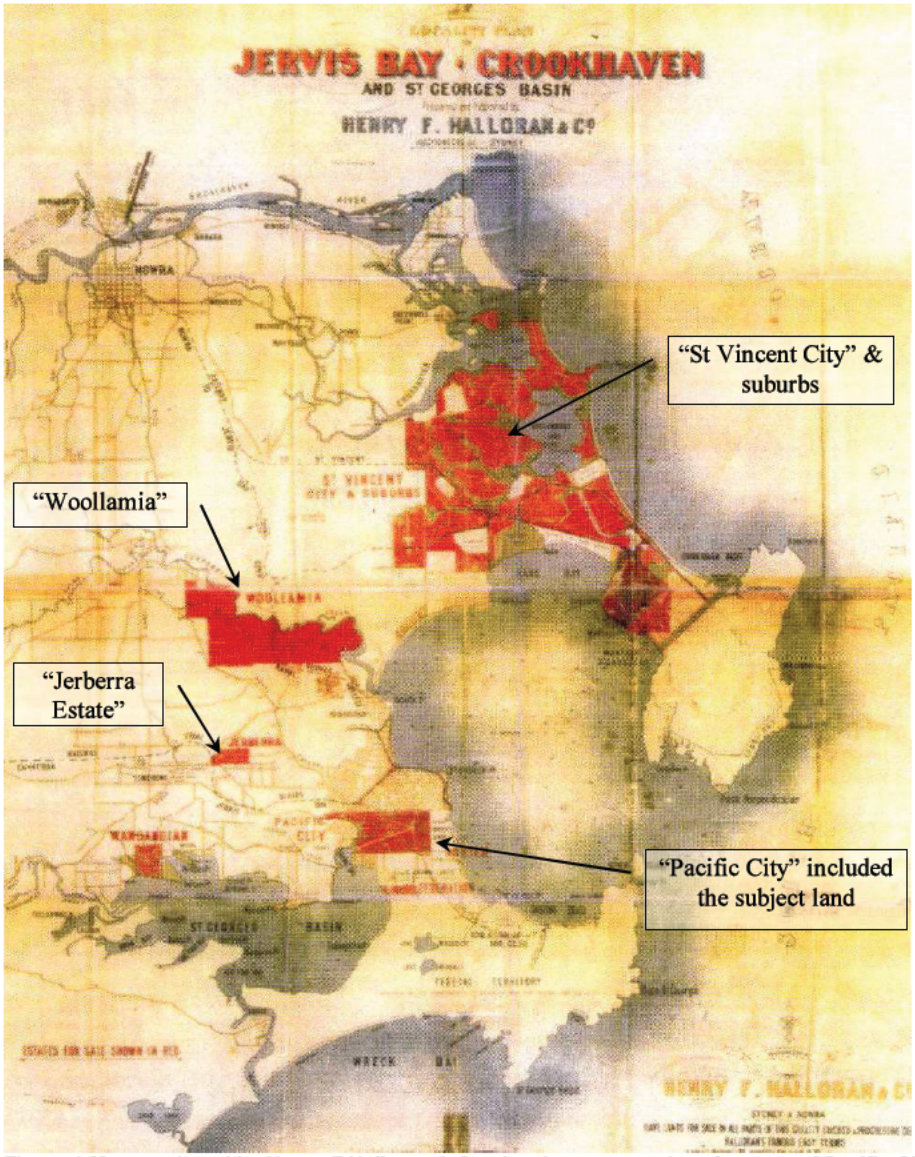


Figure 2 Map produced by Henry F Halloran & Co showing proposed settlements of Pacific City, St Vincent and other satellite towns. Note land in red was for sale at the time (late c1910s) (presented in Sant, 2004).

The Pacific City subdivision remained undeveloped and undisturbed when land use zoning was first introduced in 1964 through the Shoalhaven Interim Development Order No. 1 (IDO No. 1).

1.2.2. Vegetation clearing history

A series of aerial photographs from 1949 to 2006 are shown in Figure 3. Note that in the 1949 photograph, earlier clearing of the road network, probably undertaken at the time of subdivision, is faintly visible, except for Wanawong Boulevard which evidently was being used to access Erowal Bay.

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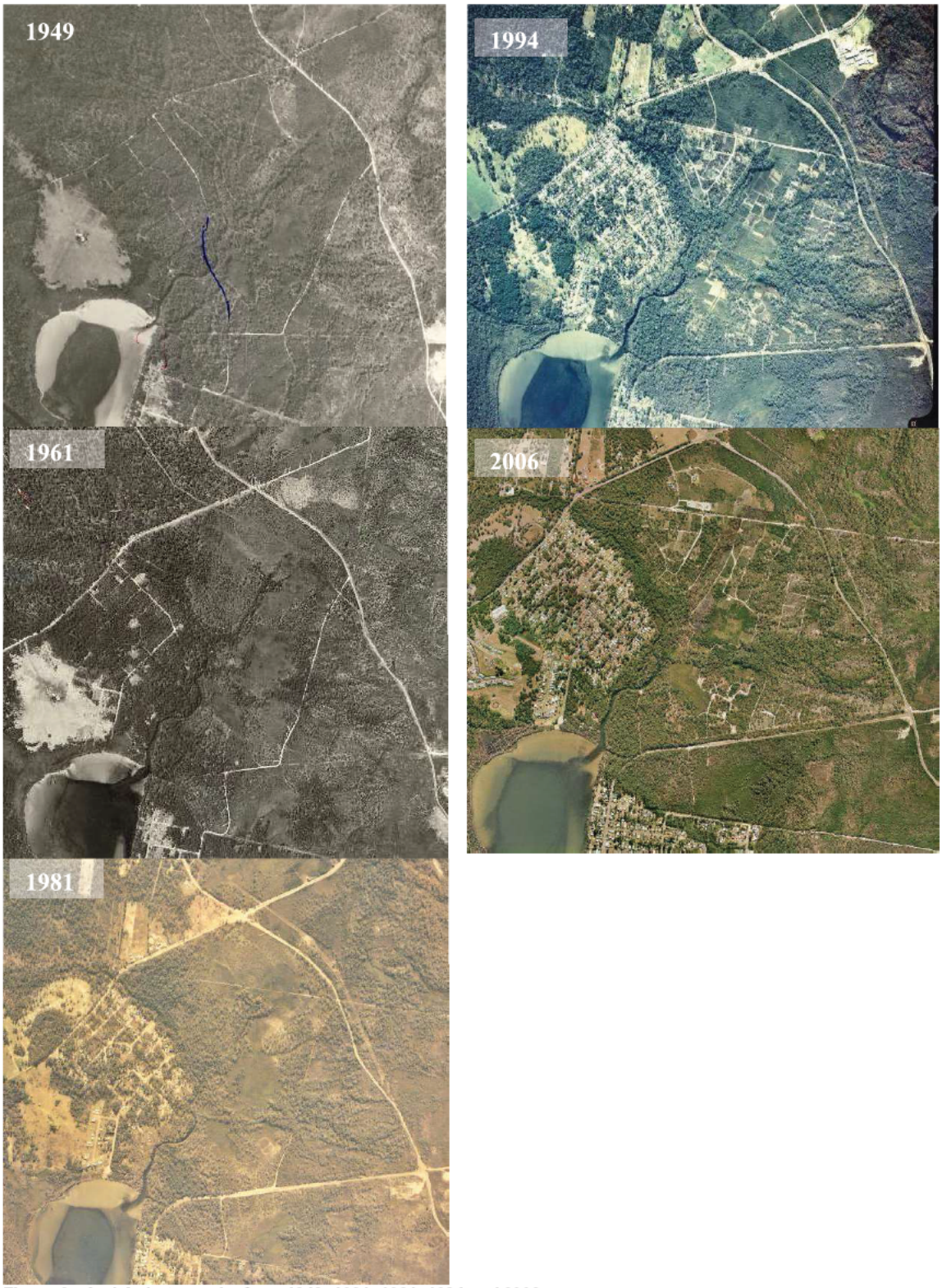


Figure 3 - Aerial photographs from 1949, 1961, 1981, 1994 and 2006.

When the Interim Development Order No.1 – Shire of Shoalhaven (IDO No. 1) was gazetted on 28 February 1964, the land was zoned "Non-urban" generally limiting erection of dwellings to lots greater than 25 acres.

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Amendments to IDO No.1 on 20 September 1974 generally prohibited erection of dwellings on lots less than 40 hectares in the "Non-urban" zones. The subdivision was largely retained in single ownership until the late 1980's and early 1990's. Refer to section 1.3 (Landuse planning).

In the late 1980's and early 1990's, the land was marketed for sale by Heritage Real Estate Pty Ltd. A brochure produced by Heritage Real Estate advertising land in Terrara Park (DP 8591) within the subdivision, marketed the land as:

- *"Magnificent new investment land release in a picturesque, parklike setting – only 2½hours drive from Sydney.*
- *Beautifully located in a water wonderland…*
- *Freehold Torrens Title. Fully surveyed blocks.*
- *Zoned rural, with no dwellings allowed, so it's an exceptional investment opportunity.*
- *Handy to 5 shopping centres, 2 schools, 2 bowling clubs and 2 excellent golf courses."*

The 1,200 lots are now held in approximately 1,100 ownerships.

1.3. Landuse planning

1.3.1. South Coast Regional Strategy (SCRS)

The South Coast Regional Strategy (SCRS) was released by the Department of Planning (DoP) in 2007. One of the primary purposes of the SCRS is to ensure that adequate land is available and appropriately located to accommodate projected needs.

The subject land is an existing investigation area and is located a short distance from the Vincentia District Centre which is identified in both the SCRS and the Jervis Bay Settlement Strategy (refer to section 1.3.5) where a 604 lot subdivision and commercial shopping centre was recently approved by the NSW State Government under Part 3A (Major infrastructure and other projects) of the *Environmental Planning and Assessment Act, 1979* and subsequently by the Commonwealth Environment Minister under the *EPBC Act*.

The subject land is located at the eastern extremity of an "Indicative Habitat Corridor" and is also mapped as "Biodiversity Assets Outside Conservation Reserves" in map 2 of the SCRS, which can be viewed at:
http://www.planning.nsw.gov.au/southcoast/p/map2_southcoast_biodiversity.pdf

In relation to the natural environment, the SCRS states that 'Biodiversity Assets Outside Conservation Areas' will be verified by councils in consultation with DoP and the Department of Environment and Climate Change (DECC). The SCRS states that new urban development is to be prohibited by LEPs on land being assessed as high conservation value.

St Georges Basin, into which the subject land drains, is identified in map 2 of the SCRS as: *"Other water bodies with significant aquatic habitat identified by DPI"* in which case the *"neutral or beneficial effect"* water quality and hydrology tests apply for any LEPs to enable additional residential or rural-residential development. This issue is addressed in section 6.5.1.

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1.3.2. NSW Coastal Policy 1997

The NSW Coastal Policy 1997 is a State Government policy that is relevant to the 'coastal zone' as defined by the policy and shown in Figure 4. The Policy contains principles for managing development in the coastal zone and has an overarching theme of ecologically sustainable development. The policy is a Section 117 Direction under the *Environmental Planning and Assessment Act, 1979*, which means that Council has to consider the Policy's provisions when preparing LEPs in the coastal zone.

The coastal zone covers all of the rezoning investigation areas 1 and 4 and part of Investigation Area 3.

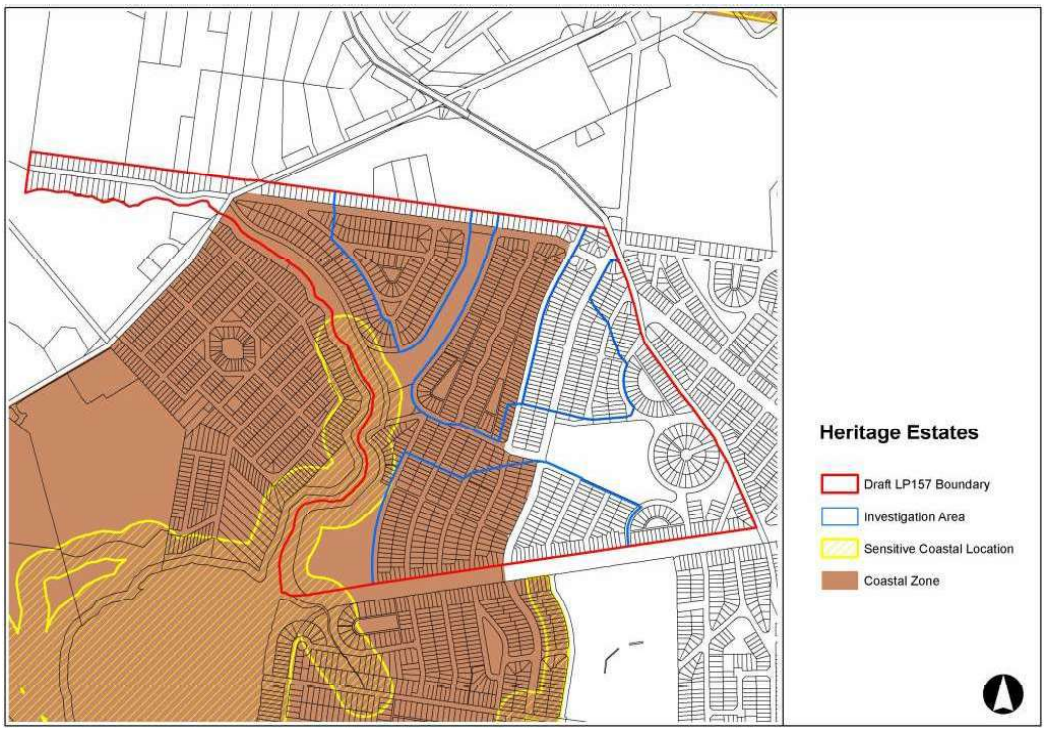


Figure 4 – Areas defined as 'Coastal zone' and 'sensitive coastal location'

1.3.3. State Environmental Planning Policy No. 71 Coastal Protection, 2002

State Environmental Planning Policy No. 71 (SEPP No. 71) seeks to ensure that development in the coastal zone is appropriate and suitably located and that there is a consistent and strategic approach to coastal planning and management. SEPP No. 71 also gives legal weight to certain elements of the NSW Coastal Policy making the Minister the consent authority for certain developments. The SEPP also defines "sensitive coastal locations". The investigation areas are not within sensitive coastal locations. Refer to Figure 4.

1.3.4. Jervis Bay Regional Environmental Plan (JBREP)

The Jervis Bay Regional Environmental Plan (JBREP) was gazetted by the NSW Government in 1997. The JBREP includes specific provisions in relation to:

- Catchment protection (clause 11);

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- Landscape quality (clause 12);
- Cultural heritage (clause 13);
- Habitat corridors (clause 14);
- Disturbed habitat and vegetation (clause 15);
- New urban releases (clause 16);
- Tourism development (clause 17); and
- National Parks (clause 18)

The western area of the subject land including part of the current investigation areas is mapped as "disturbed habitat and vegetation" under the provisions of clause 15 of JBREP. Clause 15 requires any proposal to maximise:

(a) *The retention of native vegetation; and*

(b) *The rehabilitation of degraded areas.*

1.3.5. Jervis Bay Settlement Strategy (JBSS)

The Jervis Bay Settlement Strategy (JBSS) was released in 2003. The current investigation areas are identified in the JBSS for possible residential development, subject to further detailed investigations, as shown in Figure 5 (map 10 from the JBSS). The future rezoning of the land requires detailed consideration in accordance with the recommendations of the NSW Commission of Inquiry (CoI) in 1999. Further information on the CoI is provided in section 1.4.1.

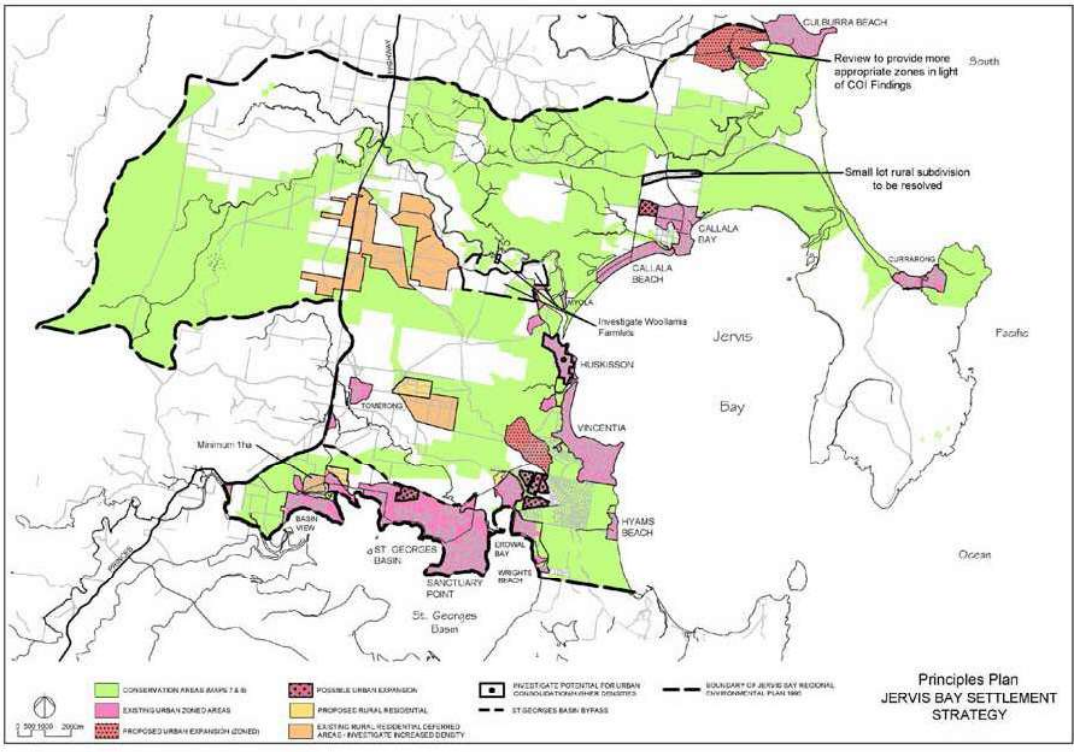


Figure 5 - Principles Plan from JBSS showing the subject land as 'possible urban expansion'

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1.3.6. Shoalhaven Local Environmental Plan 1985 (SLEP)

The Shoalhaven Local Environmental Plan (SLEP) was gazetted on 17 May 1985, superseding IDO No. 1 (refer to section 1.2.1). Under the provisions of SLEP 1985, the subject land is zoned Rural 1(d) (General Rural) and Rural 1(b) (Main and Arterial Road Protection Zone). The current zoning controls are shown in Figure 6. The erection of dwelling houses on individual allotments of less than 40 hectares is not permissible under SLEP 1985.

Land situated within 100 metres of The Wool Road, Jervis Bay Road and Erowal Bay Road is identified as a *'Scenic Preservation Area'* to which clause 43 of SLEP 1985 applies. The western part of the study area is identified as *'Land of Ecological Sensitivity'* to which clause 21 of SLEP 1985 applies. The area affected by this provision generally corresponded with the area identified as 'disturbed habitat and vegetation' under the provisions of clause 15 of the JBREP.

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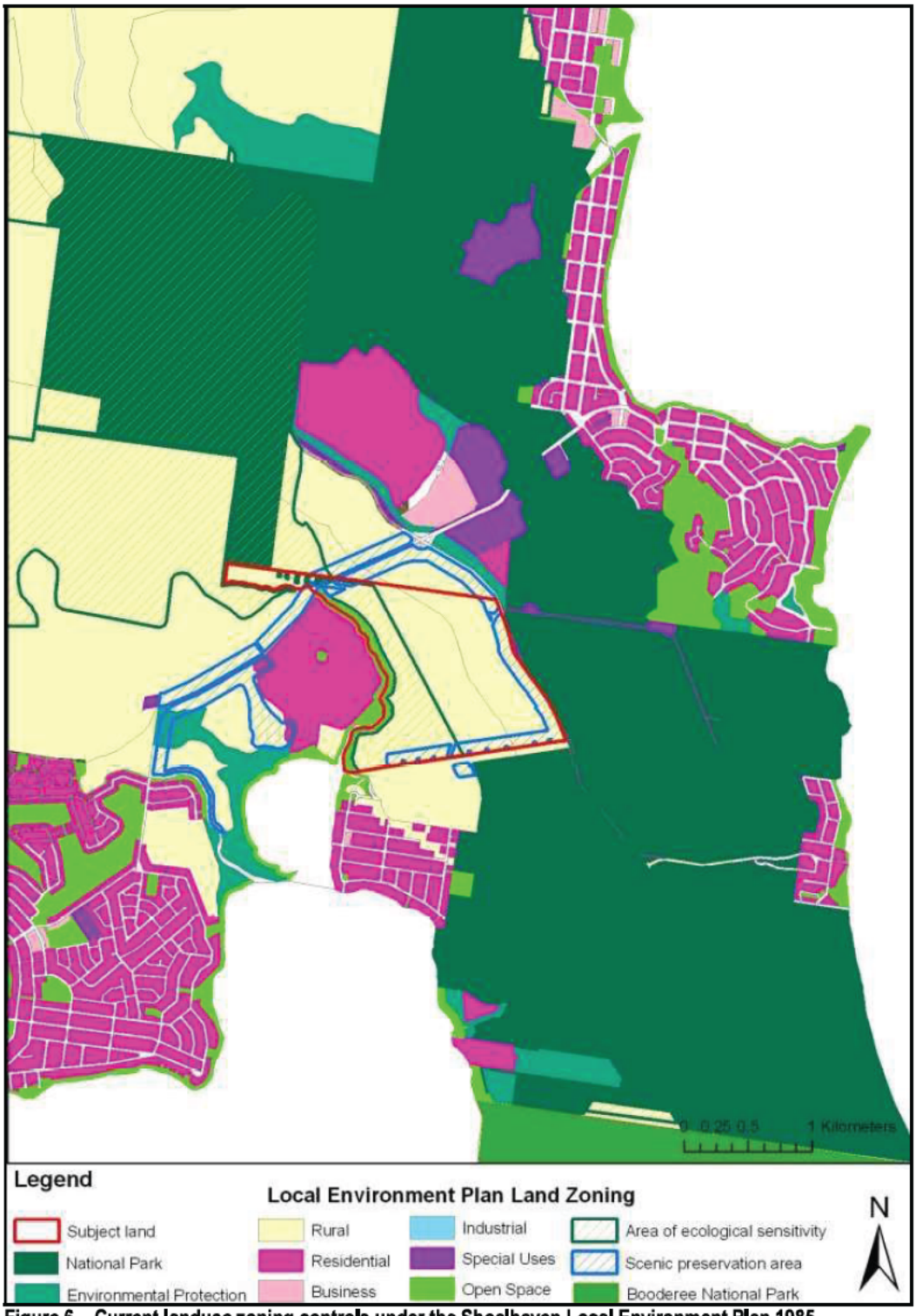


Figure 6 – Current landuse zoning controls under the Shoalhaven Local Environment Plan 1985

Council's Tree Preservation Order (TPO) also applies to the subject land. The TPO prohibits tree removal without Council's written consent.

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1.4. Rezoning investigations

In 1992 Council resolved to investigate rezoning of the subdivision to enable dwellings to be erected on the individual lots. Following this resolution, a number of planning and environmental studies were prepared including:

- A Local Environmental Study completed by Hassel Planning Consultants in 1994[4], including a Flora and Fauna Assessment completed by Andrews Neil in 1993
- A Flora and Fauna Report completed by AES in 1995[5]
- A Total Water Cycle Management, Land Capability and Infrastructure Study completed by Patterson Britton & Partners Pty Ltd in 1998[6]
- A report by a Government/Landowner Taskforce in 1998 – refer to Appendix 6 in CoI.

During this period, Council unsuccessfully sought to prepare and exhibit draft Local Environmental Plans on a number of occasions. The Government/landowner taskforce was also unable to reach agreement on a development scenario.

1.4.1. NSW Commission of Inquiry, 1999 (CoI)

Disagreement between stakeholders over the proposed rezoning culminated in a Commission of Inquiry (CoI) convened by the NSW Government in 1999. The CoI held under Commissioner Kevin Cleland, Deputy Chairman was finalised in August 1999[7] and made 12 recommendations shown below in *italics*:

1. *Council give appropriate consideration to including the Heritage Estate land in the Draft Jervis Bay Settlement Strategy subject to the findings and recommendations of this report.* Completed.
2. *Council delay preparing a draft local environmental plan to rezone part or all of the Heritage Estate land until after Council has prepared and exhibited a Draft Jervis Bay Settlement Strategy.* Completed.
3. *Council not prepare a DLEP to rezone any of the Estate unless included in a current Jervis Bay Settlement Strategy.*
   Note: The Jervis Bay Settlement Strategy (JBSS) was completed by Council and endorsed by the State Government during 2003.
4. *Land suitable for residential development be zoned Residential 2(a1). Land of Ecological significance be zoned Environment Protection* – refer to Figure 7.
   Note: the CoI focused on conservation of forest and habitat corridors for the protection of the Yellow-Bellied Glider, Common Bent-wing Bat and Glossy Black Cockatoo.
5. *Future residential development be limited to a maximum of 730 lots with 730 dwellings.* (Note: Approx. 800 lots under investigation)
   http://www.coi.nsw.gov.au/inquiry/component/view.php?CompId=97
6. *Any future residential development on the land be staged* (area 4 be developed last because of its location within the closed sedgeland as indicated in Figure 7).
7. *Pollutant discharge to be controlled to the requirements of the EPA following a comprehensive monitoring program of current runoff water quality to ensure no net increase in average annual pollutant load after development.* (Monitoring completed.)

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8. *No net increase in the volume of water discharged.*
9. *Before any development is considered in the closed sedgeland areas:*
   - *The presence or not of acid sulfate soils be confirmed and management controls implemented* (Study completed – no acid sulphate soils in investigation areas.)
   - *The quality of ground water drainage from the closed sedgeland areas be assessed in accordance with the requirement for no net increase in pollutants.*
10. *Landowners to meet the full cost of infrastructure and development of their land. Individual landowners to be responsible for the cost of groundwater drainage required for individual lots. (Special Rate for rezoning investigations commenced 2006-07).*
11. *Birriga Avenue not to be developed as a through road.*
12. *Landowners to be responsible for compensation, if any, to those whose land is unsuitable for residential development or required for water pollution control ponds.*

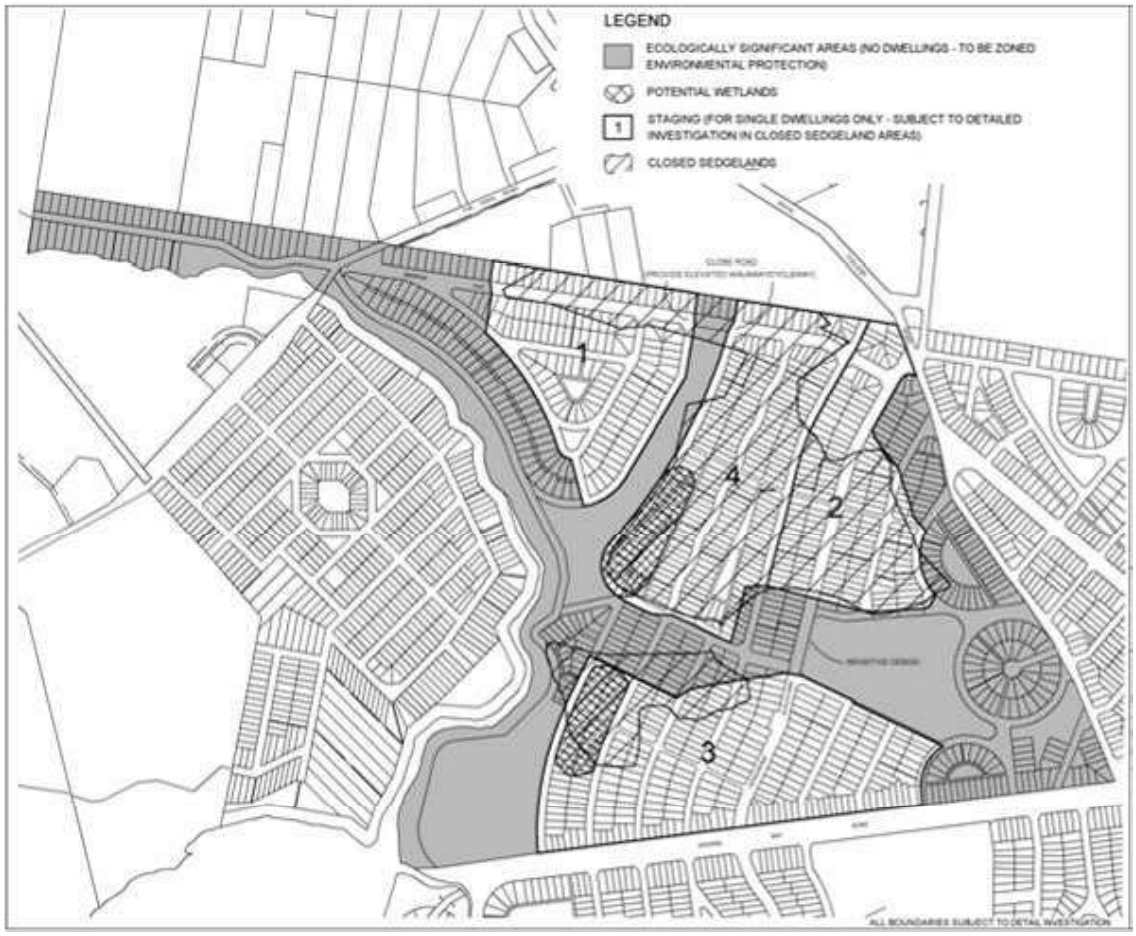


Figure 7 - Commission of Inquiry outcomes showing 4 investigation areas and areas recommended for environmental protection (shown in grey)

Further information on the CoI and its outcomes is available at:
http://www.coi.nsw.gov.au/inquiry/component/view.php?CompId=97

The Jervis Bay Settlement Strategy (JBSS) referred to in recommendations 1, 2, 3, 4 and 9, was subsequently finalised in 2003.

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1.4.2. Scoping study completed in 2004

Following the release of the Jervis Bay Settlement Strategy, a "Scoping Study" was prepared for the project by Cowman Stoddart Pty Ltd (2004[8]) that outlines the range of tasks and costs associated with progressing the rezoning investigations. The findings of the scoping study were considered by Council during February 2004 and it was resolved that:

a) *Council proceed with Stage 1 (rezoning investigations) only for the Heritage Estates and if successful leave the development application and construction stages to be negotiated by the Landowners.*

b) *The cost of the Stage 1 rezoning investigations of the Heritage Estates be ultimately recouped by way of a special rate to be applied to rateable properties in the rezoned area.*

Following on from this resolution, Council included funding of $350,000 in its 2004/2005 Management Plan to advance the rezoning investigations. This funding has been used to employ a dedicated project officer to oversee the detailed investigations (e.g. flora/fauna, bushfire, stormwater etc) associated with the proposed rezoning and also fund the required detailed investigations that were outlined in the Scoping Study.

1.4.3. Special rate introduced in 2005

In March 2006, Shoalhaven City Council made an application to the NSW Minister for Local Government for a Special Variation to allow Council to fund the rezoning investigations into the subject land through a 'special rate'. Council's application was approved and the special rate was incorporated into the Management Plan 2006-09 and is levied on those properties currently under investigation.

A work program for the re-zoning investigations was prepared detailing three major stages:

Stage 1 – Strategic Analysis

Stage 2 – Economic Feasibility and Secondary Studies

Stage 3 – Implementation Process

Stage 1, which involved the following studies, has been completed:

- Threatened Biodiversity
- Bushfire Assessment
- Water Quality Monitoring
- Hydrogeology & Soils
- Preliminary Land Contamination Assessment
- Cultural Heritage (Aboriginal and European)

1.5. Regional biodiversity conservation planning

Jervis Bay Territory encompasses Bherwerre Peninsula on the southern side of Jervis Bay, including marine waters between Bowen Island and HMAS Creswell. Booderee National Park occupies approximately 80% of the Territory. Figure 8 illustrates the regional linkages between Jervis Bay Territory, NSW National Park land and other land recognised for its regional conservation significance in the JBREP.

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Approximately 6,000 ha of the Jervis Bay region was identified and zoned as National Park 8(a) or Proposed National Park 8(b) in the Jervis Bay REP. This facilitated the creation of the Jervis Bay National Park (NSW NPWS). The remainder of 'Pacific City', excluding the south-western corner adjacent to Erowal Bay, was identified as Proposed National Park 8(b) and has since been acquired by NSW NPWS.

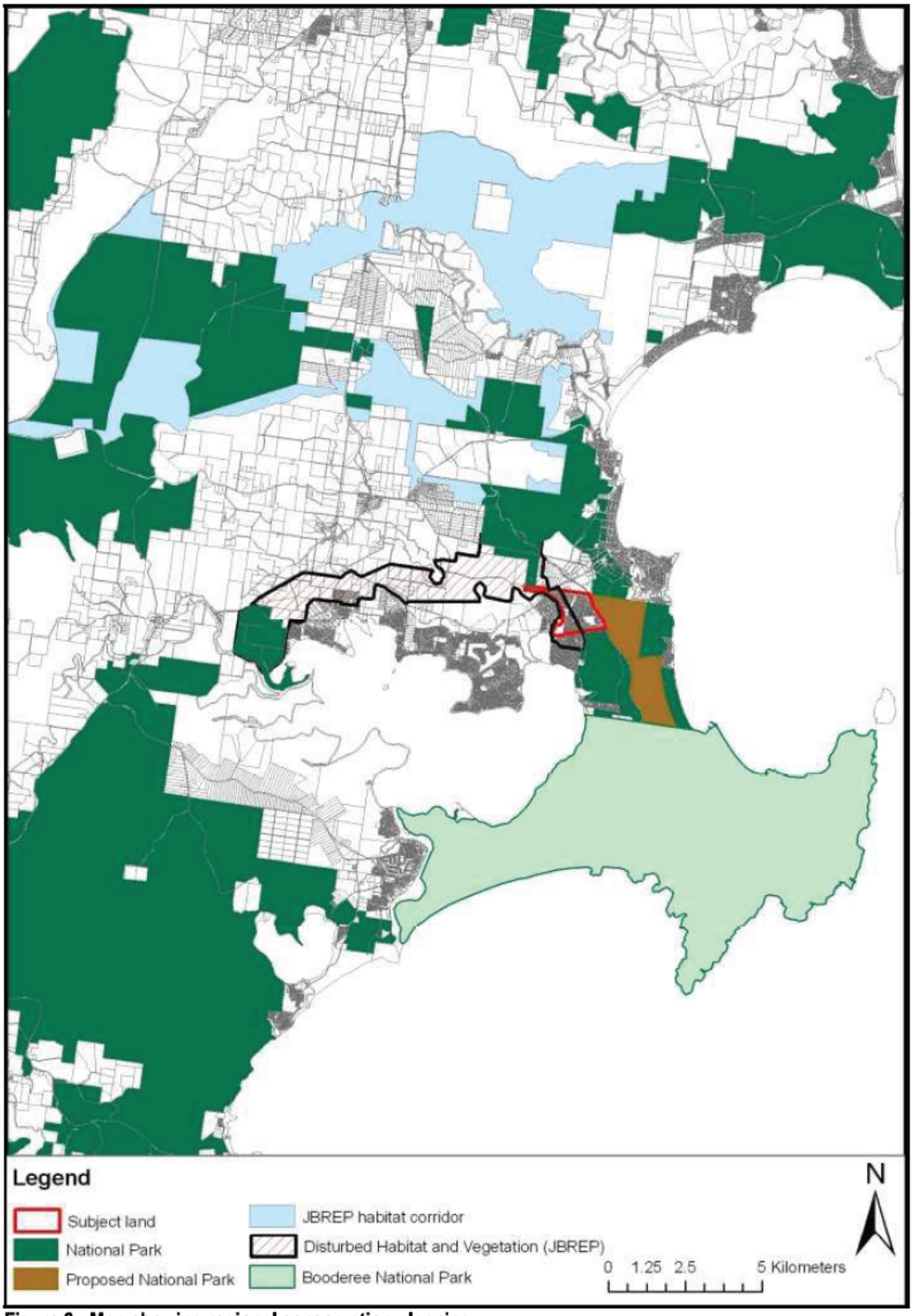


Figure 8 - Map showing regional conservation planning

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Shoalhaven City Council played a key role in progressively securing many lots in that part of the 'Pacific City' subdivision located on the eastern side of Naval College Road. This action may have prevented the Heritage Estates situation from occurring more widely in the Pacific City subdivision.

Had land ownership in the remainder of Pacific City been fragmented, it would have been more difficult for the NSW National Parks and Wildlife Service to acquire the land for inclusion in the Jervis Bay National Park.

Planning of regional habitat corridors around Jervis Bay was initially discussed in the document "*Jervis Bay – Our Heritage Our Future – A Discussion Paper*" prepared by the Department of Planning in 1992[9] and which preceded the Jervis Bay REP.

Habitat corridors were defined as "*areas of natural vegetation which connect two or more larger areas of vegetation in order to maintain the full range of plant and animal life found in the region.*" Four habitat corridors were identified in the discussion paper, which are briefly described below:

- Habitat Corridor 1 (HC1): linking Beecroft to Lake Wollumboola and Parma Creek
- Habitat Corridor 2 (HC2): linking wetlands and forests of lower Currambene Creek and Currambene State Forest and HC1
- Habitat Corridor 3 (HC3): linking forests and woodlands around Huskisson and Vincentia, with Tomerong Creek valley, the then proposed Parma Creek Nature Reserve
- Habitat Corridor 4 (HC4): linking Bherwerre Peninsula, Gurumbi Nature Reserve to forests north of St Georges Basin to Yerriyong State Forest and the then proposed Parma Creek Nature Reserve. The western part of the subject land was identified as one arm of this corridor, with a 'choke point' where it intersects The Wool Road. Another arm of this corridor was between the site of the current Vincentia Leisure Centre and Vincentia township, with a choke point where it intersects The Wool Road.

A 1995 DUAP report[10] concluded that HC4 should be omitted from the finalised habitat corridor system on the basis of:

- It had seven identifiable choke points;
- It served the same purpose as HC3 in that it provided an east-west link between larger areas of reserved habitat;
- 67% of its area was in private ownership;
- It was pressured from urban expansion.

HC4 was subsequently largely encompassed in the "disturbed habitat and vegetation" (clause 15) in JBREP. HC1, HC2 and HC3 broadly correlate to the "habitat corridors" (clause 14) in JBREP.

HC4 also correlates to the "indicative habitat corridor" in the South Coast Regional Strategy (SCRS).

See also sections 1.3.1 and 1.3.4, and Figure 6.

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1.5.1. Register of the National Estate listings

There are two listings under the Register of the National Estate under the *Australian Heritage Commission Act 1975*, and one listing on the Commonwealth Heritage List in the vicinity of the subject land. A brief description of each listing is provided below in Table 1 and maps are shown in Figure 9, Figure 10 and Figure 11.

Table 1 - Listings on Register of National Estate and Commonwealth Heritage List

ID	List category	Title	Class	Description
RNE: 1587	Register of National Estate[2]	Jervis Bay & surrounds	Natural	Approx. 30,000 ha including marine and terrestrial environments around Jervis Bay. Extends from Sussex Inlet in the south to Culburra Beach in the north and westward to include Currambene and Tomerong State Forests. Skirts around the subject land.
RNE: 1604	Register of National Estate	Gurumbi Nature Reserve	Natural	Located to south of the subject land, 152 ha east of Erowal Bay. Supports heath, open forest and hanging swamps
CHL: 105394	Common-wealth Heritage List[3]	Jervis Bay Territory	Indigenous	7,600 ha comprising all of Jervis bay Territory

[2] The Register of National Estate is a nationwide register of more than 12000 natural and cultural heritage places compiled by the Australian heritage Council. The data is part of the Australian Heritage Database.

[3] The Commonwealth Heritage List comprises natural; Indigenous and historic heritage places owned or controlled by the Commonwealth. These include places connected to defence, communications, customs and other government activities that also reflect Australia's development as a nation.

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Figure 9 - Jervis Bay and surrounds listed on Register of National Estate

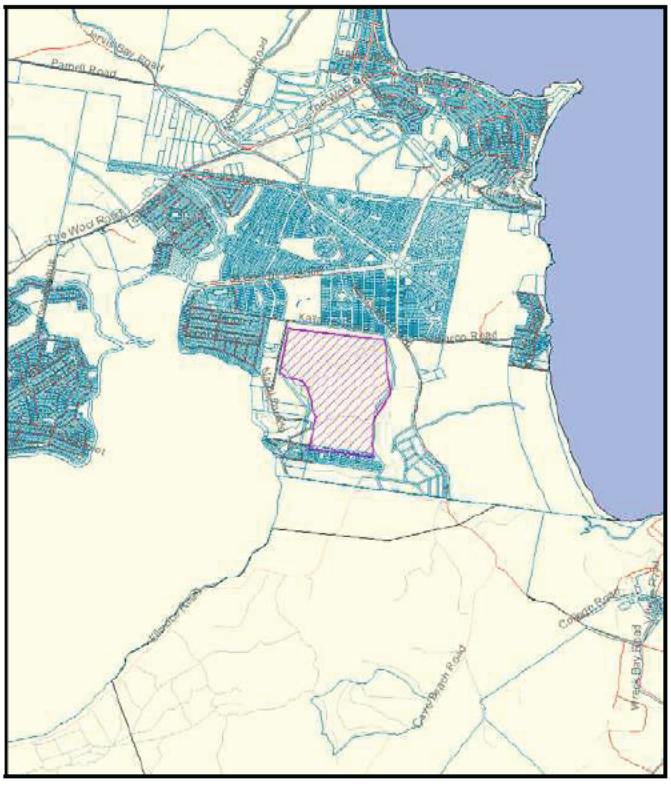


Figure 10 - Gurumbi Nature Reserve listed on Register of National Estate

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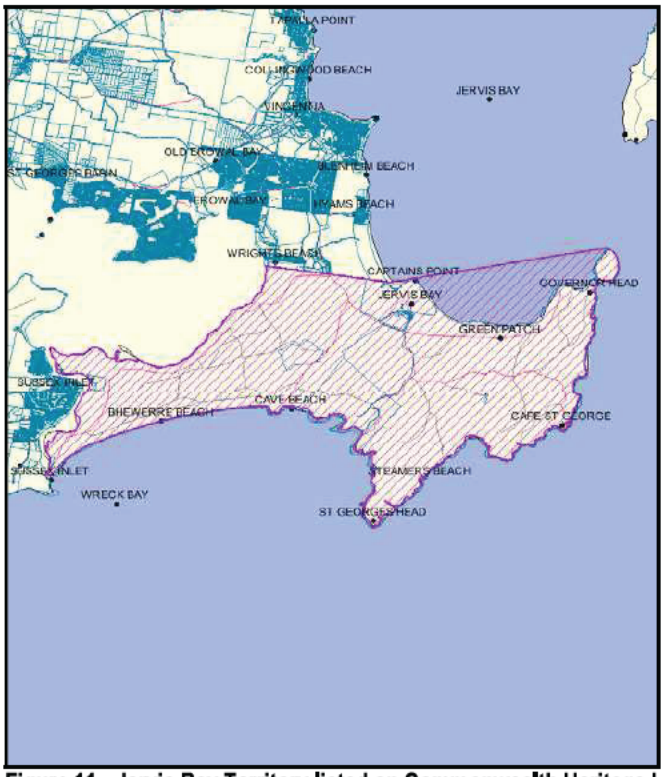


Figure 11 - Jervis Bay Territory listed on Commonwealth Heritage List

Specific elements of the listings on the Register of the National Estate in the area of Booderee include: Jervis Bay Nature Reserve (in 1987) for the diverse range of well preserved coastal plant communities; and Booderee Botanic Gardens as an important example of mid-twentieth century botanic gardens established to display native plants.

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2. THE PROPOSAL

Council is undertaking investigations that may culminate in the rezoning of land from rural to residential to enable eventual construction of infrastructure associated with up to 730 dwellings on 730 lots (the maximum development scenario arising from a NSW Commission of Inquiry in 1999).

If the proposed rezoning proceeds on this basis, implementation would involve clearing of native vegetation, road construction, bushfire asset protection clearing and maintenance, and provision of services and infrastructure including sewer, water and electricity.

It is likely that development of the Estate would be staged in a manner that is generally consistent with recommendation 6 of the NSW CoI, subject to satisfying water quality and hydrology issues (recommendations 7-9 of the CoI).

2.1. Access & egress

A Bushfire Assessment report prepared by Bushfire & Environmental Services Pty Ltd (BES) in 2006[11] indicated that perimeter access roads would be required as shown in Figure 12. It should be noted that to comply with NSW bushfire planning requirements, Birriga Avenue would need to be constructed to provide alternate bushfire emergency access for stages 1, 2 and 4. This requirement would contradict recommendation 11 of the CoI which states that Birriga Avenue not be constructed as a through-road between Jervis Bay Road and The Wool Road and will need to be negotiated with the State Government should the rezoning proceed.

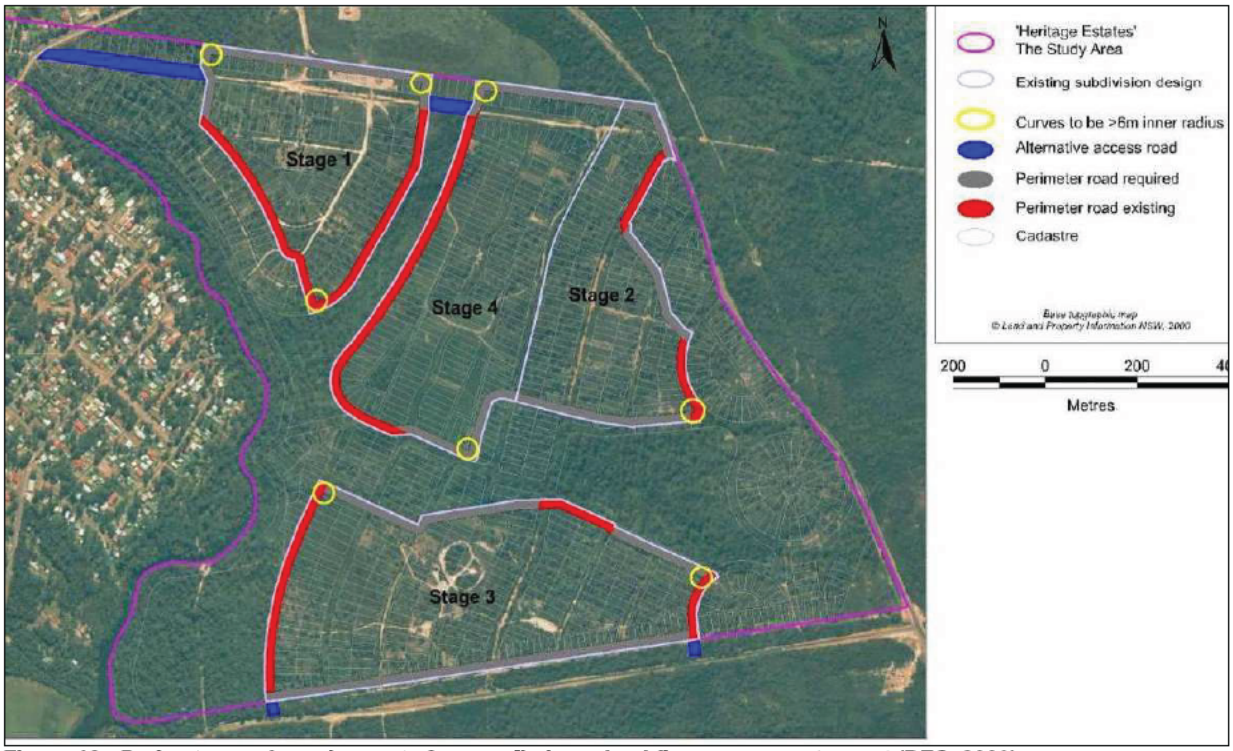


Figure 12 - Perimeter road requirements from preliminary bushfire assessment report (BES, 2006)

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2.2. Water supply

The source of water supply for the subject land should the proposal proceed, is Vincentia 13ML reservoir. The subject land has been listed as potential growth area within Council's Water Supply Development Servicing Plan (WSDSP) (Nov 2005). At the time of the WSDSP the area included lands west of The Wool Road. A developer contribution would be required by each lot that connects to the water supply system.

Subject to detailed hydraulic investigation an additional service reservoir may be required.

Reticulated water would be provided to the subject land from an existing 600 mm MSCL trunk main that runs along Birriga Avenue on the northern side of the subject land. To keep water pressure to within acceptable levels (15 m to 60 m) pressure reducing valve/s would be provided subject to the option adopted. Water supply reticulation mains varying from 100 mm to 250 mm diameter would be extended to serve all lots and metered water services (20 mm) would also need to be provided.

Two options have been explored. Option 1 proposes a single connection to the 600 mm diameter MSCL trunk main. Option 2 proposes two separate connection points on the 600 mm diameter MSCL trunk main to keep residual pressures lower. It also reduces the pipe reticulation sizes. All water reticulation infrastructure and metered water services shall be paid for by the landowners.

2.3. Sewerage services

The townships of Erowal Bay and Old Erowal Bay are serviced by reticulated gravity sewerage. If the proposed rezoning proceeds, either gravity or pressure sewerage would be provided to service the subject land. The subject land is listed as a potential growth area within Council's Sewerage Services Development Servicing Plan (SSDSP) (November 2005) subject to being rezoned. A sewage pumping station (SPS) and rising (pressure) main (RM) is currently planned for 2016/17. Land would also need to be set aside for this asset. A developer contribution would be required by each lot that connects to the sewerage system.

All sewage would be transferred to Vincentia/Huskisson sewage treatment plant for processing. The sizing of the SPS and RM will depend on the reticulation option adopted. There may also be a need to augment the downstream transportation system. Further detailed assessment would be required to confirm if and when this may be required.

Gravity sewer is the more traditional method in servicing subdivisions and as the subject land is currently undeveloped, it would most likely be the option used. Preliminary estimates by Council's Shoalhaven Water Group suggests at this stage (detailed design work has not been undertaken) that gravity sewerage would be the cheaper option. Pipe sizes varying from 150 mm to 300 mm diameter, would be required. All gravity sewer infrastructure would need to be paid for by the landowners.

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In addition to the construction of sewer mains within private lands, easement to drain sewage would be required over each lot which has the sewer traversing it. It is understood that where easements are taken out over private lands that such easement to drain sewage will be granted in favour of Council without compensation. Easement to drainage sewage is generally 2.5 m wide unless otherwise stated.

Pressure sewer generally involves smaller sized reticulation mains constructed throughout the Estate. Under Council's pressure sewer policy a pumping unit would be installed on each lot served by the sewerage system. Each landowner would be required to enter into agreement with Council in accordance with its pressure sewer policy for the pressure unit and have the pumping unit connected to their power supply.

As with the gravity option where infrastructure is constructed on private lands, easement to drain sewerage would be required. Where sewage easements are taken out over private lands the easements will be granted in favour of Council without compensation.

2.4. Electricity

Correspondence from Integral Energy dated 15 October 2007, provided preliminary advice on the adequacy of the existing electricity infrastructure and upgrades required to supply the proposed residential development.

Integral Energy indicated that at present, the existing infrastructure has insufficient capacity at both the Zone substation level and the Distribution network to supply the development. However, planned future augmentation may provide sufficient capacity.

The 11 kV network outside the boundary of the Estate could be either overhead or underground supply. Within the development, the electricity infrastructure would be reticulated with underground cables and pad-mounted substations.

At this stage, Council is unable to provide any further detail on work required for the provision of electricity to the subdivision.

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3. SOCIAL & ECONOMIC ISSUES AFFECTING LANDOWNERS

3.1. Context

The *EPBC Act* specifically states that:

> *In deciding whether or not to approve the taking of an action, and what conditions to attach to an approval, the Minister must consider the following…matters relevant to any matter protected by a provision of Part 3 that the Minister has decided is a controlling provision for the action; economic and social matters.*

Factors to be taken into account by the Minister also include the principles of ecologically sustainable development. The promotion of ecologically sustainable development through the conservation and ecologically sustainable use of natural resources is one of the Objects of the *EPBC Act*. The principles of ecologically sustainable development listed in the *Act* include:

> *[The] decision-making process should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.*

In a letter to Council, the Director of National Parks[11] outlined his concerns regarding environmental, social and economic impacts related to the subject land's proximity to Booderee National Park, including adverse impacts on tourist visitations, employment and social/community values associated with the Park and its environs.

Various submissions from groups, organisations and local residents to the CoI in 1999 opposed development of the Heritage Estates on the basis of environmental issues, the adequacy of existing community services and infrastructure.

The landowners themselves would be the most directly affected stakeholders should the proposal not proceed. In November 2007, Shoalhaven City Council engaged Judith Stubbs & Associates (JSA) to act on Council's behalf to research and document the social and related economic impacts should the proposed rezoning not proceed.

The JSA study did not address the overall socioeconomic (cost/benefit) impact of the proposal proceeding. Rather, it simply attempts to quantify the social (and related economic) impacts on the owners of land within the investigation areas if the proposal does not proceed. The JSA study is summarised below. Social and economic issues affecting other stakeholders are discussed in section 3A.

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3.2. Social & economic impacts on landowners

3.2.1. Terms of reference

It is acknowledged that while the landowners themselves would be the most directly affected stakeholders should the proposal proceed, there are likely to be a range of other social and economic impacts in the locality, both positive and negative. It was beyond the scope of the study undertaken by JSA to address these broader issues.

The scope of the JSA study was limited to exploring, assessing and documenting the social and related economic impacts on the individual owners of land within the investigation areas, should the rezoning not be approved. The JSA study did not assess issues relating to owners of land in the areas recommended for environmental protection by the CoI.

3.2.2. Methodology

Council set out a preferred methodology which included a survey of individual Heritage Estates owners, follow-up interviews with a small sample of selected respondents to more fully explore likely "social and economic hardship impacts" from their perspective if the rezoning does not proceed, and to document and assess these impacts.

The study aimed to provide a methodologically sound review of social and related economic effects of the proposed rezoning not proceeding within the Council's terms of reference to inform the various considerations by Government in relation to this matter.

3.2.3. Survey outcomes

Those surveyed owned land within the four investigation areas identified through the CoI. The level of response to the written survey (68% of landowners) indicates a considerable amount of interest in and concern about the rezoning issues currently facing Heritage Estates owners, and provides a high level of statistical confidence in the findings.

In summary, the following trends are evident. The age profile of Heritage Estates owners is older than the Shoalhaven and particularly NSW average, though they are far more likely to be living as part of a couple with children at home than the LGA or State average despite the older age structure. Although on generally lower than average incomes, owners' income structure indicates a reasonable proportion (78%) of low- to moderate-income working people, including retired people or pensioners.

A very high proportion of owners are from culturally and linguistically diverse backgrounds, with indications that a relatively high proportion spoke little or no English at the time they purchased the land, and have relatively poor English twenty years later. Many owners reside in the south western suburbs of Sydney, and to a lesser extent in the inner and middle ring suburbs of the south and west. This is not surprising given the high proportion of those who speak languages other than English at home, which accords with the demography of these suburbs, particularly in parts of the southwest. These are also among the most disadvantaged areas of Sydney.

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The surveys suggest that many of the Heritage Estates owners are relatively disadvantaged in terms of income, education and employment status. In this regard the profile of the Heritage Estates owners may not be too dissimilar to that of the existing profile of the locality, particularly those in Old Erowal Bay and Sanctuary Point, with the exception of the proportion of those from different cultural backgrounds. Nonetheless, a relatively high proportion of Heritage Estates landowners own a home outright or are paying off a home, which may in part be due to the historically low purchase price in the areas in which they are concentrated. Around 17% are in private rental accommodation and report that they do not own a home.

Most (80%) of the survey respondents originally purchased their block/s from Heritage Real Estate between 1987 and 1990 and most with the intention of building a home to live in immediately or in the future (e.g. after retirement). Based on survey responses, in today's dollars, the median price paid was $24,526, with significant variation particularly in recent years ($58,000 in 1987 compared with resale at just over $2,000 in 2002 CPI adjusted). Most people appeared not to be well off at the time of purchase, and the majority borrowed to buy the land. A small minority (less than 4%) are still paying it off.

Though generally aware that the rural land use zoning precluded development, the vast majority of purchasers believed that there would be no problem in the future with building on the land. The paper subdivision layout, graded tracks and street signs, and aggressive marketing strategies, as well as the residential growth occurring in what they considered to be similar areas near by, and a significant lack of knowledge of the NSW planning system and/or poor English, all combined to create and sustain hopes that the land would ultimately be rezoned. Less than 15% sought independent advice, and said that they were generally unaware that independent advice would be required.

Though owners reported that they had often holidayed or camped on their land in earlier years, current use of the land is severely constrained, though many report that they go down a few times a year to 'clean up' or 'just to be there' because they 'love it down there'. Despite these constraints, almost all respondents indicated that they continued to pay the annual Council rates currently of around $465 per annum, many for almost 20 years. Very few have attempted to sell their land, and only 15% reported that they would now sell the land, most continuing to hope that they will ultimately be able to use the land for the purpose for which it was originally purchased. The hopes of many landowners were raised by the recent approval of a large Stockland's retail, commercial and residential development to the north of Heritage Estates. The biggest change in their original intention is that far more would now build a home to live in rather than as a holiday home, which is likely to indicate the relative aging of owners.

Most owners reported that there would be a number of impacts should the land not be rezoned. The highest proportion (60%) cited economic loss, though this was generally related to a range of social and psychological impacts. The second highest proportion of responses involved emotional or psychological impacts. Moreover, the survey responses consistently revealed a high level of attachment to the land and locality and continuing strong hopes that they may be able to attain a life in a small community and beautiful location and the dream of a holiday home near the coast that was the major attractor at the time of purchase.

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Perhaps some of the more poignant comments came from those whose life circumstances have changed significantly in the interim, particularly where a spouse had died, where children were now too old to go on family holidays, families had broken up, or increasing frailty or disability made relocation increasingly difficult.

Selected cross-tabulations also indicate that there will be differing types of impacts on various owners related to factors such as current income, age and whether they own or are purchasing a home versus renting currently.

Overall, those who do not own a home and are currently renting tend to be younger and less likely to be on higher incomes than homeowners, and appear to be in lower paid jobs, or not in paid employment. Both groups were equally poorly informed at the time of purchase about the reality of eventually being able to build on their land in the Heritage Estates. Renters were far more likely to report that they would build a primary home in which to live should the land be rezoned, and those who were current homeowners were much more likely to report that they would build a holiday home in the Heritage Estates, though the majority of homeowners would still build a home to live in if the land is rezoned. Homeowners are more likely to report that a primary impact if the land is not rezoned will be economic loss including diminished retirement options, and lost opportunity to own a holiday home, whereas the impacts on those who are currently renting are at a more fundamental level, particularly the lost opportunity to own a home to live in.

Some bitterness and frequent frustration was particularly evident in comments regarding the relative position that owners feel they would have been in had they chosen to buy an alternative block of land or holiday home at that time in Shoalhaven or other coastal areas, particularly given the high levels of appreciation experienced in recent years. As it is, they may be left with an asset of little or no value if the land is not rezoned, and would be in a significantly different position now had they not purchased into Heritage Estates.

3.2.4. Impacts illustrated in case studies

Taken as a whole, the interviews reveal a relatively consistent and often poignant storey of disappointment, loss – financial and emotional – amid a continuing hope that some opportunities may still be realised through the eventual rezoning of the land.

A common comment, as people age, die or become less able, is that even if not successful this time, they will hold on to the land and continue to pay rates so that perhaps their children may eventually benefit. When asked what they would do if the land were never rezoned, it was apparent to the interviewers that this was an inconceivable idea to the majority, and one that they had never considered.

It is perhaps reasonable to take a 'caveat emptor' (buyer beware) approach to purchasing land, particularly in relation to the failure of the vast majority of owners to seek adequate and independent advice at the time of purchase. However, the interviews reveal a group of people who had virtually no understanding of the NSW planning system, or who had very different legal systems in their own country. Many had little if any English, and/or relatively limited education, and were not sophisticated or perhaps sufficiently suspicious of the deal they were being offered.

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Overwhelmingly, they were not purchasing as investors, but describe in vivid terms their hopes of building a better life for themselves or their families away from the city, and sometimes of recreating the life they had left in smaller villages in their home country. The dream of owning a home and particularly one close to the coast is seductive for Australians generally, but increasingly unattainable for those who are not well-off. Undoubtedly, it was this dream that led some also to ignore precautions that they may have otherwise taken to ensure that they were purchasing wisely. A great deal of regret was expressed by some interviewed that they did not gain or realise that they needed independent advice at the time of purchase, and anger and bitterness by others about opportunities lost compared with other investment choices they could have made at the time.

In this context, owners consistently describe the high-powered marketing strategies and plausible marketing team with which they were confronted at the time of their purchase. Most describe being flown or sometimes driven down to inspect the land, shown subdivision plans that appeared to be legal documents, taken to marked lots and graded tracks sometimes with street signs, and overwhelmed with the beauty of the area and the possibility of owning something there. From documents reviewed, it also appears that some were referred to what was reported to be independent solicitors or conveyancers, who later turned out to be associated in some way with the vendor.

A further factor was the fact that surrounding areas were being developed quite rapidly, so that it is perhaps not surprising that they believed salespeople and their legal representatives that it would only be 'a few years, 5 or 10 at most' until their land was rezoned as well. Approval of the nearby Stockland development in 2007 by the NSW Minister for Planning as a Major Project also gave renewed hope to some, though there was also considerable anger expressed about the apparent injustice of this approval for a 'large developer' with greater power and profile than a group of individual land owners. Another related theme was anger and/or mistrust of government, and what appeared to be bewilderment with a planning system that permitted some land to be developed but not other land, even if it appeared to the untrained eye to be similar.

Though most talked about financial loss, most appeared to be at least as concerned about related emotional and psychological impacts, some describing how it had or was 'making them sick' and was leading them to think of 'giving up'. A number described the considerable sacrifice of family time or resources that this had meant over some years, which had been made in anticipation of more family time on holidays or moving down with extended family later. An area of particular bitterness related to the position they or their family would now be in had they chosen to pay more for a block in a different location, or invested in a unit or home that they could now live in, sell or rent out.

There was also a general lack of understanding about the rationale for continuing to pay Council rates, particularly as they were now unable to use the land for any purpose and did not live in the Shoalhaven LGA.

The position of renters is particularly difficult in this regard, as they generally do not have any other asset to fund their retirement or in which to live securely as they get older. Though some may have never been able to do so, an alternative investment decision some 20 years ago would have undoubtedly made a considerable difference to many of these people.

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It has left some with no ability to now own a home, and others with significantly reduced income/assets to rely upon in retirement.

3.2.5. Related economic impacts for individual owners

As noted above, the JSA study was limited to the examination of economic impacts that are likely to be directly experienced by the Heritage Estates landowners, and particularly those impacts likely to be experienced in the event that the land is not rezoned for residential use at the present time.

In summary, the major economic impact to owners is foregone expenditure over the years that they have owned the block/s as a result of having money tied up in Heritage Estates, at the same time receiving no benefit from that ownership. This cost is estimated to be $44,000 to $61,000 with an average of $53,000 per landowner. If owners had put their money elsewhere, they would have received a benefit from the alternative expenditure and, if invested in land or property, a capital gain would have been expected. Foregone capital gains are estimated to be between a $20,000 loss to a $67,000 gain with an average gain of $24,000. In total they would have been $22,000 to $128,000 better off, or an average of $75,000 per landowner.

Alternatively, if rezoning had taken place within one to two years and in accordance with people's expectations, an average purchaser would be better off by between $72,000 and $102,000, or an average of $87,000 per landowner.

If the land were to be rezoned today, an average purchaser would incur a lifetime cost of $16,000; however if no section 94 contribution were to be levied, an average purchaser would be $9,000 better off over a lifetime, and $62,000 better off if costs incurred to date are considered a sunk cost. Across a range of likely development costs and land values, an average purchaser would expect to be between $11,000 and $102,000 better off if costs to date are considered as a sunk cost.

Finally, a significant barrier to development of the land relates to the servicing in the event of rezoning. Given the economic loss experienced by landowners and the changed circumstances of many since they first purchased (including diminished income through retirement, disability, marriage breakdown, unemployment and the like), the development would be far more feasible if co-ordinated and funded by an appropriate implementation agency such as Council (for example, in part or full through debt financing), with an appropriate rating or cost recovery processes put in place. Council has been collecting rates from the properties over a number of years and 97% of the owners do not live in the Council area. It could be argued that the landowners have received little tangible benefit for their rates, although significant costs have been borne by Council related to the rezoning investigations undertaken during the 1990's on behalf of the owners. The NSW Commission of Inquiry in 1999 recommended that the landowners pay the full cost of developing the land if it is rezoned. This is also Council's position and a special rate was introduced in 2005/2006 to fund the current rezoning investigations. It is also noted that Council's special rate application was supported by the majority of landowners.

However, Council could consider meeting a proportion of the costs on account of rates paid by the landowners over the years. This option has not however been considered to date.

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If owners were required to pay the full development cost, and using a development cost of $65,000 per lot, the annual cost is calculated to be of the order of $6,500 over 25 years. For renters and people on low incomes, this annual cost is likely to exceed their ability to pay. Such people would be able to access the increase in value of the lot by selling, but may be prohibited from building on their block by financial constraints.

At the same time, if a land owner could not borrow the development cost or fund it through cash flow, it seems unlikely that they would be able to borrow sufficient funds to construct a house, so that they would be unlikely to be able to build in any case. There is likely to be a group of people who could afford to borrow to build a house but when the development cost is added to the cost of the house, would be unable to fund the total cost through cash flow. As an alternative view, people would generally have $65,000 less to build a house because of the development costs.

Those who own a home or have substantial equity would of course be in a position to sell that home to finance development and building costs, or provide a substantial deposit. Such owners may otherwise be precluded from selling their existing home in a low value or depreciating housing market such as south western Sydney in order to buy a holiday home on the coast where there has been significant appreciation in recent years.

If developed privately, it is likely that a significant proportion of Heritage Estates owners would struggle to afford the development costs, and may be enticed to sell at below market price to a larger land developer, particularly in the earlier years. In the final analysis, those who cannot afford to meet the costs of development on the land are likely to be the least well-off and more vulnerable landowners described above, who may also feel they have the least bargaining power and be inclined to sell earliest and cheapest.

3.3. Conclusions

Generally speaking, there are likely to be significant adverse social and related economic impacts for landowners of the Heritage Estates if the rezoning does not proceed. Whist a small minority may take a pragmatic view, discontinue paying rates and 'cut their losses', a strong majority have invested a great deal - emotionally and financially – in their hopes of owning a home near the coast, and continue to do so by paying annual rates, which some on fixed incomes increasingly cannot afford. Walking away now would leave them with nothing, and will have cost them dearly, financially and emotionally. Amid the generally negative impacts, an identifiable positive impact of a definitive decision not to rezone the land is that it would bring some finality to the matter and allow owners the option to relinquish the land and stop the ongoing financial 'bleed' through payment of Council rates. It may also allow some to move on with their lives and, if young enough or financially able, to make an alternative investment decision that may benefit them in the future.

The economic impacts are perhaps most severe for those who have relied upon this land as their principal future asset for home ownership or for retirement, and whose financial position has not allowed them to make additional capital investments. This group also includes low-income earners who have limited capital in their family home, or whose changed personal circumstances have now left them vulnerable to financial hardship, particularly as they age.

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Though perhaps not as tangible, the emotional and psychological impacts on a generally disadvantaged and sometimes vulnerable group of people should not be underestimated. Again, it is clear that some are emotionally resilient and will be disappointed but cope in the event of the land not being rezoned.

However, the lost opportunities appear to be an enormous source of grief and stress for some owners, who have sacrificed personal or family life for future benefits that may not be realised.

Though it is generally reasonable to take a "caveat emptor" (buyer beware) approach, the case studies reveal a group of people who were particularly vulnerable to the aggressive marketing strategy of the vendor and their associates. Their lack of understanding of the NSW planning system and rationale for rezoning some land and not other land is understandable in the circumstances.

Ultimately, if the land is not rezoned, the landowners in the Heritage Estates would be left with an asset of no value, a significant economic loss, and ongoing financial liability. However, if the land is rezoned but there is no assistance with development costs or co-ordination, there may still be limited utility to some of the least well-off owners, except that they will some gain some small profit (or principally recoup past losses) if they were to sell their land. The unfortunate irony is that, without financial assistance, it is likely that a significant proportion of Heritage Estates owners would struggle to afford the development costs, and may be enticed to sell at below market price to a larger land developer, particularly in the earlier years. Those who cannot afford to meet the costs of development on the land are likely to be the least well-off and more vulnerable landowners, who may also feel they have the least bargaining power and be inclined to sell earliest and cheapest.

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3A. SUPPLEMENTARY SOCIAL & ECONOMIC ISSUES & RELATED INFORMATION

3A.1. Introduction & context

Submissions received during the consultation period for the PER raised various social and economic issues not addressed in the Draft PER (refer to Attachment A – Public Consultation on Draft PER). Information provided in this section is in response to the social and economic issues that have been raised. Such issues include:

- Communities affected by the proposal
- Impact on character of the area
- Visual impacts
- Roads and traffic flow
- Demographics, community services and infrastructure
- Regional economic benefits
- Regional economic risks
- Dealing with land that is not developed
- Impact on Booderee National Park (BNP) and regional tourism
- Impact on the Wreck Bay Aboriginal Community
- Impact on Department of Defence Activities

Of the 800 or so properties that fall within the investigation areas there are approximately 700 landowners. As already discussed, Judith Stubbs & Associates (JSA) was commissioned to research and document the potential direct impacts on these owners if the proposal does not proceed as this group would be directly impacted under this scenario.

About 400 properties that fall within the area recommended for environmental protection are held in approximately 330 different ownerships. The work completed by JSA did not explore issues related to these landowners.

Previous planning processes including the Local Environmental Study (LES) completed by Hassell Planning Consultants in 1994[12] and the Commission of Inquiry (CoI) in 1999 considered broader social and economic issues associated with the Heritage Estates. The CoI concluded that the provision of community services and facilities would not be unduly stressed if a staged development approach is applied. Moreover, the CoI concluded that arguments about the deficiencies in the existing level of services and infrastructure does not warrant refusal of the development.

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It should be noted however, that the potential social and economic impacts of the proposal proceeding will be further examined as part of the rezoning process under the NSW *Environmental Planning and Assessment Act, 1979* pending a favourable decision under the *EPBC Act*. Similarly there would be further opportunity for public input on these issues at this time.

3A.2. Communities affected by the proposal

If the proposal proceeds, a broader range of stakeholders would potentially be affected, including communities in the Jervis Bay and St Georges Basin area including the Jervis Bay Territory (JBT). Communities that could be affected by the proposal include:

- Nearby local communities, e.g. Hyams Beach, Erowal Bay, Old Erowal Bay, St Georges Basin, Sanctuary Point and Vincentia.
- The wider Shoalhaven community
- Shoalhaven City Council
- Jervis Bay Territory (JBT):
    - Booderee National Park
    - Wreck Bay Aboriginal community
    - HMAS Creswell
    - Jervis Bay Range Facility
    - Private leases near Sussex Inlet (e.g. Christians Minde)

3A.2.1. Nearby communities

Nearby communities include: St Georges Basin, Sanctuary Point, Old Erowal Bay, Erowal Bay, Hyams Beach, Huskisson and Vincentia.

Erowal Bay lies approximately 0.5 km to the south of the subject land, on the western shore of St Georges Basin and extends south to Wrights Beach and Bream Beach. It has a permanent population of 593 persons (2006 census data) and a high percentage (47.9 %) of dwellings that are not permanently occupied.

Old Erowal Bay is located to the west of the subject land, separated from the subject land by Worrowing Waterway. It has a permanent population of 1,123 persons (2006 census data). A relatively low percentage of dwellings are not permanently occupied by comparison with other residential areas in the locality (23.7% and 32.6% respectively).

The township of Vincentia is located approximately 2 km northeast of the subject land and extends to the shores of Jervis Bay and benefits from a north easterly orientation toward the Bay. It has a permanent population of 2,513 persons (2006 census data) and a high percentage (43.8 %) of dwellings that are not permanently occupied.

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The Bayswood 604 lot residential subdivision on the western side of the township that was approved in conjunction with the Vincentia District Centre will result in a significant population increase over time.

Stockland's commercial centre will increase the range of shopping facilities available to surrounding residential areas, including the Heritage Estates when it proceeds.

The town of Huskisson is located immediately north of Vincentia and has a permanent population of 774 (2006 census data) with approximately 40% of its dwellings not permanently occupied.

The village of Hyams Beach is located approximately 2 km east of the subject land on the shores of Jervis Bay. This small and tightly constrained village has a permanent population of 122 (2006 census data) and a very high percentage (74.4 %) of dwellings that are not permanently occupied.

The townships of Sanctuary Point and St Georges Basin are situated along the northern shore of the St Georges Basin waterway, with permanent populations respectively of 5,940 and 2,366 (2006 census data). St Georges Basin has relatively low percentage of dwellings not permanently occupied by comparison with Sanctuary Point (22.1 % and 31.7 % respectively) and other residential areas in the area.

Population growth and land supply

The communities listed above represent 79% of the population in Planning Area 3 in the Shoalhaven LGA for which population projections are shown in Figure 13.

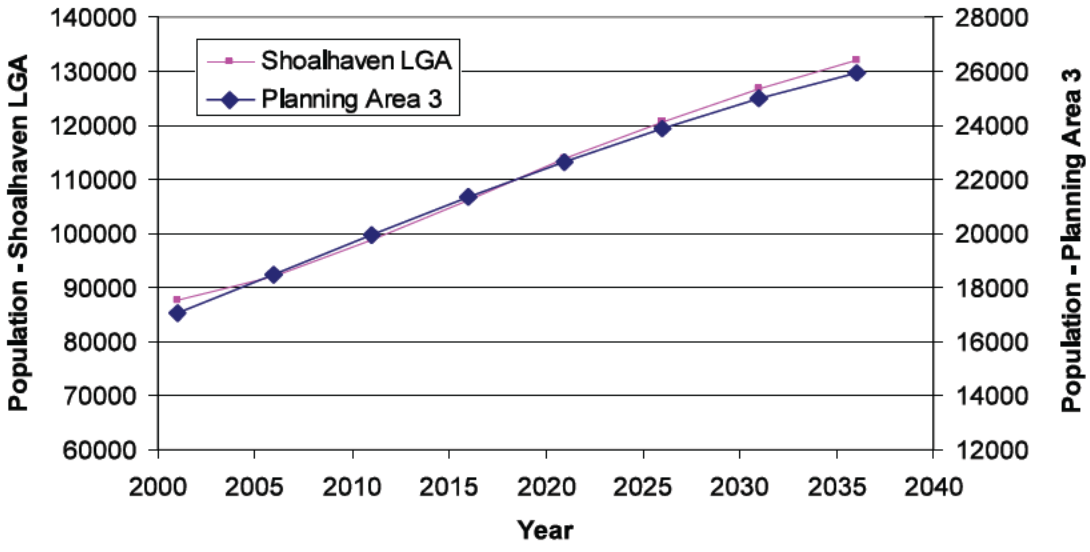


Figure 13 - Population projections for Planning Area 3 and the Shoalhaven LGA (as adopted by Council on 13th May, 2008)

The population projections data was prepared by Census Applications for Council. Population growth is a result of net migration and natural increase. Natural increase is projected to remain consistent for the next few years.

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The projections assumed that population growth will be limited by the supply of land in 2023/24. It is noted that the Heritage Estates area was included in the Jervis Bay Settlement Strategy (JBSS) as a potential urban investigation area. This strategy was prepared by Council and endorsed by the NSW Department of Planning in 2003.

A Land Monitor is currently being developed by Council in conjunction with the Department of Planning. When completed, the Land Monitor will provide more accurate and up-to-date statistics on the availability of land for residential development in any particular area.

3A.2.2. Jervis Bay Territory

The Jervis Bay Territory (JBT) comprises the following areas/communities:

Booderee National Park covers 83% of JBT and has no permanent residents. The Park provides overnight accommodation for up to 500 campers, has up to 700,000 day visitors per year, of which approximately 400,000 pay an entry fee (Commonwealth Grants Commission, 2002[13]).

BNP is owned by the Wreck Bay Aboriginal Community Council (WBACC) and leased to the Australian Government Director of National Parks. The Park is jointly managed by WBACC and the Director through a joint Board of Management.

Wreck Bay Village covers 6% of JBT with an Indigenous population of approximately 210 (2006 ABS census data, Commonwealth Grants Commission, 2002).

HMAS Creswell Naval Base and the Jervis Bay Range Facility covers 8% of JBT with a population of approximately 309 (2001 ABS census data) comprising Navy personnel and their families (*ibid.*).

Jervis Bay Village covers about 2% of JBT, has a population of approximately 85 (2006 ABS census data) comprising Commonwealth employees and their families and people leasing excess Commonwealth housing (*ibid.*).

A small number of private leases near Sussex Inlet which are excluded from BNP support approximately 25 permanent residents (2006 ABS census data) and accommodate up to 375 overnight-stay tourists (Commonwealth Grants Commission, 2002).

3A.3. Impact on character of the area

The Jervis Bay area is recognised for its natural, cultural and recreational values which are of National and International significance. The abundance of bushland, the juxtaposition of its waterways and the existing settlement patterns all contribute to the area's human and natural environmental values. The area remains relatively unspoilt compared too many other areas, yet has experienced high population growth as the area is a popular place for people to live, holiday and recreate (JBSS, 2003).

The proposed rezoning and subsequent residential development of Heritage Estates would potentially change the character of the area in that current bushland would be replaced by housing.

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However, much of the housing would not be visible from surrounding roads and other public vantage points (refer to Visual impacts below).

Furthermore, impacts on the character of the area need to be considered in the context of other development occurring in the surrounding area, particularly the District Centre west of Vincentia, comprising a large commercial centre and the 604 lot residential subdivision known as 'Bayswood' that is currently under construction. The District Centre is located approximately 1km from the Heritage Estates. Both the District Centre and the Heritage Estates are identified in the Jervis Bay Settlement Strategy and consistent with longer term planning for the area.

3A.4. Visual impacts

An analysis of impacts on the visual landscape of the area was undertaken in 1994 by Landsystems EBC and included in the Local Environmental Study (LES) prepared by Hassell Planning Consultants (1994[14]).

An analysis of the site's visual absorption capacity that was completed in 1994 is still relevant and is shown in Figure 14. An area with a high visual absorption capacity would result in minimal visual impacts if developed. Criteria used for the analysis were:

- land on the topographic skyline;
- land above 80 m AHD
- areas with low vegetation
- slopes greater than 15%
- foreground visible from main roads; and
- foreground visible from the shoreline.

Of the above criteria, those affected by vegetation, such as the visibility of foreground from surrounding roads, may be subject to change over time due to bushfires and vegetation management/clearing.

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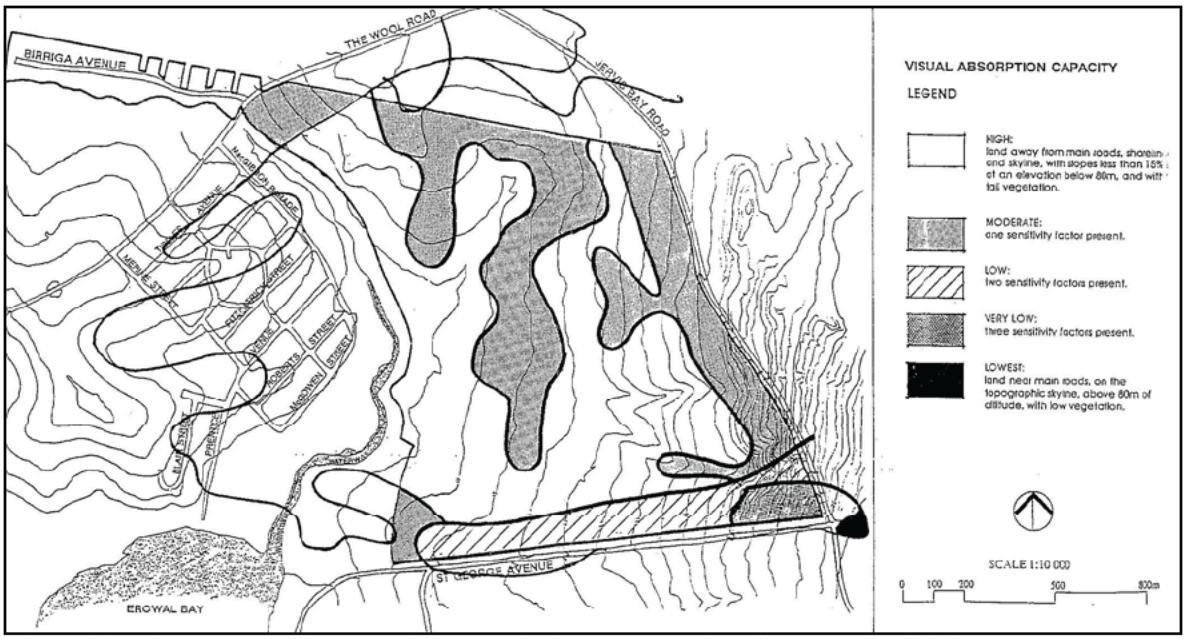


Figure 14 - Visual absorption capacity analysis (Hassell Planning Consultants, 1994)

Visibility from Erowal Bay Road

The land is currently well screened by dense vegetation along much of Erowal Bay Road (refer to Plate 4). The vegetation along this road may need to be managed as part of an asset protection zone (APZ) which could significantly increase the visibility of housing from Erowal Bay Road. Refer to Plate 4.

Visibility from Naval College Road

A buffer of 80-350 metres would separate the proposed residential areas along most of the land's frontage to Naval College Road. Visual impact from Naval College Road would be greatest where the proposed residential area directly abuts Naval College Road in the north eastern corner and where the understorey vegetation is sparse and the buffer is at its narrowest. Refer to Plates 1 and 2.

Visibility from The Wool Road

Investigation Area 1 is at least 150-300 metres from The Wool Road. Due to a north-south ridgeline and intervening forest, only the western-most fringe of Investigation Area 1 would be visible from The Wool Road. Refer to Plate 3.

3A.5. Road access & traffic flow

New intersections would potentially be required on: Naval College Road; The Wool Road; and Erowal Bay Road. One access road would be required on both Naval College Road and The Wool Road. It is likely that two access points would be required along Erowal Bay Road (see Figure 12 in section 2).

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The internal road network should be designed to provide maximum accessibility to adjacent roads; however the design must also discourage through-traffic without the need for Local Area Traffic Management (LATM) treatments, beyond what may be satisfactory for the subdivision in isolation.

The proposal is consistent with the overall land use planning strategy for the region (Jervis Bay Settlement Strategy). Should the proposed rezoning proceed, the cumulative impacts of the proposal on the State Road Network (Princes Highway), the regional road network and local traffic movements will need to be considered in the context of planned upgrades to Jervis Bay Road and The Wool Road associated with the Bayswood residential subdivision and planned commercial centre. The commercial centre is likely to change shopping habits in the broader area, possibly drawing shoppers from Nowra and Ulladulla.

The maximum development scenario for the Heritage Estates established by the Commission of Inquiry could generate additional traffic volumes, in the vicinity of the volumes generated by the Bayswood residential subdivision under construction. The combined effect of all these developments and others in the general area will potentially bring forward the need for additional upgrades to Jervis Bay Road/Naval College Road and The Wool Road.

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Plate 1 - View into Investigation Area 2 from Naval College Rd. Undergrowth is currently sparse along this section.

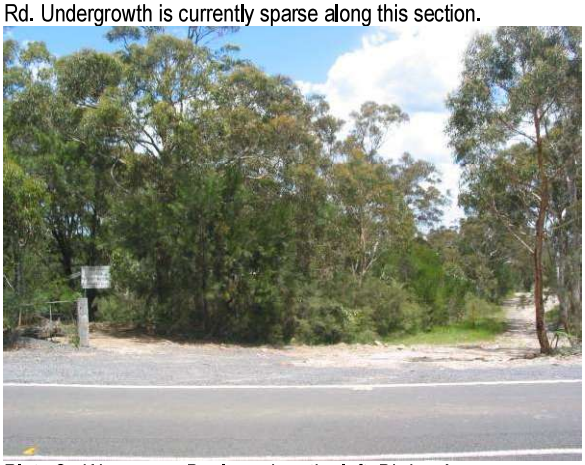


Plate 2 - Wanawong Boulevard on the left, Birriga Ave on the right, from Naval College Rd. Potential intersection location.

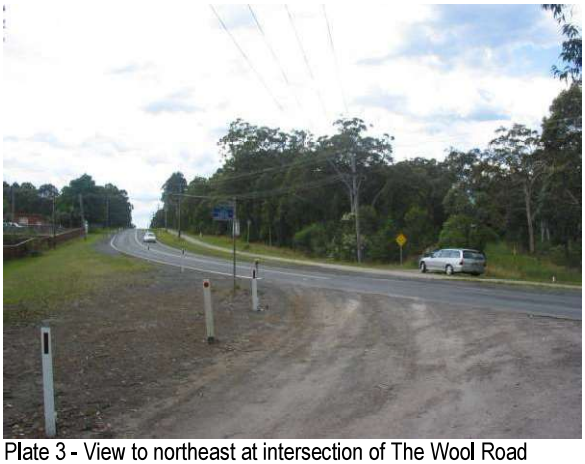


Plate 3 - View to northeast at intersection of The Wool Road and Birriga Ave. Potential intersection location.



Plate 4 - View to northeast along Erowal Bay Rd. Intersections would be required along this road.



Plate 5 - View from Coastal Waters Retirement Village toward Heritage Estates across Old Erowal Bay.

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3A.6. Demographics, community services & infrastructure

3A.6.1. Demographics

According to JSA (2008), Old Erowal Bay and St Georges Basin/Sanctuary Point in particular, historically act as areas of low cost housing, to which less well-off retirees and families have moved or retired to, including a high proportion of sole parent families in St Georges Basin/Sanctuary Point and Old Erowal Bay.

Household income in the communities of Erowal Bay, Old Erowal Bay, Sanctuary Point and St Georges Basin on average, is substantially lower than for NSW, due largely to the older age structure. In general, households in these communities require a higher level of assistance compared to NSW, also due to the age structure of these areas (*ibid.*).

According to JSA (2008) the Heritage Estates landowners are generally characterised by:

- a higher proportion of people in 30-49, 50-64 and 65-74 year age brackets than both the Shoalhaven LGA and NSW, particularly in the 50-64 age bracket;
- a relatively high proportion of people from culturally and linguistically diverse backgrounds compared to the Shoalhaven LGA;
- are relatively disadvantaged in terms of income, education and employment status compared to NSW, but similar to the Shoalhaven LGA.

The population of Planning Area 3 is expected to increase at a relatively high rate over the next three decades compared to many other areas. This relatively high population growth rate will have implications for the provision of community services and infrastructure across the region, particularly in relation to aged-care and healthcare services.

3A.6.2. Implications of population ageing on social & community services

According to a report prepared for Council by Judith Stubbs & Associates (2004)[15] the Shoalhaven LGA is the fourth most popular area in NSW for the over-55s to resettle in their pre- or post-retirement years. Many of these new arrivals come from Sydney, Canberra or other parts of the Illawarra to the smaller and more remote coastal villages.

As a result, Shoalhaven's age profile is significantly older than NSW and is aging at a far more rapid rate (*ibid.*). This is due principally to:

- The natural aging of population from an already high base, including an historical retirement population; and
- A very high rate of in-migration for affordability and lifestyle reasons.

Population growth and ageing will present a considerable challenge for Council and the range of government, community and voluntary agencies that provide health, community and support services to this widely-dispersed population (JSA, 2004). This will continue to be a challenge, with or without the proposed development.

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Community services in the St Georges Basin area are currently operating with limited capacity. An ageing population will mean that additional funding from State and Federal Governments will be necessary to maintain an adequate level of services such as Home Care, Community Transport, Meals On Wheels etc.

Shoalhaven currently has a shortage of doctors and medical services and many doctors currently have closed their books. People in need of medical services often have to wait for a vacancy, travel further to locate a doctor, or attend Shoalhaven District Hospital. If the proposal proceeds it is possible that there would a time lag before the resulting demand for medical services would be met by additional services.

3A.6.3. Impacts on services & infrastructure in Jervis Bay Territory (JBT)

There are significant social and economic needs in JBT and due to it's geographical isolation from the ACT, many services are currently provided within NSW (Commonwealth Grants Commission, 2002), including:

- Secondary education and vocational education and training;
- Some primary education;
- Hospital and ambulance services;
- Allied health services;
- Welfare; and
- Prison services.

A 2002 report by the Commonwealth Grants Commission (*ibid.*) investigated costs associated with options for funding NSW for the provision of some services. The report identified deficiencies in JBT in the areas of community and welfare services. Access to and provision of home and community care and disability services were also found to be below national standards. Health and education services were found to be adequate, largely due to the range of services provided in the Shoalhaven LGA and elsewhere in NSW.

The Non Self-governing Territories Branch of DOTARS (Department of Transport and Regional Services) is responsible for administering JBT on behalf of the Commonwealth. DOTARS provides funding to the ACT Government and other contractors for the provision of State and local government-type services for JBT residents. DOTARS provides some services directly, but most through contracts with the ACT Government, Shoalhaven City Council (mobile library and dog control) and private providers (Commonwealth Grants Commission, 2002).

BNP provides services within the Park, including roads, walking tracks, rubbish removal and recreation facilities, either directly or through contracts. Electricity is purchased from the NSW-owned electricity supplier, Integral Energy. Naval College Road provides the only access into JBT. Naval College Road forms the eastern boundary of the subject land.

Management of JBT's water and sewerage infrastructure is contracted out. Lake Windermere in the Park is the water supply source for the JBT (BNP, 2007[16]).

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It is unlikely that the proposed development will have a direct impact on services within JBT. One indirect impact could be a slight increase in and resident use of infrastructure within JBT and BNP given their relative proximity to the subject land.

3A.7. Regional economic benefits

Major components of the region's economy include tourism; manufacturing; retail; and building and construction (refer to Table 2).

Table 2. Economic value of sectors of the economy in the Shoalhaven LGA

Sector of Economy	Value ($M)	Year
Tourism	$647 gross	2003
Manufacturing	$432 turnover	1997
Retail	$401 turnover	1992
Building Activity	Based on approvals	2003
Commercial	$38	
Residential (new)	$154	
Industrial	$6	
Agriculture	$41	1997

The percentage of employed persons working in the main employment generating industries in selected locations/areas is shown in Table 3 - Proportion of employed population working in different industries

Table 3 - Proportion of employed population working in different industries.

Industry	Area					
	Jervis Bay Territory	Old Erowal Bay - Erowal Bay - Wrights Beach - Hyams Beach & Surrounds	Vincentia	Bay - Basin area	Shoalhaven LGA	NSW
Retail Trade	0%	13.6%	9.3%	15.9%	14.3%	11.1%
Construction	2.6%	13.5%	11.6%	10.0%	10.0%	7.3%
Health Care and Social Assistance	19.0%	13.0%	11.3%	13.3%	11.9%	10.5%
Manufacturing	0%	9.7%	8.1%	8.4%	8.3%	9.6%
Accommodation	4.1%	5.8%	8.9%	7.1%	8.7%	6.6%

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and Food Services						
Education and Training	0%	9.4%	13.2%	6%	7.8%	6.0%
Public Administration and Safety	69.2%	9.9%	13.1%	9.6%	9.2%	7.6%

Source: Australian Bureau of Statistics, Census of Population and Housing 2006.

Percentages of the workforce employed in health care and social assistance, retail and construction are a relatively high in the Shoalhaven LGA compared to the NSW average.

The proposal would provide a significant stimulus to the construction sector in the short to medium term. If for example 700 dwellings were constructed at $250,000 per dwelling, this would represent an injection of $175 million to the region's economy. Similarly, construction of roads, sewer, water, electricity and other infrastructure would potentially be in the order of $35-40 million. There is a potential risk that some of the development costs could be borne by the broader community. Apportionment of these costs is discussed below.

Benefits would be expected to flow to other sectors, particularly retail trade, the single largest employer in the Jervis Bay and St Georges Basin area (15.9 %).

Based on an estimate of developer contributions of around $7000 per lot, approximately $5 million would be generated over the life of the development process for expenditure on community services and infrastructure.

3A.8. Regional economic risks

Several submissions opposed to the proposal expressed concerns that the cost of the development would be borne by the broader community.

The work undertaken by Judith Stubbs & Associates (JSA, 2008) included an economic assessment from the perspective of the landowners. The JSA assessment considered the cost effectiveness of developing the land based on a total development cost of $65,000 per lot. Significant uncertainties are associated with some components of the total development costs.

For example, a feasibility analysis of stormwater treatment to achieve the standards recommended by the CoI has not been undertaken at this stage. This analysis would be required as part of the NSW planning legislation and rezoning investigations.

The JSA report emphasised the disadvantaged socio-economic status of many of the Heritage Estates landowners and concluded that some owners may not be able to afford the development costs.

The JSA report explored arguments that Council would be obliged to contribute to the significant development costs given the rates paid by the landowners over the years. The JSA report stated:

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"Hence by one view, Council has had the use of owners' money over twenty years without commensurate expenditure. On this view it is arguable that Council should bear some proportion of any costs associated wit the development."

It should be noted that the rezoning investigations prior to the JBSS (2003) were funded by Council to avoid raising the owners' expectations about the outcome. Money allocated by Council to fund the post-JBSS rezoning investigations is being repaid by the landowners through a special rate levy.

Despite contrary arguments to JSA's suggestion and notwithstanding Council's long-held position that it's support for the rezoning is contingent on the landowners paying the full cost of development, it would be open to Council's consideration to contribute in the future to the cost of the development.

In 2008 Council resolved to contribute matching funding for road construction in other similar subdivisions (namely Verons, Nebraska and Jerberra Estates). This decision could be perceived as a precedent by the Heritage Estates landowners. Any decision to contribute to development costs in the Heritage Estates would potentially have major implications for Council's budget and expenditure program.

In relation to the landowners' contribution to the costs of development, it is likely that Council would be required to borrow money to construct the necessary infrastructure up front and subsequently recover money from the landowners. The most likely means of recovering costs from landowners would be through special rates (paid off over a given number of years) and/or developer contributions which would be required to be paid prior to construction of homes. In either case there is a risk that Council would not recover all money expended by Council.

3A.9. Dealing with land that is not developed

There are several issues that will need to be resolved in the future in relation to the zoning, ownership and management of properties that are not developed, such as those that are within the area recommended for environmental protection by the CoI.

In relation to ownership of the undevelopable/environmental protection land there are two possibilities for these properties:

- Status quo – ownership of the land remains fragmented with the majority of properties privately owned. Rates would be levied on the privately owned properties. Council could continue with its policy of allowing the owners to transfer their land to Council in lieu of unpaid rates or if rates are owed for more than 5 years and the owner doesn't voluntarily offer the land, Council can acquire the property via the sale of land for unpaid rates in accordance with the *Local Government Act, 1993*. Historically, the majority of owners of this land have chosen to continue to pay rates in the hope that the zoning will be reviewed in their favour. As a result, it may take a long time, if at all, for the affected properties to be acquired.

- The properties could be purchased through compulsory acquisition and transferred to an entity that would be responsible for management. Acquisition could be difficult and costly given the number of properties involved. Management of the land would be a significant and ongoing burden and would not be an attractive proposition for Council. The distribution of costs would also need to be considered. One option might be to

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pass on the costs onto the benefiting landowners, however this may jeopardise the economic feasibility of the development.

3A.10. Impact on Booderee National Park (BNP) and regional tourism

Concerns were raised that the proposal would have an adverse impact on tourism in BNP and in the region generally. These issues are discussed below.

It is acknowledged that national parks can contribute to economic performance and social welfare in regional and rural areas. Jervis Bay is a major draw card for tourism in the Shoalhaven LGA and Booderee National Park is a significant feature in the Jervis Bay area.

The scenic qualities of Booderee are widely recognised and are important to the regional tourism industry and local communities. The landscape encompasses a peninsula of native vegetation, scenic beaches and bays, and magnificent sandstone cliffs.

Comprising of much of Bherwerre Peninsula, all of Bowen Island and the water and seabed at the southern end of Jervis Bay, Booderee offers visitors an opportunity to experience a variety of coastal settings. There are also a number of cultural and historical features such as the historic lighthouse which add to the Park's visual attributes.

Without careful planning, the visual attributes of the Park can be disturbed. In 1969, an area near Murrays Beach was cleared and excavated for a proposed atomic power station. This activity has caused a large scar on the landscape, which is clearly visible. There are also a number of long established Department of Defence facilities adjacent to the Park which impact on the visual attributes of the region.

Source: Booderee National Park Management Plan (2002)

The numbers of visitors to the Park (over 400,000 annually) and Park revenue have been fairly stable over recent years (BNP Visitors' Centre, unpublished data). People generally visit for one day to three or more weeks during the Christmas and Easter peak periods. The majority of visitors stay and spend money in the Shoalhaven LGA (Director of National Parks, 2008).

Camping is the only form of accommodation within the Park and is only available at Green Patch, Bristol Point and Cave Beach. The Park itself provides overnight accommodation for up to 500 campers and provides a range of recreational opportunities in natural and scenic settings. Visitor activities in the Park include walking, swimming and other beach activities, fishing, camping, boating, sailing, picnicking, nature study, photography, and snorkelling and SCUBA diving.

Other forms of overnight accommodation are available in the private lease areas in the Christians Minde area. Camping area management is a major task for Park Management. Another significant task is maintenance of the Park's 30 km of walking trails. A number of commercial tours operate in the Park, providing recreational opportunities otherwise unavailable to most visitors.

3A.10.1. Is tourism in BNP expected to increase?

In consideration of the recent enhancement of BNP's profile in the tourism sector (e.g. winning Gold at NSW Tourism Awards for Indigenous Tourism and Keep Australia Beautiful Award for

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Cleanest Beach on the South Coast) it is expected that ensuing marketing and promotional activities – both national and international – may result in increased visitation and revenue for BNP and the Jervis Bay and St Georges Basin area. Further, a range of sustainable ecotourism businesses in the area are at the planning stages and, once established, will draw an added increase in visitation and revenue (Booderee National Park, pers. comm., 2008).

3A.10.2. Impact of the proposal on tourism in BNP

A proper analysis of impacts of the proposal on Park visitation would require a detailed assessment of visitor profiles and the spending patterns associated with their use of the Park. No such data is currently available and it is Council's view that the proposal would not have a negative impact on tourism and/or revenue in BNP in the longer term as it will not directly alter the Park.

3A.11. Impact on the Wreck Bay Aboriginal Community

Wreck Bay Enterprises Limited (WBEL) is the business arm of WBACC and is the contractor for many of the functions in BNP (Commonwealth Grants Commission, 2002). BNP provides direct employment to 68 staff, including 35 from WBEL, as well as significant indirect employment through sub-contracted services (BNP, 2008). These arrangements result in social benefits to the Wreck Bay Aboriginal community. WBACC's responsibilities include:

- where practicable, taking action for the benefit of the community in relation to housing, social welfare, education, training and health needs;
- providing community services;
- protecting and conserving natural and cultural sites; and
- conducting enterprises for the economic and social benefits of the community.

The Booderee National Park Management Plan (Director of National Parks, 2002[17]) provides the following WBACC Vision Statement.

> Wreck Bay Aboriginal Community Council seeks to be a respected equal and valued part of a culturally diverse Australian society. By controlling and managing its own lands and waters, the Community aims to become self sufficient and able to freely determine its future and lifestyle.
>
> The Community desires to do this by protecting its interests and values while preserving for future generations, its unique identity, heritage and culture. To achieve this vision Wreck Bay Aboriginal Community Council's Goals are:
>
> - Sole ownership of all lands and waters within the Jervis Bay Territory.
> - Sole management of its freehold land and waters, allowing for Community responsibility, empowerment and self determination.
> - Sole representation of the Community's united and democratically agreed interests, at all levels of Government and in all external dealings so as to protect Community and members rights.

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- Environmentally sustainable development, to allow a productive economic base for the Community. By managing Booderee as an ongoing park, the Community seeks to protect the land and waters while earning income, creating jobs and achieving financial security.
- Social and cultural development, linked with appropriate cultural training and education, to improve Community empowerment and management, security and wellbeing, while preserving Community value.
- Improved health, housing and living standards, to levels at least comparable with good practice in other Australian communities.
- Recognition and support from the wider Australian community and Government, to achieve these worthwhile and positive goals.

3A.11.1. WBACC's submission on Draft PER

A submission received from WBACC on the Draft PER expressed strong opposition to the development of the Heritage Estates land. Extracts from WBACC's submission are provided below.

"This land you propose to develop in the isthmus of the Bherwerre Peninsula is special to us, because we know that without it, some species on our lands may not be able to survive. We know that species are being lost which degrades our lands and our cultural heritage."

"…We were bitterly disappointed to see the [Stockland's] development proceed despite the wide range of rare or endangered species present, the site's strategic importance connecting our natural areas, and wide ranging opposition to the proposal…

…The Wreck Bay Community and the Park were involved in considerable debate with Council when this land came on the market, and anyone purchasing blocks were speculating on high risk…

…You have employed a consultant to interview people who have taken a chance, and the product is inherently flawed and biased. If you wish to consider socio-economic impacts of the development, then we would like to provide feedback on potential impacts of the development on our Community"

WBACC (2008)[18]

3A.12. Impact on Department of Defence Activities

Defence operations in the Shoalhaven region result in significant economic and social benefits for the region. The Department of Defence provides a number of services for its staff and their families within the boundaries of HMAS Creswell. It provides health and housing, limited welfare services, some policing functions, maintains the roads and provides recreational facilities. It allows wider access to some facilities including a childcare centre when positions are available.

Difficulties can occur where there are concerns that growth and development may compromise Defence operations. The Department of Defence did not make a submission to Council on the Draft PER and Council is unaware of the Department having any specific concerns about the proposal.

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3A.13. Conclusion

The CoI in 1999 concluded that the provision of community services and facilities would not be unduly stressed if a staged development approach is applied. Moreover, the CoI concluded that arguments about the deficiencies in the existing level of services and infrastructure does not warrant refusal of the development. While there is a degree of uncertainty in relation to some of the social and economic issues discussed in this section, it is Council's view that the information provided in this section is sufficient to allow an informed decision to be made at this stage under the *EPBC Act*.

Social and economic issues associated with the proposal will be further examined as part of the rezoning process under the NSW *Environmental Planning and Assessment Act, 1979* pending a favourable decision under the *EPBC Act*. Similarly there would be further opportunity for public input on these issues.

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4. ALTERNATIVES

4.1. Alternative development options

The current proposal is based on a protracted rezoning investigation process that commenced in 1992; and the findings and recommendations of the 1999 CoI which were included in the Jervis Bay Settlement Strategy 2003. The current investigation areas comprise 809 lots, from which the CoI recommended a maximum yield of 730 dwellings.

A preliminary bushfire assessment was completed by BES in 2006, based on the Planning for Bushfire Protection Guidelines, 2001, which the NSW Rural Fire Service revised in 2006. The assessment indicated that bushfire protection measures including asset protection zones (APZ) and perimeter roads would sterilise or severely compromise in the order of 140-180 lots (BES, 2006). This number may be less under the new guidelines (the bushfire assessment has not been reviewed against the 2006 guidelines) and it is uncertain whether the maximum of 730 dwellings on 730 lots could be achieved.

If the current proposal is considered unacceptable by the Minister, a reduced development footprint could be considered.

In relation to threatened species habitat, BES concluded the entire site represents primary habitat for threatened species recorded on site. It should be noted that the information obtained from Council's recent investigations is more comprehensive than was available to the CoI. BES (2007) recommended that, should the land be rezoned for residential development, that:

"The boundaries of any investigation areas considered for residential development should be amended to incorporate substantial additional areas of habitat to be retained for threatened biodiversity conservation, as indicated within this report."

Any further reduction in development yield (from 730 dwellings on 730 lots as recommended by the CoI) will increase the development cost per lot for the benefiting lots, reducing the economic viability of developing the land. Any further reduction in the development footprint would result in direct adverse economic and social impact on those owners whose land was excluded. The costs of managing the remaining land might also increase.

It should be noted that the CoI concluded that the issue of compensation (if appropriate) would need to be addressed among the landowners themselves (refer to recommendation 12 of the CoI). There is currently no compensation scheme in place for owners whose properties were recommended by the CoI for environmental protection. Furthermore, Council is still legally required to rate these properties under the *Local Government Act, 1993*.

Council has a policy specifically for land within the areas recommended for environmental protection by the CoI. Council may accept the transfer of land within the subject land, in lieu of unpaid rates, if requested by the owner. This has occurred in relatively few cases. Alternatively, Council may act pursuant to section 713 of the *Local Government Act, 1993* where rates and charges have been unpaid for more than five years.

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4.2. Offsets

It might be possible to offset the loss of biodiversity values at the site by increasing biodiversity values of land elsewhere. 'Offsets' are specifically defined in a discussion paper prepared by DEWHA (2007[19]) as:

Actions taken outside of a development site that compensate for the impacts of that development – including direct and indirect impacts.

ELA undertook an analysis of the potential use of offsets based on the definitions and principles identified in the draft policy. ELA's assessment is provided below.

Direct offsets (e.g. purchase and conservation of habitat) for the Heritage Estates rezoning are not considered to be available for a number of significant species. Impacts to some species such as the Biconvex Paperbark could potentially be offset off-site by investing in the increased conservation of the population to the north of St Georges Basin, much of which is on private land. However, most of the other species on site will not substantially benefit from off-site offsets.

For example, the Leafless Tongue Orchid will require the maintenance of existing populations to maintain the current level of genetic variation. The loss of a population cannot be offset as the genetic information cannot be replaced and translocation of individuals is not considered to be a legitimate offset tool.

Another example involves the Eastern Bristlebird that is restricted to the heath and woodland vegetation communities along Bherwerre Peninsula. The population is largely contained south of the Wool Road and significant areas of connected habitat outside of Bherwerre Peninsula do not exist.

Concurrently, the Bherwerre Peninsula population is the largest remaining population of this species and is therefore highly significant for the ongoing survival of this species. Approximately 10% of this population currently occupies the Heritage Estates and the remaining population is predominately within reserved lands. As a result of these points, direct offsets are not considered available for this species and this population. While it may be possible to put in place indirect offsets for this species (e.g. contribution to research), these would not adequately compensate for the impacts to this species.

Similarly, offsets for the species requiring connectivity through Heritage Estates for movement along Bherwerre Peninsula cannot be provided. The intrinsic value and functionality of the identified habitat corridors through Heritage Estates are due to their location in the environment. This functionality cannot be replaced anywhere on Bherwerre Peninsula. Loss or indirect impacts to this corridor that disrupt its functionality cannot be recreated or replaced.

Part 7A of the NSW *Threatened Species Conservation Act 1995* (*TSC Act*) provides a systematic and quantitative framework for offsetting the impacts to achieve an 'improve or maintain' biodiversity outcome through 'biobanking'. It is not considered a viable means of allowing development of the subject land given the ownership of the land and the site specific issues. See also section 4.4.2.

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4.3. The 'do nothing' alternative

A 'do nothing' approach would simply perpetuate the existing situation which is clearly unacceptable, particularly for Council and the landowners.

Judith Stubbs & Associates Pty Ltd carried out a social and economic impact study on behalf of Council in 2007/2008. The study, which focused on owners of properties within the current investigation areas, clearly shows that the ongoing uncertainty with the land has had significant social and economic impacts on the owners.

The current situation has also resulted in various environmental impacts in relation to illegal clearing, recreational 4WD and trail bike use. These activities have the potential to increase soil erosion and effect water quality in St Georges Basin. Erosion from recreational 4WD and trail bike use has occurred and is severe along some of the more disturbed tracks and clearings. Wheel ruts from vehicles are particularly deep in the closed sedgeland and heath areas, concentrating flows and eroding exposed dispersive soils.

The proximity of the subject land to existing residential areas has contributed to an ongoing problem with illegal dumping. The Regional Illegal Dumping (RID) Squad has coordinated the removal of numerous car bodies, white goods etc from the subject land over the years. A Preliminary Land Contaminated Land Assessment completed by Coffey Geosciences Pty Ltd on behalf of Council identified some minor localised contamination issues associated with dumped car bodies etc.

The land would remain unmanaged and be prone to illegal clearing, dumping, recreational 4WD use etc. It is likely that until the matter is resolved once and for all, the landowners would continue to lobby all levels of Government to rezone the land for development.

4.4. Conservation options

If the conservation value of the subject land as a whole is considered to outweigh the social and economic needs and incentives of the landowners, consideration should be given to options which achieve: protection and enhancement of the conservation values of the land and financial return to the landowners. Two possible options are discussed below: joint government acquisition and biodiversity banking. The viability and applicability of these options would need to be fully considered and a key consideration for the appropriateness of these would be the relative importance of local and regional biodiversity.

4.4.1. Government acquisition

If the land cannot be developed because of its role in maintaining regional biodiversity, there could be an argument for joint State and Federal Government acquisition and inclusion of the land in the National Park system.

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4.4.2. Biodiversity banking

The land could be used as a biodiversity bank to allow other appropriate areas in the region to be developed. Under such a scheme, the land would be assessed for its biodiversity values and credits issued which could then be sold to developers seeking to develop land elsewhere with similar biodiversity values.

Once sold, the credits would be retired and the land managed for its conservation values in perpetuity. More detailed information is available on DECC's website at:

http://www.environment.nsw.gov.au/threatspec/biobankbill.htm

While the subject land is rich in biodiversity values, the number of separate owners may make negotiating and operating a biobanking scheme problematic. However, if ownership or management of the land was centralised (e.g. purchased or managed by a biobank agent) biobanking may be a feasible option for both conserving the land; and providing a remuneration fund for landowners.

The biobank manager would receive an up front payment as well as an annual payment for ongoing conservation management activities. There is also the question of who would be responsible for managing the site over the long term.

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5. DESCRIPTION OF THE ENVIRONMENT

5.1. Introduction

This section of the report describes the regional context of the subject land, focusing on the isthmus that links Booderee National Park (BNP) with the Jervis Bay National Park (JBNP) and other land with regional biodiversity conservation significance. The subject land is also described, drawing on work completed as part of Council's rezoning investigations.

The Jervis Bay region is a unique area with outstanding landscape, biotic and cultural values of local, national and international significance (Cho et al., 1995[20]). The region's land-based biodiversity includes complex and diverse native vegetation communities, which provide a range of habitats for many species of animals and plants. The range of threatened species found in the region can be attributed to the diversity and condition of vegetation communities. Substantial areas around Jervis Bay are protected as National Parks (NSW and Commonwealth).

In terms of the broader environment, the majority of species specific information has been collected as a result of studies in BNP and JBNP, as well as flora and fauna assessments completed for development proposals on nearby land.

5.2. Geology

The Bherwerre Peninsula is underlain with Permian sandstones, siltstone and conglomerates of marine origin. They are part of the southernmost extent of the Sydney basin sedimentary rocks. Dunes and sandy soils overcap the Peninsula. Bedrock is exposed in cliffs, marine platforms and minor exposures in creeks and dune areas.
(http://www.environment.gov.au/parks/booderee/special.html)

5.3. Hydrology & rainfall

The freshwater systems in the Bherwerre Peninsula range from ephemeral sheet and stream surface flows to permanent and semi-permanent streams, swamps and waterholes which may be self-contained or a surface expression of extensive ground water resources. There are several perched lakes. Lake Windermere and Lake McKenzie, both of which are closed freshwater dune lakes, are the largest permanent waterbodies in BNP. Both are characterised by considerable cyclical water level fluctuations in response to climatic variations. (http://www.environment.gov.au/parks/booderee/special.html)

The long term average annual rainfall is approximately 1200 mm, with highest monthly averages occurring from March to June, but there is significant seasonal and long term rainfall variability (http://www.bom.gov.au/climate/averages/tables/cw_068034.shtml).

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5.4. Vegetation communities

Vegetation across Bherwerre Peninsular is diverse. Significant vegetation communities known in BNP include littoral rainforest containing *Acmena smithii*, *Syzygium paniculatum*, *Ficus coronata*, and *Livistona australis* (poorly conserved in NSW, Benson 1989), mangrove and saltmarsh containing *Avicennia marina* (mangrove), *Sarcocornia quinqueflora* (saltmarsh herbland), and *Juncus kraussi* (saltmarsh rushland) (all having limited occurrence in NSW), *Ceratopetalum apetalum* rainforest (small patches highly susceptible to fire damage and weed infestation), and *Eucalyptus paniculata* dry mallee (unusual in distribution and form).

The littoral (intertidal) vegetation communities of BNP are of both local and statewide significance. They include mangrove communities along Sussex Inlet and south of Whiting Beach; saltmarsh communities at Flat Rock Creek and on the southern section of Bowen Island; and intertidal rocky platforms.

The mangrove communities provide habitat for a number of intertidal estuarine organisms, fish and terrestrial species. They also aid in sediment stability and enhance productivity in estuarine ecosystems. Saltmarsh communities are of high conservation value as bird feeding areas.

Forest communities in BNP are dominated by Blackbutt *Eucalyptus pilularis* and Southern Mahogany *E. botryoides*, with Sydney Golden Wattle *Acacia longifolia* and banksias dominating the understorey. Relic rainforest communities, which are generally found in wet gullies within forest communities, are dominated by Hard Corkwood *Endiandra sieberi* and Lilly Pilly *Acmena smithii*. Native Poplar *Omolanthus populifolius*, Blueberry Ash *Elaeocarpus reticulatus*, Bastard Rosewood *Synoum glandulosum* and Cabbage Tree Palm *Livistona australis* also occur. Ferns and creepers are common ground cover species in the rainforest gullies.

Woodland communities in the BNP are dominated by Silvertop Ash *E. sieberi* and Bloodwood *E. gummifera*. Woodland understoreys are composed mainly of Heath Banksia *Banksia ericifolia* and Old Man Banksia *B. serrata* and the Grass Tree *Xanthorrhea australis* also occurs.

Common heath species occurring in the BNP include *B. ericifolia*, Dagger Hakea *Hakea teritifolia*, Manuka *Leptospermum scoparium*, *Xanthorrhea resinosa* and *Allocasuarina distyla*. Coastal scrub communities are dominated by Coastal Tea Tree *L. laevigatum*. *Sporobolus virginicus*, *Stipa* spp. and *Zoysia macrantha* dominate grassland communities on Bowen Island.

The marine seagrass beds contain three genera: *Posidonia*, *Zostera* and *Halophila*. Due to the clarity of the water some marine species are found at much greater depths than usual. The region has approximately thirty saltmarsh species. There are two species of mangrove in BNP: Grey Mangrove *Avicennia marina* and River Mangrove *Aegiceras corniculatum*. Subtidal and intertidal platforms support a diversity of rocky reef algae with *Hormosira*, *Ecklonia*, *Sargassum*, *Phyllospora* and *Cystophora* being the dominant genera.

Broad scale vegetation mapping of the region is shown in Figure 15.

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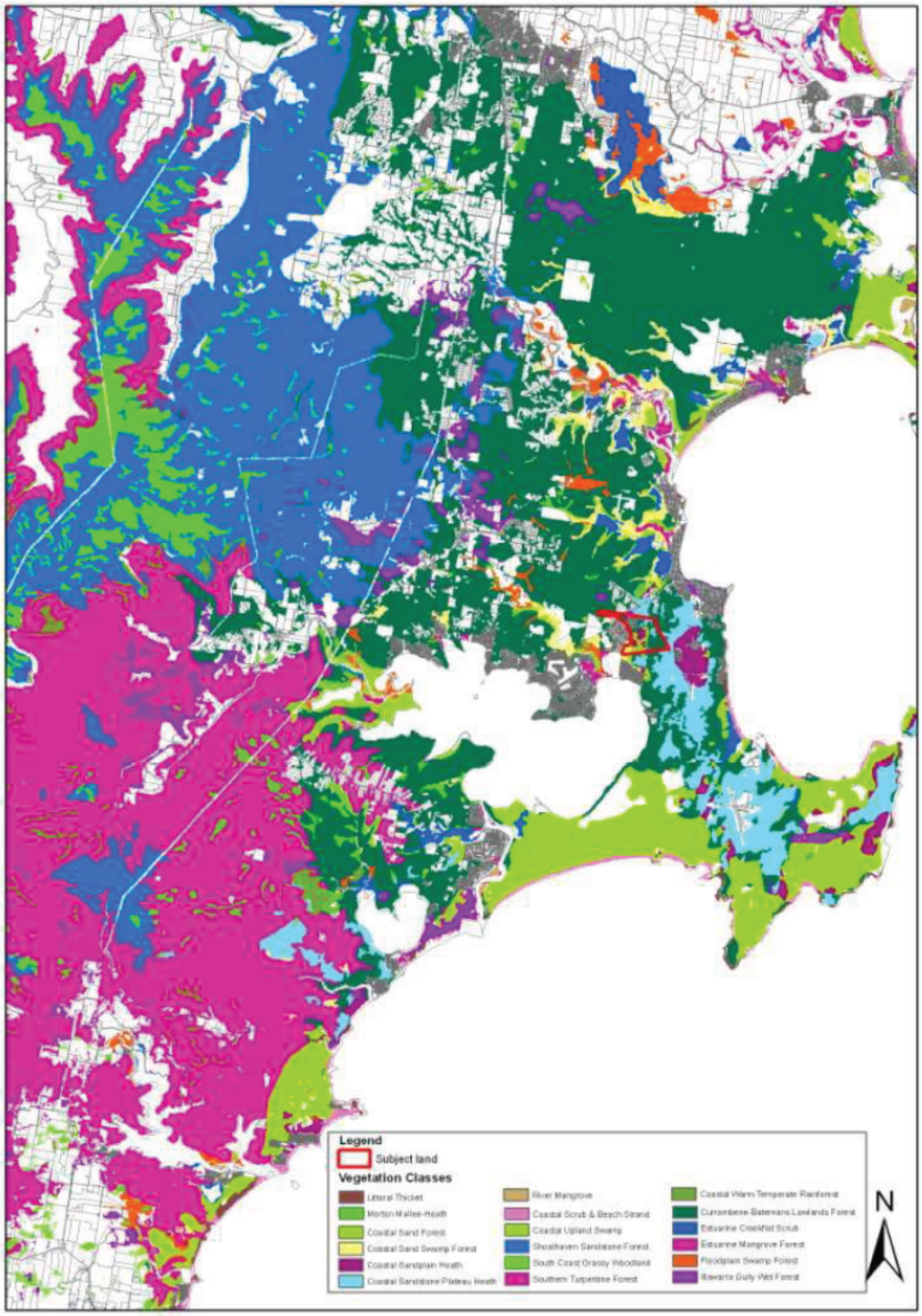


Figure 15 - Broad scale vegetation mapping
Source: Department of Environment and Climate Change, Native Vegetation Map Report Series No.4 (version 2.2)

The subject land is in the catchment of St Georges Basin, a significant coastal lake with a large shallow basin connected to the ocean by a narrow channel at the town of Sussex Inlet. The vegetation type, size, makeup and location of the major Estuarine Vegetation groups for this estuary are illustrated at:

http://naturalresources.nsw.gov.au/estuaries/inventory/data/vegetation/stgeorges.shtml

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St Georges Basin is recognised as being of national significance and is listed within the 3rd edition of "A Directory of Important Wetlands in Australia" (Environment Australia, 2001)[21]. It is considered to be a good example of a wetland type occurring within a biogeographic region in Australia, and also as it provides habitat for animal taxa at a vulnerable stage in their life cycles, and can provide a refuge when adverse conditions such as drought prevail.

5.5. Topography, hydrology & soils of the subject land

The subject land is characterised by moderately undulating topography, generally sloping to the west and southwest, towards Worrowing Waterway. Elevation of the land ranges from approximately 5m Australian Height Datum (AHD) along Worrowing Waterway to a maximum of just over 70m AHD in the south-eastern corner of the land. The investigation areas are generally situated between 10m and 50m AHD.

The land drains to Worrowing Waterway, via three main ephemeral watercourses and direct overland flow. Of the ephemeral watercourses, Marang Creek (locally named) is the largest.

A Hydrological and Soil Assessment report completed by Coffey Geosciences Pty Ltd (2005) on behalf of Council, indicates that there is a shallow, perched aquifer and a deeper aquifer at 5-8m below the soil surface (Coffey Geosciences, 2005[22]). The shallow aquifer is expressed by groundwater discharge zones and closed sedgeland and heath vegetation communities. A number of small drainage channels from upslope dissipate where they meet the exposed shallow aquifer (Coffey Geosciences, 2005).

Laboratory testing of soil samples taken from across the site indicated that the upper soil layers are partially to highly dispersive. More detailed information on terrain units, soil dispersivity and acid sulphate soils is provided in ATTACHMENT 4.

5.6. Vegetation of the subject land

Nine vegetation communities were identified in the subject land by BES (2007) comprising:

- Scribbly Gum-bloodwood Woodland
- Gallery Rainforest
- Bangalay Swamp Forest
- Woollybutt-Paperbark Swamp Forest
- Spotted Gum-Woollybutt Woodland
- Spotted Gum-Blackbutt Open Forest
- Blackbutt-Bloodwood Open Forest
- Heathland
- Sedgeland-Shrubland

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Full descriptions of vegetation communities from BES (2007) are provided in ATTACHMENT 5.

A total of 252 flora species were identified during the flora surveys and included 246 native species and 6 introduced species. These are also listed in ATTACHMENT 5.

5.7. Fauna of the subject land

5.7.1. Habitats

The fauna habitats present in the study area are diverse, largely reflecting the diversity of vegetation types present and the hydrology. These range from gallery rainforest, swamp forest and open forest, through to woodland with high floristic understorey diversity, to sedgeland and heathland. Additionally, the study area provides specific fauna resources including a large number of trees with visible hollows, stands of Black She-oak, winter-flowering and high nectar-producing trees and shrubs, sap-trees, ephemeral creeks with a few apparently permanent ponds, and the partly tidal Worrowing Waterway.

A key fauna resource of the study area is the large number of trees with visible hollows, which provide shelter and breeding sites for a range of hollow-dependent species. Hollow-dependent threatened species of the study area include the East Coast Freetail Bat, Eastern False Pipistrelle, Greater Broad-nosed Bat, Large-footed Myotis, Yellow-bellied Glider, Glossy Black-cockatoo, Gang-gang Cockatoo, Powerful Owl, and Masked Owl. Hollows are also likely to be important for sustaining populations of non-hollow-dependent species, which sometimes utilise hollows, including the threatened Eastern Pygmy-possum and White-footed Dunnart, and the Common Ringtail Possum, which is an important prey species for the threatened Powerful Owl.

Four hundred and eighty nine trees containing medium to large visible hollows were recorded during the surveys, generally within forest and woodland vegetation and mostly within the CoI recommended environmental protection areas, although a number of substantial hollow-bearing trees occurred within the investigation areas. The total number of trees containing visible hollows within the study area is substantially higher, as trees containing only small hollows were not recorded during the survey. A high number of mature and hollow-bearing trees would generally reflect a high number of hollow-bearing logs on the ground, although this resource has been substantially reduced in some areas by firewood collection, 'cleaning up' fallen timber within slashed lots, and possibly by the frequency of fires.

The seed cones of Black She-oak trees provide an almost exclusive food source for the Glossy Black-cockatoo, and these trees occur in stands or higher concentrations within forest and woodland areas within both investigation areas and COI recommended environmental protection areas. One hundred and one Black She-oaks were found to be used by Glossy Black-cockatoos for foraging. Canopy and sub-canopy seed sources for the Gang-gang Cockatoo and other birds occur widely throughout the forests and woodlands of the study area.

Important nectar sources for birds and mammals, including the threatened Regent Honeyeater, Swift Parrot, Yellow-bellied Glider, Eastern Pygmy-possum and Grey-headed Flying-fox, are present in the form of eucalypts and larger banksias within forest and woodland areas. In particular, Swamp Mahogany, Grey Ironbark, Woollybutt and Spotted Gum generally flower over winter, which sustains nectar and pollen sources throughout the year.

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In addition, dense patches of *Banksia ericifolia*, a substantial winter nectar source, occur within many woodland, sedgeland and heathland areas. Large numbers of Red Bloodwood trees within forest and woodland provide important summer nectar resources for possums, gliders and Grey-headed Flying-foxes, and provide a food source for prey species of microchiropteran bats and the Square-tailed Kite.

Red Bloodwood provides the main sap resource for gliders throughout the study area, including the threatened Yellow-bellied Glider. At least 13 Red Bloodwood trees in the study area are incised by the Yellow-bellied Glider to procure sap.

The density of understorey and groundcover vegetation varies throughout the study area according to various disturbance regimes, but overall, provides important habitat for a range of small terrestrial mammals, which in turn provide a prey base for species including the threatened Masked Owl. Lower level vegetative strata within sedgelands, heathlands and woodland provide important habitat for the threatened Eastern Bristlebird and Ground Parrot. Dense shrub layers within some forest communities, particularly near creek lines, also provide important Eastern Bristlebird habitat.

Aquatic habitats within the study area are varied, and support a wide range of fauna. Ephemeral creeks in the east of the study area that pass through forest and woodland are underlain by sandstone, which retains water in ponds for some time after rainfall. These creeks flow into poorly-drained sedgelands, which also retain surface and soil water following heavy rainfall. All creeks in the study area drain into Worrowing Waterway, of which the lower half is tidal.

Creeks and associated sedgelands provide habitat for a range of frog species, including potential breeding habitat for the threatened Giant Burrowing Frog. Aquatic foraging habitat for the Large-footed Myotis is provided along Worrowing Waterway and other ephemeral creeks and ponds. The threatened Black Bittern is known to forage, roost and potentially breed within the riparian habitat of Worrowing Waterway, and the wetter sedgeland areas provide habitat for the migratory Latham's Snipe. Apart from threatened and migratory species, the aquatic habitats of the study area support a large range of species, mainly birds and frogs, and contribute substantially to the area's biodiversity.

5.7.2. Fauna species

Targeted fauna surveys and opportunistic observations during the survey period, together with the results of previous surveys, resulted in the detection of 154 faunal species in or adjacent to the study area. A total of 34 mammals, 99 birds, nine reptiles and 12 amphibians were recorded and are listed in ATTACHMENT 6.

The results of the survey indicate a high faunal species richness and diversity, particularly as this survey focused on threatened species and recorded other species mainly opportunistically. Of the seventeen threatened fauna species recorded during the survey period, consisting of eight threatened birds and nine threatened mammals, two are listed on the *EPBC Act:* the Eastern Bristlebird (endangered); and the Grey-headed Flying-fox (vulnerable).

Seven introduced species were recorded during the survey period, however all of the introduced fauna species occur at low densities and most occur irregularly and/or only on the fringes of the study area near the bushland/residential interface.

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Overall, the study area contains high levels of faunal diversity, a high proportion of threatened fauna and a low incidence of introduced fauna. According to BES (2007) the results of the fauna survey suggest that the study area contains good quality and important habitat for native fauna and has high fauna conservation values.

5.7.3. EPBC-listed threatened species recorded on the subject land

Eastern Bristlebird (*Dasyornis brachypterus*)

The Eastern Bristlebird is listed as endangered in both the *Environment Protection and Biodiversity Conservation Act 1999* and on Schedule 1 of the *Threatened Species Conservation Act 1995*. It is thought to be among the rarest vertebrate species in Queensland and Victoria and is close to local extinction in these states.

Eastern Bristlebirds are a dull brownish colour, with an average length of 210mm (Pizzey & Doyle 1980[23]). They are semi-flightless terrestrial birds. They depend on dense, low vegetation. They are sensitive to fire and predation by feral animals (such as foxes). Studies suggest that if predators can be controlled, their resilience against fire may increase. Being semi-flightless, few birds generally survive bushfire. Fire also removes the dense understory vegetation which characterizes their habitat, making the population recovery slow.

The NSW Recovery Plan for this species estimates the species abundance to be less than 2000 individuals. 700 of these are thought to occur around Jervis Bay. Targeted surveys throughout the Jervis Bay region from 1992-1996 (Baker, 1997[24]) recorded the species in substantial numbers only on Bherwerre Peninsula. Surveying during 1999 detected Eastern Bristlebirds south-west of Huskisson (Bain, 2001). Bain considers these detections as recent dispersals, as the birds were not detected in these areas before the fires in 1994, 1996 and 1997. The presence of duetting pairs at these sites may indicate that the two sites are now breeding areas. This is quite significant as these Eastern Bristlebird pairs are distant from the core Bristlebird habitat around Jervis Bay and their habitat is only tenuously connected (Bain, 2001[25]).

Breeding occurs from August to February and they only ever raise one fledgling. Bristlebirds are sensitive to disturbance and have been reported to abandon their nests after human interference (Hartley & Kikkawa, 1994[26]). It is presumed they are also sensitive to other disturbances such as intrusion by predators.

Habitat loss is recognised as the main process which reduced the occurrence of the Eastern Bristlebird. The recovery plan states that much of the known habitat is now reserved. It also sights management of habitat on private land, particularly at Jervis Bay to be extremely important.

During the study by BES (2007), the Eastern Bristlebird was found to be well established in the study area. Eastern Bristlebird habitat occurs in all four investigation areas and the CoI recommended environmental protection area throughout the study area apart from the north-west and extreme south-west.

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During the survey period, wildfire had temporarily reduced the area of habitat available to the Eastern Bristlebird. This was most noticeable in the north-eastern, eastern and south-eastern sections of the study area. Disturbances to Eastern Bristlebird habitat by frequent fires is a key management issue for the study area.

Large areas of the study area boundaries provide connectivity with Eastern Bristlebird habitat on adjacent properties. According to BES (2007), approximately 75% of the Erowal Bay Road reserve immediately adjacent to the study area provided suitable habitat for the species up until a recent fire, and is of merit as it reduces the width of clearing across Erowal Bay Road. Much of this habitat was burnt during the BES study. Good quality Eastern Bristlebird habitat occurs south of Erowal Bay Road. Most of the eastern boundary of the study area provides connectivity to known Eastern Bristlebird habitat to the east of Naval College Road. The eastern portion of the northern boundary also provides connectivity to known habitat within the Baptist Church property to the north. Another potential habitat link occurs along the dense riparian vegetation understorey of Worrowing Waterway between the study area and habitat in the north-west (BES, 2007).

Grey-headed Flying-fox (*Pteropus poliocephalus*)

This species is a canopy-feeding frugivore, blossom-eater and nectarivore of rainforests, open forests, woodlands, Melaleuca swamps and Banksia woodlands. As such, it plays an important ecosystem function by providing a means of seed dispersal and pollination for many indigenous tree species (Eby, 1996[27]; Pallin 2000[28]). Grey-headed Flying-foxes also feed on introduced trees including commercial fruit crops. Breeding habitat is usually canopy trees associated with rainforest, or coastal scrub or riparian or estuarine communities. There must be sufficient foraging resources available within 40km of a breeding site. Annual mating commences in January and a single young is born each October or November.

Grey-headed Flying-foxes are relatively long-lived mammals, with the average age of reproductive animals being between 6 and 10 years. They have a low rate of recruitment as sexual maturity is reached after at least two to three years and generally only one offspring is produced each year (Martin et al., 1996[29]).

Grey-headed Flying-foxes are found within 200 km of the eastern coast of Australia, from Bundaberg in Queensland to Melbourne in Victoria. The Grey Headed Flying Fox is listed as Vulnerable in both the *Environment Protection and Biodiversity Conservation Act 1999* and on Schedule 2 of the *Threatened Species Conservation Act 1995*.

The main threat to Grey-headed Flying-foxes in NSW is clearing or modification of native vegetation. This removes appropriate camp habitat and limits the availability of natural food resources, particularly winter-spring feeding habitat in north-eastern NSW. The urbanisation of the coastal plains of south-eastern Queensland and northern NSW has seen the removal of annually-reliable winter feeding sites, and this threatening process continues (Catterall et al., 1997[30]). In NSW, less than 15% of potentially suitable forest for the Grey-headed Flying-fox occurs in conservation reserves; only 5% of roost sites are similarly reserved (Hall and Richards, 2000[31]).

The Grey-headed Flying-fox was recorded foraging within the study area on a number of occasions during the warmer months (BES, 2007) and it is known to forage throughout the locality. No roosting sites were recorded or are expected to occur within the study area.

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The study area contains a range of foraging resources for this species in the form of eucalypts and large banksias in forest and woodland communities. The majority of primary habitat for the species is contained within the CoI recommended environmental protection areas. Scribbly Gum-Bloodwood Woodland, particularly the more structurally intact sections within investigation areas 2, 3 and 4, is also likely to be used by the species for foraging on occasions.

Whilst it is desirable to maintain the current diversity of foraging resources in the study area for this species, the Scribbly Gum-Bloodwood Woodland foraging resources within the investigation areas are not of sufficient quality or quantity to justify their retention for this species alone as it forages well beyond the study area, and better foraging habitat occurs within CoI recommended environmental protection areas (BES, 2007).

Leafless Tongue Orchid (*Cryptostylis hunteriana*)

As its name implies, the Leafless Tongue Orchid has no leaf. It produces an upright flower-stem to 45 cm tall, bearing five to 10 flowers between November and February. It has small narrow green sepals and petals to 22 mm long, but is dominated by an erect narrow very hairy 'tongue' (the labellum). This is up to 33 mm long, maroon along the margins and at the widened tip, and with a black central band. All other tongue orchids have leaves; most have a downward pointing labellum.

The Leafless Tongue Orchid is listed as Vulnerable on both the *Environment Protection and Biodiversity Conservation Act 1999* and on Schedule 2 of the *Threatened Species Conservation Act 1995*.

The Leafless Tongue Orchid has been recorded from as far north as Gibraltar Range National Park south into Victoria around the coast as far as Orbost. It is known historically from a number of localities on the NSW south coast and has been observed in recent years at numerous sites between Batemans Bay and Nowra (although it is uncommon at all sites). The orchid is also recorded at Nelson Bay, Wyee, Washpool National Park, Nowendoc State Forest, Ku-Ring-Gai Chase National Park, and Ben Boyd National Park.

The larger populations typically occur in woodland dominated by Scribbly Gum (*Eucalyptus sclerophylla*), Silvertop Ash (*E. sieberi*), Red Bloodwood (*Corymbia gummifera*) and Black Sheoak (*Allocasuarina littoralis*). It appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (*C. subulata*) and the Tartan Tongue Orchid (*C. erecta*). In addition to reproducing from seed, it is also capable of vegetative reproduction and thus forms colonies which can become more or less permanent at a site.

This species does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland.

DECC[32] has identified a total of 4 strategies to help recover this threatened species:

1. Habitat management: Site Protection (e.g. Fencing/Signage) - Protection of key populations that in any one year have more than 20 individuals. High priority.
2. Habitat Protection: (e.g. critical habitat nomination etc) Prepare plans of management for development sites where plants have been retained and managed. Medium priority.

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3. Monitoring Long-term monitoring of key populations that in any one year have at least 20 individuals. Medium priority.
4. Survey/Mapping and Habitat assessment map known populations and identify sites with over 20 plants. Medium priority.

According to BES (2007) all of the 211 individuals found in the subject land were located within the four investigation areas, in woodland and sedgeland. No individuals were found within the CoI 'environmental protection' areas.

5.7.4. EPBC-listed species which may be present

Giant Burrowing Frog (*Heleioporus australiacus*)

The Giant Burrowing Frog is listed as Vulnerable on both the *Environment Protection and Biodiversity Conservation Act 1999* and on Schedule 2 of the *Threatened Species Conservation Act 1995*. The Giant Burrowing Frog is a large, squat, slow-moving frog that grows to about 10 cm long. It has prominent, large eyes and has dark chocolate-brown upperparts with white or yellow spots on the side. Adult males have enlarged forearms, with a large conical black spine and several small spines on their first finger. Females have reduced arm-musculature compared to males.

The Giant Burrowing Frog occurs from the NSW Central Coast to eastern Victoria, but is most common on the Sydney sandstone. It has been found from the coast to the Great Dividing Range. The habitat described for the Giant Burrowing Frog appears to be widespread throughout the south-east of NSW and Victoria, however there is only a small number of records of the frog from this region and few current populations of the species are known (Penman et al. 2005[33]). It is possible that the known sites actually represent the true extent of the species within the region and that this species really is rare and restricted in this part of its range.

It has been found in a variety of habitats from heath, woodland through to open forest with sandy soils. It will travel several hundred metres to creeks to breed from August to March and the eggs are laid in a white foam-mass under vegetation in creeks or in yabby holes. Studies by Penman et al. (2005[34]) on non-breeding habitat requirements of the species suggest that the frogs spend the majority of their time burrowed between one and 30 centimetres under the ground, at considerable distances from their breeding sites. Their preferred non-breeding habitat is dry forest with relatively little vegetative ground cover.

The diet of the Giant Burrowing Frog consists of ground-dwelling invertebrates such as ants, beetles and spiders.

Information provided by DEWHA[35] from various sources indicates that while the species is usually found in association with breeding sites, individuals may disperse over dry sandstone ridges and pitfall trapping indicates that animals do move through eucalypt forest. Observations from a radio tracking study indicate that diurnal hours are nearly always spent burrowed underground and weekly movements vary from 0 to 500 m. Importantly, no specimens have been recorded from cleared lands and the species appears to be dependant on areas with native vegetation.

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Each frog appears to have its own small territory ranging in size from 400 to 1000 m^2. Within these territories, the frogs have a series of burrows that they re-use. This contrasts with the long-held belief that the frogs travelled widely through the forest (Penman, 2005[36]).

While individuals have been found near Vincentia and in BNP, no individuals of this species were detected during the survey period in the subject land. The subject land is also hydrologically isolated from the nearby sites. Potential breeding and foraging habitat for this species was identified in the study area. However, given that conditions were sub-optimal during the study BES (2007) concluded that the Giant Burrowing Frog 'may' occur.

Jervis Bay Leak Orchid (*Prasophyllum affine*)

The Jervis Bay Leak Orchid is listed as endangered on both the *Environment Protection and Biodiversity Conservation Act 1999* and on Schedule 1 of the *Threatened Species Conservation Act 1995*.

The Jervis Bay Leek Orchid is a relatively inconspicuous ground orchid with single clustered spikes of small flowers that are upside down relative to most other orchids. It has a single tubular, not flat, leaf. The stem is rarely more than 25 cm tall and bears up to 35 flowers, each about 9 mm across, on the top third of the stem. The leaf may be twice that length.

This species grows on poorly drained clay soils that support low heathland and sedgeland communities. Plants retreat into subterranean tubers after fruiting, so are not visible above-ground.

The Jervis Bay Leek Orchid is currently known from three areas south-east of Nowra including on land immediately north of the subject land. Other sites include Kinghorne Point, Wowly Gully near the village of Callala Bay, and near the township of Vincentia.

No records have been recorded on the study site. Suitable habitat was however, identified and given the close proximity of known records, BES concluded that it is considered possible that they could occur in the study area.

5.8. Jervis Bay National Park (JBNP)

Jervis Bay National Park (JBNP) comprises areas around the northern and western sides of Jervis Bay, as well as the bed and parts of the shore of Lake Wollumboola. The southern end of JBNP extends through the isthmus between Jervis Bay and St Georges Basin, to BNP. Refer to Figure 8.

The area covered by JBNP and reserve has a relatively flat topography but the landscape is diverse, including features such as dunes, beaches, rock platforms, wetlands, estuaries and Lake Wollumboola. Estuarine wetlands are a prominent feature near the mouths of all the small streams entering Jervis Bay and are particularly extensive around Carama Creek. JBNP's interface with the waters of St Georges Basin and Jervis Bay add to its landscape diversity.

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A major feature of the landscape of JBNP and reserve is the diversity of native plant communities. Of the thirty distinct vegetation types defined by Mills (1993)[37] for the Jervis Bay region, twenty-four occur in JBNP, ranging from a small area of rainforest to coastal heathland. There are thirteen distinct woodland/forest communities in JBNP and the wetland communities include freshwater, brackish and saline wetlands.

Over two hundred species of birds, forty-two native mammal species, seventeen species of frog, fifteen species of lizard, thirteen species of snake and one tortoise species have been recorded in the Jervis Bay region, and JBNP contains habitat suitable for most of these species. Of particular interest is the large number of species of insectivorous bats which have been recorded (Wise and Spencer 1997[38]; Gaia Research Pty Ltd 1999[39]).

JBNP contains a number of animal species listed on the *TSC Act* including: bird species, mammal species (six of which are bats) and frog species. Of these, the endangered Eastern Bristlebird (*Dasyornis brachypterus*) and vulnerable Ground Parrot (*Pezoporus wallicus*) have significant populations in JBNP and in the adjacent BNP. The vulnerable Eastern Chestnut Mouse (*Pseudomys gracilicaudatus*) reaches its southern geographical limit of distribution in the Jervis Bay area and has recently been recorded on the eastern side of Jervis Bay Road opposite the subject land (Townley, 2007[40]). In addition JBNP includes several endangered ecological communities listed under the *TSC Act*. A full list of flora and fauna species of conservation significance to JBNP is at ATTACHMENT 8.

5.9. Booderee National Park (BNP)

5.9.1. General description

Booderee National Park (BNP) comprises 80% of the Jervis Bay Territory and is a small and diverse coastal national park consisting of 5,504 ha of terrestrial and 875 ha of marine environment. It lies between bioregions and consequently it is rich in natural resources with 625 native plant, 26 mammal, 200 bird, 17 reptile, 14 amphibian, and 308 fish species recorded. Many species are at their northern or southern limit of distribution (BNP, 2007[41]).

5.9.2. Significant fauna

According to Booderee National Park (BNP, 2007) the following animal species are considered to be at threat in BNP if the habitat linkages are impacted:

<u>Mammals</u>

- White-footed Dunnart – had not been recorded in BNP for over 20 years but was rediscovered in 2005. Recovery possibly linked to fox control.
- Long-nosed Bandicoot
- Greater Glider – in sharp decline since 2003 Windermere fires.
- Sugar Glider
- Eastern Pygmy-possum
- Feathertail Glider
- Red-necked Wallaby – appears to have increased since intensive fox baiting.

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- Swamp Wallaby – appears to have increased since intensive fox baiting.
- Swamp Rat
- Eastern Chestnut Mouse – very rare in BNP. Found mostly in recently burnt heath.

Birds

- Powerful Owl – requires large home range (1,000 ha/pair). 8 breeding pairs have been recorded in BNP, the highest known population density of this species.
- Barking Owl
- Ground Parrot – found in small pockets of heath. Locally very rare.
- Southern Emu Wren – confined to low, dense vegetation such as heath.
- Beautiful Firetail – occurs in coastal heaths and tea-tree scrub.
- Eastern Bristlebird – may have reoccupied additional habitats (other than heath) since fox control. Jervis Bay is the major stronghold.

Reptiles & Amphibians

- Diamond Python
- Giant Burrowing Frog – recorded in heath and woodland. BNP is likely to be a stronghold for the species.

A number of animal species have become locally extinct in BNP (BNP, 2007). These are listed in Table 4.

Table 4 - Vertebrate species which have become locally extinct in Booderee National Park

Species	Common Name	Status
Mammals		
Phascolarctos cinereus	Koala	Locally extinct 1920's
Dasyurus maculatus	Spotted-tailed Quoll	Locally extinct 1990's
Vombatus ursinus	Common Wombat	Locally extinct 1990's
Isoodon obesulus (sub-fossil record)	Southern Brown Bandicoot	Locally extinct 1970's
Petaurus australis	Yellow-Bellied Glider	Locally extinct 1980's
Herpitofauna		
Veranus varius	Lace monitor	Locally extinct 1970's
Litoria aurea	Green and Golden Bell Frog	Reportedly was relatively common in permanent waterbodies. Locally extinct 2006

Lists of rare and threatened animals that are known to occur in BNP; animals for which suitable habitat exists; and species which are considered significant because of their conservation status, their particular scientific value or because they are subject to international treaties are contained in the information provided by (BNP, 2007) – refer to ATTACHMENT 7.

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BNP and the adjoining JBNP contain the largest remaining population of the Eastern Bristlebird (approximately 50%) (Baker, 1997). Recent research indicates loss and fragmentation of habitat and the fox, particularly after fire, are principal endangering processes for the species (BNP, 2007).

The potential impacts on this species alone (direct loss of habitat) could be considerable. The investigation areas contain habitat for this species including heath, sedgeland, and woodland. The subject land provides contiguous habitat for Bristlebird populations in Booderee, NSW Jervis Bay National Park, and populations to the west as far as Tomerong. According to Booderee National Park Authority, without effective habitat corridors, the largest remaining population of the species within Booderee and the adjoining NSW Jervis Bay National Park will become fragmented and be under significant threat (BNP, 2007).

The Giant Burrowing Frog has been recorded in other nearby areas and has potential primary habitat over a large percentage of the investigation area. However, it should be noted that targeted surveys by BES when the species was calling at a nearby location failed to detect the species on the subject land (BES, 2007).

Targeted surveys by BES for the Green and Golden Bell Frog on the subject land failed to detect the species and BES concluded that it is unlikely to occur in the area (BES, 2007). This species has not been located in BNP for two years, but was previously recorded in a range of wetland sites in BNP and in adjacent wetland areas including within the investigation areas (BNP, 2007). According to BNP, both frog species are in serious decline, and the destruction of very limited ephemeral wetland habitat is likely to contribute to the local extinction of these species.

5.9.3. Significant flora

BNP contains a diverse range of well preserved coastal plant communities including remnant rainforest, heath communities, woodland and coastal littoral communities. More than 600 species of naturally occurring terrestrial plants have been recorded.

A number of plant species which occur in BNP have significant conservation status and warrant special protection because they are at the edge of their range, have limited distribution or are considered rare or threatened (BNP, 2007). A substantial number of flora species are listed on NSW and Commonwealth threatened and endangered species schedules or are subject to international treaties. These species are listed in ATTACHMENT 7 in alphabetical order.

Syzygium paniculatum is the only known naturally occurring plant species in BNP which is classified under the *EPBC Act* as vulnerable. Although not listed as threatened, *Grevillea macleayana* is a naturally occurring endemic species, restricted to the Jervis Bay region. Four other plant species are considered rare nationally and another is too poorly known to classify. Management prescriptions in this plan reflect the conservation requirements of these species.

The area is scientifically valuable, as it has not undergone the degradation that similar coastal sites (such as those surrounding Sydney) have suffered. The preservation as a southern representative of the sandstone ecosystems of coastal New South Wales is highly important (BNP, 2007).

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5.10. Habitat connections

A habitat corridor is a linear two-dimensional landscape element that connects two or more patches of otherwise isolated habitat, which functions as a conduit for both plants and animals (Soul'e & Gilpin 1991[42], Wilson & Lindenmayer 1995[43]).

Environment ACT (2001)[44] reports that habitat corridors generally:

- are natural, remnant and cultural in origin;
- are not restricted by State or Territory boundaries;
- are for maintaining plants and animals and ecological processes;
- are for resident populations and or individuals of plant and animal species but also, potentially, may enhance natural movement of some (but not necessarily all) wildlife;
- may facilitate the spread of weeds, pests, predators, diseases and maintain other threatening processes;
- must take into account the surrounding land uses and be integrated with and include vegetation remnants outside nature reserves, in areas with a variety of land uses;
- must be viewed as a component of a broader regional conservation system to ensure the maintenance of wildlife populations in fragmented off-reserve habitat within the rural landscape. Protection, maintenance and monitoring are essential components of a habitat corridor network. Research into function, effectiveness and management of habitat corridors needs to be encouraged to ensure habitat suitability is maintained in the long term. An adaptive management approach should be adopted to improve corridor design when new information is provided.

Of relevance to this proposal is the relatively narrow area of land between Jervis Bay and St Georges Basin. This isthmus contains a variety of habitat types including sedgeland, heath, woodland and forest.

The NSW Government agency submission to the CoI stated that the vegetation communities are not evenly represented across the isthmus between the townships of Vincentia and Erowal Bay. Habitat links on the eastern side of the isthmus are dominated by heath and sedgeland whereas the western side (including the subject land) includes woodland and forest links. These habitat connections are broadly shown in Figure 16.

It should be noted however that the subject land and surrounding area is not formally recognised as a 'habitat corridor' in the JBREP. The western side of the subject land is recognised only as 'disturbed habitat and vegetation' in the JBREP.

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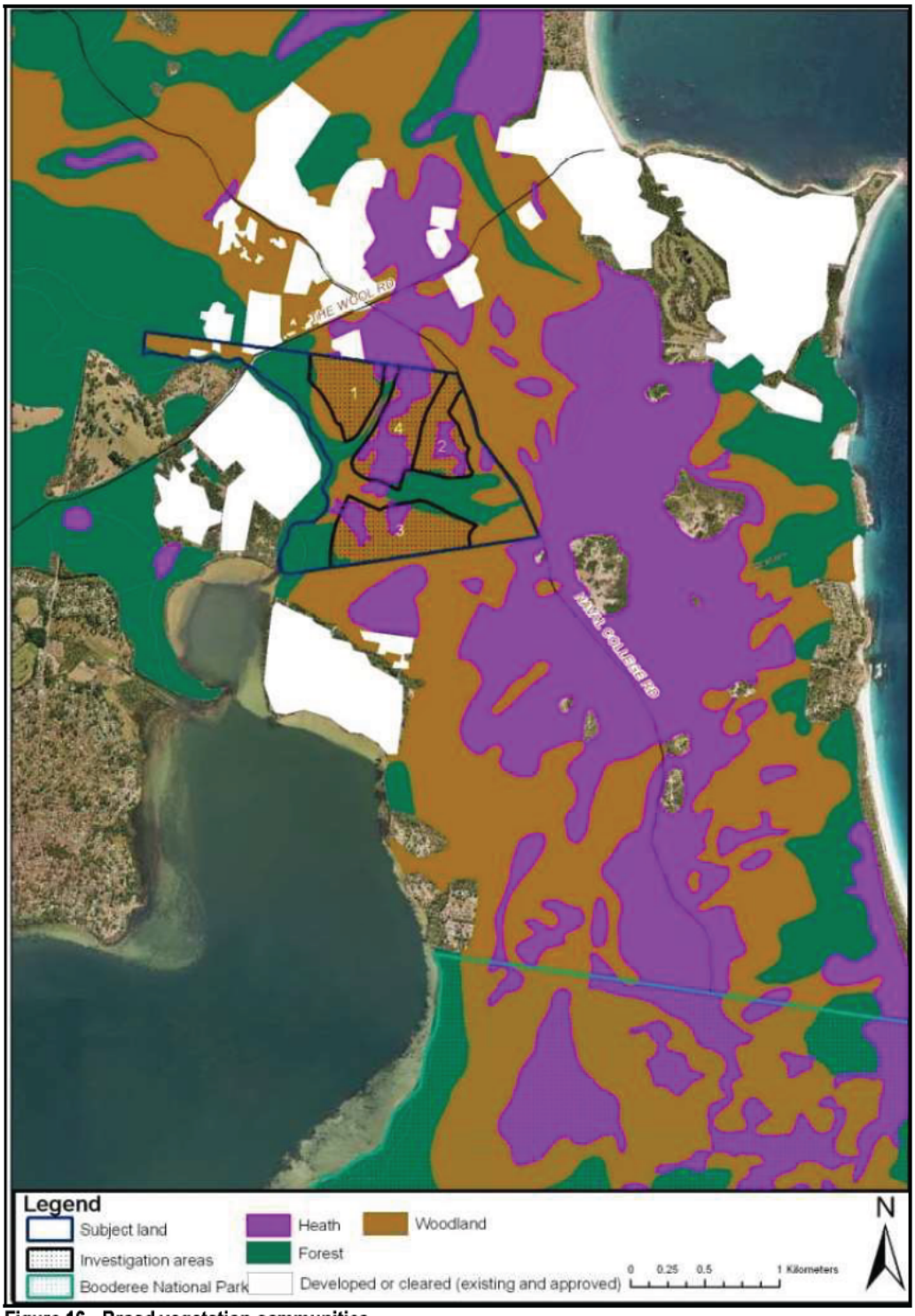


Figure 16 - Broad vegetation communities
(Source: Mills, 1993)

The linkage of tall forest in the subject land is approximately 100 metres wide at its narrowest point to the west of the Wool Road. The forest in the subject land links forest to the north and east of St Georges Basin. Forest in the subject land is largely encompassed the Col environmental protection area.

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While species found in the subject land are generally a subset of those found in BNP, species occur in the subject land that are not found on the eastern side of the isthmus. One such example is the Yellow-bellied Glider which occurs along Worrowing Waterway, within the Col environmental protection areas, and adjacent to Erowal Bay, but not east of the subject land (ERM, 2002[45]; BES, 2007).

Some species, which require large areas of suitable habitat, are perhaps not catered for in BNP. Such species can be found in the habitat corridors of the region but these are under considerable development pressure.

Other potential connectivity 'choke points' in the isthmus occur in heath and woodland vegetation communities in proximity of Vincentia High School and Vincentia Primary School.

An assessment of whether the subject land performs an important role as a habitat corridor between BNP and other habitat west of Jervis Bay is discussed further in section 6.4.

5.11. Government agencies views on adequacy of identified regional habitat corridors

Section 4(b) of the PER guidelines prepared by DEWHA require "government agencies' views on the adequacy of identified regional habitat corridors". The following sections summarise submissions received from Booderee National Park and the NSW National Parks and Wildlife Service. Except for italicised text (direct quotes) the text in shaded boxes paraphrases correspondence from these agencies.

5.11.1. Views expressed by BNP

This section summarises concerns expressed by Booderee National Park in correspondence to Council dated 19th October 2007.

Both the northern (Beecroft) and southern (Bherwerre) peninsulas of Jervis Bay are pristine, protected areas and, hold much of the biological diversity of the region, but are characterised by narrow necks, making them vulnerable to genetic isolation, habitat fragmentation, and species extinction. Their protection requires careful planning and cooperation of the region's landowners. The narrowest point of the Bherwerre Peninsula is close to the boundary of Jervis Bay Territory with NSW, and is 3 km in width. Vegetation communities at the boundary are typically diverse over a small scale and include littoral rainforest, forest, woodland, mallee, heathland, sedgeland, and scrubland.

For many of Booderee's species, contiguous habitat is important in maintaining viable populations because it allows free flow of individuals between the Park and the broader Jervis Bay environment, allowing for example, recolonisation of the Park after major disturbances such as wildfire. Furthermore, the free flow of individuals through contiguous habitat helps to maintain healthy levels of genetic diversity within the Park's fauna and flora. Contiguous habitat is also important because individuals of some species have a large home range requirement and the Park is not big enough on its own to sustain a viable population of some species.

Habitat corridors are designed to maintain contiguous habitats. The usefulness of these habitat corridors is affected by factors including their length, width, habitat type, the management regime in the corridors and adjacent disturbance.

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Adjacent disturbance might include factors such as the presence of foxes and other pests, domestic cats, introduction of weeds, pathogens, changes in fire and hydrology regimes, changes to the water table from drainage works, or large volumes of traffic along nearby roads. Taken together these factors form a complex set of interacting variables, which affect different species in different ways.

It is very likely that the inadequate nature of existing habitat corridors, which includes the undeveloped Heritage Estate, has contributed significantly to the local extinction of some species and continues to contribute to some species being able to reoccupy suitable habitat in the Park. Several species have been lost in the Park in recent times such as Yellow-bellied Glider, and Tiger Quoll. Refer to Table 4.

Clearly the current level of connectivity is inadequate for some species, which have been unable to colonise the Park after localised extinction events (e.g. fire and predation by foxes).

The corridors identified in the Jervis Bay Regional Environmental Plan 1996 are inadequate for maintaining maintenance of contiguous habitat, genetic diversity, and viable populations of species. NSW DECC state in information for planners in north-east NSW "Regional corridors are primary landscape connections between larger important areas of habitat." They are generally substantial in width (>500m) and provide not only for dispersal of individual species but act as habitat in their own right for a range of species. Ecological principles indicate that ideally regional corridors should be at least twice the width of the average home range area of the animal species identified as potential users of the corridor." For the Eastern Bristlebird, which has a small home range, this would mean at least 600m, or the Yellow-bellied Glider which has a large home range, a much larger area than is available (>3km).

Corridors need to contain the range of representative vegetation assemblages as habitat for species which occur in the area. Within the development site this includes rainforest, swamp forest, sedgeland, open forest and heathland. Because of the region's biogeography, it is important the necks of both peninsulas remain undeveloped and are managed for conservation. Any further development in the neck of the Bherwerre Peninsula will restrict the ability of locally extinct species to re-colonise adjacent areas, and increase the risk of extinction of species of concern in both the Park and NSW.

Further, in a subsequent letter to Council dated 22nd January 2008 BNP stated:

The Park has participated in a number of regional planning processes (Our Heritage Our Future, the Regional Environment Plan etc), which have recognised the need to maintain linked natural areas and water quality for the future. Unfortunately the final products have not recognised the science behind biodiversity conservation with respect to habitat corridors or maintenance of water quality. As identified in our previous correspondence, species are becoming locally extinct and in decline. The Heritage Estates site is a vital component of the regional protected areas, as well as having very high intrinsic value.

The Park is owned by the Wreck Bay Aboriginal Community, which has a strong affinity and desire to maintain links with the natural and cultural environment. The Community has clearly identified the importance of maintaining habitat links through the Bherwerre Peninsular for their social, cultural, and economic well-being. This has been articulated through the Booderee National Park Management Plan, and numerous representations to Council and State Government processes. Local Aboriginal Communities are important stakeholders in local planning issues, and stand to loose through inappropriate development of the Bherwerre isthmus.

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As previously stated, the biogeography of the Bherwerre Peninsular dictates that biodiversity conservation is totally dependent of maintenance of habitat corridors and protection of the Bherwerre isthmus in as pristine condition as is possible.

5.11.2. Views expressed by NSW Department of Environment & Climate Change

In response to Council's request for comment on DECC's views on the adequacy of the identified regional corridor system, a letter from DECC dated 20th November 2007[46], stated "*...DECC's current position on this issue remains as outlined in the attached combined NSW Government Agencies' submission to the Commission of Inquiry on Heritage Estates in 1999.*"

The following section summarises matters discussed in the NSW Government agency submission to the CoI.

The joint agencies' position to the CoI was that the southeast corner of Heritage Estates and vegetation along Worrowing Waterway were acting as a regional networked link of habitat in an east-west corridor and a north-south corridor linking forests north of St Georges Basin to; Yerriyong State Forest, and the then proposed Parma Creek Nature Reserve.

The joint agency submission considered that in relation to the north-south corridor, the south-eastern section of the Heritage Estates provided a critical timbered link between Bherwerre Peninsula and the central and northern sections of NSW Jervis Bay National Park.

Despite these deficiencies, the DUAP (1995) report acknowledged that Habitat Corridor No.4 had intrinsic values, including the fact that it contained regionally significant flora and fauna.

"Regardless of the assessments and zoning in the REP, the reality is that the linkage formed by HC4 functions as both habitat and conduit for movement for some species of wildlife. For example, a population of the threatened arboreal possum, the Yellow-bellied Glider, has been recorded as occurring along the Worrowing Waterway within the Heritage Estates site for a number of years (Andrews Neil 1993 and AES 1995)."

"In considering the potential importance of the habitat provided by HC4 the Commissioner should be aware that in order to function as a wildlife corridor there needs only to be wildlife movement and/or genetic flow on an irregular basis for the linkage to be essential in a local context. Of course, the more frequently movement occurs, the more useful the link. Whilst choke points no doubt impinge on the ability of HC4 to function efficiently, they do not in themselves render the corridor useless for biodiversity conservation."

"While the value of habitat corridors for biodiversity conservation has been unequivocally demonstrated by the scientific community and in turn by land managers, much remains to be learned about the optimum configuration or dimensions of such corridors given a specific management objective. In considering the issue of the Heritage Estates, given these uncertainties, the Government agencies are of the view that the Heritage Estates is positioned at an important, if not critical, part of the overall Jervis Bay landscape. The extensive reserved lands of the Bherwerre Peninsula are undoubtedly reliant upon adjacent linkages through areas such as the Heritage Estates for the dispersal of wildlife and genetic material. In the absence of such linkages the Bherwerre Peninsula would otherwise perhaps become an island for many species, both threatened and non-threatened."

Reference was also made to DECC's letter to Council dated 29th August 2007 in respect of the site's intrinsic conservation value of the land in light of the BES (2007) study.

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A Working Party was established between DECC and Council at the suggestion of the Minister for Planning, the Hon Mr Frank Sartor and the former NSW Minister for Environment, the Hon Mr Bob Debus. The Working Party, comprising staff from Council and DECC, met on three occasions in late 2006 and early 2007 and discussed at length the findings of the Threatened Biodiversity Assessment prepared by BES. Council wrote to DECC as required under Section 34A of the *EP&A Act* on 17 July 2007 seeking formal advice in relation to:

- The maximum development scenario from the Commission of Inquiry (i.e. 730 dwellings on 730 lots) in respect of the NSW legislation.
- Preliminary comment on the ability to mitigate impacts through offsets (both on and off-site), translocation of threatened species, modify/reduce the proposed development etc.

DECC's response dated 29 August 2007, stated:

> DECC concurs with the (BES) report's assessment, that threatened species, populations or ecological communities, or their habitats would be affected by any rezoning to permit residential development onsite. DECC also agrees that no additional assessment is required to make an informed decision on the potential impacts on threatened species of the Local Environmental Plan amendment.
>
> It (BES) recommended because of the extent of the significant ecological constraints that none of the study area should be zoned for residential development. The study area should be managed to retain and improve its ecological values.
>
> In regard to partial development of the site, the report's recommendation appears clear as shown on page 79:
>
> *"Figure 16 indicates that the combined primary habitat for threatened species known to occur in the study area covers the entire study area"*
>
> The recommendations of the report are considered appropriate given the significant list of threatened species and their habitat recorded onsite. The level of knowledge of conservation values in the region has increased dramatically in recent years, and the high level of conservation value in the sedgeland and heathland communities mirrors findings on the nearby Stockland development.
>
> To summarise, DECC supports the recommendations of the biodiversity assessment prepared by BES on behalf of Shoalhaven City Council. The assessment indicates there are substantial constraints for any rezoning to urban, including partial development, on the site"

A copy of DECC's letter is provided in ATTACHMENT 8.

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6. RELEVANT IMPACTS

6.1. How impacts were assessed

The PER guidelines prepared by Department of the Environment, Water, Heritage and the Arts (DEWHA) requires Council to describe all of the *potential relevant impacts* including:

a) *Potential direct and consequential impacts on listed threatened species and species of conservation significance from the proposed development of the site;*

b) *Potential direct, indirect and consequential impacts on regional corridor habitat values and the environment on Commonwealth land from the proposed development of the Heritage Estate site;*

c) *Potential impacts to hydrology, including from erosion and sedimentation;*

d) *Potential bushfire property protection and fire management regimes for the site;*

e) *Potential impacts from feral and domestic animals;*

f) *A detailed assessment of the nature and extent of the likely short-term and long-term relevant impacts;*

g) *A statement as to whether any relevant impacts are likely to be unknown, unpredictable or irreversible;*

h) *An analysis of the relevant impacts; and*

i) *Any technical data and other information used or needed to make a detailed assessment of relevant impacts.*

Eco Logical Australia Pty Ltd (ELA) was engaged by Shoalhaven City Council in November 2007, to assess a), b), e), f), g) and h). Findings from the ELA report in relation to these matters are summarised in sections 6.3 and 6.4. The ELA report is attached to this PER. (ATTACHMENT 9)

The *EPBC Act* protects the whole of the environment with respect to actions that may impact on Commonwealth land. The environment is defined in the *EPBC Act* as; ecosystems and their constituent parts, natural and physical resources, qualities and characteristics, and heritage values. This analysis focuses on potential impact to biodiversity and does not assess potential impact to heritage.

A significant impact is described as an impact that is important, notable, or of consequence, having regard to its context or intensity. This analysis of impacts has been undertaken with consideration of the relevant *EPBC Act* significant impact guidelines (Policy Statements 1.1 and 1.2).

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6.2. Degree of uncertainty

ELA concluded that:

> The assessment of the impact of the Heritage Estates rezoning proposal on those species within the CoI Investigation Areas contains very little uncertainty as the individuals occurring there will be lost. This pertains to species such as the Eastern Bristlebird and Leafless Tongue Orchid.
>
> Impacts to species such as the Giant Burrowing Frog, Swamp Rat, Eastern Chestnut Mouse, glider species, Eastern Pygmy Possum, Beautiful Firetail, Ground Parrot and White-footed Dunnart are partly based on the assumption that proximity of urban development will increase introduced predators and introduced competitors (see section 4.2). This assumption is widely established and accepted within literature (BCC 2007; WMC 2007; GCC 2005; Tait et al 2005; Meek 2003; Meek and Saunders 2000) and for those species outlined.
>
> The full impacts of potential development on the functionality of the habitat corridors within Heritage Estates are uncertain. However, this functionality would not be able to be re-established in the locality in the mid to long-term given significant disturbance in the location following any urban development. The severing of this habitat link along Bherwerre Peninsula will cause a cessation of movement of the primarily forest dependent species including gliders between Bherwerre Peninsula and the forests to the north of the St Georges Basin and escarpment forests west of the Princes Hwy. For some species such as heath and woodland dwellers, connectivity to BNP will be reduced but not lost altogether.

6.3. Impacts on EPBC-listed threatened species

A list of significant impact criteria are given by DEWHA for the assessment of impacts on matters of NES. These criteria are specific to the status of listed species and generally pertain to impacts to populations rather than individuals.

In relation to endangered species, a 'population' is defined under the *EPBC Act* as an "occurrence of a species in a particular area, including; a geographically distinct regional population or collection of local populations; or a population, or collection of populations, that occurs within a particular bioregion".

For vulnerable species, an 'important population' is defined under the *EPBC Act* as a "population that is necessary for a species' long-term survival and recovery, including; a population identified as such in recovery plans; key source populations for breeding or dispersal; populations that are necessary for maintaining genetic diversity; or populations that are near the limit of the species range".

A summary of impacts on the EPBC species and their significance as assessed by ELA (2008) is provided in Table 5 - Summary of impacts on EPBC species recorded on site or considered likely to occur on site.

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Table 5 - Summary of impacts on EPBC species recorded on site or considered likely to occur on site

Species	Impact summary	Significance
Leafless Tongue Orchid (*Cryptostylis hunteriana*)	Loss of important populations	Major
Biconvex Paperbark (*Melaleuca biconvexa*)	Localised impacts to individuals	Minor
Eastern Bristlebird (*Dasyornis brachypterus*)	Loss of up to 10% of largest remaining population	Major
Giant Burrowing Frog (*Heleioporus australiacus*)[4]	Loss of potential breeding habitat	Moderate

ELA's rationale for the above conclusions including habitat mapping for each species, is provided in sections 6.3.1 through to 6.3.4.

6.3.1. Eastern Bristlebird (*Dasyornis brachypterus*)

EPBC Act status: endangered

The population of Eastern Bristlebirds on Bherwerre Peninsula is of critical importance for the conservation of the species as it is the largest remaining population of the species in Australia (ELA, 2008). The three largest populations are Jervis Bay (<700 individuals), Barren Grounds Nature Reserve (600 individuals) and Budderoo National Park (250 individuals) (Baker, 1997). ELA concluded that all Eastern Bristlebirds on site, at minimum an estimated 50-70 individuals (>7% to 10% of population), based on Baker (2001)[47] home range estimates, will be negatively impacted to some degree from the subject land rezoning proposal, either through loss of habitat or indirect impacts (ELA, 2008). It is understood that ELA's population estimate for the subject land is based on population densities published for the Jervis Bay area (Baker, 2001).

The proposed rezoning of the subject land will directly remove 83 ha of high quality habitat within the investigation areas (BES, 2007). It is estimated that there would be in the order of 15 to 20 territories (approximately 30 to 40 individuals) within this habitat (Baker, 2001). A significant number of non-calling individuals will also be impacted. Recent research has shown that the Eastern Bristlebird population at Jervis Bay contains a subset of non-calling individuals that will not be sampled by current survey techniques (Bain, 2006)[48].

There is approximately 67ha of Eastern Bristlebird habitat within the CoI Environmental Protection area and individuals within this habitat will be subject to indirect impacts from urban development (Refer to Figure 15). These indirect impacts include increases in introduced predators such as foxes (*Vulpes vulpes*), cats (*Felis catus*) and black rats (*Rattus rattus*), and increases in fire frequency. Both of these impacts are exacerbated through proximity to urban development (see discussion in section 4.2). Along with direct loss of habitat, these indirect impacts are key threats to the long-term survival of Eastern Bristlebirds (DECC, 2007). These indirect impacts will not be confined to the remaining habitat on the subject land. Increases in

[4] Not recorded in heritage Estates but recorded on nearby land and considered likely to occur due to suitability of habitat

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fire frequency and prevalence of introduced species will further impact on Eastern Bristlebird habitat surrounding the subject land.

The proposed rezoning is not expected to impact significantly on the connectivity or movement of Eastern Bristlebirds along Bherwerre Peninsula. Sufficient habitat exists east of the subject land, within National Park, to maintain an effective corridor for the species.

Summary of impacts on Eastern Bristlebird (ELA, 2008)

- *Significant impacts to a key population of the species are likely to occur due to the direct loss of habitat and loss of a significant portion of individuals in a key population.*
- *Substantial indirect impacts to protected habitat in and around the subject land are also likely.*
- *There will be only minimal impact to connectivity along Bherwerre Peninsula.*

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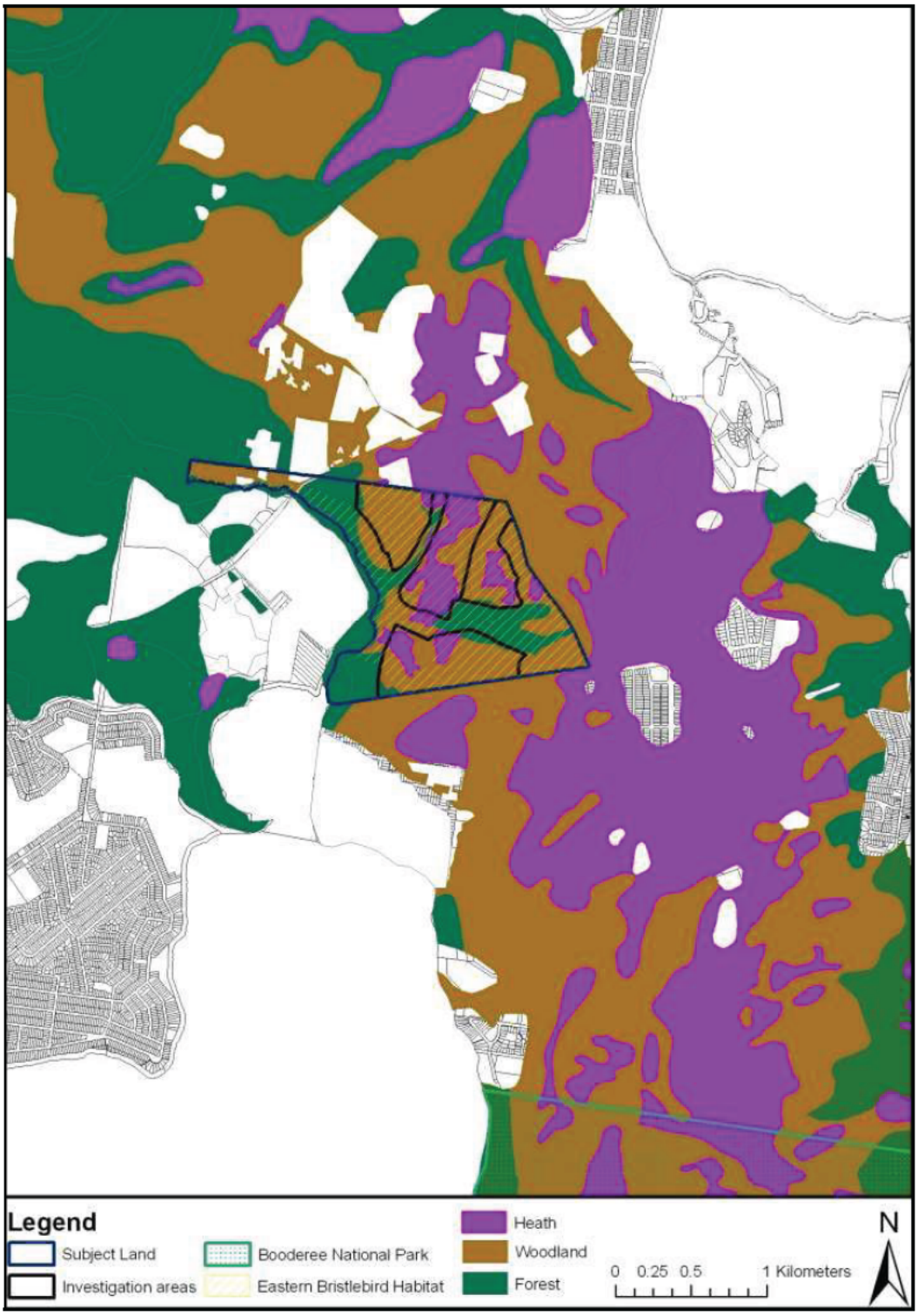


Figure 17 - Eastern Bristlebird habitat (BES, 2007) and simplified vegetation communities (Mills, 1993)

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6.3.2. Leafless Tongue Orchid (*Cryptostylis hunteriana*)

EPBC Act status: vulnerable

Nearly all of the 211 identified individuals of the Leafless Tongue Orchid (*Cryptostylis hunteriana*) will be lost as a result of the proposed development. Only one of the 40 surveyed locations is outside of the identified rezoning investigation areas (BES, 2007) and this one location is within a few metres of investigation area 4 (see Figure 18). The individuals found within the subject land are considered by ELA to constitute at least two important populations of the species in the region. These populations have been assessed as 'important populations' as they are likely to be necessary for maintaining genetic diversity in the Jervis Bay region (see discussion below). The first of these populations consists of those individuals in investigation area 3 and the second those individuals within the other 3 investigation areas (1, 2 & 4) in combination with individuals recorded in Lot 4 DP1015690 north of the site (BES, 2005[49]). There are two other known populations immediately to the north of the subject land (100 individuals) and north of The Wool Road within 1km of the subject land (112 individuals).

While the nearby populations have been considered and set aside from recently approved development, there may still be a range of indirect negative impacts due to increased pedestrian activity, changed fire regimes, altered hydrological regimes and rubbish dumping associated with the developments (ELA, 2008). According to ELA these pressures are likely to reduce the quality of orchid habitat in those areas and will put those individuals under increased threat of extinction. As a result, the populations within the subject land have greater conservation significance.

The species, as with many orchid species, is pollinated by insects. Specifically, the Leafless Tongue Orchid is pollinated solely by the ichneumonid wasp (*Lissopimpla excelsa*) (Bell, 2001[50]). Reproduction is largely restricted to seed which is dispersed by wind, although dispersal distance is unknown. The species also has the capacity for vegetative reproduction and can form permanent colonies in a location. As a result of these life attributes, the species is unlikely to be dispersed widely and is likely to only exchange minimal genetic information between populations within a region. Genetic variability in the species is likely to be greatest across regional populations rather than within populations (Stiling, 1996[51]). Therefore all populations within an area are considered important to retain to maximise the level of genetic diversity within a region.

Summary of impacts on Leafless Tongue Orchid (ELA, 2008)

- *Likely that the loss of these important populations would be a significant impact and would be likely to threaten the long-term survival of the species in the region.*

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Figure 18 - Leafless Tongue Orchid populations in and around the subject land

6.3.3. Biconvex Paperbark (*Melaleuca biconvexa*)

EPBC Act status: vulnerable

ELA concluded that there are unlikely to be direct impacts arising from the proposal on *M. biconvexa* within the subject land. ELA concluded that:

> *…indirect impacts are uncertain but are considered to be localised and unlikely to have a substantial detrimental impact on the local population of the species.*

6.3.4. Giant Burrowing Frog (*Heleioporus australiacus*)

EPBC Act status: vulnerable

No individuals of the Giant Burrowing Frog have been recorded within the subject land area, although potential breeding habitat exists. The Giant Burrowing Frog is extremely difficult to survey as little is known about its biology. It is generally only readily identified by call and/or spotlighting following heavy rainfall. There are nearby known breeding sites for this species in Vincentia and BNP, and there is one tadpole record from north of The Wool Road.

Surveys on the subject land were undertaken by BES in June-July 2006 when conditions had triggered calling at known breeding sites near Vincentia. As no individuals were heard calling on site, ELA concluded that the area is unlikely to support an 'important population' of the species.

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Given all the available information, ELA considered that suitable breeding habitat for this species exists along the Worrowing Waterway tributaries and poorly drained sedgeland areas, and that suitable foraging and movement habitat occurs throughout the site in all vegetation communities in proximity to breeding sites.

Given that Giant burrowing frogs are known to travel several hundred metres from breeding sites, ELA concluded that: "*The presence of the Giant Burrowing Frog on the site cannot be discounted*". ELA concluded there would be:

- *Loss of some potential breeding habitat for the species on Heritage Estates, although the importance of this habitat is unknown.*

It appears that on the basis that "*Dispersal would be expected along the Worrowing Waterway and its tributaries*" ELA also concluded there would be:

- *Significant reduction in connectivity as a result of **indirect impacts** on corridor function, rather than direct loss of connecting habitat.*

Given the cryptic nature of the species; the limited survey effort in the area; and the lack of any positive records along Worrowing Waterway or its tributaries, it is concluded that the impacts of the proposal on the long term viability of the Booderee populations are uncertain.

6.4. Impacts on biodiversity of BNP

6.4.1. Biodiversity impacts discussed by BNP

In its submission to Council, BNP (2007) expressed the following concerns about the impacts of the proposal on the biodiversity of BNP. The full submission from BNP is provided in ATTACHMENT 7 and the following is an excerpt from their submission.

It is very likely that the inadequate nature of existing habitat corridors, which includes the undeveloped Heritage Estate, has contributed significantly to the local extinction of some species and continues to contribute to some species being unable to reoccupy suitable habitat in the park. Several species have been lost in the Park in recent times such as Yellow-bellied Glider, and Tiger Quoll. Clearly the current level of connectivity is inadequate for some species, which have been unable to colonise the Park after localised extinction events (e.g. fire and predation by Foxes).

The Park is concerned that rezoning and consequent development of the subject land will impact on the following values, which have been identified by BES:

<u>Listed Migratory Species which occur in Booderee</u>

The area contains important habitat for migratory species, and five species have been recorded by BES (2007) within the relatively short time frame of their assessment. These are the Black-faced Monarch, Latham's Snipe, Rufous Fantail, White-bellied Sea eagle, and White-throated Needle tail. Two species are reported by BES as likely to breed in the area. These species are particularly susceptible to changes in drainage, which would be unavoidable to accommodate a large residential housing development.

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EPBC Listed threatened species and Communities (Section 18 (3))

Two species of threatened flora, *Melaleuca biconvexa*, and *Cryptostylis hunteriana* and the Eastern Bristlebird have been recorded at the site.

The Eastern Bristlebird is of particular concern, and the direct impacts on this species alone (direct loss of habitat) would be considerable. Booderee National Park and the adjoining Jervis Bay Nature Reserve contain the largest remaining population of the Eastern Bristlebird (approximately 50%), but this population is under pressure through development in the area. Recent research indicates loss and fragmentation of habitat and the fox, particularly after fire, are principal endangering processes for the species. The entire development site contains important habitat for this species including heath, sedgeland, and woodland. The site provides vital contiguous habitat for Bristlebird populations in Booderee, NSW Jervis Bay National Park, and populations to the west as far as Tomerong. Without effective habitat corridors, the largest remaining population of the species within Booderee and the adjoining NSW Jervis Bay National Park will become fragmented and be under significant threat.

The loss of habitat for highly specialised orchids with characteristic small distribution and specialised needs is a major concern, and will require considerably more research to prevent the extinction of these very rare species.

Listed NSW species and Communities

Four Rare or Threatened Australian Plants (ROTAP) occur on the subject land.

The site contains TSC Act 1995 NSW Endangered Ecological Community Swamp Sclerophyll Forest.

The entire development area is exceptional in containing primary habitat for a wide range of NSW threatened fauna, most of which occur in Booderee National Park. This primary habitat needs to be conserved for future conservation of the species. Notable fauna species include the Greater Glider, Yellow-bellied Glider, Sugar Glider, Eastern Pigmy-possum, White-footed Dunnart, Ground Parrot, Powerful Owl, Masked Owl, Glossy Black Cockatoo, Black Bittern, Rufous Fantail, Black-faced Monarch, Latham's Snipe, Southern Emu Wren, Beautiful Firetail, Giant Burrowing Frog, and a range of microchiropteran bats. The Yellow-bellied Glider and White-footed Dunnart are particularly susceptible to local extinction through loss or degradation of habitat, and increasing predation. The collective primary habitat of these species cover the entire site, and BES conclude and we concur there is no area remaining for development.

Impacts on Commonwealth Land (EPBC Section 26 (2b))

Development of the site will have a significant impact on the biodiversity of Jervis Bay Territory (Commonwealth Land) including Booderee National Park as outlined above.

6.4.2. Assessment of Biodiversity Impacts by ELA (2008)

Information provided in this section is derived from the assessment by ELA (2008).

The subject land provides connectivity for many species along Bherwerre Peninsula. This connectivity links BNP through the Bherwerre Peninsula isthmus to native vegetation north of St Georges Basin and The Wool Road and to the escarpment vegetation west of the Princes Highway as generally indicated in Figure 19 - Simplified vegetation communities in the isthmus.

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These corridors and linkages have been identified in the Jervis Bay Regional Environmental Plan and the Jervis Bay Settlement Strategy. At the same time as providing this connectivity, the subject land also provides habitat for many species in its own right.

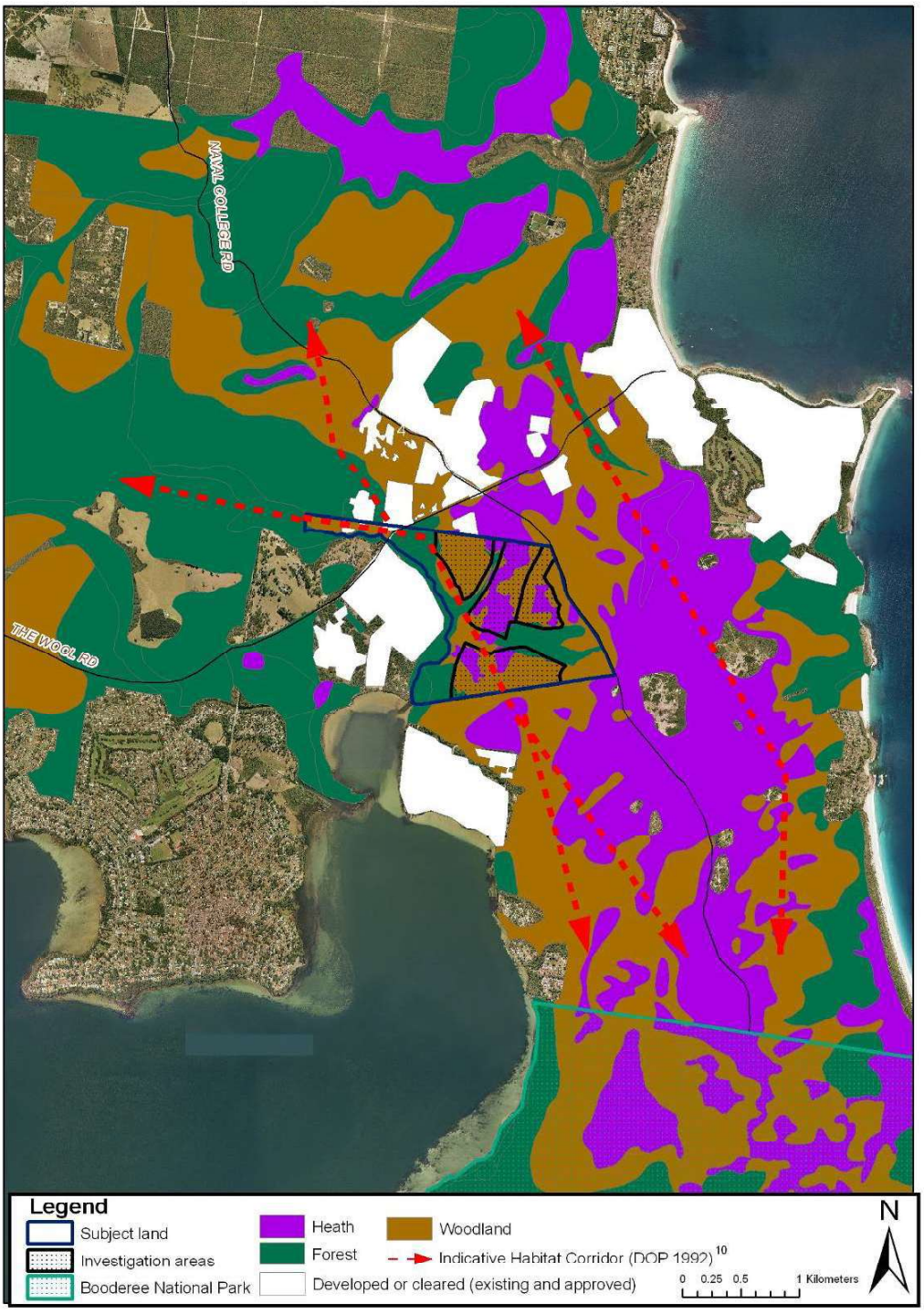


Figure 19 - Simplified vegetation communities in the isthmus to BNP

ELA concluded that the subject land provides habitat for a variety of species and forms part of the link between Booderee National Park and other habitat around and inland from Jervis Bay.

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Habitat connectivity is most effective when corridors support individuals and provide continuous habitat rather than 'bridges' between areas of habitat (Merriam, 1991[52] and Bennett, 1990[53]).

For all types of animals, movement is fundamental to their survival (Bennett, 1992). Animals often rely upon corridors because they have an obligate relationship with natural vegetation and cannot move through inhospitable urban environments. In an urban landscape the optimum widths for corridors will be greater than in environments where adjacent activities produce fewer disturbances. Ultimately, corridor design should be considered in light of the particular species that the corridor is to benefit (Bennett, 1992).

In assessing the suitability of wildlife corridors for species a number of factors need to be examined; the quality of the habitat; the quality or continuity of the connection; the length of connection and the width of connection (Forman 1995[54]; Soulé & Gilpin 1991). The functionality of corridors for species will depend on their susceptibility to edge effects (width, condition), ability to traverse unfavourable environments (continuity) and the distance they have the capacity to move (length).

All species utilising the subject land will be impacted to different degrees from the rezoning proposal, although impacts to connectivity for species with similar habitat requirements or life histories are expected to be similar. As a result, impacts to species have been rationalised into groups to enable specific habitat and connectivity issues for surrogate species to be discussed in detail. However, where differences or exceptions for specific species are expected these will be highlighted and discussed.

ELA considered the following factors in their assessment of impacts on connectivity, including:

- the quality of the habitat;
- the quality or continuity of the connection;
- the length of connection and the width of connection;
- the susceptibility of each species to edge effects (width, condition);
- species ability to traverse unfavourable environments (continuity); and
- the capacity of each species to move (distance).

Impacts to the species of concern nominated by Booderee National Park were rationalised into groups to enable specific habitat and connectivity issues for surrogate species to be discussed in detail. The 13 species considered in the assessment of Commonwealth land were grouped into broad categories based on life history and habitat usage to rationalise the impact assessment and include:

1. Heath or wet area species - Swamp Rat (*Rattus lutreolus*), Eastern Chestnut Mouse (*Pseudomys gracilicaudatus*)
2. Owls - Powerful Owl (*Ninox strenua*), Barking Owl (*Ninox connivens*)
3. Gliders - Yellow-bellied Glider (*Petaurus australis*), Greater Glider (*Petauroides volans*), Sugar Glider (*Petaurus breviceps*), Feathertail Glider (*Acrobates pygmaeus*)
4. Heath and woodland species - Eastern Pigmy-possum (*Cercartetus nanus*), Beautiful Firetail (*Stagonopleura bella*)
5. Heath and sedge species - Ground Parrot (*Pezoporus wallicus*)

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6. Woodland and forest species - White-footed Dunnart (*Smithopsis leucopus*), Spotted-tail Quoll (*Dasyurus maculata*)

ELA's findings in relation to each of the above are summarised in Table 6. Detailed discussion is also provided below and habitat maps are contained in the ELA report (ATTACHMENT 9).

Table 6 - Summary of impacts on connectivity to Booderee National Park (ELA, 2008)

Species	Impact summary	Significance
Heath or wet area species		
Swamp Rat (*Rattus lutreolus*)	Limited loss of connectivity	Minor
Eastern Chestnut Mouse (*Pseudomys gracilicaudatus*)[5]	Impaired connectivity through loss of habitat and competition	Moderate
Owls		
Powerful Owl (*Ninox strenua*)	Limited loss of connectivity. Loss of breeding and foraging resources.	Moderate
Barking Owl (*Ninox connivens*)	Limited loss of connectivity. Loss of foraging resources.	Minor
Gliders		
Yellow-bellied Glider (*Petaurus australis*)	Loss of some sites south of the subject land and unlikely to re-establish in BNP	Major
Greater Glider (*Petauroides volans*)	Impaired connectivity through predation and competition	Major
Sugar Glider (*Petaurus breviceps*)	Some loss of habitat and connectivity, increase in predation and competition	Moderate
Feathertail Glider (*Acrobates pygmaeus*)[1]	Impaired connectivity through predation and competition	Moderate
Heath and woodland species		
Eastern Pigmy-possum (*Cercartetus nanus*)	Loss of high quality foraging and nesting habitat also serving as habitat corridor	Moderate
Beautiful Firetail (*Stagonopleura bella*)[1]	Loss of good quality habitat and some connectivity	Minor
Heath and sedge species Ground Parrot (*Pezoporus wallicus*)	Loss of important habitat and important 'stepping stone' connectivity for Jervis Bay population	Major
Woodland and forest species		
White-footed Dunnart (*Smithopsis leucopus*)	Loss of habitat and impair connectivity to BNP	Major
Spotted-tail Quoll (*Dasyurus maculata*)	Impaired connectivity to BNP	Major

[5] Not recorded on the subject land but recorded on nearby land and considered by ELA as likely to occur due to suitability of habitat.

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Impacts to the Leafless Tongue Orchid, *Melaleuca biconvexa*, Eastern Bristlebird and Giant Burrowing Frog, all species of concern for BNP have been discussed in the previous section.

Heath or wet area species

Species included in this group are the Swamp Rat (*Rattus lutreolus*) and the Eastern Chestnut Mouse (*Pseudomys gracilicaudatus*).

The Swamp Rat is found throughout the Jervis Bay region in areas of suitable habitat. The Eastern Chestnut Mouse was recently rediscovered in BNP in 2005 (BNP, 2007) and the Jervis Bay location is the southern known limit of its distribution. There were several recent records of the species to the east of the subject land (Townley, 2007[55]).

Both of these species are reliant on wet or swampy areas incorporating some grasses, heaths or sedges, with the Eastern Chestnut Mouse having a preference for the younger wet heath areas (Strahan 2002[56]). There is only minimal connectivity of wet or swampy areas along Bherwerre Peninsula. The subject land forms an integral link between the wet areas south of Erowal Bay Road to those to the east.

The areas identified by the CoI for 'Environmental Protection' incorporate much of the habitat along the drainage lines, although a large proportion of the swampy sedgeland or wet heath areas will be lost within the Investigation Areas (Figure 19). The result will be a reduction in available habitat and a loss of much of the connectivity for these species. The habitat requirements for the Eastern Chestnut Mouse overlap with, but are narrower than for the Swamp Rat (Strahan 2002). In areas where the two species have been found, the Eastern Chestnut Mouse is out-competed by the Swamp Rat (Strahan 2002). The reduction and simplification of the mosaic of habitats in the subject land may result in a substantial loss of connectivity for the Eastern Chestnut Mouse whilst retaining some connectivity for the Swamp Rat.

These species will also be subject to indirect impacts due to increases in introduced species. As a result of increased proximity to urban development, there will be an associated increase in introduced predators such as cats and introduced competitors such as the Black Rat. The increased pressures from these introduced species will reduce the functionality of the habitat corridor for these species.

Owls

Species included in this group are the Powerful Owl (*Ninox strenua*) and the Barking Owl (*Ninox connivens*).

The Powerful Owl individuals around the Bherwerre Peninsula are likely to be wide ranging as they are known to have large home ranges. The recent study by BES (2007) identified nesting Powerful Owls within the subject land, a number of roost trees and their presence on site all year round. It is therefore considered that the subject land forms a core area of home range for at least one pair of Powerful Owls.

Based on home range size, the whole of Bherwerre Peninsula including BNP is estimated to sustain a maximum of approximately four breeding pairs. Retention of important breeding areas for the species is vital for its survival in the region. Barking Owls were not observed on the subject land. However, they are known from areas just south of Vincentia and BNP.

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Both of these species have good dispersal ability and can travel significant distances during hunting activities. However, the Barking Owl tends to have a much more restricted home range than the Powerful Owl. Both species roost and hunt in forests and woodlands, much of which will be retained within the Col 'Environmental Protection' areas. Significant areas of potential foraging habitat are also present in other areas of Bherwerre Peninsula.

Impacts to these species will result from their longer term proximity to urban development. In particular the known nesting tree for the Powerful Owl will be directly adjacent to Wanawong Boulevard. Raptors and owls are notoriously susceptible to high levels of human disturbance (Olsen, 1998[57]) and buffers for nesting trees in the United States are in the order of 1500m to 3000m (Richardson & Miller, 1997[58]). The BES (2007) study recommends minimum buffers of 100m for the nest tree and 50m for the roost trees.

Other impacts to these owl species will be in the form of impacts to prey species. Impacts to these species are mainly through indirect impacts from the proximity of urban development.

The proposal is unlikely to impact on connectivity for these owl species as they have good mobility and the majority of the important habitat will be retained. However, the rezoning will result in increased human disturbance to important resources such as known nesting areas, and so will result in indirect impacts to prey species within the subject land. The outcomes of this are likely to be the loss of the area as breeding habitat for the species and reduced functionality as foraging habitat.

Gliders

Species included in this group are the Yellow-bellied Glider (*Petaurus australis*), the Greater Glider (*Petauroides volans*), the Sugar Glider (*Petaurus breviceps*) and the Feathertail Glider (*Acrobates pygmaeus*).

All gliders within this group are found in the forests around Jervis Bay and in BNP, with the exception of the Yellow-bellied Glider, which disappeared from BNP in the 1980's. Connectivity for these species along Bherwerre Peninsula from forests north of St Georges Basin to BNP is restricted to the forests in the subject land. All species with the exception of the Feathertail Glider were surveyed on site in the recent study by BES (2007). The subject land supports at least two family groups of Yellow-bellied Gliders and presumably many Greater Glider and Sugar Glider individuals, both of which have much smaller home ranges.

Habitat for these species is restricted to the forest and woodland communities on site (Figure 19). The majority of habitat for the Yellow-bellied Glider, Greater Glider and Feathertail Glider and approximately two thirds of the habitat for the Sugar Glider is contained within the Col Environmental Protection areas.

Gliders, and in particular Yellow-bellied Gliders, are considered to be susceptible to increased urban development as they are particularly sensitive to habitat alteration and barriers to dispersal (NSW NPWS 2003; Incoll *et. al* 2001). Consequently, it is rare to find many of individuals of this species in close proximity to urban development.

Connectivity for these gliders will not be greatly impacted by the direct loss of habitat from the proposed rezoning, but rather from indirect impacts resulting from habitat proximity to urban development (see ATTACHMENT 9 - discussion in section 4.2). Increases in the prevalence of introduced predators such as foxes, cats and dogs will impact on the functionality of the Col Environmental Protection areas as viable habitat and corridors for these species.

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Narrow corridors are impacted to a larger degree from edge effects, including exposure to predators. The proposed corridor for glider species through the subject land ranges between approximately 50m to 150m and currently provides no buffer to edge effects such as increases in introduced predators. It is acknowledged that there is a narrow pinch point in the corridor in the vicinity of The Wool Road. However, this short, narrow pinch point is considered to be less of a barrier to movement than a long narrow corridor adjacent to urban development, as would occur with the current proposal.

The functionality of any corridor depends in part on the functionality of the area as habitat, rather than being solely a 'bridge' across unfavourable areas. Other arboreal mammal species such as the Common Brushtail Possum (*Trichosurus vulpecula*) are much more adaptable and are known to survive in urban situations. It is likely that this species will out-compete other arboreal mammal species in proximity to urban development, particularly for habitat resources such as tree hollows and potentially food resources. Brushtail Possums commonly feed on flowers, a significant Yellow-bellied Glider food source, and leaves, a significant Greater Glider food source (Strahan 2002).

A recent study by Grarock (2006)[59] examined the impact of potential future development in Yellow-bellied Glider populations in the St Georges Basin area. The study involved modelling the losses of Yellow-bellied Glider sites from development across the area and concluded that there would be a loss of known individuals south of the subject land (toward BNP) if the development was to proceed. Any future recolonisation of BNP by Yellow-bellied Gliders would be unlikely following the current proposed rezoning and development of the subject land.

Heath and woodland species

Species included in this group are the Eastern Pygmy-possum (*Cercartetus nanus*) and Beautiful Firetail (*Stagonopleura bella*).

The heath and woodland on the site (refer to Figure 19) provides habitat and connectivity for many heath and woodland species including the Eastern Pygmy-possum and Beautiful Firetail. The proposal would result in the loss of 49% (87 ha) of habitat for the Eastern Pygmy-possum and 55% (83 ha) of habitat for the Beautiful Firetail on the subject land. However, approximately 1100 ha of habitat will still remain on Bherwerre Peninsula.

The majority of Eastern Pygmy-possum captures recorded during the BES (2007) study were from within Investigation Areas 1, 2 and 3 and not from within the CoI Environmental Protection areas. The remaining areas identified as the CoI Environmental Protection areas contain significant habitat, and some connectivity, for these species through the subject land. Connectivity, particularly for the Eastern Pygmy-possum, is concentrated in the woodland habitat. To retain corridors of woodland vegetation along Bherwerre Peninsula, connectivity needs to be maintained through the woodland corridor in the subject land.

As these species are small in size and these areas of connectivity are already compromised by Naval College Road and Erowal Bay Road, any corridors need to be as wide and accommodating as possible. The CoI recommended Environmental Protection areas are sufficient for this connectivity across Naval College Road. However, development of Investigation Area 3 will result in a significant reduction to potential movement paths across Erowal Bay Road as it contains a large amount of suitable habitat for these species.

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It should be noted that the subject land is not critical for the movement of these species along Bherwerre Peninsula, as both species are known from the areas of heath found east of Naval College Road. However, these areas to the east provide few nesting resources for the Eastern Pygmy-possum, a species of which several individuals were recorded in the subject land. Foraging and nesting resources are found east of the subject land for the Beautiful Firetail. Indirect impacts such as increases in introduced predators resulting from urban development as proposed may increase in these areas of habitat to the east.

Indirect impacts to these species from edge effects such as increases in introduced predators like foxes and cats, and weed encroachment from increased proximity to urban development, will affect the functionality as habitat and corridors of the Col Environmental Protection areas (see ATTACHMENT 9 - discussion in section 4.2).

Both of these species are cover-dependent and the loss of the majority of vegetation communities with thick understoreys will result in higher susceptibility to predation. Increases in fire frequency and increased weed encroachment from proximity to urban development may also increase the amount of open understorey habitat remaining in the Col Environmental Protection areas, further reducing the functionality of these areas as corridors for these species. Any increase in weed encroachment is also likely to reduce the availability of food resources for these species by out competing native vegetation.

Heath and sedge species

The species included in this group is the Ground Parrot (*Pezoporus wallicus*).

The majority (74%) of habitat for the Ground Parrot in the subject land will be lost from development of the Investigation Areas (see ATTACHMENT 9 - MAP 9). The area is likely to support a breeding population of the species, as the surveys by BES (2007) recorded Ground Parrot activity during the breeding season and the site is adjacent to other known individuals of the species.

There is a restricted amount of habitat for the Ground Parrot on Bherwerre Peninsula and all areas are considered important for the species and their movement in the region. The species is only known from just north of The Wool Road, Bherwerre Peninsula and BNP on the western side of Jervis Bay.

Ground parrots rarely fly long distances (DECC 2007) and consequently, long distance dispersal is unlikely. As a result, maintaining connectivity, through continuous habitat or through 'stepping stones' of viable habitat is critical for this species to endure.

Connectivity for the population on the western side of Jervis Bay requires the maintenance of these small stepping stones of habitat which includes habitat north of The Wool Road behind Huskisson, habitat within the subject land and adjacent to it to the north, habitat east of the subject land to the south of Vincentia and west of Hyams Beach, habitat east of Erowal Bay, and habitat within BNP.

Of these areas, only the habitat north of Wool Road and habitat in and around the subject land is not within reserved lands. These areas of habitat are critical to maintaining the northern extension of this population in the Bherwerre Peninsula region.

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A small amount of habitat is identified for protection within the Col Environmental Protection areas (18 ha). However this portion of habitat alone is not considered viable for the Ground Parrot due to its size and the likely indirect impacts from proximity to urban development. Indirect impacts on this habitat would include increased introduced predators such as the fox, cat and black rat (see ATTACHMENT 9 - discussion in section 4.2) and changes to the hydrological regime affecting the sedge dominated vegetation of the habitat.

Woodland and forest species

Species included in this group are the White-footed Dunnart (*Smithopsis leucopus*) and Spotted-tail Quoll (*Dasyurus maculata*).

The woodland and forest components of the subject land are largely encompassed in the proposed environmental protection areas. Despite this, approximately half (88 ha) of suitable habitat for the White-footed Dunnart and the Spotted-tail Quoll would be lost within the Investigation Areas (refer to Figure 19).

There are very few records of the Spotted-tail Quoll in the Jervis Bay region (KMA 1991) although it was only considered extinct from BNP in the 1990's (BNP 2007). Any potential recolonisation of BNP would need to be from forests to the north and west of the St Georges Basin area and through the subject land, using corridors identified as 'disturbed habitat and vegetation' (refer to Figure 8). The Spotted-tail Quoll requires large areas of habitat, with home ranges between 750 ha to 3000 ha, and is susceptible to competition with introduced predators. The proximity to urban development is likely to increase the prevalence of introduced predators such as cats and foxes (see ATTACHMENT 9 - discussion in section 4.2). The narrow corridors proposed within the Col Environmental Protection areas are considered unsuitable for the movement of Spotted-tail Quolls.

The White-footed Dunnart was trapped within woodland and forest in Investigation Area 1. It is also known to occur in heath and woodland east of the subject land, north of The Wool Road west of Huskisson and in BNP. The proposed rezoning would result in the loss of a significant portion of habitat from Bherwerre Peninsula and also impact on connectivity.

The subject land forms the only connectivity for this species between habitat north of Wool Road and BNP. As with many of the species discussed here, the areas within the Col Environmental Protection areas are suitable habitat for the White-footed Dunnart. However, connectivity will be impacted indirectly by edge effects such as increases in introduced predators and increased weed encroachment (see ATTACHMENT 9 - discussion in section 4.2) that will result in the decreased functionality of the habitat as a corridor.

The White-footed Dunnart is a small mammal that is at risk from predation by cats and foxes and prefers an open understorey in its habitat (Strahan 2002). Weed growth within the Col Environmental areas resulting from proximity to urban development and associated edge effects may result in unsuitable habitat for the species within these proposed corridors.

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Summary

The proposed rezoning and subsequent development will result in significant impacts to a range of species that utilise BNP. These impacts include the loss of habitat for these species on the subject land (*i.e.* in an area nearby to BNP) and a substantial loss of connectivity to and from BNP. This loss of habitat and connectivity are likely to reduce the functionality of BNP as habitat for some of these species, and impact on the viability of populations of some of these species within the region. Species likely to be significantly affected include the Eastern Chestnut Mouse, Yellow-bellied Glider, Greater Glider, Ground Parrot and White-footed Dunnart.

As a result of impacts to these species, it is considered by ELA that significant impacts to BNP will occur. More broadly, the needs of the species focused on in this report are broadly representative of a number of other species which may also be impacted on and contribute to impacts to BNP.

6.5. Other related impacts

6.5.1. Maintenance of water quality and hydrological regimes

During the construction phase, soil erosion and sedimentation would be the main water quality concern, particularly in the northern half of investigation area 3 and most of investigation area 4 due to the dispersive nature of the soil (Coffey Geosciences, 2005 – refer to ATTACHMENT 4).

Key strategies for minimising erosion during the construction phase would be to stage construction (refer to recommendation 6 of the CoI) to minimise soil exposure, stabilise and where possible, to progressively rehabilitate disturbed areas.

Erodibility of the site would decrease significantly post construction. The potential for gross pollutants and water soluble pollutants, and oil and grease would be expected to increase once developed, but could be controlled through appropriate stormwater treatment.

Drainage of some waterlogged zones would be required to render those areas suitable for residential development, but as noted by Coffey Geosciences (2005) further assessment including surface and groundwater modelling would be required to enable a decision to be made in respect of these water logged zones. Development of the site would potentially create impermeable surfaces, altering the pre-development groundwater hydrological regime. Consideration would need to be given to the use of porous zones such as vegetated waterways in surface water drains, porous paving etc. (Coffey Geosciences, 2005).

The no net impact on water quality and flow objectives referred to in recommendations 7 and 8 of the CoI, are reiterated in the South Coast Regional Strategy and other plans and policies (refer to section 1.3). Given the relatively undisturbed condition of the site; its complex hydrogeological characteristics; the importance of the sedgeland and heath areas in attenuating any waterborne pollutants; and the sensitivity of the receiving waterbody; meeting the 'no net impact on water quality' objectives would require a comprehensive water sensitive urban design (WSUD) process.

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A key long term design objective would be to minimise impermeable surfaces to maximise infiltration and maintain current groundwater flows as far as possible. Detailed soil and water management plans would need to be prepared for each construction phase.

WSUD has not yet been undertaken for the proposal. However a substantial monitoring program was undertaken in 2006 to assist in the WSUD process and provide a greater level of confidence when undertaking modelling. The Model for Urban Stormwater Improvement Conceptualisation (MUSIC) would probably be used to configure and optimise the stormwater treatment system.

Ongoing maintenance and monitoring of the stormwater treatment system would be required following their construction. The monitoring undertaken in 2006 provides a benchmark for future monitoring during and post construction, should this be deemed necessary.

6.5.2. Bushfire protection & fire regimes

A Bushfire Assessment undertaken by BES (2000)[60] on behalf of Council addressed the level of bushfire threat and risk in accordance with NSW planning legislation and *Planning for Bushfire Protection 2001* (RFS 2001[61]). Development of the subject land would alter fire regimes in natural areas within the subject land (refer to Figure 20) as well as on adjacent lands outside of the study area.

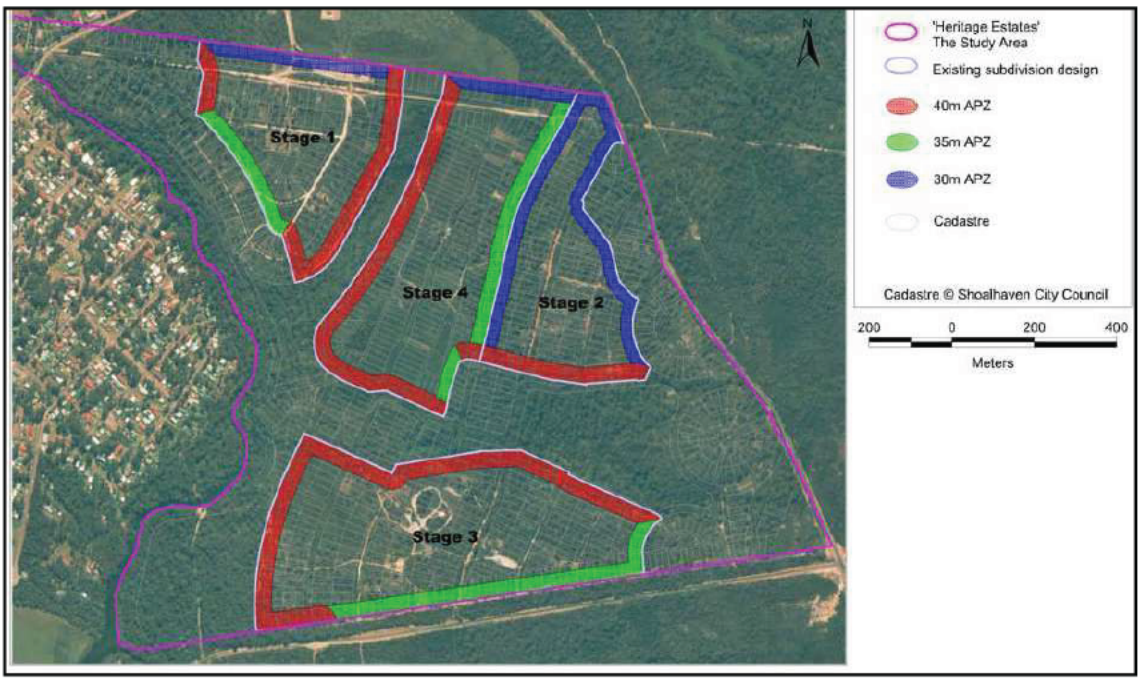


Figure 20 - Indicative asset protection zones (BES, 2006) based on Planning for Bushfire Protection, 2001 (NSW Rural Fire Service)

Birriga Avenue would have to be constructed as a through road between the Wool Road and Naval College Road to allow investigation areas 1, 2 and 4 to be developed (BES, 2006). This contradicts recommendation 11 of the CoI which stated that Birriga Avenue should not be developed as a through road, in reference to the section between Investigation Areas 1 and 4.

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The Shoalhaven District Bushfire Risk Management Plan (SDBRMP) Strategic Fire Advantage Zone (SFAZ) Management Plan identifies the actions and activities that will be undertaken in bushland areas within, and immediately surrounding, urban areas. These actions and activities are primarily directed toward the hazard reduction around urban areas, e.g.

- an APZ (up to 100m in depth) and
- an SFAZ (to an additional depth, typically 300m) may be placed around all village/urban areas.

The SDBRMP requires that within the SFAZ "fuel will be managed to maintain fuel loads at <7-10t/ha over 70-80% of the SFAZ" (SDBRMP, 2000). The creation of new urban land within the current investigation areas would therefore require management of fuel loads in surrounding bushland areas. These areas would include the CoI 'environmental protection' areas as well as land to the north, east and south of the subject land.

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6A. CLIMATE CHANGE

6A.1. Background

A number of public submissions on the draft PER raised climate change as a general issue requiring consideration. Given the concerns raised, some additional analysis and general comment is provided below in relation to general climate change related impacts. In particular:

- Impacts of the proposal on climate change – direct greenhouse gas emissions from the proposal.
- Impacts of climate change on the proposal and impacts on biodiversity, including:
  - the potential for climate change to increase the risk of adverse effects on biodiversity in BNP; and
  - sea level rise.

6A.2. Impact of the Proposal on Climate Change (Greenhouse Gas Emissions from the Proposal)

After water vapour, carbon dioxide (CO_2) is the next most significant greenhouse gas in terms of its contribution to global climate. Debate around setting targets for reducing greenhouse gas emissions has largely focussed on CO_2.

> *"Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years. The global increases in carbon dioxide concentration are due primarily to fossil fuel use and land use change…"*
> (IPCC, 2007)[62]

This section provides some information on CO_2 emissions arising from the proposal. However, there are many data gaps and uncertainties at this stage. A full assessment of CO_2 emissions would require a detailed life cycle assessment (LCA) that accounts for clearing and developing the site, over a 50 year period.

6A.2.1. CO_2 Emissions from Clearing Vegetation on the Site

CO_2 would be emitted from the following activities associated with the proposal:

- Vegetation removal – release of carbon stored in above- and below-ground biomass, including use of fossil fuels; and,
- Construction of infrastructure and up to 730 dwellings.
- Occupation of up to 730 dwellings.

Carbon is stored in the several components of forest ecosystems (NSW DPI, 2005[63]):

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- tree stem, canopy, comprising branches and leaves/needles, other vegetation, primarily understorey, comprising shrubs, grasses, litter, comprising large and small logs, branches and leaves/needles on the forest floor;
- tree roots, (both coarse and fine); and,
- soil carbon, comprising carbon stored as organic matter (highest levels in topsoil) (Young et al., 2005[64]).

Mackey et al. (2008)[65] argue that intact natural forests store a significant amount of carbon and should be protected from carbon emitting land-use activities, and that there is substantial potential for carbon sequestration if logged forests are allowed to re-grow.

The literature reviewed indicates a wide range of carbon storage in different vegetation types. Mackey et al. (2008) reported intact eucalypt forests in south-eastern Australia store about 640 t C ha-1 of total carbon (biomass plus soil). This is considerably higher than IPCC (Intergovernmental Panel on Climate Change) default values for temperate forests of 217 t C ha-1 of total carbon. Carbon stored in woodland vegetation is likely to be in the order of 5 to 87 t C/ha (tree biomass only) depending largely on the density of trees (Young et al., 2005).

The areas of different vegetation communities that occur within each of the investigation areas are shown in Table 7. Additional clearing would be required for provision of roads and other infrastructure. Hazard reduction burning and clearing in adjacent bushland would also be likely to lower the biomass in those areas.

Table 7 - Hectares of different vegetation communities in each investigation area.

	Investigation Area 1	Investigation Area 2	Investigation Area 3	Investigation Area 4	Total (ha)
Blackbutt Open Forest		0.7	1.7		2.4
Blackbutt Spotted Gum Open Forest	0.7		1.1		1.8
Scribbly Gum Woodland	16.7	11.7	22.6	9.6	60.6
Sedgeland / Shrubland	0.7		5.7	15.2	21.6
Heathland		4.0			4.0
Bangalay Swamp Forest	0.2			0.2	0.4
Total (ha)	18.3	16.4	31.1	25	90.8

If the average value of carbon stored in soil and biomass is in the order of 100-200 t/ha, total carbon stored across the investigation areas would be in the order of 9,000 – 18,000 tonnes. Given the range of values for carbon storage for different vegetation types and the number of vegetation types and degree of disturbance across the site, no attempt has been made to more accurately quantify potential carbon release from clearing the investigation areas. Nor has any attempt been made to quantify carbon emissions from the use of fossil fuels for clearing vegetation.

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6A.2.2. CO_2 Emissions from Construction of Infrastructure and Dwellings

CO_2 emissions would result from the use of fossil fuels directly in construction and emissions embodied in the extraction, processing and transport of materials. The total length of sealed roads required in the Heritage Estates would be in the order of 15 km. CO_2 emissions arising from road construction might be in the order of 7,000 – 17,000 t over 50 years (construction and maintenance) (Mroueh et al., 2000[66]).

Significant road drainage and stormwater treatment infrastructure would be required. Other significant infrastructure would include water, sewer and electricity.

Up to 730 dwellings would be constructed. Their designs and choice of materials would influence the amount of CO_2 emissions generated from construction. It should also be noted that some of the carbon losses would be offset by carbon stored in wood products used in housing and construction and vegetation established in gardens, lawns, reserves etc (Jaakko Pöyry Consulting, 2000)[67].

Not surprisingly, literature suggests that greenhouse gas emissions are higher per square meter in high density residential development compared to low density residential development, but the reverse is true if emissions are compared per person (Norman et al., 2006[68]). In their LCA of high and low density development, Norman et al. (*ibid.*) reported that greenhouse gas emissions associated with transport of residents is considerably higher in areas of low residential density.

In summary, CO_2 emitting activities associated with the proposal could include clearing approximately 90 ha of native vegetation ; the construction of infrastructure including around 15 km of roads, drainage, electricity sewer and water infrastructure); and construction and occupation of up to 730 dwellings. Rough estimates for some of these aspects have been sourced from the literature - 9,000 to 18,000 tonnes from vegetation clearing and 7,000 to 17,000 tonnes from road construction. There is insufficient basis to assess total emissions arising from the proposal with any degree of accuracy at this early stage.

6A.3. Impacts of Climate Change

6A.3.1. Background

According to the CSIRO (2007[69]), the climate of the Southern Rivers (extends from Nowra to Eden, to the Great Dividing Range) will become warmer and there are likely to be more extreme weather events with increased heat waves, intense storms, extreme winds and bushfire risk. These manifestations are discussed briefly in this section.

Temperature
The range of projected temperature increase for Australia in the near term (to 2030) is about 0.5 to 2.0˚C above the 1990 level (CSIRO 2001)70. For the longer term (to 2070), the CSIRO (ibid.) projected temperature increase is about 1 to 6˚C above 1990.

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Rainfall & Drought
The east coast of Australia, including the NSW South Coast, has experienced significant drying over the last 50 years, exceeding a decrease of 50mm per decade (CSIRO, 2007[71]).

Rainfall projections are less certain than temperature projections (*ibid.*). Rainfall in the region is distributed relatively evenly throughout the year. Projections for the Jervis Bay area published DECC[72] suggest that summer rainfall will increase by 20-50%, winter rainfall will increase by 5-10%, and spring and autumn rainfall will increase by 10-20%. This suggests that rainfall will become more summer-dominant due to an increased incidence of storm activity during the warmer months of the year.

Higher evaporation rates are likely to result in drier conditions during winter and spring (DECC, 2008).

Fire Regimes
Fire weather risk is projected to increase for south-eastern Australia due to increases in overall temperatures, wind speed, hot days and drought conditions (CSIRO, 2000). It is believed that this is likely to increase stress on plants and animals (*ibid.*).

6A.4. Impact of Sea Level Rise on the Proposed Development

Global Mean Sea Level increased by 195mm between 1870 and 2004, and is continuing to rise at a fairly steady rate of just over 3mm/year (CSIRO, 2008)[73]. IPCC project sea level rise of between 0.1 and 0.9m from 1990 to 2100.

The 1 in 100 year flood level for St Georges Basin generally (not including any localised flooding associated with its tributaries) is 2.4m AHD and the lowest part of any potential residential lots within the investigation area is at approximately 5m AHD. Therefore, even allowing for the more extreme IPCC sea level rise predictions described above, any proposed residential land in the investigation areas would be unaffected.

6A.5. Impacts of Climate Change on Biodiversity

The literature reviewed suggests that significant losses of biodiversity will occur in the long term due to climate change. Thomas et al (2004)[74] suggest that many impacts will arise from interactions between threats rather than from climate change in isolation. Temperature, rainfall and bushfire incidence all influence where species can live, grow and reproduce. Climate change is likely to drive changes in the distribution of some plants and animals (CSIRO, 2007). Changes to seasons and habitat will affect breeding success, and the structure and composition of ecosystems will change. Opportunity to 'recruit' via habitat connections will become more important for continuation of some species.

Thomas et al. (2004) used three methods to examine extinction probabilities over 20% of the earth's land area (including Qld); for low-range, mid-range and high-range climate change scenarios for 2050. Average estimates of long-term species extinctions were 18%, 24% and 35% for low-range, mid-range and high-range climate change scenarios.

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The authors (*ibid.*) also acknowledged that there are many unknowns involved in predicting species extinction. Hughes (2003)[75] reported that bio-climates of some Australian flora and fauna would disappear with warming of 0.5-1.0°C and Leemans and Eickhout (2004)[76] argue that increases of 1-2°C will impact on many species, ecosystems and landscapes.

6A.5.1. Climate Change and Biodiversity of Bherwerre Peninsula

A number of submissions expressed concerns that climate change would exacerbate long term biodiversity impacts caused by the proposed development on BNP. One such submission was received from the Commonwealth Director of National Parks, which stated:

> *"Park management acknowledges that Booderee National Park itself is insufficient to protect the region's biodiversity because of its relatively small size, isolation and biogeographical characteristics… …In addition, the region's parks form part of Australia's National Reserve System protecting representative samples of Australia's biodiversity. I am particularly concerned about the effectiveness and resilience of the reserve system in the face of climate change, and there is a growing emphasis by governments generally on improving connectivity and coordinating management programs (e.g. pest management) to increase resilience to climate change impacts."*

CSIRO (2007) suggest that plants and animals may become 'stranded' in isolated remnants of vegetation due to the combined effects of climate change and development. ELA concluded that the subject land provides habitat connections to the Bherwerre Peninsula; including via forest vegetation communities not available on the eastern side of the isthmus.

One aspect of climate change that may be directly relevant is the predicted increase in frequency and severity of bushfires. If part of the vegetation within the isthmus is cleared, it would also be less likely that sufficient unburnt vegetation could be retained to allow wildlife movement and refuge within the isthmus following bushfires. Impacts are likely to be most pronounced if extensive areas of BNP are burnt within a short time frame and fires are high intensity.

In summary, the potential predicted changes to bushfire occurrences, intensity and frequency would potentially exacerbate any impacts resulting from removal of habitat within the isthmus. The significance of any such impacts on biodiversity in BNP would depend on the degree to which these facets of bushfire behaviour change.

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7. PROPOSED SAFEGUARDS AND MITIGATION MEASURES

7.1. Mitigation measures in the CoI 'environmental protection' corridors

In relation to mitigation of impacts, ELA concluded:

> *Local mitigation measures cannot adequately address the full impacts to all the species of concern (i.e. the EPBC listed species and the species connected to Booderee NP). In assessing the mitigation of impacts to the various EPBC species and connectivity to Booderee NP a number of measures were examined. These mitigation measures included modifying the identified investigation areas, enlarging the CoI environmental protection areas, implementing sensitive urban design and development controls on tree retention and domestic animals.*
>
> *Some of these mitigation measures will work well for some species and others will work well for other species. However, on balance, none of the measures and no combination of measures will mitigate impacts to all species, nor will they address completely the impacts on connectivity to Booderee NP. This outcome concurs with the findings and recommendations from BES (2007), Lindenmayer (2007) and to a lesser extent Possingham (2007)…*
>
> *…The combination of all on-site mitigation measures for all species of concern would result in the loss of all developable areas identified within the CoI Investigation Areas. Consequently, any further mitigation measures must look at the alleviation of impacts through off-site offset actions…*

Notwithstanding the main conclusion by BES (2007) that the subject land should not be rezoned for development, a number of other recommendations were made should development proceed to mitigate impacts of developing the investigation areas. These relate to land within the areas recommended for environmental protection by the CoI, including:

- *The corridor choke point where The Wool Road crosses Worrowing Waterway should be actively managed and revegetated to enhance the functionality of this corridor for arboreal and terrestrial mammals in particular.*
- *The riparian vegetation and habitat along Worrowing Waterway (on both sides of the creek) should be actively managed to enhance the area's habitat and connectivity values. This should include bank erosion control and revegetation of degraded areas.*
- *As much as possible, the vegetation within the Erowal Bay Road reserve on the southern boundary of the subject land should be retained and appropriately managed for its habitat and connectivity values.*

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- *The preparation of a vegetation management plan for the Swamp Sclerophyll Forest endangered ecological community on the Greek Orthodox Church property should be considered to ensure that the ecological community and any vegetated buffers are appropriately managed.*

7.2. Offsets

In relation to offsets, ELA concluded:

> *Direct offsets (e.g. purchase and conservation of habitat) for the Heritage Estates rezoning are not considered to be available for a number of significant species. Impacts to some species such as the Biconvex Paperbark could potentially be offset off-site by investing in the increased conservation of the population to the north of St Georges Basin, much of which is on private land. However, most of the other species on site will not substantially benefit from off-site offsets.*
>
> *For example, the Leafless Tongue Orchid will require the maintenance of existing populations to maintain the current level of genetic variation. The loss of a population cannot be offset as the genetic information cannot be replaced and translocation of individuals is not considered to be a legitimate offset tool.*
>
> *Another example involves the Eastern Bristlebird that is restricted to the heath and woodland vegetation communities along Bherwerre Peninsula. The population is largely contained south of the Wool Road and significant areas of connected habitat outside of Bherwerre Peninsula do not exist.*
>
> *Concurrently, the Bherwerre Peninsula population is the largest remaining population of this species and is therefore highly significant for the ongoing survival of this species. Approximately 7-10% of this population currently occupies the Heritage Estates and the remaining population is predominately within reserved lands. As a result of these points, direct offsets are not considered available for this species and this population. While it may be possible to put in place indirect offsets for this species (e.g. contribution to research), these would not adequately compensate for the impacts to this species.*
>
> *Similarly, offsets for the species requiring connectivity through Heritage Estates for movement along Bherwerre Peninsula cannot be provided. The intrinsic value and functionality of the identified habitat corridors through Heritage Estates are due to their location in the environment. This functionality cannot be replaced anywhere on Bherwerre Peninsula. Loss or indirect impacts to this corridor that disrupt its functionality cannot be recreated or replaced.*

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8. OTHER APPROVALS AND CONDITIONS

Should approval be given under the *EPBC Act*, the land would still need to be rezoned before development could proceed. The rezoning process is subject to statutory requirements under the *Environmental Planning and Assessment Act 1979* (*EP&A Act*) and the *Threatened Species Conservation Act 1995 (TSC Act)*.

As illustrated in Figure 21, an LEP Review panel acts in an advisory role to the NSW Minister for Planning and/or Director General of the NSW Department of Planning in the rezoning process. The panel includes senior departmental officers and a nominee from the Local Government and Shires Association.

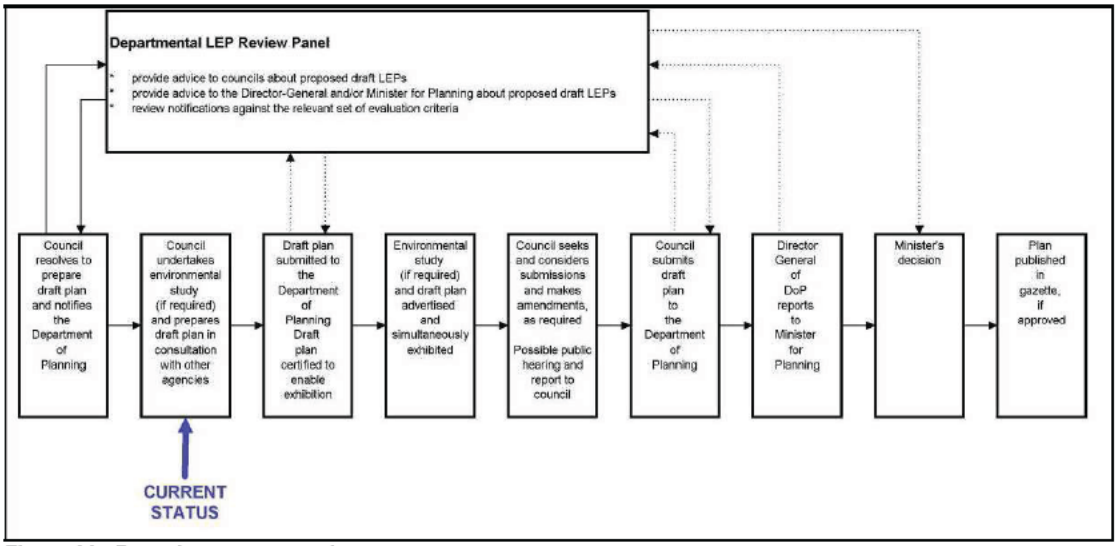


Figure 21 - Rezoning process and current status

Section 34A(2) of the *EP&A Act* specifically requires Council to consult with the Director General of National Parks and Wildlife before preparing:

> *(a) an environmental study, or*
>
> *(b) a draft local environmental plan,*
>
> *if, in the opinion of the council, critical habitat or threatened species, populations or ecological communities, or their habitats, will or may be affected by the environmental study or draft plan.*

As outlined in section 5.11.2, the NSW Department of Environment and Climate Change (DECC) has indicated that it does not support the proposed rezoning due to impacts on threatened biodiversity. The decision to rezone the land would ultimately fall to the Minister for Planning, who would be required to balance environmental impacts against social and economic issues.

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9. CONSULTATION

9.1. Consultation undertaken prior to the CoI

Extensive consultation was undertaken by Hassel Planning Consultants in 1993-1994 whilst completing the Local Environmental Study. Discussions were conducted with representatives of relevant Government agencies, local community groups, real estate gents and individual landowners. A series of workshops were held with representatives of the Shoalhaven Landowners Association.

Organisations consulted included:

- Department of Planning
- Roads & Traffic Authority
- NSW Fisheries
- Department of Agriculture
- Department of Conservation and Land Management
- Illawarra Electricity
- Australian Conservation Foundation
- NSW National Parks & Wildlife Service
- Environment Protection Authority NSW
- Vincentia Ratepayers & residents Association
- Bay & Basin Community Resources
- St Georges Basin Environs Precinct Committee
- Shoalhaven Landowners Association

9.2. Commission of Inquiry (CoI)

The CoI was advertised in The Sydney Morning Herald, Illawarra Mercury, Nowra Shoalhaven News Chronicle and the Government Gazette in March 1999. Background documents were exhibited at Shoalhaven City Council, Sanctuary Point Library, and the Commission of Inquiry's office from 8 March 1999. Submissions were received from 47 parties. The first session of the CoI was held from 31 May to 3 June 1999. The second session was held on 30 June and comments on new material were allowed up to 15 July 1999.

A summary of submissions made to the CoI is provided in Table 8.

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Table 8 - Summary of submissions made to the CoI

Group or Organisation	Representation	Number of Submissions	Stand Point (supported/ opposed)	Key Issues
Shoalhaven City Council			Supported	Only viable if a threshold of development can be achieved. Preferred position was development of 1060 lots.
NSW Gov. Agencies	DLWC, DLG, DUAP, EPA & NPWS		Not Supported	No strategic planning justification in short term, but recommended option 4 if CoI was to support rezoning.
Australian Conservation Foundation	Shoalhaven Branch		Opposed	Due process of planning has been sabotaged at a number of stages.
Booderee National Park			Opposed	Important for reservoirs in region to be linked by habitat corridor.
The Bay & Basin Community Resources Inc.	Sole provider of community services in the Area		Opposed	Would further stress social and community services and infrastructure.
Coasts & Wetlands Society Inc.			Opposed	Not suitable for development given the land's conservation significance.
Helensburgh Land Pooling Inc.	Members own land similarly affected to that of the subject land		Supported	
Hyams Beach Villages Association			Opposed	Would over stress infrastructure, increase unemployment, reduce property value, pollute watercourses & remove wildlife corridors.
The Jervis Bay Regional Alliance Inc.	Community Group		Opposed	
Shoalhaven Landowners' Association	1,100 people who own land in the Heritage Estate		Supported	Critical of the conclusion drawn in earlier consultants' reports relating to the significance of flora and fauna on land.
Social Economic Environmental Group			Supported	Should be placed in the overall context of the areas development and zoned residential.
South Coast Conservation Society Co-operative Ltd			Opposed	Would destroy vegetation which is habitat for threatened species, prevent proper wildlife corridor & pollute watercourse.
Total Environment Centre & National Parks Association			Opposed	Potential to destroy the natural and recreational values of Jervis Bay.
Worrowing Progress Association			Supported	Development will provide work and opportunity for better community services
Residents	Individual residents of the subject land	10	Supported	Want to build on their land, development will create jobs, have been paying rates, and will suffer financial loss if not compensated.
Residents	Individual Residents outside of the subject land	23	Opposed	Sensitive location, land contains valuable flora and fauna, wildlife corridors, water pollution, and requires high expenditure to provide infrastructure, lack of services and infrastructure, high unemployment, increased rates for residents.

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The CoI report can be found at: http://www.coi.nsw.gov.au/inquiry/65/6.pdf

9.3. Consultation with indigenous communities

Indigenous communities were consulted in 2005-2006 by Mary Dallas Consulting Archaeologists in preparing an *Aboriginal and European Cultural Heritage Assessment* on behalf of Shoalhaven City Council. This consultation is summarised below.

At the outset of the study, advertisements were placed in the South Coast Register on 30th November 2005 and the Shoalhaven and Nowra News on 1st December 2005. Letters of introduction were also sent in late November/early December 2005 to:

- Jerrinja Local Aboriginal Land Council (through their administrator)
- Jerrinjah Wandiwandian People
- The Connelly family native title group
- Wreck Bay Aboriginal Community Council
- The Dharawal Aboriginal Corporation Community Association

Letters were also sent in late November 2005 to NSW Native Title Services, Southern Rivers Catchment Management Authority, the Department of Environment and Conservation and the Registrar of Aboriginal Owners (Department of Aboriginal Affairs) asking for their advice on any additional Aboriginal people or organisations who should be contacted. Only the Registrar of Aboriginal Owners responded confirming it was not aware of any additional persons or organisations who should be contacted. A letter was also sent to the Nowra local Aboriginal Land Council out of courtesy.

All organisations who expressed an interest in participating in the field survey were afforded the opportunity to do so. The following were involved in the field survey:

- Jerrinja LALC (represented by Delia Lowe and Teresa Farrel)
- The Connelly family native title group (represented by Maria Connelly and Linda Connelly)
- The Jerrinjah Wandiwandian People (represented by Delia Lowe); and
- The Wreck Bay Aboriginal Community Council (represented by James McKenzie)

A summary of the survey was also sent to Mr Robert Williams upon request.

Written responses were provided by Jerrinja LALC (correspondence from Ms Delia Lowe also representing Jerrinjah Wandiwandian People) and the Connelly family native title group.

A list of the street names in the subject land was forwarded to Reuben Ardler, Delia Lowe and Graham Connelly to clarify their meaning and appropriateness. It is understood that no response has been received on this issue however; the report's authors recommended that consultation be ongoing in this regard.

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A copy of the Cultural Heritage Assessment Report was sent to Ms Adel Hyslop, Jerrinja LALC; Ms Delia Lowe, Jerrinjah Wandiwandian People, Mr Graham Connelly; Mr Reuben Ardler, Wreck Bay Aboriginal Community Council; Mr Robert Williams, Dharawal Aboriginal Corporation Community Association; and the South Eastern Aboriginal Cultural Heritage Unit (DECC).

9.4. Proposed public consultation

The *Environmental Planning & Assessment Act 1979* (*EP&A Act*) provides statutory requirements for public consultation as part of the rezoning process. Upon receipt of a Section 65 certificate from the Director General of Planning, Council would be required to place the draft Local Environmental Plan (LEP) and Environmental Study on public exhibition for at least 28 days. Council would then be required to consider submissions made, make any amendments required before submitting the draft LEP to DoP (refer to Figure 21).

The draft Public Environment Report will be placed on public exhibition for a minimum of 20 business days after the Minister has accepted that the PER guidelines have been adequately addressed. Council will be required to submit a submission to DEWHA addressing submissions received during the public consultation period.

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10. ENVIRONMENTAL RECORD

Shoalhaven City is a multi-faceted Council that deals with many issues which would not be covered by councils in many other local government areas. Council activities which have the potential to have an impact (both positive and negative) on the environment are:

- Studying of local environments so as to more fully understand local ecosystems.
- The identification of environmental degradation and the taking of action to protect, maintain and improve these environments.
- The making of policies that regulate how land is developed.
- The assessing of applications for the use and development of land.
- The monitoring of development to ensure environmental compliance.
- The undertaking of works.
- The provision of services.
- The collection, treatment and disposal of the City's liquid and solid wastes.
- Educating the community on ways to preserve and protect the environment.
- When undertaking these activities the environment is increasingly a major consideration.

Council's Management Plan outlines how Council plans to promote ecological sustainability and protect sensitive areas. The Management Plan notes that the State of the Environment reporting process is crucial in reporting progress in achieving these goals. As part of this process over recent years, Council has developed (and is developing) processes that allow the City's environment to be studied so that long term action plans may be implemented for the benefit of the environment and/or the benefit of the community. The results of these studies; what Council has found and what aims Council has for each sector of the environment have been reported in Council's annual State of the Environment Reports. Thus the State of the Environment Report not only serves as an important educational tool for the community but it is also an excellent management tool for Council.

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11. CONCLUSION

Council proposes to rezone land within the subject land from rural to residential to enable construction of up to 730 dwellings on 730 lots. Implementation would involve clearing of native vegetation, road construction, bushfire asset protection clearing and maintenance, and provision of services and infrastructure including sewer, water and electricity.

Impacts on listed threatened species (Section 18 of the *EPBC Act*) relate primarily to the Leafless Tongue Orchid and Eastern Bristlebird.

Impacts on the biodiversity of Booderee National Park (Commonwealth land) (Section 26 and 27A of the *EPBC Act*) were assessed by ELA for key 'surrogate' species with a range of habitat preferences: heath or wet area species such as the Eastern Chestnut Mouse; gliders such as the Yellow-bellied Glider, Greater Glider and Feathertail Glider; heath and woodland species, particularly the Eastern Pygmy Possum; heath and sedge species such as the Ground Parrot; and woodland and forest species such as the White-footed Dunnart and Spotted-tail Quoll.

ELA concluded that the proposed rezoning of the CoI Investigation Areas for residential development is considered likely to have a significant impact on listed threatened species and on Commonwealth land. ELA also concluded that the impacts cannot be effectively mitigated or offset elsewhere.

Predicted changes to bushfire occurrences, intensity and frequency would potentially exacerbate any impacts resulting from removal of habitat within the isthmus. The significance of any such impacts on biodiversity in BNP would depend on the degree to which these facets of bushfire behaviour change and are difficult to predict at this early stage.

As required under Section 136(1)(b) of the *EPBC Act*, the Minister must also consider the environmental impacts in light of social and economic considerations. Council engaged Judith Stubbs & Associates (JSA) to research and document the potential social and related economic impacts on the landowners should the proposal not proceed. The findings from this work are summarised below.

Generally speaking, there are likely to be significant adverse social and economic impacts for landowners if the rezoning does not proceed. Whilst a small minority may take a pragmatic view by discontinuing to pay rates and 'cut their losses', a strong majority have invested a great deal - emotionally and financially – in their hopes of owning a home near the coast, and continue to do so by paying annual rates, which some on fixed incomes increasingly cannot afford. Walking away now would leave them with nothing, and will have cost them dearly, financially and emotionally. Amid the generally negative impacts, an identifiable positive impact of a definitive decision not to rezone the land is that it would allow owners the option to relinquish the land and stop the ongoing financial 'bleed' through payment of Council rates. It may also allow some to move on with their lives and, if young enough or financially able, to make an alternative investment decision that may benefit them in the future.

The economic impacts are perhaps most severe for those who have relied upon this land as their principal future asset for home ownership or for retirement, and whose financial position has not allowed them to make additional capital investments. This group also includes low-income earners who have limited capital in their family home, or whose changed personal circumstances have now left them vulnerable to financial hardship, particularly as they age.

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Though perhaps not as tangible, the emotional and psychological impacts on a generally disadvantaged and sometimes vulnerable group of people should not be underestimated. Lost opportunities appear to be an enormous source of grief and stress for some owners, who have sacrificed personal or family life for future benefits that may not be realised.

Though reasonable in some cases to take a "caveat emptor" (buyer beware) approach, case studies of the owners reveal a group of people who were particularly vulnerable to the aggressive marketing strategy of the vendor and their associates. Their lack of understanding of the NSW planning system and rationale for rezoning some land and not other land is understandable in the circumstances.

Ultimately, if the land is not rezoned, the landowners in the Heritage Estates are left with an asset of no value, a significant economic loss, and ongoing financial liability. However, if the land is rezoned but there is no assistance with development costs or co-ordination, there may still be limited utility to some of the least well-off owners, except that they will some gain some small profit (or principally recoup past losses) if they were to sell their land. The unfortunate irony is that, without assistance, it is likely that a significant proportion of Heritage Estates owners would struggle to afford the development costs, and may be enticed to sell at below market price to a larger land developer, particularly in the earlier years. Those who cannot afford to meet the costs of development on the land are likely to be the least well-off and more vulnerable landowners, who may also feel they have the least bargaining power and be inclined to sell earliest and cheapest.

Correspondence to Council from BNP dated 22nd January 2008, expresses concerns regarding environmental, social and economic impacts related to the subject land's proximity to BNP, including adverse impacts on tourist visitations, employment and social/community values associated with the Park and its environs.

Submissions on the Draft PER opposing the proposed development, received

predominantly from residents in nearby communities as well as various organisations, societies and agencies, expressed concerns about a range of potential social and economic impacts. These included: the ability of existing community services and infrastructure, including health and aged care, to meet demand from the proposed development; and potential adverse affects on the area's attractiveness for tourism. Submissions in favour of the proposal, largely from or on behalf of the landowners, suggest that the proposed development would provide economic and related benefits to the local economy.

Additional information has been provided in section 3A of the PER on various social and economic issues raised in the public consultation phase, to enable a decision to be made under the *EPBC Act*.

Though there are likely to be a range of other social and economic impacts in the locality, both positive and negative, the balancing of these various impacts is ultimately a matter for the Minister in making his decision.

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ATTACHMENTS

ATTACHMENT 1.	Independent advice provided to DEWHA
ATTACHMENT 2.	Guidelines for the Content of a Draft Public Environment Report (PER)
ATTACHMENT 3.	Heritage Estates Social Impact Assessment (2008) Judith Stubbs & Associates. Report prepared for Shoalhaven City Council
ATTACHMENT 4.	Geotechnical information on the subject land (Coffey Geosciences, 2005)
ATTACHMENT 5.	Vegetation descriptions & plant species identified on the subject land (BES, 2007)
ATTACHMENT 6.	Fauna species recorded on the subject land (BES, 2007)
ATTACHMENT 7.	Information provided by BNP
ATTACHMENT 8.	Information provided by NSW Department of Environment and Climate Change (DECC)
ATTACHMENT 9.	Report prepared by Eco Logical Australia Pty Ltd (ELA)
ATTACHMENT A.	Public Consultation on Draft PER

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ATTACHMENT 1. Independent advice provided to DEWHA

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THE ECOLOGY CENTRE

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Date 15 Jun. 07

Ms Sylvana Maas
Government and Transport Section
Department of the Environment and Water Resources
PO Box 787
Canberra ACT 2600

Dear Sylvana,

Re: Review regarding the effects of the Heritage Estates proposal, Worrowing Heights, Jervis Bay (EPBC Referral 2007-3448) on the Eastern Bristlebird and other threatened fauna and flora.

Further to our agreement please find below the findings with regard to this review:

1. The conclusions of this report are based on the information we were asked to assess using our background knowledge of the area and species in question and our expertise in ecological processes.

2. The proposal is to rezone the Heritage Estate land for residential development. Different versions of the development directly affect varying amounts of land. Regardless of the details of the plan, there will be a direct impact on the site where infrastructure is developed. In addition, there will be indirect impact on areas of native vegetation within and near the development causing severely diminished conservation value.

3. The area proposed for development contains a number of EPBC listed species and forms part of a main vegetation corridor connecting Booderee National Park to the rest of Australia.

4. The Eastern Bristlebird is nationally endangered under the federal EPBC Act 1999, endangered in New South Wales and Queensland and threatened in Victoria. Eastern Bristlebirds have a number of isolated populations disjunct from the main populations and in some instances with very little connecting habitat in between. One of the largest populations of this species in the world is in Booderee National Park, which is connected by narrow habitat corridors to other habitat patches in the area of Jervis Bay. The main threats to this species are incremental habitat loss and fragmentation of remaining habitat, such as the conversion of habitat to urban or agricultural land. Other important threats are extensive fire

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and the spread of exotic plants, as the species' ideal habitat is dense, low vegetation including heath and open woodland with a heathy understorey. The Eastern Bristlebird has low fecundity and nests on or close to the ground, which makes the bird and its eggs susceptible to introduced predators, such as fox, cat and black rat. The bird is cover dependent and semi-flightless, therefore has poor mobility; however, there is a record of one bird dispersing over four km through adequate and continuous habitat. The Heritage Estate area currently has at least five breeding pairs of Eastern Bristlebird, which could be higher if the habitat was restored.

5. The proposed development would locally impact the Eastern Bristlebird by direct destruction of the birds and their habitat within the area and have broader-scale negative effects by impairing the corridor function of the area. Removing habitat would cause the loss of breeding Eastern Bristlebirds from the area of development. Replacing Bristlebird habitat with urban dwellings is likely to increase edge effects in remaining habitat, leading to an increase in the number of cats and other introduced predators, as well as enhance weed invasion. The development is also likely to change fire regimes in the area and increase transport activities and other human-related disturbance. This direct impact will be the loss of at least five pairs, but indirectly and potentially many more birds.

6. The study area is an important habitat corridor and the proposed development would negatively impact the long-term viability of the Eastern Bristlebird in two ways. First, increased isolation reduces genetic exchange between populations and decreases population viability. Second, the Eastern Bristlebird exists as isolated populations, each of which is prone to local extinction through catastrophic events, such as fire or disease. Consequently, long-term persistence of the species depends on connectivity through continuous habitat that enables individuals to recolonise areas of local extinction and to colonise new areas.

7. The Heritage Estates area contains diverse vegetation communities and fauna habitat, and it has a high level of conservation value based on its relatively high species richness and the relatively high number of species of conservation significance. Besides the Eastern Bristlebird, the area contains 16 other threatened fauna species and three threatened flora species.

8. The Ground Parrot is listed as vulnerable under the TSC Act and it has similar life history and threats to the Eastern Bristlebird. Therefore the effects of the Heritage Estate development would be similar on both species. Arboreal mammals would also suffer from the loss of habitat and corridor function. The Giant Burrowing Frog was not recorded during surveys but it could potentially inhabit the area. The development would negatively influence this species by removing habitat, changing fire regimes and impairing water quality downstream from the development. Two threatened orchid and a threatened paperbark species were also found during surveys, which would be negatively affected by the development.

9. In our opinion there is sufficient information currently available to conclude that the proposal would have a wide range of impacts on all threatened species.

10. The proposal has two sets of impacts on the Eastern Bristlebird: it would lead to the direct loss of individuals and prohibit movement between suitable habitat patches. These two impacts of the development in theory could be mitigated, however, these measures would have to go on indefinitely, they would be very expensive and their results not guaranteed.

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The loss of individuals could be mitigated by improving habitat elsewhere, the loss of connectivity by regular translocations. These measures would need to be accompanied by regular monitoring of numbers and genetic diversity.

11. Similar measures would be necessary for the other threatened birds, mammals and the frog. Given a lack of basic ecological knowledge, mitigation measures for the endangered orchid species would be extremely difficult and require further information.

12. Qualifications:
Dr Judit K. Szabo completed a Master's degree in Theoretical Ecology at the University of Szeged, Hungary in 1999. Her research focussed on the habitat selection of the Black Stork in the flood forests of the Danube River in Hungary. She then continued to pursue a doctoral degree in Environmental Toxicology at The Institute of Environmental and Human Health, Lubbock, Texas, USA. In 2001 she moved to Australia to conduct fieldwork about the exposure and effects of locust-control pesticides on birds in Eastern Australia. She was awarded her PhD in December 2005. In 2006 she conducted postdoctoral research on the Plains-wanderer employed by the University of Wollongong and the Department of Environment and Conservation. In 2007 she was appointed as a postdoctoral fellow at the University of Queensland. She has over 15 years of experience conducting bird surveys and bird banding. Having lived in Wollongong for five years, she has a thorough knowledge of the region and its birds. Judit's CV is available upon request.

Prof. Hugh P. Possingham
After attaining a Rhodes Scholarship Hugh completed his doctorate at Oxford University in 1987. Postdoctoral research periods followed at Stanford University and ANU (as a QEII Fellow). In 1991 he took a Lectureship in Applied Mathematics at UofA and was appointed Foundation Chair of the Department of Environmental Science in 1995. In July 2000 Hugh became director of The Ecology Centre at The University of Queensland. Prof. Possingham is a Federation Fellow (2006–2010) and Director of a Commonwealth Environment Research facility. The lab includes eight postdoctoral researchers and fourteen PhD students working on empirical and theoretical aspects of biodiversity conservation. Prof. Possingham has undertaken bird surveys at Jervis Bay and is an expert in population viability analysis and conservation planning. A detailed CV is available at:
http://www.ecology.uq.edu.au/docs/staff-profiles/hugh-possingham/CVJuly2006.pdf

Yours sincerely



Dr Judit Szabo (DPhil, MSci)
Postdoctoral Research Fellow



Dr Hugh Possingham (DPhil, Oxford, FAA)

Director of The Ecology Centre
Professor of Mathematics
Professor of Ecology
ARC Professorial Fellow (Research)

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Document 20

Professor David Lindenmayer

Fenner School for Environment and Society

The Australian National University

Canberra, ACT., Australia

15 June 2007

Re: Impacts of the Heritage Estates development proposal

To whom it may concern,

I have now carefully read a range of documents associated with the **Heritage Estates development proposal**. Based on 25 years experience as a professional terrestrial ecologist and environmental scientist, coupled with a deep understanding of the Jervis Bay and Booderee National Park areas gained from intensive scientific studies that I have competed in the region in the past five years, I strongly believe that the **Heritage Estates development proposal** is clearly unacceptable given its impacts on the natural environment generally, on biodiversity (including threatened and endangered species) and on the integrity of Booderee National Park. More detailed discussion for this conclusion is outlined in the attached report.

Given my experience, together with background research in the Jervis Bay region, I support the conclusion of the Major Report by Bushfire and Environmental Services for the **Heritage Estates development proposal** which concludes that the project should not proceed. Moreover, I cannot see how the **Heritage Estates development proposal could be** re-designed to mitigate the not inconsiderable negative ecological and environmental impacts that would be associated with it. In addition, further field survey and assessment work like that done in the report by Bushfire and Environmental Services would only increase the definitiveness of my conclusions about the unacceptability of the **Heritage Estates development proposal.** [For example, through identifying additional species for which the proposal would have negative and unacceptable ecological and environmental impacts

I hope this letter will be received favourably and I will be more than happy to further discuss the basis for the conclusions reached.

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Yours Sincerely,

Professor David Lindenmayer BSc, Dip. Ed., Ph.D., DSc

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Impacts of the Heritage Estates development proposal

Professor David Lindenmayer

Fenner School for Environment and Society

The Australian National University

Canberra, ACT., Australia

I am a professional terrestrial ecologist and environmental scientist of 25 years standing. I have written 18 books and 457 scientific articles (http://cres.anu.edu/dbl/books.php on Australia's environment, biodiversity, conservation management and mitigating environmental impacts. I currently lead 46 projects on biodiversity and conservation in south-eastern Australia. I have led a major series of experiments and allied research studies in Booderee National Park since 2002.

Given my expertise generally and specific knowledge as it relates to the Jervis Bay region, I strongly believe that the **Heritage Estates** development proposal is clearly unacceptable in terms of:

- Its impacts on biodiversity.
- Its impacts on threatened and/or endangered species.
- The disruption it will cause to the environmental values of Booderee National Park and the key species and environments in that protected area.

Given the nature of the proposed **Heritage Estates** development, I cannot see any way these major negative impacts could be effectively mitigated or appropriately offset.

A brief summary of the impacts of the proposed **Heritage Estates** development is set out below. I am more than happy to provide extensive further information on these issues if requested.

1. The proposed **Heritage Estates** development would take place on an area that supports an extraordinary number of threatened and endangered animals, plants and an endangered plant community. These factors alone, coupled with development

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impacts on these taxa, strongly indicate that the proposed **Heritage Estates** development should not proceed.

2. The proposed **Heritage Estates** development would necessarily involve the construction of a network of roads and powerlines. This will directly destroy habitat for an array of threatened and/or endangered species and significantly undermine the ecological integrity of an endangered plant community that occurs on the site proposed for development. There is considerable precedent for such negative effects of urban expansion in many parts of Australia, including coastal New South Wales. There is no evidence to suggest that the substantial negative effects of the proposed **Heritage Estates** development would be any different or less severe in this regard. As an example, habitat loss for the nationally endangered Eastern Bristlebird – a species known to occur in the areas targeted for the proposed **Heritage Estates** development would likely result in the extirpation of the species from the development area.

3. The construction of a network of roads and powerlines associated with the proposed **Heritage Estates** development would result in weed invasion, this will indirectly destroy habitat for a number of key species and reduce the quality of habitats for others. The construction of a network of roads and powerlines associated with the proposed **Heritage Estates** development would result in increased numbers of feral animals. This will result in direct negative impacts on a range of threatened and/or endangered species. There is considerable precedent for such negative effects of urban expansion in many parts of Australia, including coastal New South Wales. There is no evidence to suggest that the substantial negative effects of the proposed **Heritage Estates** development would be any different or less severe in this regard.

4. If the proposed **Heritage Estates** development were to proceed, a large number of dwellings would be constructed. This would lead to a direct loss of habitat for an array of threatened and/or endangered species. It also would lead to the significant erosion in the ecological integrity of an endangered plant community that occurs on the site. There is considerable precedent for such negative effects of urban expansion in many parts of Australia, including coastal New South Wales. There is no evidence to suggest that the substantial negative effects of the proposed **Heritage Estates** development would be any different or less severe in this regard.

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5. If the proposed **Heritage Estates** development were to proceed, there would be a significant increase in the number of domestic cats and dogs owned as pets in the area. Domestic pets are well documented as having significant negative impacts on populations of native fauna. Predation on threatened and/or endangered fauna in the proposed **Heritage Estates** development would have significant additional negative effects on these important listed species.

6. If the proposed **Heritage Estates** development were to proceed, there would be a significant increase in the number of fires that would occur in the area, including the adjacent peri-urban interface. Altered fire regimes have been shown to be a significant factor threatening a wide range of Australian vertebrates including a suite of threatened and endangered ones. Additional fires would be expected to have negative impacts on key species of conservation concern known to occur in the area targeted for the proposed **Heritage Estates** development. An example is the nationally endangered Eastern Bristlebird (see Baker, 1999, 2000).

7. The proposed **Heritage Estates** development area is actually a mosaic of different vegetation types (*sensu* Bennett *et al*., 2006) comprising not only forest, but also heathland and other key types of native vegetation cover. Functional corridors to provide habitat connectivity (sensu Lindenmayer and Fischer, 2006, 2007) for key elements of the biota will often need to be of the vegetation type which provide suitable habitat for the species of concern. For example, for species such as the Eastern Bristlebird which are primary heathland taxa, wildlife corridors comprised of forest are unlikely to provide suitable habitat connectivity. Indeed, appropriate wildlife corridors for these and other similar species (e.g. Southern Emu Wren) would need to be heathland. Therefore, I do not believe that it would be possible to mitigate the impacts of the proposed **Heritage Estates** development through re-design of the development proposal.

****

We have conducted extensive research and monitoring studies in Booderee National Park since 2002. Two ANU staff (Mr. Chris MacGregor and Mr. Darren Brown) work full time in the park as part of the ANU research team. Our research team has quantified the importance of Booderee National Park for an extensive suite of terrestrial vertebrate fauna (birds, mammals, reptiles and frogs) as well as flora. Based

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on our intimate understanding of the biology and ecology of Booderee National Park, the proposed **Heritage Estates** development would be highly likely to have significant negative effects on the ecological integrity of this important protected area.

A. The **Heritage Estates** development area provides significant habitat connectivity (*sensu* Lindenmayer and Fischer, 2006) to Booderee National Park. This is critical for the maintenance of key populations of species such as the nationally endangered Eastern Bristlebird and other key species in Booderee National Park such as the Greater Glider.

B. The importance of the loss of connectivity is reflected by the local extinctions of several key species in Booderee National Park. In the past these local extinctions would have been reversed by dispersal and recolonisation events. However, urban and other developments have reduced habitat connectivity and limited the potential for the reversal of local extinctions. Evidence for the impairment of this key ecological process is reflected by the extinction followed by continued absence from Booderee National Park of species such as the Yellow-bellied Glider (listed as vulnerable in NSW), the Superb Lyrebird and the Common Wombat.

C. Additional urban development that destroy significant areas of native vegetation – as would occur if the proposed **Heritage Estates** development were to proceed would further impair levels of habitat connectivity for Booderee National Park. Local (and subsequently unreversed) extinctions of other species would be expected to occur – effects that have been recorded in a wide range of studies worldwide (reviewed by Lindenmayer and Burgman, 2005, Lindenmayer and Fischer, 2006). Dispersal-limited species (e.g. the nationally endangered Eastern Bristlebird – see Baker, 2000) would be among those taxa likely to be most threatened by the impairment of habitat connectivity associated with the proposed **Heritage Estates** development. Similar effects would be expected to occur for other species of conservation concern with limited dispersal capabilities (e.g. the Giant Burrowing Frog and the Southern Emu Wren).

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In summary, based on my expertise of 25 years together with my direct experience in working in the Jervis Bay area over the past 5 years, I support the conclusion of the major report by Bushfire and Environmental Services for the **Heritage Estates development proposal** which concludes that the project should not proceed. The **Heritage Estates development proposal** would have unacceptable impacts on biodiversity, including a suite of nationally threatened and endangered species. Moreover, I cannot see how the **Heritage Estates development proposal could be** re-designed to mitigate the not inconsiderable negative ecological and environmental impacts that would be associated with it. In addition, further field survey and assessment work like that done in the report by Bushfire and Environmental Services would only increase the definitiveness of my conclusions about the unacceptability of the **Heritage Estates development proposal**. [For example, through identifying additional species for which the proposal would have negative and unacceptable ecological and environmental impacts].

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ATTACHMENT 2. Guidelines for the Content of a Draft Public Environment Report (PER)

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GUIDELINES FOR THE CONTENT OF A DRAFT PUBLIC ENVIRONMENT REPORT (PER)

Heritage Estate Rezoning and Associated Public Works to Facilitate Residential Development, Worrowing Heights, NSW

Environment Protection and Biodiversity Conservation Act 1999
(Reference: EPBC 2007/3448)

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GUIDELINES FOR A PUBLIC ENVIRONMENT REPORT

HERITAGE ESTATE REZONING AND ASSOCIATED PUBLIC WORKS TO FACILITATE RESIDENTIAL DEVELOPMENT, WORROWING HEIGHTS, NSW

PREAMBLE

The Shoalhaven City Council (SCC) proposes to undertake rezoning and associated public infrastructure works to facilitate residential development of the Heritage Estate, a 176.9ha area of land at Worrowing Heights, on the Bherwerre Peninsular, near Jervis Bay, NSW.

In 1999 the Heritage Estate proposal was the subject of a NSW Commission of Inquiry to investigate the potential for development of the site. The inquiry recommended that land with important fauna habitat and wildlife corridor values should be protected and that a maximum of 730 residential lots could be considered for development.

On 9 May 2007 the proposed action was referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The referred proposal was drawn from the Commission of Inquiry recommendation for a maximum development of 730 residential lots. On 22 June 2007 the delegate for the Minister for the Environment and Water Resources determined that the proposed action requires approval under the EPBC Act, and that it will be assessed by a Public Environment Report (PER).

The proposed action has the potential to have a significant impact on the following matters, which are protected under Part 3 of the EPBC Act:

- Sections 18 and 18A (Listed threatened species and ecological communities); and
- Sections 26 and 27A (Commonwealth land).

Information about the action and its relevant impacts, as outlined below, is to be provided in the PER. This information should be sufficient to allow the Minister to make an informed decision on whether or not to approve, under Part 9 of the EPBC Act, the taking of the action for the purposes of each controlling provision.

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GENERAL ADVICE ON GUIDELINES

1 GENERAL CONTENT

The PER should be a stand-alone document that primarily focuses on the matters listed above. It should contain sufficient information to avoid the need to search out previous or supplementary reports.

The PER should enable interested stakeholders and the Minister for the Environment and Water Resources to understand the environmental consequences of the proposed development. Information provided in the PER should be objective, clear, and succinct and, where appropriate, be supported by maps, plans, diagrams or other descriptive detail. However, detailed mapping of the specific locations of threatened species should not be included. Rather, information about threatened species known to occur at the site is required in terms of the species' numbers, distribution and habitat requirements, within a regional context.

The body of the PER is to be written in a clear and concise style that is easily understood by the general reader. Technical jargon should be avoided wherever possible. Cross-referencing should be used to avoid unnecessary duplication of text.

Detailed technical information, studies or investigations necessary to support the main text should be included as appendices to the PER. It is recommended that any supporting documentation and studies, reports or literature, from which information has been extracted and which are not normally available to the public, be made available at appropriate locations during the period of public display of the PER. The proponent should also make the PER and supporting information available on the Internet.

If it is necessary to make use of material that is considered to be of a confidential nature, the Proponent should consult with Department of the Environment and Water Resources (DEW) on the preferred presentation of that material, before submitting the draft PER to the Minister for approval for publication.

The level of analysis and detail in the PER should reflect the level of expected impacts on the environment. Any and all unknown variables or assumptions made in the assessment must be clearly stated and discussed. The extent to which the limitations, if any, of available information may influence the conclusions of the environmental assessment should be discussed.

The proponent should ensure that the PER addresses the matters stated in Schedule 4 of the EPBC Regulations *Matters to be addressed by draft Public Environment Report* at Attachment 1.

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2 FORMAT AND STYLE

The PER should comprise three elements, namely:

- the executive summary;
- the main text of the document, and
- appendices containing supporting technical information and other information that can be made publicly available.

The guidelines have been set out in a manner that may be adopted as the format for the PER. This format need not be followed where the required information can be more effectively presented in an alternative way. However, each of the elements must be addressed to meet the requirements of the EPBC Act and Regulations.

The PER should be written so that any conclusions reached can be independently assessed. To this end all sources must be appropriately referenced using the Harvard standard. The reference list should include the address of any Internet "web" pages used as data sources.

The main text of the PER should include a list of abbreviations, a glossary of terms and appendices containing:

- a copy of these guidelines;
- a list of persons and agencies consulted during the PER;
- contact details for the Proponent; and
- the names of, and work done by the persons involved in preparing the PER.

Maps, diagrams and other illustrative material should be included in the PER where appropriate. The PER should be produced on A4 size paper capable of being photocopied, with maps and diagrams on A4 or A3 size and in colour where possible.

The proponent should consider the format and style of the document appropriate for publication on the Internet. The capacity of the website to store data and display the material may have some bearing on how the document is constructed.

Information about species listed under the EPBC Act should be provided in electronic format to DEW. The provision of this information will help facilitate decision making under the EPBC Act and assist in the protection and recovery of species and communities.

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SPECIFIC CONTENT

1 GENERAL INFORMATION

This should provide the background and context of the action including:

(a) the title of the action;

(b) the full name and postal address of the designated Proponent;

(c) a clear outline of the objective of the action;

(d) legislative background for the proposal, including the NES matters protected under Part 3 of the EPBC Act and any other requirements and approvals needed under the EPBC Act;

(d) the location of the action;

(e) the background to the development of the action;

(f) how the action relates to any other actions (of which the proponent should reasonably be aware) that have been, or are being, taken or that have been approved in the region affected by the action;

(g) the current status of the action; and

(h) the consequences of not proceeding with the action.

2 DESCRIPTION OF THE ACTION

All components of the proposed action, including all areas proposed for development, should be described. This should include:

(a) the number and location of all residential allotments proposed for development; and

(b) a description of public works, such as roads, sewerage, powerlines, bushfire protection and hazard reduction requirements, that would be required to facilitate the proposed development, including areas where public works would be undertaken.

3 FEASIBLE ALTERNATIVES

Any feasible alternatives to the proposed action should be described to the extent reasonably practicable, including:

(a) if relevant, the alternative of taking no action;

(b) constraints and opportunities for alternative development footprints;

(c) a comparative description of the impacts of each alternative on the NES matter protected by Part 3 of the EPBC Act; and

(d) sufficient detail to make clear why any alternative is preferred to another.

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4 DESCRIPTION OF THE ENVIRONMENT

Undertake a desktop study of existing and available information about the environment at the proposal site and in the surrounding region, which may be affected by the proposed development of the Heritage Estate. The study should investigate the relevant matters protected under Part 3 of the EPBC Act, including but not restricted to:

(a) Information about listed threatened species and their habitats that are likely to be present at the site, including:

- a description of the values and extent of the regional ecosystem impacted;
- contextual information about the species' regional status, population and distribution, including mapping of regional distributions; and
- a description of the species' core breeding and foraging habitats, including information about the regional distribution of suitable habitat.

(b) A description of the environment on and adjacent to Commonwealth land (Booderee National Park) that is likely to be impacted by the proposal, including but not restricted to:

- the biological diversity of the environment on Commonwealth land, including:
  - i. listed threatened, rare or geographically restricted species and ecosystems that occur within the Booderee National Park and regional environment;
  - ii. species of conservation significance to the Booderee National Park, including the species' regional status, population and distribution; and
  - iii. any non-threatened species that occur within the Booderee National Park and at the Heritage Estate site, which may be impacted by the potential fragmentation and disturbance of habitat corridor values.
- the context and importance of regional habitat corridors, including:
  - i. the Jervis Bay regional planning framework and identified habitat corridors, including maps;
  - ii. government agencies' views on the adequacy of identified regional habitat corridors;
  - iii. requirements for effective habitat corridors on the Bherwerre Peninsular, including recommended lengths and widths of corridors, and species' requirements for habitat diversity; and
  - iv. an analysis of the context and importance of the site's habitat corridor values.
- the heritage values of adjacent and nearby places listed on the Commonwealth Heritage List (CHL) and Register of the National Estate (RNE).

(c) A discussion of potential impacts on the heritage values of the Jervis Bay Territory (CHL #105394), and places adjacent to Commonwealth land (RNE # 1604 and #1587), where relevant impacts on heritage values have not been addressed as part of 4(a) or (b).

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5 RELEVANT IMPACTS

The PER must include a description of all the potential relevant impacts of the proposed action, including consequential impacts as defined by Section 527E of the EPBC Act, on the relevant matters of NES protected under Part 3 of the EPBC Act. This must include, but are not restricted to:

(a) potential direct, indirect and consequential impacts on listed threatened species and species of conservation significance from the proposed development of the site;

(b) potential direct, indirect and consequential impacts on regional habitat corridor values and the environment on Commonwealth land from the proposed development of the Heritage Estate site;

(c) potential impacts to hydrology, including from erosion and sedimentation;

(d) potential bushfire property protection and fire management regimes for the site;

(e) potential impacts from feral and domestic animals;

(f) a detailed assessment of the nature and extent of the likely short-term and long-term relevant impacts;

(g) a statement as to whether any relevant impacts are likely to be unknown, unpredictable or irreversible;

(h) an analysis of the relevant impacts; and

(i) any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

6 PROPOSED SAFEGUARDS AND MITIGATION MEASURES

The PER must provide information on mitigation measures, with a particular focus on matters protected under Part 3 of the EPBC Act. Specific measures must be provided and substantiated, based on best available practices, and must include the following elements:

(a) A consolidated list of mitigation measures proposed to be undertaken to prevent, minimise or compensate for the relevant impacts of the action, including:

- a description of proposed safeguards and mitigation measures to deal with relevant impacts of the action, including mitigation measures proposed to be taken by State governments, local governments or the proponent;
- assessment of the expected or predicted effectiveness of the mitigation measures;
- any statutory or policy basis for the mitigation measures; and
- the cost of the mitigation measures.

(b) The name of the agency responsible for endorsing or approving each mitigation measure or monitoring program.

7 OTHER APPROVALS AND CONDITIONS

Information given on any other requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action must include:

(a) details of any local or State Government planning scheme, or plan or policy under any local or State Government planning system that deals with the proposed action, including:

- what environmental assessment of the proposed action has been, or is being, carried out under the scheme, plan or policy; and

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- how the scheme provides for the prevention, minimisation and management of any relevant impacts;

(b) a description of any approval that has been obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the Act), including any conditions that apply to the action;

(c) a statement identifying any additional approval that is required; and

(d) a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.

8 CONSULTATION

Any consultation about the action, including:

(a) any consultation that has already taken place, including with Indigenous communities;

(b) proposed consultation about relevant impacts of the action, including with Indigenous communities with reference to *Ask First,* which can be found at: http://www.ahc.gov.au/publications/ask-first.html;

(c) if there has been consultation about the proposed action, any documented response to, or result of, the consultation.

The proponent should ensure that Clause 2 (i) of Schedule 4 of the EPBC Regulations at Attachment 1 is adequately addressed in the PER.

9 INFORMATION SOURCES PROVIDED IN THE PER

For information given in a draft Public Environment Report, the draft must state:

(a) the source of the information;

(b) how recent the information is;

(c) how the reliability of the information was tested; and

(c) what uncertainties (if any) are in the information.

10 ENVIRONMENTAL RECORD OF PERSON PROPOSING TO TAKE THE ACTION

Details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:

(a) the person proposing to take the action; and

(b) for an action for which a person has applied for a permit, the person making the application.

If the person proposing to take the action is a corporation, also include details of the corporation's environmental policy and planning framework.

11 CONCLUSION

An overall conclusion as to the environmental acceptability of the proposal should be provided.

Measures proposed or required by way of offset for any unavoidable impacts on NES matters, and the relative degree of compensation, should be highlighted.

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ATTACHMENT 1

MATTERS THAT MUST BE ADDRESSED IN A PER
(SCHEDULE 4 OF THE EPBC ACT REGULATIONS 2000)

1 General information

1.01 The background of the action including:

(a) the title of the action;

(b) the full name and postal address of the designated proponent;

(c) a clear outline of the objective of the action;

(d) the location of the action;

(e) the background to the development of the action;

(f) how the action relates to any other actions (of which the proponent should reasonably be aware) that have been, or are being, taken or that have been approved in the region affected by the action;

(g) the current status of the action;

(h) the consequences of not proceeding with the action.

2 Description

2.01 A description of the action, including:

(a) all the components of the action;

(b) the precise location of any works to be undertaken, structures to be built or elements of the action that may have relevant impacts;

(c) how the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts;

(d) relevant impacts of the action;

(e) proposed safeguards and mitigation measures to deal with relevant impacts of the action;

(f) any other requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action;

(g) to the extent reasonably practicable, any feasible alternatives to the action, including:

(i) if relevant, the alternative of taking no action;

(ii) a comparative description of the impacts of each alternative on the matters protected by the controlling provisions for the action;

(iii) sufficient detail to make clear why any alternative is preferred to another;

(h) any consultation about the action, including:

(i) any consultation that has already taken place;

(ii) proposed consultation about relevant impacts of the action;

(iii) if there has been consultation about the proposed action — any documented response to, or result of, the consultation;

(i) identification of affected parties, including a statement mentioning any communities that may be affected and describing their views.

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3 Relevant impacts

3.01 Information given under paragraph 2.01 (d) must include:

(a) a description of the relevant impacts of the action;

(b) a detailed assessment of the nature and extent of the likely short term and long term relevant impacts;

(c) a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible;

(d) analysis of the significance of the relevant impacts;

(e) any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

4 Proposed safeguards and mitigation measures

4.01 Information given under paragraph 2.01 (e) must include:

(a) a description, and an assessment of the expected or predicted effectiveness of, the mitigation measures;

(b) any statutory or policy basis for the mitigation measures;

(c) the cost of the mitigation measures;

(d) an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing;

(e) the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program;

(f) a consolidated list of mitigation measures proposed to be undertaken to prevent, minimise or compensate for the relevant impacts of the action, including mitigation measures proposed to be taken by State governments, local governments or the proponent.

5 Other approvals and conditions

5.01 Information given under paragraph 2.01 (f) must include:

(a) details of any local or State government planning scheme, or plan or policy under any local or State government planning system that deals with the proposed action, including:

(i) what environmental assessment of the proposed action has been, or is being, carried out under the scheme, plan or policy;

(ii) how the scheme provides for the prevention, minimisation and management of any relevant impacts;

(b) a description of any approval that has been obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the Act), including any conditions that apply to the action;

(c) a statement identifying any additional approval that is required;

(d) a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.

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6 Environmental record of person proposing to take the action

6.01 Details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:

(a) the person proposing to take the action; and

(b) for an action for which a person has applied for a permit, the person making the application.

6.02 If the person proposing to take the action is a corporation — details of the corporation's environmental policy and planning framework.

7 Information sources

7.01 For information given in a draft public environment report or environmental impact statement, the draft must state:

(a) the source of the information; and

(b) how recent the information is; and

(c) how the reliability of the information was tested; and

(d) what uncertainties (if any) are in the information.

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ATTACHMENT 3. Heritage Estates Social Impact Assessment (2008) Judith Stubbs & Associates. Report prepared for Shoalhaven City Council

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Shoalhaven City Council



Heritage Estates

Social Impact Assessment

20 March 2008

JUDITH STUBBS & ASSOCIATES

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1. Summary of Social & Economic Impacts

1.1. Terms of Reference

In November 2007, Shoalhaven City Council engaged Judith Stubbs & Associates to act on Council's behalf to research and document social and related economic impacts should the proposed rezoning of a small-lot rural subdivision known as 'Heritage Estates', Worrowing Heights not proceed because of Commonwealth and/or State biodiversity legislation.

Council set out a preferred methodology which principally included a survey of individual Heritage Estates owners, follow-up interviews with a small sample of selected respondent to more fully explore likely "social and economic hardship impacts" from their perspective if the rezoning does not proceed, and to document and assess these impacts. It is understood that there are likely to be wider social and economic impacts in the locality related to the proposed development[1] However, the scope of the study is thus limited to exploring, assessing and documenting the social and related economic impacts on the individual landowners should the rezoning not be approved.

It is understood that information from the study will be included in a Public Environment Report (PER) being prepared by Council for the Commonwealth Department of the Environment, Water Heritage and the Arts (DEWHA) under the Environment Protection and Biodiversity Conservation Act 1999 (Cth). It is also noted that this study may also be provided at a later date to the NSW Department of Environment and Climate Change in respect of the Threatened Species Conservation Act 1995 (NSW), and to the Department of Planning in relation to the rezoning application under the Environmental Planning and Assessment Act 1979 (NSW).

As such, the study aims to provide a methodologically sound review of social and economic effects of the proposed rezoning within the Council's terms of reference to inform the various considerations by government in relation to this matter. **Section 2** sets out the background to this study, whilst **Section 3** details the methodology

[1] See for example social and economic impacts in letter to Shoalhaven City Council from the Director of National Parks dated 22 January 2008, which sets out his concerns regarding environmental, social and economic impacts related to the Heritage Estates' proximity to Booderee National Park, including adverse impacts on tourist visitations, employment and social/community values associated with the Park and its environs.

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used. A brief statement of the qualifications and experience of the project staff that undertook this work is provided at **Attachment A.**

1.2. Survey Outcomes

The level of response to the written Survey (68% of landowners), reported in full in **Section 4**, indicates a considerable amount of interest in and concern about the rezoning issues currently facing Heritage Estates owners, and provides a high level of statistical confidence in the findings.

In summary, the following trends are evident. The age profile of Heritage Estates owners is older than the Shoalhaven and particularly NSW average, though they are far more likely to be living as part of a couple with children at home than the LGA or State average despite the older age structure. Although on generally lower than average incomes, owners' income structure indicates a reasonable proportion (78%) of low- to moderate-income working people, including retired people or pensioners.

A very high proportion of owners are from culturally and linguistically diverse backgrounds, with indications that a relatively high proportion spoke little or no English at the time when they purchased the land, and have relatively poor English 20 years later. Moreover, they are most heavily concentrated in the south western suburbs of Sydney, and to a lesser extent in the inner and middle ring suburbs of the south and west. This is not surprising given the high proportion of those who speak languages other than English at home, which accords with the demography of these suburbs, particularly in parts of the southwest. These are also among the most disadvantaged areas of Sydney (see **Section 3**).

The surveys suggest that many of the Heritage Estates owners are relatively disadvantaged in terms of income, education and employment status. In this regard the profile of the Heritage Estates owners may not be too dissimilar to that of the existing profile of the locality, particularly those in Old Erowal Bay and Sanctuary Point, with the exception of the proportion of those from different cultural backgrounds. Nonetheless, a relatively high proportion own a home outright or are paying off a home, which may in part be due to the historically low purchase price in the areas in which they are concentrated. Around 17% are in private rental accommodation and report that they do not own a home.

Most (80%) of the survey respondents purchased their block/s from Heritage Real Estate between 1987 and 1990 and most with the intention of building a home to live in immediately or in the future (e.g. after retirement). Based on survey

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responses, in today's dollars, the median price paid was $24,526, with significant variation particularly in recent years ($58,000 in 1987 compared with resale at just over $2,000 in 2002 CPI adjusted). Most people appeared not to be well off at the time of purchase, and the majority borrowed to buy the land. A small minority (less than 4%) are still paying it off.

Though generally aware that the rural zoning precluded development, the vast majority of purchasers believed (or were reportedly led to believe by the vendor or their legal agents) that there would be no problem in the future with building on the land. The paper subdivision layout, graded tracks and street signs, and aggressive marketing strategies, as well as the residential growth occurring in what they considered to be similar areas near by, and a significant lack of knowledge of the NSW planning system and/or poor English, all combined to create and sustain hopes that the land would ultimately be rezoned. Less than 15% sought independent advice, and said that they were generally unaware that this would be required.

Though owners reported that they had often holidayed or camped on their land in earlier years, current use of the land is severely constrained, though many report that they go down a few times a year to 'clean up' or 'just to be there' because they 'love it down there'. Despite these constraints, almost all respondents indicated that they continued to pay the annual Council rates currently of around $465 per annum, many for almost 20 years. Very few have attempted to sell their land, and only 15% reported that they would now sell the land, most continuing to hope that they will ultimately be able to use the land for the purpose for which it was originally purchased. Further hope appears to be offered by the recent approval of a large Stockland's retail, commercial and residential development just to the north of Heritage Estates. The biggest change in their original intention is that far more would now build a home to live in rather than as a holiday home, which is likely to indicate the relative aging of owners.

Most owners reported that there would be a number of impacts should the land not be rezoned. The highest proportion (60%) cited economic loss, though this was generally related to a range of social and psychological impacts. The second highest proportion of responses involved emotional or psychological impacts. Moreover, Survey responses consistently revealed a high level of attachment to the land and locality and continuing strong hopes that they may be able to attain a life in a small community and beautiful location and the dream of a holiday home near the coast that was the major attractor at the time of purchase. Perhaps some of the more poignant comments came from those whose life circumstances have changed

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significantly in the interim, particularly where a spouse had died, where children were now too old to go on family holidays, families had broken up, or increasing frailty or disability made relocation increasingly difficult.

Selected cross-tabulations also indicate that there will be differing types of impacts on various owners related to factors such as current income, age and whether they own or are purchasing a home versus renting currently.

Overall, those who do not own a home and are currently renting tend to be younger and less likely to be on higher incomes than homeowners, and appear to be in lower paid jobs, or not in paid employment. Both groups were equally poorly informed at the time of purchase about the reality of eventually being able to build on their land in the Heritage Estates. Renters were far more likely to report that they would build a primary home in which to live should the land be rezoned, and those who were current homeowners were much more likely to report that they would build a holiday home in the Heritage Estates, though the majority of homeowners would still build a home to live in if the land is rezoned. Homeowners are more likely to report that a primary impact if the land is not rezoned will be economic loss including diminished retirement options, and lost opportunity to own a holiday home, whereas the impacts on those who are currently renting are at a more fundamental level, particularly the lost opportunity to own a home to live in.

Some bitterness and frequent frustration was particularly evident in comments regarding the relative position that owners feel they would have been in had they chosen to buy an alternative block of land or holiday home at that time in the Shoalhaven or other coastal areas, particularly given the high levels of appreciation experienced in recent years. As it is, they may be left with an asset of little or no value if the land is not rezoned, and would be in a significantly different position now had they not purchased into Heritage Estates. This view has validity. Economic findings are summarised in relation to economic impacts below, and explored in more detail in **Section 6.**

1.3. Impacts Illustrated in Case Studies

The impacts outlined above are illustrated in 30 case studies provided in **Section 5** of this report. Taken as a whole, the interviews reveal a relatively consistent and often poignant story of disappointment, loss – financial and emotional – amid a continuing hope that some opportunities may still be realised through the eventual rezoning of the land. A common comment, as people age, die or become less able, is that even if not successful *this* time, they will hold on to the land and continue to

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pay rates so that perhaps their children may eventually benefit. When asked what they would do if the land were never rezoned, it was apparent to the interviewers that this was an inconceivable idea to the majority, and one that they had never considered.

It is perhaps reasonable to take a *caveat emptor* approach to this matter, particularly in relation to the failure of the vast majority of owners to seek adequate and independent advice at the time of purchase. However, the interviews reveal a group of people who had virtually no understanding of the NSW planning system, or who had very different legal systems in their own country. Many had little if any English, and/or relatively limited education, and were not sophisticated or perhaps sufficiently suspicious of the deal they were being offered.

Overwhelmingly, they were not purchasing as investors, but describe in vivid terms their hopes of building a better life for themselves or their families away from the city, and sometimes of recreating the life they had left in smaller villages in their home country. The dream of owning a home, and particularly one close to the coast is seductive for Australians generally, but increasingly unattainable for those who are not well-off. Undoubtedly, it was this dream that led some also to ignore precautions that they may reasonably have taken to ensure that they were purchasing wisely. A great deal of regret was expressed but some interviewed that they did not gain or realise that they needed independent advice at the time of purchase, and anger and bitterness by others about opportunities lost compared with other investment choices they could have made at the time.

In this context, owners consistently describe the high-powered marketing strategies and plausible marketing team with which they were confronted at the time of their purchase. Most describe being flown or sometimes driven down to inspect the land, shown subdivision plans that appeared to be legal documents, taken to marked lots and graded tracks sometimes with street signs, and overwhelmed with the beauty of the area and the possibility of owning something there. From documents reviewed, it also appears that some were referred to what was reported to be independent solicitors or conveyancers, who later turned out to be associated in some way with the vendor.

A further influence was the fact that nearby areas were being developed quite rapidly, so that it is perhaps not surprising that they believed salespeople and their legal representatives that it would only be 'a few years, 5 or 10 at most' until their land was rezoned as well. Approval of the nearby Stockland development in 2007 by the NSW Minister for Planning as a Major Project also gave renewed hope to some, though there was also considerable anger expressed about the apparent

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injustice of this approval for a 'large developer' with greater power and profile than a group of individual land owners. Another related theme was anger and/or mistrust of government, and what appeared to be bewilderment with a planning system that permitted some land to be developed but not other land, even if it appeared to the untrained eye to be similar.

Though most talked about financial loss, most appeared to be at least as concerned about related emotional and psychological impacts, some describing how it had or was 'making them sick' and was leading them to think of 'giving up'. A number described the considerable sacrifice of family time or resources that this had meant over some years, which had been made in anticipation of more family time on holidays or moving down with extended family later. An area of particular bitterness related to the position they or their family would now be in had they chosen to pay more for a block in a different location, or invested in a unit or home that they could now live in, sell or rent out. There was also a general lack of understanding about the rationale for continuing to pay Council rates, particularly as they were now unable to use the land for any purpose and did not live in the LGA.

The position of renters is particularly difficult in this regard, as they generally do not have any other asset to fund their retirement or in which to live securely as they get older. Though some may have never been able to do so, an alternative investment decision some 20 years ago would undoubtedly have made a considerable difference to many of these people. It has left some with no ability to now own a home, and others with significantly reduced income/assets to rely upon in retirement.

1.4. Related Economic Impacts for Individual Owners

As noted above, Council's *Project Brief* limits the examination of economic impacts to those impacts that are likely to be directly experienced by the Heritage Estates landowners, and particularly those impacts likely to be experienced in the event that the land is **not** rezoned for residential use at the present time. **Section 6** sets this assessment out in detail.

In summary, the major economic impact to owners is **foregone expenditure** over the years that they have owned the block/s as a result of having money tied up in Heritage Estates, at the same time receiving no benefit from that ownership. Based on purchase price and ongoing costs, this cost is estimated to be $44,000 to $61,000 in present value with an average of **$53,000 per landowner**.

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Further, if owners had **put their money elsewhere**, they would have received a benefit from the alternative expenditure and, if invested in land or property, a capital gain would have been expected. Foregone capital gains are estimated to be between a $20,000 loss to a $67,000 gain with an average gain of $24,000. In addition the purchaser would not incur the cost of $44,000 to $61,000 above, meaning in total they would have been $22,000 to $128,000 better off, or an average of **$75,000 per landowner**.

Alternatively, if **rezoning** had taken place **within one to two years of purchase** and in accordance with people's expectations, an average purchaser would be better off by between $72,000 and $102,000, or an average of **$87,000 per landowner**.

If the **land were to be rezoned today**, an average purchaser would incur a **lifetime cost of $16,000**; however if no section 94 contribution were to be levied, an average purchaser would be **$9,000 better off over a lifetime, and $62,000 better off** if costs incurred to date are considered a sunk cost. Across a range of likely development, section 94 costs and land values, an average purchaser would expect to be between **$11,000 and $102,000 better off** when costs to date are considered as a sunk cost.

Finally, a significant barrier to development of the land relates to the servicing in the event of rezoning. Given the economic loss experienced by landowners and the changed circumstances of many since they first purchased (including diminished income through retirement, disability, marriage breakdown, unemployment and the like), the development would be far more feasible if co-ordinated and funded by Council (for example, in part or full through debt financing), with an appropriate rating or cost recovery processes put in place. It is noted that Council has been collecting rates from the properties over a number of years and, while money has been expended in progressing rezoning applications, it is unlikely that the owners have received other significant services such as maintenance of roads in return. As 97% do not live in the Council area, they would also be unlikely to use other Council services such as libraries, recreation or community facilities. We have calculated that the amount in rates paid per lot in Net Present Value is around $10,000 per lot or around $8.0 million for the 800 lots under consideration in Heritage Estates in 2007 dollars over the past 20 years. It would be for Council's consideration as to the extent to which costs for aspects of the development of any land rezoned could be met through rates collected from landowners over the years.

Alternately, if owners were required to pay the full development cost, and using a development cost of $65,000 per lot including section 94 contributions, the cost is

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calculated to be of the order of $6,500 per annum over 25 years. For renters and people on low incomes, this annual cost is likely to exceed their ability to pay. Such people would be able to access the increase in value of the lot by selling, but may be prohibited from building on their block by financial constraints. At the same time, if a land owner could not borrow the development cost or fund it through cash flow, it seems unlikely that they would be able to borrow sufficient funds to construct a house, so that they would be unlikely to be able to build in any case. There is likely to be a group of people who could afford to borrow to build a house but when the development cost is added to the cost of the house, would be unable to fund the total cost through cash flow. As an alternative view, people would generally have $65,000 less to build a house because of the development costs.

Those who own a home or have substantial equity would of course be in a position to sell that home to finance development and building costs, or provide a substantial deposit. Such owners may otherwise be precluded from selling their existing home in a low value or depreciating housing market such as south western Sydney in order to buy a holiday home in a coastal area like the Heritage Estates, which has experienced significant appreciation in recent years.

If developed privately, it is likely that a significant proportion of Heritage Estates owners would struggle to afford the development costs, and may be enticed to sell at below market price to a larger land developer, particularly in the earlier years. In the final analysis, those who cannot afford to meet the costs of development on the land are likely to be the least well-off and more vulnerable landowners described above, who may also feel they have the least bargaining power and be inclined to sell earliest and cheapest.

1.5. Conclusion

Generally speaking, there are likely to be significant adverse social and economic impacts for landowners of the Heritage Estates if the rezoning does not proceed. Whist a small minority may take a pragmatic view, discontinue paying rates and 'cut their losses', a strong majority have invested a great deal - emotionally and financially – in their hopes of owning a home near the coast, and continue to do so by paying annual rates, which some on fixed incomes increasingly cannot afford. Walking away now would leave them with nothing, and will have cost them dearly, financially and emotionally. Amid the generally negative impacts, an identifiable positive impact of a definitive decision not to rezone the land is that it would allow owners the option to relinquish the land and stop the ongoing financial 'bleed' through payment of Council rates. It may also allow some to move on with their

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lives and, if young enough or financially able, to make an alternative investment decision that may benefit them in the future.

The economic impacts are perhaps most severe for those who have relied upon this land as their principal future asset for home ownership or for retirement, and whose financial position has not allowed them to make additional capital investments. This group also includes low-income earners who have limited capital in their family home, or whose changed personal circumstances have now left them vulnerable to financial hardship, particularly as they age.

Though perhaps not as tangible, the emotional and psychological impacts on a generally disadvantaged and sometimes vulnerable group of people should not be underestimated. Again, it is clear that some are emotionally resilient and will be disappointed but cope in the event of the land not being rezoned. However, the lost opportunities appear to be an enormous source of grief and stress for some owners, who have sacrificed personal or family life for future benefits that may not be realised.

Though generally reasonable to take a *caveat emptor* approach, the case studies reveal a group of people who were particularly vulnerable to the aggressive marketing strategy of the vendor and their associates. Their lack of understanding of the NSW planning system and rationale for rezoning some land and not other land is understandable in the circumstances.

Ultimately, if the land is not rezoned, the landowners in the Heritage Estates would be left with an asset of no value, a significant economic loss, and ongoing financial liability. However, if the land is rezoned but there is no assistance with development costs or co-ordination, there may still be limited utility to some of the least well-off owners, except that they will some gain some small profit (or principally recoup past losses) if they were to sell their land. The unfortunate irony is that, without financial assistance, it is likely that a significant proportion of Heritage Estates owners would struggle to afford the development costs, and may be enticed to sell at below market price to a larger land developer, particularly in the earlier years. Those who cannot afford to meet the costs of development on the land are likely to be the least well-off and more vulnerable landowners, who may also feel they have the least bargaining power and be inclined to sell earliest and cheapest.

Though there are likely to be a range of other social and economic impacts in the locality, both positive and negative, which must also be balanced with an assessment of environmental impacts, it is beyond the scope of this assessment to

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deal with these. The balancing of these various impacts is ultimately a matter for the decision maker in the relevant jurisdictions.

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2. Background

2.1. Purpose of the Study

In November 2007, Shoalhaven City Council engaged Judith Stubbs & Associates to conduct a study to

> …act on Council's behalf, to research and document social and related economic impacts should the proposed rezoning of a small-lot rural subdivision known as 'Heritage Estates', Worrowing Heights not proceed because of Commonwealth and/or State biodiversity legislation.

Council set out a preferred methodology which principally included a survey of individual Heritage Estates owners, follow-up interviews with a small sample of selected respondent to more fully explore likely "social and economic hardship impacts" from their perspective if the rezoning does not proceed, and to document and assess these impacts. Whist it is understood that there are likely to be wider social and economic impacts in the locality related to the proposed development,[2] the scope of this study is limited by Council's Brief to exploring, assessing and documenting the social and related economic impacts on the individual landowners should the rezoning/development not be approved.

It is understood that information from the study will be included in a Public Environment Report (PER) being prepared by Council for the Commonwealth Department of the Environment, Water, Heritage and the Arts under the Environment Protection and Biodiversity Conservation Act 1999. This study will thus contribute to general information requested that will provide background and context for the PER, specifically those aspects related to the consequences of not proceeding with the rezoning.[3] The Act specifically states that:

> In deciding whether or not to approve the taking of an action, and what conditions to attach to an approval, the Minister must consider the following…matters relevant to any matter protected by a provision of Part 3 that the Minister has decided is a

[2] See for example social and economic impacts in letter to Shoalhaven City Council from the Director of National Parks dated 22 January 2008, which sets out his concerns regarding environmental, social and economic impacts related to the Heritage Estates' proximity to Booderee National Park, including adverse impacts on tourist visitations, employment and social/community values associated with the Park and its environs.

[3] Guidelines for the content of a draft Public Environment Report (PER): Heritage Estates Rezoning and Associated Public Works to Facilitate Residential Development, Worrowing Heights NSW, Reference: EPBC 2007/3448, July 2006, p. 5.

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> controlling provision for the action; **economic and social matters.**[4]

Furthermore, factors to be taken into account by the Minister include the principles of ecologically sustainable development.[5] The promotion of ecologically sustainable development through the conservation and ecologically sustainable use of natural resources is one of the Objects of the EPBC Act.[6] The principles of ecologically sustainable development listed in the Act include,

> [The] decision-making process should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.[7]

This statement positions the social and economic impacts detailed in this study as a piece of information required for the Minister to consider in conjunction with the range of impacts identified.

It is also noted that this study may also be provided at a later date to the NSW Department of Environment and Climate Change in respect of the Threatened Species Conservation Act 1995 (NSW), and to the Department of Planning in relation to the rezoning application under the Environmental Planning and Assessment Act 1979 (NSW).

As such, the study aims to provide a methodologically sound and transparent review of social and economic effects of the proposed rezoning within the Council's terms of reference to inform the various considerations by government in relation to this matter. A brief statement of the qualifications and experience of the project staff who undertook this work is provided at Attachment A.

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[4]Section 136, (1)(b) General considerations, Environment Protection and Biodiversity Conservation Act 1999.

[5]Section 136, (2)(a) General considerations, Environment Protection and Biodiversity Conservation Act 1999.

[6]Section 3, (1)(b) Objects of the Act, Environment Protection and Biodiversity Conservation Act 1999.

[7]Section 3A (a), Principles of ecologically sustainable development, Environment Protection and Biodiversity Conservation Act 1999.

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2.2. Overview of the 'Heritage Estates'

2.2.1. Location

The 'Heritage Estates' consists of approximately 1,200 mostly urban-sized lots in Deposited Plans 8590, 8591, 8770, 8771 and 8772 that were subdivided by Henry Halloran in 1915/16. The study area concerns approximately 800 lots in four rezoning investigation areas within the Heritage Estates. The study area is within the Worrowing Heights locality, around 28kms south of Nowra and immediately to the north of Erowal Bay, a small embayment of St George's Basin on the NSW south coast.

The name 'Heritage Estates' is derived from the company that sold the land in the late 1980s and early 1990s, Heritage Real Estate Pty Ltd. [8]

The study area is bounded by the Worrowing Waterway, land fronting Birriga Avenue east of the Wool Road, Jervis Bay Road to the east and Erowal Bay Road to the south. Jervis Bay National Park is to the east of Jervis Bay Road and to the south of Erowal Bay Road. Also to the south of Erowal Bay Road is another rural zoned paper subdivision known as Eloura Estate, which was also part of the same group of subdivisions, but is largely in a single private ownership. Rural zoned land adjoins the site to the north. The main townships in the vicinity of Heritage Estates are, from the south, St Georges Basin, Sanctuary Point, Old Erowal Bay, Erowal Bay and Vincentia.[9]

Areas identified as Scenic Protection Areas are within 100 metres, and a significant part of the western portion of the study area is identified as Land of Ecological Sensitivity under SLEP 1985. This also correlates with an area of 'disturbed habitat and vegetation', clause 15 of JBREP.

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[8] Public Environment Report; Draft Introduction Chapter (supplied by Eric Hollinger, email 7/12/07)

[9] Consultant's Brief. Heritage Estates Rezoning Investigations Social and Economic Considerations

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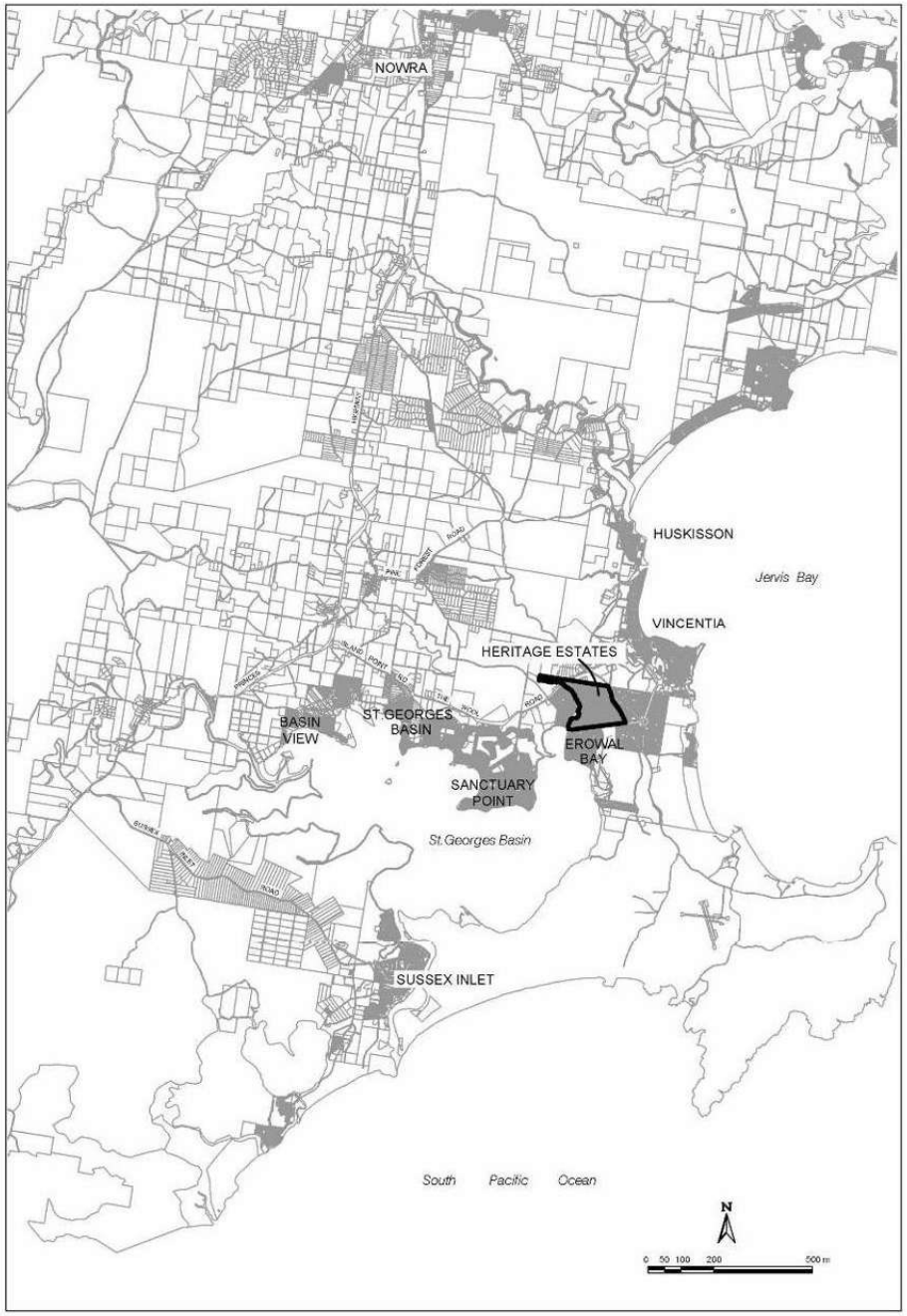


Figure 2.1: Location map[10]

[10] Public Environment Report; Draft Introduction Chapter (supplied by Eric Hollinger, email 7/12/07)

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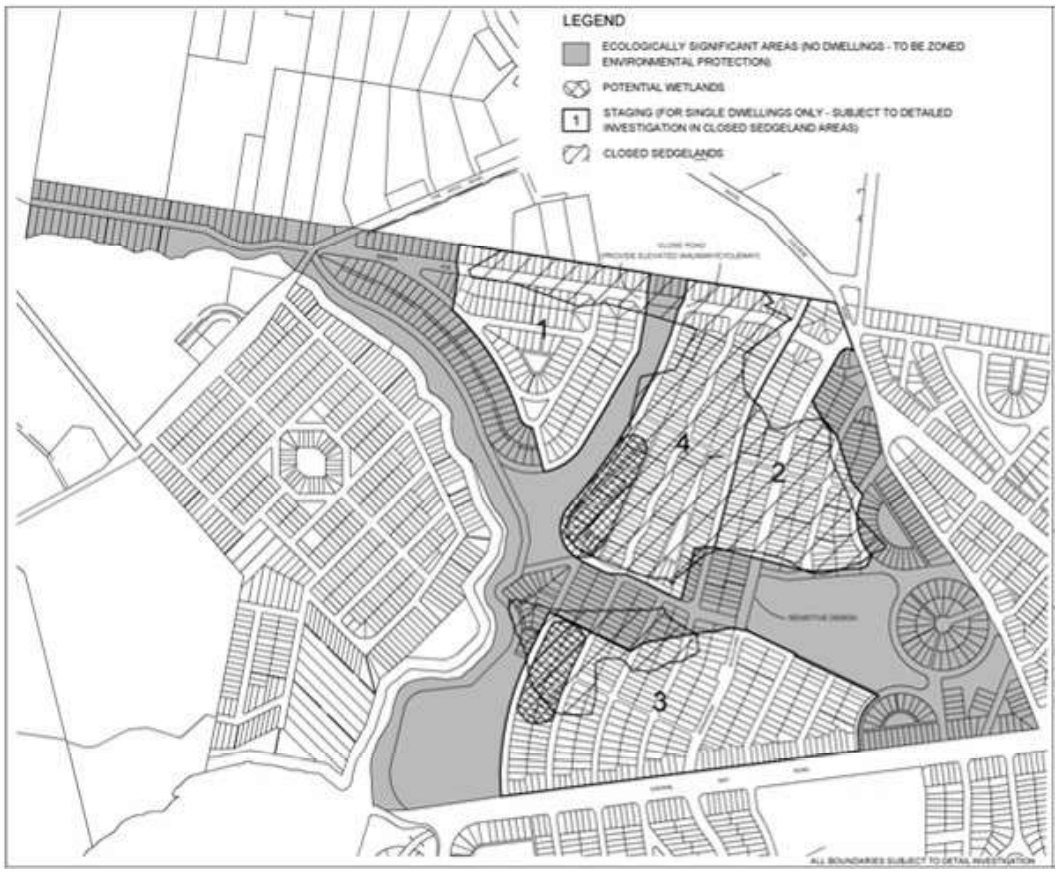


Figure 2.2: Map showing investigation areas from the Commission of Inquiry

2.2.2. History

The Heritage Estates subdivisions were created in 1915/16 as part of a new 'Pacific City', which was never realised. The land remained undeveloped, without services or infrastructure when land use zoning was introduced in 1964. After this, the land was ultimately zoned 'rural', which prevented development of the individual lots.

The land retained its rural zoning under the provisions of Shoalhaven Local Environmental Plan 1985 (SLEP 1985) (Rural 1(d)(General Rural) and Rural 1(b) (Main and Arterial Road Protection Zone). As such, the erection of dwelling houses on individual allotments of less than 40 hectares is not permissible under SLEP 1985.

It is understood that around 1,200 lots at an average of around 800 m^2 each were marketed and sold to over 1,100 individual landowners in the late 1980s and early 1990s by Heritage Real Estate Pty Ltd.

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Shoalhaven City Council (SCC) made submissions to the Minister for Local Government seeking a change in legislation to prevent sale of paper subdivisions in the late 1980s. The Minister subsequently agreed to convene a working party comprising representatives of government departments and Council to examine action that could be taken to resolve the problem[11].

Council signs were erected around the perimeter of the Heritage Estates in 1988 stating:

> *"WARNING – Please Take Notice of the Following:*
>
> *Council is unable to approve dwellings on individual lots on Ooranye Gardens and Terrara Park Estates.*
>
> *Council has a policy prohibiting camping or the erection of temporary structures on such land.*
>
> *A Tree Preservation Order exists over these lots. The Removal of trees requires Council consent.*
>
> *Further information can be obtained from Shoalhaven City Council, Bridge Road, Nowra.*
>
> *By Order Town Clerk."*[12]

It is noted that by the end of 1988 48% of survey respondents had bought their blocks, so there was still utility in erecting the signs. Despite the warning signs, 42% of respondents still bought their blocks between 1989 and 1995. The signs were removed in 1995 at the request of the Shoalhaven Landowners Association.

In response to pressure from the landowners, Council resolved to investigate rezoning the land on 22 December 1992. Following this resolution, a number of planning and environmental studies were prepared on Council's behalf including:

- A Local Environmental Study completed by Hassell Planning Consultants in 1994, including a Flora and Fauna Assessment completed by Andrews Neil in 1993
- A Flora and Fauna Report completed by AES in 1995
- A Total Water Cycle Management, Land Capability and Infrastructure Study completed by Patterson Britton & Partners Pty Ltd in 1998

[11] SCC documentation: Matters to be raised with the Premier of NSW on 5 November 1990

[12] Extracts form SCC Report of General Manager, Policy and Planning Committee, Tuesday 7 November 1995 (p.2) and Adopted Council Meeting Held on Tuesday 28 November 1995 (2837)

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- A report by a Government/Landowner Taskforce in 1998.

During this period, Council unsuccessfully sought to prepare and exhibit draft Local Environmental Plans on a number of occasions. The Government/landowner taskforce was also unable to reach agreement on a development scenario. The NSW Department of Planning also placed a moratorium on rezoning land in Jervis Bay area in 1995.

Disagreement between stakeholders over the proposed rezoning culminated in a Commission of Inquiry (CoI) convened by the NSW Government in 1999. The CoI held under Commissioner Kevin Cleland, Deputy Chairman was finalised in August 1999[i] and made 12 recommendations listed below. Council's actions are shown in italics following each recommendation.

1. Council give appropriate consideration to including the Heritage Estate land in the Draft Jervis Bay Settlement Strategy subject to the findings and recommendations of this report. *(Completed*).
2. Council delay preparing a draft local environmental plan to rezone part or all of the Heritage Estate land until after Council has prepared and exhibited a Draft Jervis Bay Settlement Strategy. *(Completed)*.
3. Council not prepare a DLEP to rezone any of the Estate unless included in a current Jervis Bay Settlement Strategy. (*The Jervis Bay Settlement Strategy (JBSS) was completed by Council and endorsed by the State Government during 2003*).
4. Land suitable for residential development be zoned Residential 2(a1). Land of Ecological significance be zoned Environment Protection (*Note: the CoI focused on conservation of forest and habitat corridors for the protection of the Yellow-Bellied Glider, Common Bent-wing Bat and Glossy Black Cockatoo*).
5. Future residential development be limited to a maximum of 730 lots with 730 dwellings. (*Note: Approx. 800 lots under investigation*).
6. Stage 2 to be the final stage due to its location largely within the closed sedgelands.
7. Pollutant discharge to be controlled to the requirements of the EPA following a comprehensive monitoring program of current runoff water quality to ensure no net increase in average annual pollutant load after development. (*Monitoring completed*.)
8. No net increase in the volume of water discharged.
9. Before any development is considered in the closed sedgeland areas:
    - the presence or not of acid sulfate soils be confirmed and management controls implemented (Study completed – no acid sulphate soils in investigation areas.)
    - the quality of ground water drainage from the closed sedgeland areas be assessed in accordance with the requirement for no net increase in pollutants.
10. Landowners to meet the full cost of infrastructure and development of their land. Individual landowners to be responsible for the cost of groundwater drainage required for individual lots. (*Special Rate for rezoning investigations commenced 2006-07*).

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11. Birriga Avenue not to be developed as a through road.
12. Landowners to be responsible for compensation, if any, to those whose land is unsuitable for residential development or required for water pollution control ponds.

The *Jervis Bay Settlement Strategy,* prepared by Council subsequent to the COI, was endorsed by the NSW Department of Infrastructure Planning and Natural Resources, and released in 2003, at which time the moratorium on rezoning was lifted. A suite of detailed studies followed from 2005, including a *Threatened Biodiversity Survey and Assessment*. It is understood that the study identified several species listed under State and/or Commonwealth threatened species legislation and concluded that none of the study area should be developed (BES 2007).

On 9 May 2007, the proposal to rezone Heritage Estates and undertake public infrastructure works to facilitate residential development was referred to the then Commonwealth Department of the Environment and Water Resources under the *Environment Protection & Biodiversity Conservation Act 1999 (NSW).* The EPBC Act protects matters of national environmental significance and the environment, in relation to Commonwealth actions and actions on, or impacting upon, Commonwealth land.[13] The Department determined that the proposal is a "controlled action", that is, an action that is likely to cause significant impact to matters of national environmental significance. As a result of this decision, the Environment Minister is required to determine the outcome of the proposal for rezoning. The matters of national environmental significance that have been identified related to the Heritage Estates rezoning proposal include:

- listed threatened species and ecological communities; and
- the environment of Commonwealth land (Booderee National Park)

In order for the Minister to make a decision about the proposal, Council is required to prepare a Public Environment Report (PER). Guidelines for the PER were finalised on 19 September 2007. The scope of the PER is limited to matters of national environmental significance. Upon review of the PER and any additional information provided, the Minister will approve the proposal, approve the proposal subject to constraints, or not approve the proposal.

[13] Referral of proposed action, Department of the Environment and Water Resources, March 2007.

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While information on social and economic matters is not mandatory in the PER, such information can be included. Further, it is generally considered an integral part to a social impact assessment.[14] It is understood that social and economic considerations are among those matters listed under s 136 of the EPBC Act that must be considered by the Minister.

It is also understood that, should approval be granted under the EPBC Act, SCC will still be required to work through the NSW planning and threatened species legislation (TSC Act) and the Environmental Planning and Assessment Act 1979 (NSW) in relation to the rezoning.

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2.2.3. Overview of Site and Locality

The Subject Site

JSA staff conducted a site visit on 5 December 2007, with Eric Hollinger, Strategic Project Planner, SCC.

The Heritage Estates was accessed from Erowal Bay Road, which is a two-lane sealed road. The graded tracks that existed at the time the Heritage Real Estate was selling the land were not and are not maintained by Council. Some old street signs were still present, but the block delineations were generally not apparent. Much of the site was heavily vegetated, with mature native plants and trees, and the majority of the area viewed was not cleared. Vegetation had evidently been thinned in some areas and one cleared block was sighted, with minimal ground cover and bed rock visible.

Some of the tracks were easily accessible by a four-wheel drive vehicle, but others were not because of the amount of erosion, leaving deep ruts, some with exposed tree roots. Based on the multiple criss-crossing tyre tracks it appeared that some parts of the dirt roads had been recently used for recreational trail bike riding and 4-wheel driving.

Illegal dumping was observed in some parts of the site, comprising large objects, for example household white goods such as washing machines, parts of old car bodies and tyres, and smaller objects, for example old plastic bottles.

The Locality

Erowal Bay, located to the south of the Heritage Estates at the end of Jervis Bay Road, is the closest service centre. However, it has minimal services available, including:

- A combined bottle shop/corner store/service station
- Public telephone box
- Boat ramp
- Greek Orthodox Church (St John the Baptist).

Old Erowal Bay, located to the west is a small residential area only and has no services.

The Prime Life Retirement Resort, Henry Kendall Coastal Waters Retirement Village (Jervis Bay Aged Care) located south of Old Erowal Bay is under construction. Upon

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completion it will contain approximately 560 independent living units, and a 110-bed high care facility, known as Wyoming Nursing Home[15]

Nearby settlements to the south of the locale include Sanctuary Point and St Georges Basin. There is a limited range of services available in these towns, including medical, physiotherapy, chiropractic, pharmacy, services stations, churches and public schools. There is an IGA supermarket in Sanctuary Point. The nearest dentist is located at Vincentia. These centres are likely to be used for residents daily needs should the rezoning and subsequent development proceed.

The nearest major service centre to the study locale is the Vincentia-Huskisson conurbation. Vincentia is approximately 1.5 to 2 kilometres north-east of the Heritage Estates, with Huskisson further north along the coast. The NSW Department of Planning's *South Coast Regional Strategy 2006-2031* defines the 'Vincentia District' as a 'major town', [16] which has the major shopping and business centre for the district including warehouses, transport logistics and bulky goods, and health and professional services serving surrounding areas. It is expected that this would be the major centre for a comprehensive range of services needed by Heritage Estates' residents, should it be developed.

Stockland's Vincentia development, located on the corner of The Wool Road and Naval College Road, Vincentia (Lots 801 and 802 in DP 1022286), depicted in Figure 1.2 below, will eventually provide a new large commercial shopping centre and 604 residential lots. It was approved on 25 January 2007 by the Minister for Planning under Part 3A (Major Projects) of the EP&A Act 1979 (NSW) and subsequently by the Commonwealth Environment Minister under the EPBC Act on 30 July 2007. The shopping centre will have a range of uses including a discount department store, supermarket, medical centre, childcare centre, restaurants and specialty retail. The commencement date for construction of the shopping centre is "late 2009".[17] There is also an adaptable housing component,[18] catering for a rapidly aging population in the Shoalhaven.

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[15] Personal Communication, February 2008 with Prime Life (phone:1800 550 550), Henry Kendall Gardens (phone:(02) 4323 2722) and Wyoming Nursing Home (phone: (02) 4323 1922).
[16] South Coast Regional Strategy 2006-31, NSW Department of Planning, p.10,
[17] Personal Communication 11/2/08, Stockland sales
Source:http://www.stockland.com.au/NR/rdonlyres/D870F53B-06D8-4679-8F40-933F34757790/0/Bayswood_BanksiaRelease_SalesPlan.pdf; Telephone: 135263.
[18] NSW Department of Planning: www.planning.nsw.gov.au

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The proximity of this development to the Heritage Estates can be seen in Figure 1.3 below, with the Stocklands Vincentia development situated less than 1 km to the north of Heritage Estates.



Figure 2.2: Stocklands Vincentia Development
Source: www.stockland.com.au



Figure 2.4: Stocklands Vincentia Development in relation to Heritage Estates
Source: www.maps.google.com.au; Judith Stubbs & Associates

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2.2.4. Demographic Context of the Locality

Overview

This section provides a brief analysis of the study area's immediate surrounds. This analysis includes a demographic profile of the closest urban settlements and is benchmarked against Shoalhaven LGA and NSW for comparative purposes. The four urban settlements (shown in Figure 2 below) include:

- St George's Basin- Sanctuary Point UCL,
- Old Erowal Bay,
- Erowal Bay,
- Huskisson – Vincentia.

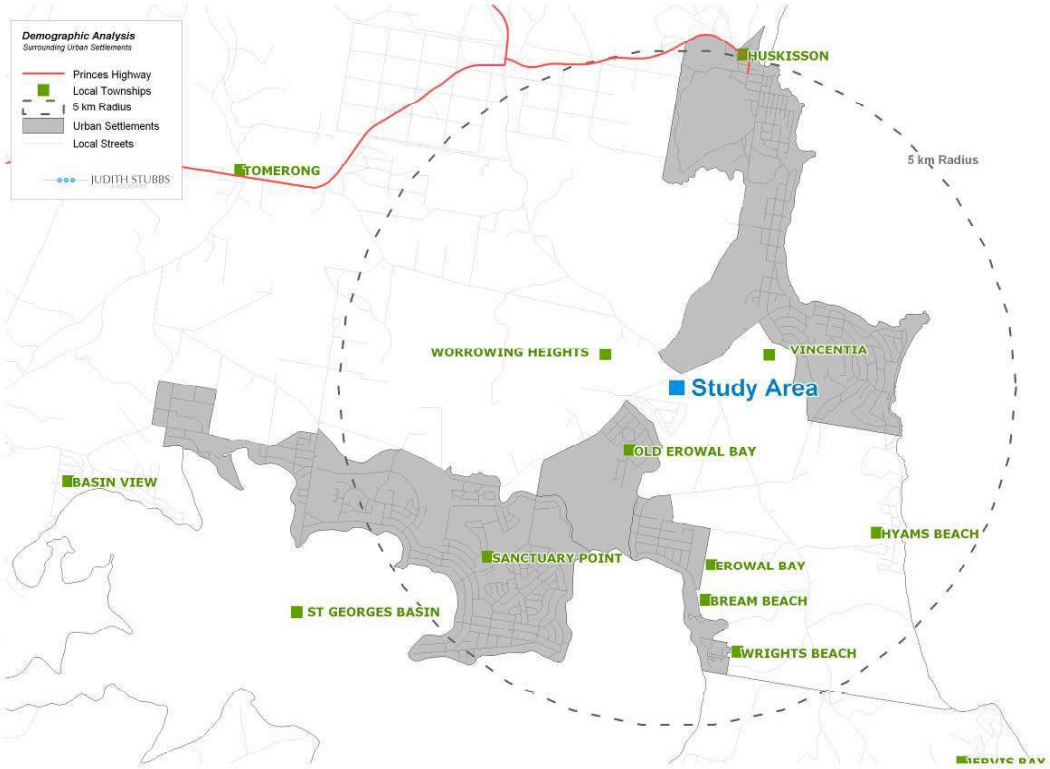


Figure 2.5: Surrounding Urban Settlements Analysis Map

Source: Judith Stubbs & Associates (2008)

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Selected Medians

The following table provides a comparison of medians for select indicators between the closest urban settlements, Shoalhaven LGA and NSW. Key characteristics include the following:

- In general, the median age of residents within the Shoalhaven is 7 years older than the median age for NSW, and 11 years older for Huskisson-Vincentia, which is in line with its attractiveness as a retirement area;
- There are lower median individual and household income in all urban settlements when compared against NSW, in part reflective of the older age structure, as well as a significantly more disadvantaged socio-economic profile in some areas;
- Median Family income for St Georges Basin-Sanctuary Point and Old Erowal Bay are significantly lower than NSW (45% lower respectively), which is again likely to reflect the age of the population as well as a lower engagement with the labour market, and less advantaged educational/occupational status in some areas;
- Mortgage and rental costs are also considerably lower in the locality compared with NSW, which would also act as an attractor for more disadvantaged families, and is also in part a function of the more mature family structure of the area.

Moreover, the profile of the immediately surrounding locality (particularly Old Erowal Bay and St Georges Basin-Sanctuary Point) indicates that historically it has acted as an area of relatively lower cost housing, and one to which less well off retirees and families have moved or retired to. The latter includes a high proportion of sole parent families in St Georges Basin and Old Erowal Bay. This is shown in more detail below.

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Table 2.1: Selected Medians

	St Georges Basin- Sanctuary Point	Old Erowal Bay	Erowal Bay	Huskisson- Vincentia	Shoalhaven LGA	NSW
Median Age	44	44	44	48	44	37
Median Individual Income ($)	299	314	354	379	349	461
Median Family Income ($)	647	643	917	917	849	1,181
Median Household Income ($)	584	613	811	682	659	1,036
Median Housing Loan Repayment ($)	1,083	978	1,183	1,300	1,200	1,517
Median Weekly Rent ($)	170	170	180	180	165	210
Average number of persons per bedroom	1.1	1.1	1.1	1.0	1.1	1.1
Average household size	2.4	2.5	2.5	2.2	2.4	2.6

Source: ABS 2006

Population Change, Age Profile & Indigenous Population

The population of the urban settlements that make up the immediate locality range from 630 persons in Erowal Bay to 8,343 in St Georges Basin. Combined, the area includes a population of approximately 13,488 residents about 15% of the Shoalhaven Population. In turn the Shoalhaven population makes up about 1.3% of the NSW population.

Table 2.2: Population and Change

Area	2006 Population	2001 Population	Actual Change	% Change
St Georges Basin- Sanctuary Point UCL	8,343	7,369	+ 974	+ 13.2%
Old Erowal Bay	1,126	885	+ 241	+ 27.2%
Erowal Bay	630	592	+ 38	+ 6.4%
Huskisson - Vincentia	3,389	3,101	+ 288	+ 9.3%
Shoalhaven	88,405	84,422	+ 3983	+ 4.7%
NSW	6,549,177	6,326,579	+ 222,598	+ 3.5%

Source: ABS 2006 Census

It is noted that the rezoning of the Heritage Estates per the COI recommendations would represent an increase in population of around 1230 people,[19] which is an increase of around 9% on the population of the locality, and around 1.4% on the

[19] The COI's recommended 730 lots at an average occupancy rate of 2.4 persons per dwelling, and allowing for the average proportion of unoccupied private dwellings in Council's Planning Area 3 (31%).

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Shoalhaven's 2006 population. This would be adding a population roughly the same size as the closest urban settlement, Old Erowal Bay. It is also noted that the adjacent Stocklands' development would add a similar sized resident population (around 1014 residents)[20], as well as a significant working population in its commercial and retail components.

The age profile of the five suburbs is shown below

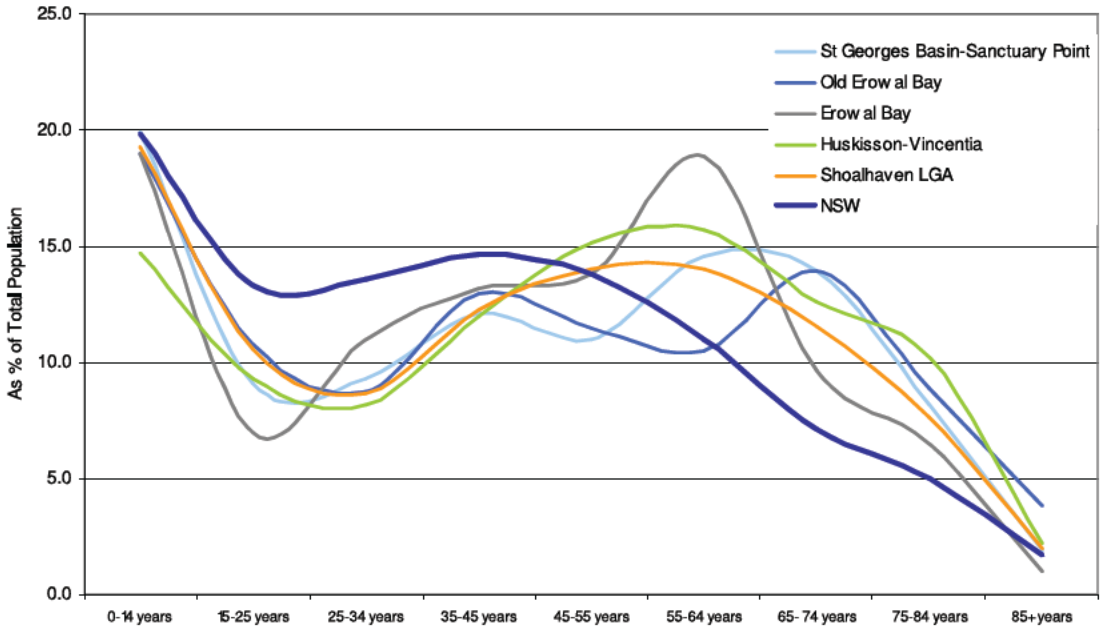


Figure 2.3: Age Profile, 2006

Source: ABS Census of Population and Housing (2006)

Across all surrounding areas, residents are typically much older with corresponding lower proportions of youth and young-middle aged adults. Again, this reflects the area's attractiveness to retirees or near or people in the late stages of their working life.

The household income of residents in the surrounding area is shown below. In general, households in the surrounding areas have a lower earning capacity than NSW, largely due to the older age structure, and also due to lower level of labour market engagement. Residents of St Georges Basin-Sanctuary Point have a much higher concentration in lowest income ranges, with a median weekly gross

[20] 604 lots x 2.4 ppd x 70% for Occupied Private Dwellings.

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household income of $584 – more than 44% below the NSW rate, which corresponds with its much older age structure. It is also noted that St Georges Basin-Sanctuary Point and Erowal Bay have significantly more disadvantaged profiles than NSW average in relation to factors such as educational and employment status (see SEIFA scores below).

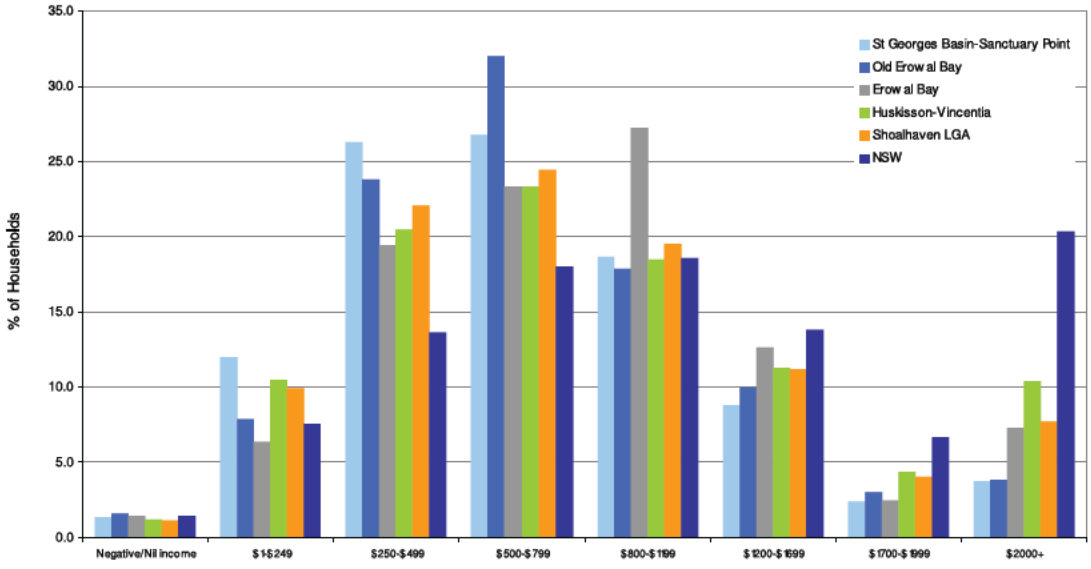


Figure 2.4: Household Income, 2006

Source: ABS Census of Population and Housing (2006)

The nature of families in the surrounding area is also shown below.

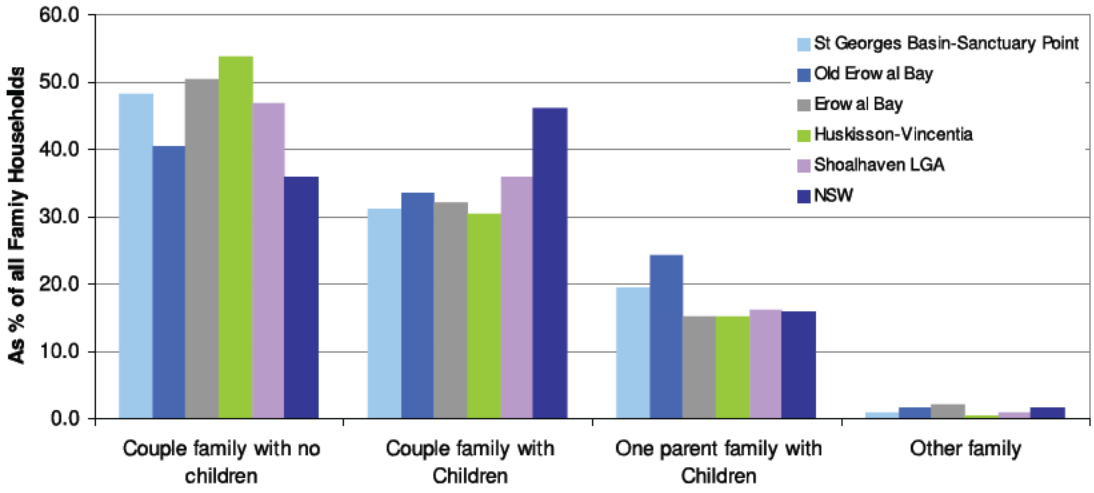


Figure 2.5: Family Type, 2006

Source: ABS Census of Population and Housing (2006)

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The majority of family households across the surrounding settlements have higher levels of 'couples without children' than NSW, and correspondingly lower levels of couples with children. The proportion of families with children ranges from 30.4% in Huskisson-Vincentia to 36% for the broader Shoalhaven LGA – a rate 51% to 27% lower than the NSW average.

St George's Basin and Old Erowal Bay have a higher proportion of single parent families than the other settlements and NSW, which in part explains their more disadvantaged profile.

In general, across all nearby settlements the following may be said:

- Couple families without children make up 50% of all families,
- A third of all families have children,
- 15% have one parent only and
- 5% described as 'other family' i.e. multiple family households

The following graph illustrates the proportion of the population for each settlement that requires some sort of assistance. This is the result of persons requiring self care, mobility or help with communication due to a disability, long-term health condition, or old age.

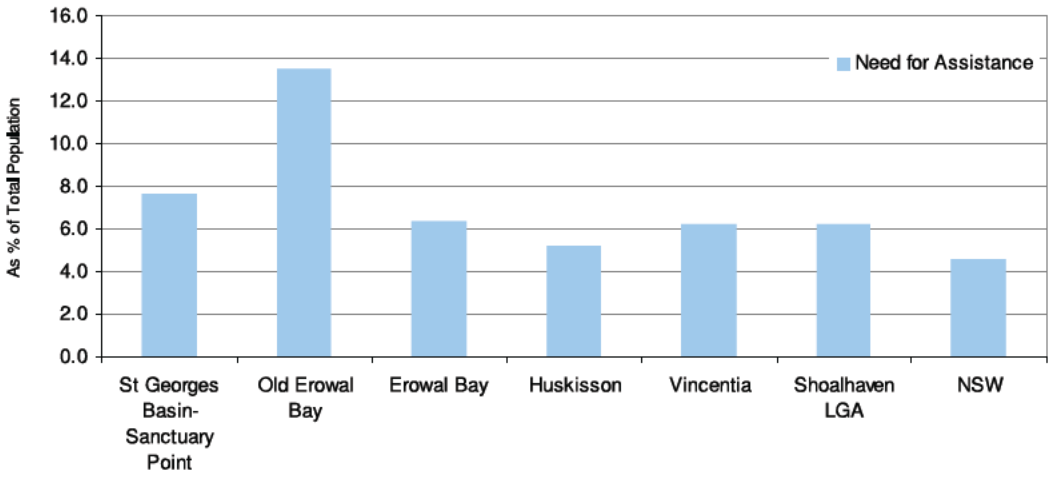


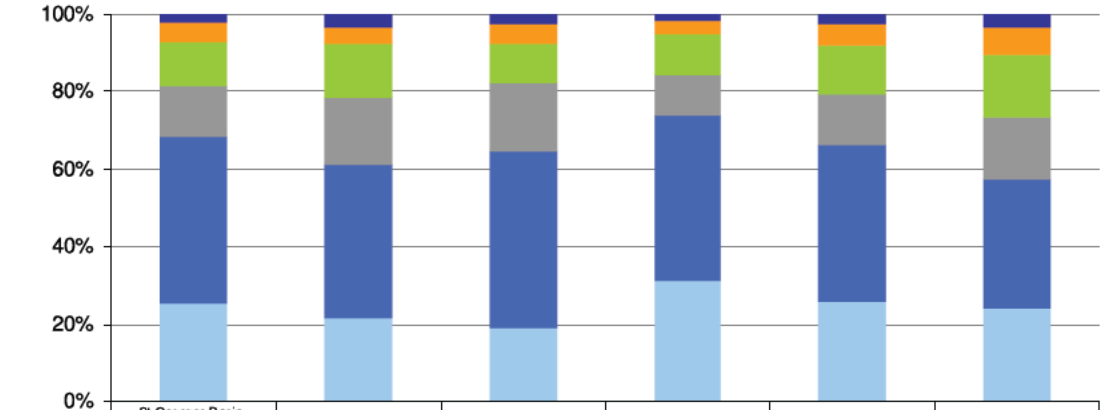
Figure 2.6: Proportion of Residents Requiring Assistance, 2006

Source: ABS Census of Population and Housing (2006)

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In general, the rate of assistance required across the surrounding areas is considerably higher than the NSW rate. In particular, 13.5% of all residents in Old Erowal Bay require assistance – a rate three times the NSW average. Again, this signals an aging population in the locality, and in all likelihood higher rates of disability or high support needs among a younger population.

The number of persons per dwelling in the surrounding urban settlements has also been calculated. The majority of dwellings have 1-2 persons residing within. Huskisson had the highest proportion of dwellings with 1-2 persons. However, this is not significantly different to that of the overall NSW rate.



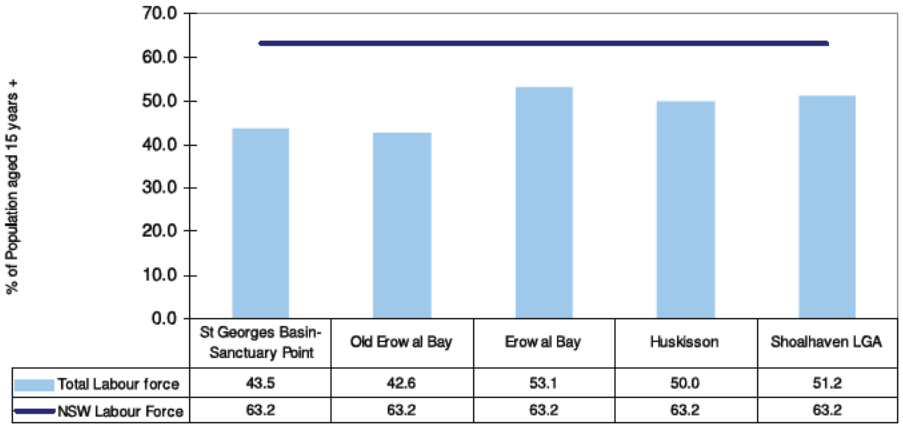
	St Georges Basin-Sanctuary Point	Old Erowal Bay	Erowal Bay	Huskisson-Vincentia	Shoalhaven LGA	NSW
Six or more	2.1	3.3	2.7	1.7	2.4	3.5
Five	4.9	4.3	4.9	3.3	5.5	7.3
Four	11.6	14.0	10.2	10.6	12.8	16.0
Three	13.1	17.3	17.8	10.7	13.2	16.0
Two	42.9	39.6	45.3	42.6	40.2	33.2
One	25.4	21.6	19.1	31.1	25.9	24.2

Figure 2.7: Number of Persons Per Household Usually Resident, 2006

Source: ABS Census of Population and Housing (2006)

In general, the surrounding urban settlements have a lower proportion of residents in the labour force when compared with NSW. This is illustrated in Figure 9 below. St Georges Basin – Sanctuary Point, and Old Erowal Bay have labour force participation rates approximately 30% lower than NSW, which again is likely to be due to a large extent to an older age structure as well as less advantaged educational profile and lower engagement of sole parent families with the labour market.

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	St Georges Basin-Sanctuary Point	Old Erow al Bay	Erow al Bay	Huskisson	Shoalhaven LGA
Total Labour force	43.5	42.6	53.1	50.0	51.2
NSW Labour Force	63.2	63.2	63.2	63.2	63.2

Figure 2.8: Percentage of Population in Labour Force, 2006

Source: ABS Census of Population and Housing (2006)

The tenure of households in the catchment area is shown below.

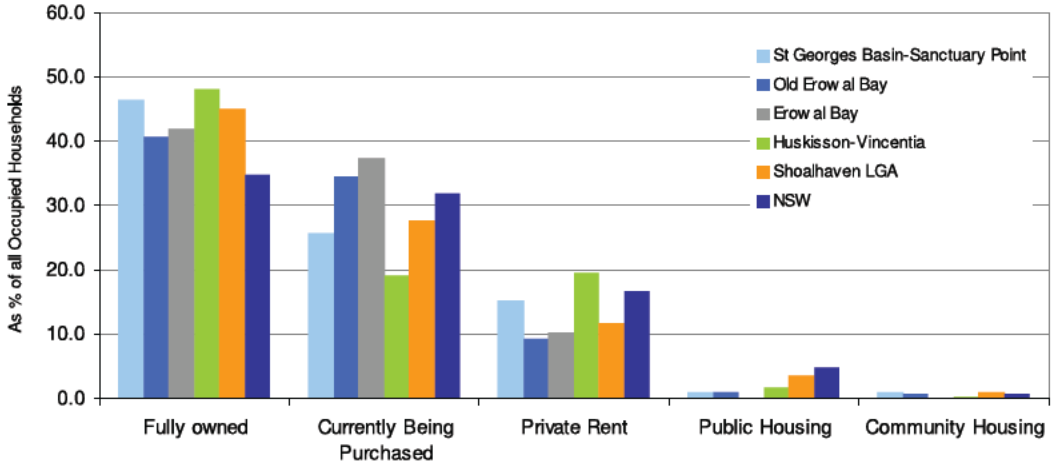


Figure 2.9: Tenure, 2006

Source: ABS Census of Population and Housing (2006)

Generally, home ownership rates in the surrounding areas and Shoalhaven LGA are higher than the rate for NSW, although Old Erowal Bay and Erowal Bay have rates slightly less than the Shoalhaven rate. This lower rate of outright home ownership is complimented by a higher than average rate of households in the process of paying off their mortgages.

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Huskisson-Vincentia is the only surrounding area having a higher proportion of households renting than both the Shoalhaven and NSW. Very little public or community housing is available for rent within the surrounding catchment area.

SEIFA 2001[21]

The following table provides a breakdown of 2001 SEIFA scores by the same settlement areas and again is benchmarked against Shoalhaven LGA and NSW. All four SEIFA scores have been provided for complete analysis. SEIFA 2006 data is not expected for release until late March 2008.

Table 2.3: SIEFA Scores, 2001

Urban Settlement	Disadvantage	Advantage-Disadvantage	Economic Resources	Educational Occupation
Huskisson – Vincentia UCL	1014.56	991.67	968.63	1012.60
St Georges Basin – Sanctuary Point	921.14	868.83	866.70	888.76
Old Erowal Bay	914.05	864.00	860.21	897.87
Erowal Bay	994.71	934.81	910.23	954.29
Shoalhaven LGA	967.71	937.38	921.67	951.47
NSW	1000.46	1015.34	1030.51	1009.70

Source: ABS 2001 Census

There is wide variation of overall disadvantage within the surrounding catchment area. Huskisson-Vincentia with a SEIFA score of 1014.56 is the least disadvantaged area and is above the NSW index. By comparison, Old Erowal Bay (914.05) and St Georges Basin–Sanctuary Point (921.14) have considerably lower SEIFA scores than NSW, and indicate populations with relatively low income, educational and employment status.

Also important to this study is the 'economic resources' SEIFA ranking. Economic resources includes such variables as home ownership, rent paid, income by family type, mortgage payments, and rental households. Except for Huskisson-Vincentia, the surrounding areas have a lower economic resources ranking than NSW, particularly in Old Erowal Bay and St Georges Basin-Sanctuary Point. This is likely to be due to the lower earning capacity of families, and lower levels of housing and other resources.

[21] Socio-Economic Indexes for Areas 2001 (SEIFA 2001); Source: ABS 2001 Census

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The Heritage Estates Owners

In relation to the current owners of the individual lots in the Heritage Estates, in Council's brief it also notes that:

- Many of the landowners are first or second generation migrants of non-English speaking background;
- Many are or have been low income earners or pensioners; and
- Approximately 3% of the landowners reside in the Shoalhaven, whilst around 83% live in the Sydney Metropolitan Area, and 14% live elsewhere in Australia or overseas.

We have conducted a more detailed analysis of the locations in which the landowners currently live. As shown in the following map, they are most heavily concentrated in the south western suburbs of Sydney, and to a lesser extent in the inner and middle ring suburbs of the south and west. This is not surprising given the high proportion of those who speak languages other than English at home, which accords with the demography of these suburbs, particularly in parts of the southwest. These are also among the most disadvantaged areas of Sydney.

Based on the survey responses, it would appear that many of the Heritage Estates owners are relatively disadvantaged in terms of income, education and employment status. It is interesting to note that the profile of the Heritage Estates owners may not be dissimilar to that of the existing profile of the locality, with the exception of the proportion of those from different cultural backgrounds.

The distribution of landowners is shown in the following map. More detailed analysis of the demography of landowners is also provided as part of the findings of the Survey, set out later in this report.

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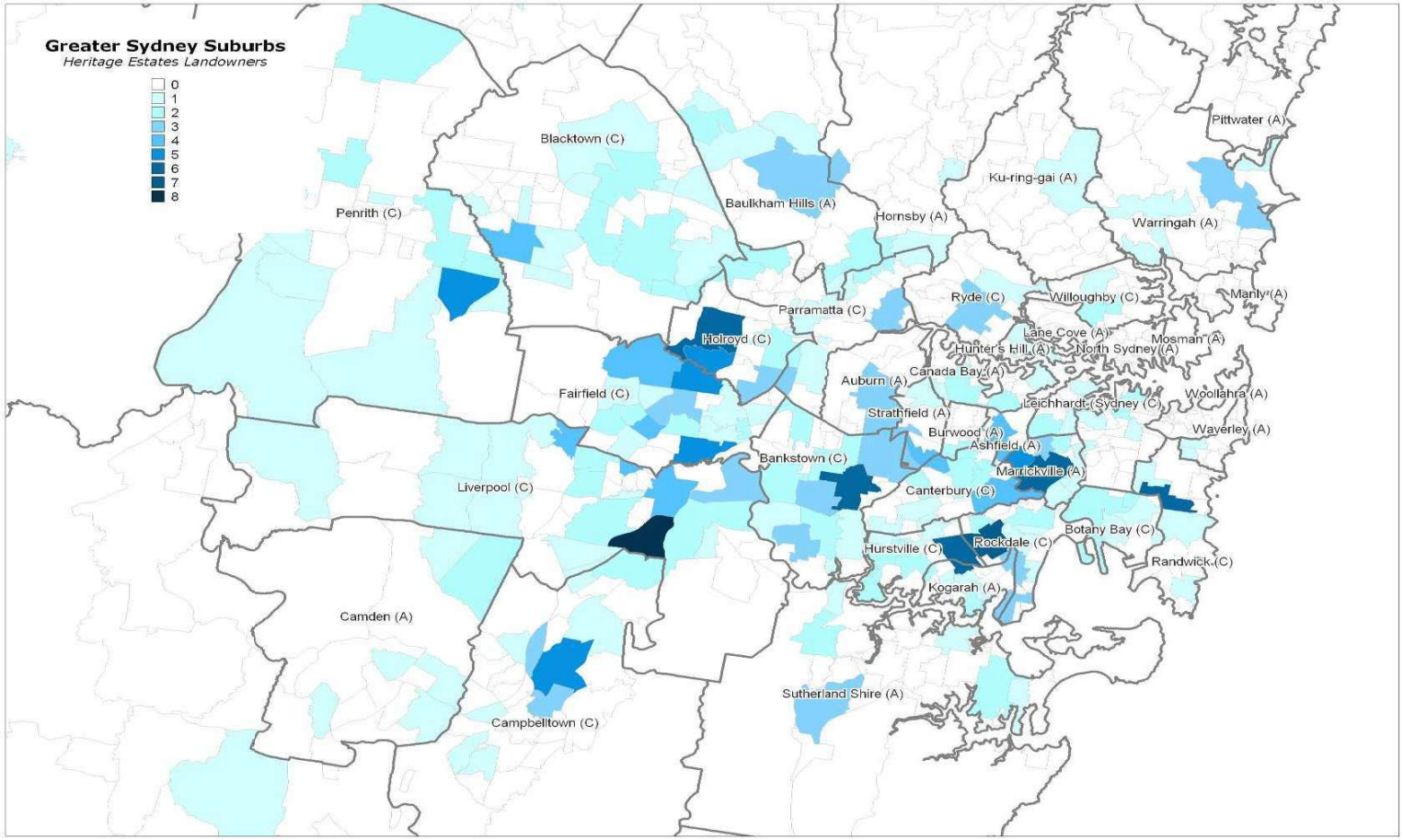


Figure 2.10:Distribution of Heritage Estates Owners in Metropolitan Sydney

Source: Judith Stubbs & Associates (2008)

JUDITH STUBBS & ASSOCIATES

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Document 20

3. Methodology

3.1. Overview

The study aims to assess the social and related economic impacts on the Heritage Estates landowners should the rezoning not proceed. Primary research was conducted via a mail-back survey of owners, and structured interviews with a further 30 randomly selected respondents. A review of relevant documents and demographic data was also conducted, as well as an analysis of likely economic impacts from data collected during the survey and interviews.

Judith Stubbs and Associates (JSA) maintained telephone contact with Eric Hollinger, (Strategic Project Planner, SCC) and other SCC staff in his absence to discuss a variety of matters that arose during the course of this survey and to seek information regarding history, Council policy and so on when necessary. A number of landowners contacted JSA directly, particularly during the initial part of the study. Where their inquiries related to the study's process, JSA staff responded. Where inquiries related to zoning matters or SCC processes and policies, they were advised to contact SCC's Strategic Planning Group and given the telephone number. JSA has responded to around 100 phone calls/inquiries to date on such matters.

3.2. Cleansing the Database

A letter of introduction, written survey and stamped return envelope were posted to all Heritage Estates landowners, using the data base supplied by SCC. The original database contained a number of sets of duplicate information. If different landowners with different Heritage Estate lot numbers were listed at the same address, a survey was sent to each landowner. Landowners who had more than one lot number were sent one survey each only, as the survey allowed for information about multiple lots to be recorded. Consolidation of the database produced a total of 672 landowners.

3.3. Introductory Letter

The letter that accompanied the survey introduced JSA, set out the project aim, detailed how the information collected would be used and invited the landowners to complete and return the enclosed survey by 21 December 2007. The letter advised that survey replies were confidential and that individual landowners would not be identified in any reports.

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Landowners were directed to contact SCC's Strategic Planning Group on the phone number provided with any specific questions about rezoning matters.

The reverse side of the letter contained a short paragraph translated into Italian, Serbian, Croatian, Macedonian and Greek, the main languages identified among the group. The paragraph explained that the landowner might be selected to participate in a survey about the possible rezoning of this land and that if they were unable to complete the written survey because they did not read English, to contact JSA. We would then arrange an interpreter or other assistance where required so as to maximise participation and ensure access and equity in the process.

The letter is provided at Attachment B.

3.4. Written Survey

A written survey was designed in consultation with Eric Hollinger (Strategic Project Planner, SCC), and Gordon Clark (Strategy Planning Manager, SCC). The written survey is provided at Attachment C.

The survey sought basic demographic information relevant to the study, including the landowner's age, family type and weekly household income. Other items related to the block of land purchased, including year of purchase, purchase price, whether the land was purchased from Heritage Real Estate, main reason for purchase, whether any advice was sought about the zoning of the land at the time of purchase, and if so, from whom, whether they had tried to sell the block, planned use if the land were to be rezoned for residential building, and what the main impact on the landowner would be if the land was not rezoned. The majority of responses required a tick box response to nominated categories. A small number of questions required free written response so as not to prejudge the answers. These were thematically analysed and coded as discussed below.

3.5. Survey Mail Out

The introductory letter, survey and a stamped return address envelope were mailed to all landowners on Tuesday 11 December 2007. A total of 672 surveys were sent out.

3.6. Survey Response

By close of business on Wednesday 16 January 2008 a total of 455 written responses had been received, that is, a return rate of 68%. This was well above

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the number required to achieve an appropriate level of confidence in the findings. Although landowners were asked to return surveys by 21 December 2007, replies were accepted up until 16 January 2008. This closing date was extended as it was noted that there may have been delays in returning the surveys due to the busy holiday period and heavier demands on postal services. Two landowners contacted JSA by telephone to advise that they had overlooked the survey. These landowners were advised that the closing date had passed and results had been tabulated, and reassured that a very large number of landowners had returned their surveys.

Again, in consideration of access and equity, JSA made follow up telephone calls to over 20 landowners who had returned incomplete survey forms in order to assist them to clarify or complete the information provided. Some forms, for example, contained conflicting information, suggesting the possibility of low English literacy skills.

A maximum of three attempted telephone calls was made over three days. If landowners were able to be contacted, the purpose of the call was explained, and clarification of information sought. Verbal responses were recorded on the survey form. Fifteen landowners were able to be contacted. Of these, twelve supplied additional information and one indicated that she was too busy to discuss the survey. Nationally accredited Telephone Interpreter Services (TIS) were used for two of these telephone calls. It is noted that some landowners indicated that they did not wish to use an interpreter, as they believed their spoken English skills were adequate. In some cases, this resulted in longer telephone calls to ensure that the responses were correctly understood. Other landowners were assisted by their adult children. Seven landowners were not able to be contacted. Their survey responses were entered into the database with missing information, for example the year of purchase or the cost of the block, noted.

3.7. Data Entry

3.7.1. Written Survey

The survey contained 22 questions. All responses were entered into Microsoft Excel for data analysis, with any nil responses noted. Questions 17b, 18 and 22 were open-ended. All open-ended responses were read and key themes independently identified by two JSA research staff members. Theme identification was compared to gauge consistency of interpretation. Themes were then coded for data entry. Further details of the coding are as follows.

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Question 17b

Question 17a asked landowners to tick one of a range of pre-categorised responses to: "When you bought your block(s) of land did you think there could be problems with it being rezoned"? Possible responses were: yes, no, perhaps or unsure. Question 17b asked for clarification of that response, that is, "Why/why not"?

Question 17b responses were grouped in categories as detailed in Table 3.1.

Table 3.1: Question 17b Response Categories

Response Code	Response Category
I	Reported was given poor or incomplete information by the **seller** or their agent, eg Real Estate Agent, Heritage Estates Lawyer, other source
Ii	Reported was given poor or incomplete information by **buyer's** agents, eg buyer's lawyer, friend, other source
Iii	Reported was given poor or incomplete information by **SCC**
Iv	**Buyer made assumptions,** eg based on existence of surrounding developments, existing infrastructure such as sealed roads in surrounds?
V	Buyer's lack of information/awareness of zoning requirements/status
Vi	Allegations of unethical behaviour, eg "Real Estate Agent bribed me and many others"
Vii	Nil response

Source: JSA January 2008

Question 18

Question 18 asked landowners: "How do you use the land now (eg visit occasionally, holiday once per year, camping)"? The response categories are set out in Table 3.2 as follows.

Table 3.2: Question 18 Response Categories

Response Code	Response Category
18a	Visit occasionally
18b	Holiday once per year
18c	Camping
18d	Other; eg maintain, mow
18e	Nothing
18f	Nil response

Source: JSA January 2008

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Question 22

Question 22 asked land owners: "What will be the main impact on you if the land is **NOT** rezoned"? Analysis of the written responses revealed a range of self-identified impacts. These have been grouped under the categories detailed in Table 3.3 as follows.

Table 3.3: Question 22: Self-identified impacts if land is NOT rezoned

Response Code	Category of self-identified impact
22a	Economic loss
22b	Loss of superannuation/ savings/ nest egg/ investment
22c	Loss of holiday home/ recreational opportunity
22d	Loss of retirement options
22e	Loss of home to live in/relocate to (ie as primary dwelling)
22f	Inability to pay off land/maintain repayments/ annual fees and rates/financial hardship
22g	Emotional/psychological impacts
22h	Physical/health impacts
22i	Loss of confidence in government/ justice system/ institutional processes
22j	Nil/ minimal/ don't know

Source: JSA January 2008

3.8. Structured Interviews

Further information was sought from 30 landowners via telephone interviews that were conducted in a semi-structured way, with trigger questions used to begin discussion, and other issues raised in more depth from their completed survey. This allowed for further exploration of key areas of relevance to the study, and more detailed discussion of some of the responses on the survey, as well as for the respondent to raise issues of their own and put forward further information they felt to be relevant. Interviews were conducted by Judith Stubbs and Associates (JSA) staff skilled in this methodology. Dr Judith Stubbs, Ms Jacquelin Capell and Ms Colleen Lux conducted thirty interviews between Monday 7 January and Friday 11 January 2008.

Landowners were selected at random using a random number generator in Microsoft Excel which selected 30 numbers at a time based on JSA's database of returned Heritage Estates: Rezoning Surveys. These numbers were then matched

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to the corresponding number assigned to each of the written surveys forms that had been returned by the landowners to JSA.

The randomly selected landowners were then contacted by phone in the week prior to the interview being scheduled to ask whether they were interested in participating in a telephone interview, and if so to arrange an appointment time that suited them, and to ask whether they needed an interpreter. In this pre-call to the landowners it was explained that they had been selected at random to take part in a more in-depth interview via phone.

The purpose of the interview was explained to each participant. Landowners were informed that their responses were confidential and that individual landowners would not be identified in any case studies or reports. Permission was requested to record the interviews, either manually or by the use of recording software. Almost all respondents agreed to be recorded.

A maximum of three telephone calls was made to contact these landowners. A further two sets of 10 random numbers were required to be generated to fill the quota of 30 in-depth interviews. The interviews were booked between the 7 and 9 January 2008 on a Microsoft Excel schedule with any landowner who required interpreter assistance being booked on 11 January. The interviews where recorded using a Trillium N629 telephone recording adaptor and VRS recording software.

Interviews were then transcribed in full. Edited case studies were then prepared to highlight key issues raised and impacts identified by interviewees. The case studies are provided at **Section 4** of this report.

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4. Owners' Survey

4.1. General Survey Findings

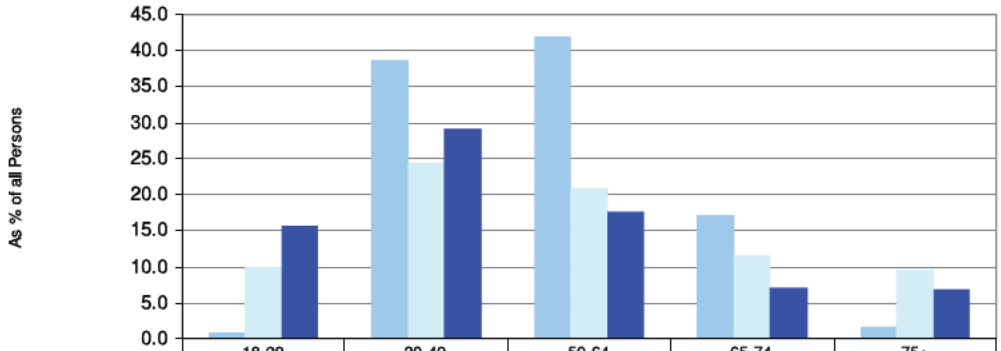
The following section provides details of findings from the survey of owners.

4.1.1. Return Rate

From the mail out of 672 surveys a total of 455 written responses were returned, a participation rate of 68%. This exceeds the number of returns required to achieve appropriate confidence levels, that is, approximately 280. Almost double this number was received, which is highly unusual for a mail out survey, and indicates a high level of interest in the study from the target group.

4.1.2. Selected Demographic Information

Approximately 58% of respondents were over 50 years of age, whist 41% were aged between 30-49 years. Around 2% were over 75 years and 1% were less than 30 years old. The age profile is thus much older than the LGA and NSW average, though it is noted that most would have been around 20 years younger at the time the blocks of land were purchased.



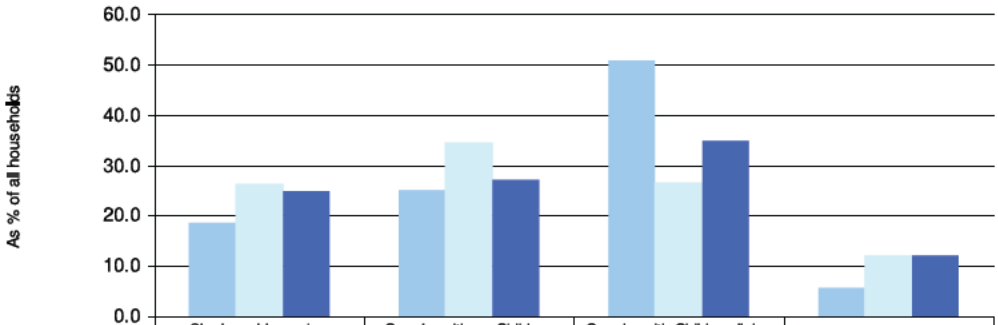
	18-29	30-49	50-64	65-74	75+
Land Owners	0.7	38.6	41.8	17.1	1.7
Shoalhaven LGA	10.0	24.4	20.8	11.6	9.6
NSW	15.7	29.0	17.5	7.1	6.7

Figure 4.1: Current Landowner Age

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008) and ABS Census of Population of Housing (2006)

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As shown in Figure 4.2 below, 51% of respondents were living as part of a couple with children at home, and 25% as part of a couple without children. About 19% were single, widowed or divorced, and 6% described "other" family types, for example single parent. Owners were far more likely to be living as part of a couple with children at home than the LGA or State average despite the generally older age structure, which may be related to the higher concentration of those aged 40-49 years as well as other factors (e.g. different in family structures among those from culturally and linguistically diverse backgrounds).

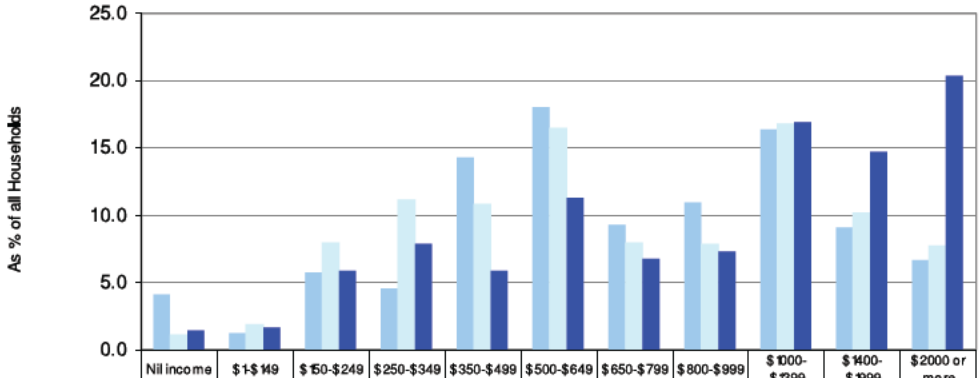


	Single, widowed or divorced	Couple with no Children living at home	Couple with Children living at home	Other Family
Land owners	18.5	25.1	50.9	5.5
Shoalhaven	26.3	34.5	26.5	12.0
NSW	24.7	27.1	34.8	12.1

Figure 4.2: Current Family Type

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008) and ABS Census of Population of Housing (2006)

The gross weekly household income profile of the landowners is shown below.



	Nil income	$1-$149	$150-$249	$250-$349	$350-$499	$500-$649	$650-$799	$800-$999	$1000-$1399	$1400-$1999	$2000 or more
Land Owners	4.0	1.2	5.7	4.5	14.3	18.1	9.3	10.9	16.4	9.0	6.7
Shoalhaven LGA	1.1	1.9	8.0	11.2	10.8	16.5	8.0	7.8	16.8	10.1	7.7
NSW	1.4	1.7	5.9	7.8	5.8	11.3	6.7	7.3	16.9	14.8	20.4

Figure 4.3: Gross Weekly Household Income, 2006

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008) and ABS Census of Population of Housing (2006)

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In general, the respondents had lower household income levels than NSW households. Approximately 53% of the respondents earned less than $800 per week,[22] which is higher than NSW (39%), but slightly less than Shoalhaven (56%). They were far more likely to be clustered at or just below the NSW median income, indicating low- to moderate-income workers as well as retired people or pensioners, and far less likely to be on household incomes of $75,000 or more per annum.

In terms of current tenure, the overwhelming majority of survey respondents, 83%, reported that they now own or are purchasing their own home. This is a substantially higher rate than NSW (around 70%), and than the Shoalhaven. The balance (around 17%) was renting mostly in private accommodation.

4.1.3. Heritage Estate Owners Purchase Arrangements

Ninety-three percent of landowners responded that they had purchased their property from Heritage Real Estate/ Interpacific Property Corporation Pty Ltd (i.e. they were the original purchasers of the land). As shown in Figure 4.4, approximately 90% had purchased their properties between 1985 and 1992. Eighty percent of purchases took place between 1987 and 1990. The earliest recorded purchase was in 1980, and the most recent in 2006.

Approximately 60% had borrowed money to purchase their block. Of these, less than 4% reported that they were still paying of their loan. Approximately one percent reported paying less than $100 per month, 1% are paying between $100-$250 per month, and 0.5% paying between $250-$399 per month.

About 77% of respondents owned one block, with 15% owning two blocks. Five percent did not supply information about the number of bocks purchased, and 2% owned three or four blocks.

[22] $829 equals 80% of the NSW median weekly gross household income

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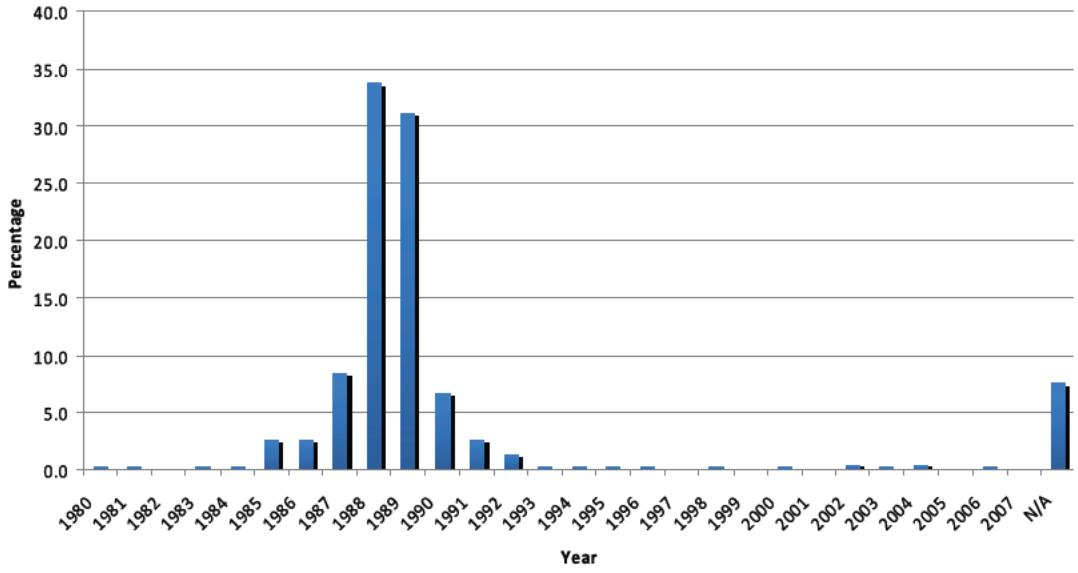


Figure 4.4: Year Land Purchased

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

The overwhelming majority of people surveyed (90%) indicated that they had bought the land intending to build on it. As shown in Figure 4.5 below, 30% intended to build and live in the area soon after the purchase, 32% to build and retire and 28% to build a holiday home. Of those who bought the land as an investment, about 4% intended to resell the land, 3% intended to build a home on it to rent out, 1% were going to build a home to sell and about 2% had other non-specified plans.

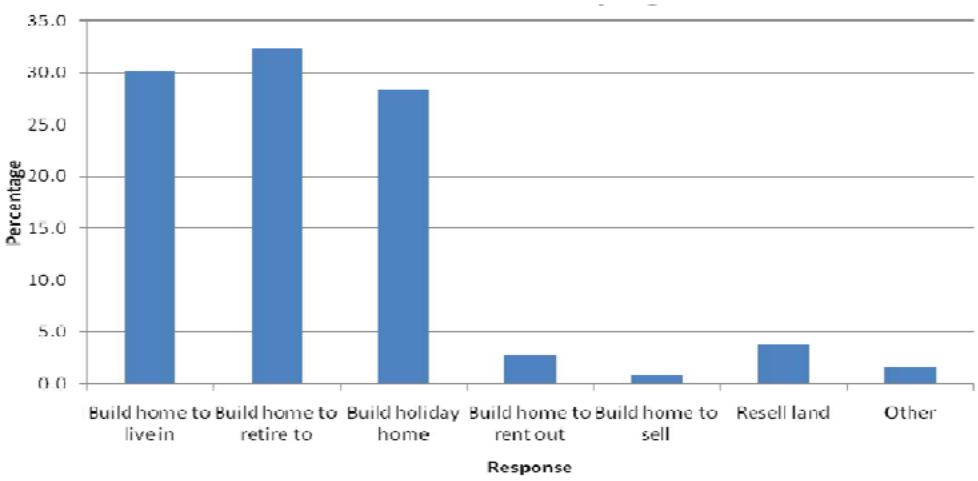


Figure 4.5: Reason for Buying Land at Heritage Estate

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

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Landowners were also asked how much they had paid for their block/s. The small number of survey responses (less than 7%) which did not provide either the year or the purchase price were excluded from the analysis. Figures were adjusted for CPI, using ABS data. September quarterly data was chosen to calculate purchase price in 2007 dollars, allowing easy comparison between prices paid in different years. Attributes of the blocks, for example size or position, were not known.

As shown in Table 4.1 below, the median price in 2007 dollars for a block of land (CPI adjusted) was $24,526. This is almost identical to the average price per block of $24,801. Based on adjusted figures, the highest price paid for a block was $58,024 in 1988. The lowest price paid was $2,061 in 2002. Eighty per cent of prices were between $7,916 and $41,685 (all figures in 2007 dollars).

Table 4.1: Cost per block of land (CPI adjusted)

Price Paid Per Block	$	Year	Standard Deviation	SD 80% range	
Median	$24,526				
Mean	$24,801		$8,615	$7,916	$41,685
Highest	$58,024	1988			
Lowest	$2,061	2002			

Source: JSA 2008

It is noted that there were a wide range of prices, which is likely to reflect the levels of awareness of buyers including the extent to which they were convinced by the vendor's 'pitch' as well as the amenity of the individual blocks. In particular, it represents a significant depreciation in the value of lots over time, with more recent purchasers paying much lower prices as the perceived risk associated with potential rezoning increases. Note that the prices are those reported by the respondent and may not be accurate in all cases.

This is shown in more detail in Figure 4.6 below.

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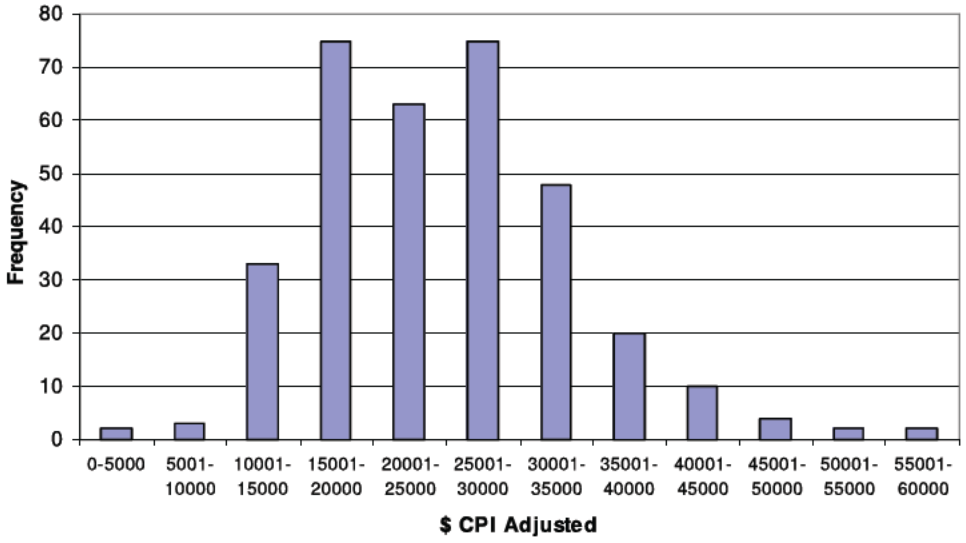


Figure 4.6: Cost of Land (CPI Adjusted)

Source: JSA 2008

The purchase price paid for the land does not fully represent the cost incurred by the purchaser. From the consumer's point of view, there is a time aspect to the money in that money available now is worth more than the promise of money in the future. Secondly, the expenditure on the land can be treated as expenditure for which the purchaser has received no benefit. Finally, the expenditure on the land has resulted in a reduction in alternative lifetime expenditure for purchasers (for example, purchasing an alternative block of land or holiday home of which they may have the use, and which is likely to have appreciated over 20 years).

Discount cash flow analysis is used to represent the time value of money in consistent terms. NSW Treasury suggests a social time preference rate of 2-4%.[23]

There are two aspects to the land purchase, these being the initial purchase cost and the ongoing cost of ownership, the latter principally consisting of Council rates. A figure of $365 per annum has been used for Council rates in current day dollars. This is based on current rates of $465 less the $100 special rate introduced in 2005/2006 to allow Council to recoup expenditure on current rezoning investigations.

[23] NSW Treasury: Guidelines For Economic Appraisal, TPP 07-5, 2007 Section 10 http://www.treasury.nsw.gov.au/__data/assets/pdf_file/0016/7414/tpp07-5.pdf

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Accounting for the time value of money and including rates, and as shown in the following table, the median cost of ownership over time is estimated at between $42,700 and $58,841, with the average estimated at between $43,705 and $60,779. Those who have potentially lost the most are those who purchased earliest, due both to the time value of money and the higher purchase prices (between $92,897 and $134,774 in 1987 in today's dollars). This is explored in more detail in **Section 6** below, which assesses economic impacts on landowners in more detail.

Table 4.2: Cost per block of land as NPV (Using 2% and 4% discount rates) and including rates of $365 per year. (CPI adjusted)

Price Paid Per Block	$	Year	Standard Deviation
Median	$42,700-$58,841		
Mean	$43,705-$60,779		$12,860-$19,015
Highest	$92,897-$134,774	1987	
Lowest	$4,175-$4,485	2002	

Source: JSA 2008; ABS

In terms of single versus multiple ownership, approximately 87% of respondents were sole owners of the block, or owned it as a couple, for example husband and wife. Thirteen percent of respondents owned the property with other parties, for example siblings, or other families.

Almost 100% of respondents indicated that they continued to pay the annual Council rates.

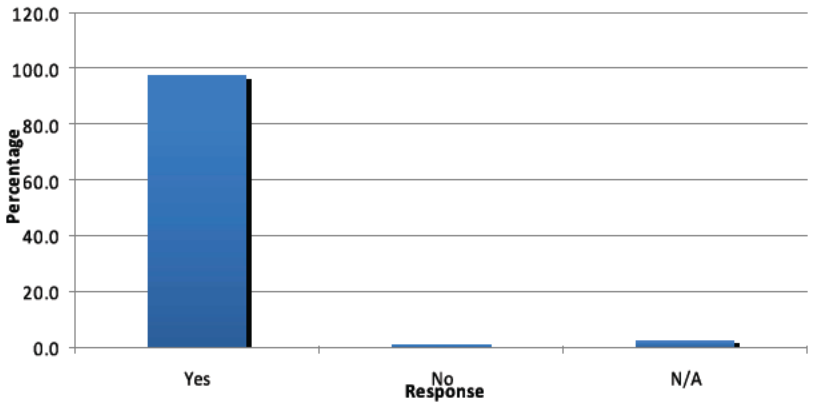


Figure 4.7: Continuing payment of rates

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

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4.1.4. Awareness of Zoning Implications and Related Issues

Advice on Rezoning

Respondents had sought advice about the zoning of the land from a variety of sources, with some nominating more than one source. The largest group (58%) had sought advice from the Heritage Estates Real Estate Agent, and approximately 25% from the lawyers nominated by Heritage Estates. The vast majority of these two groups did not seek advice from an independent source (or, as noted in the case studies below, believed the lawyer to be an independent advisor). Less than 15% had sought advice from other sources, including Shoalhaven City Council (12%), an independent lawyer or conveyancer (11%) or family and friends (10%). About 9% reported that they had not sought advice from any source. This information is presented in the following figure. Note that results do not add up to 100% as a minority sought multiple advice.

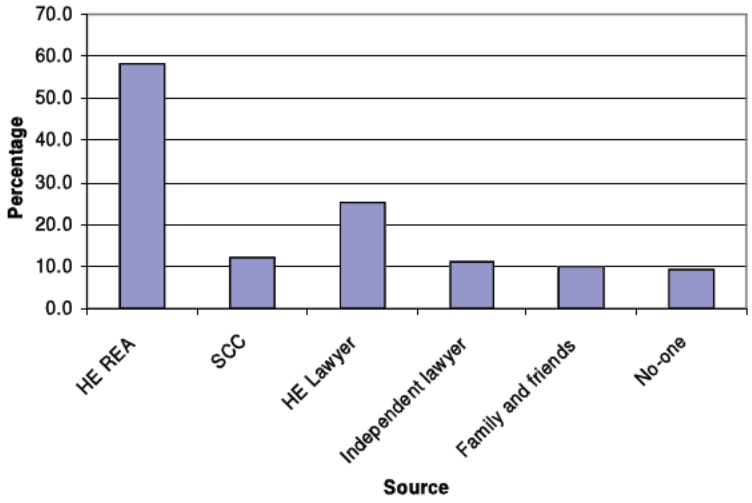


Figure 4.8: Sources of Information about Zoning

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

Respondents were also asked whether they realised at the time of purchase that zoning did not allow building on their block of land. As shown in the following figure, the majority of landowners (65%) reported that they were aware of this. A third of respondents indicated that they had not been aware of the zoning implications.

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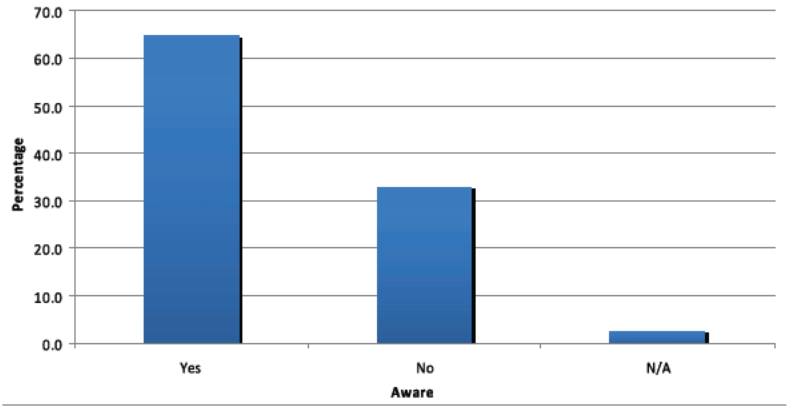


Figure 4.9: Landowners aware of zoning at the time of purchase

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

Almost 90% of landowners indicated that at the time of purchase they did **not** think there would be problems with the land being rezoned in a few years or eventually, as they had been informed by the vendor or their lawyers. Landowners were asked their reasons for this view. As described above the written responses were thematically analysed and then coded, which is shown in summary form below.

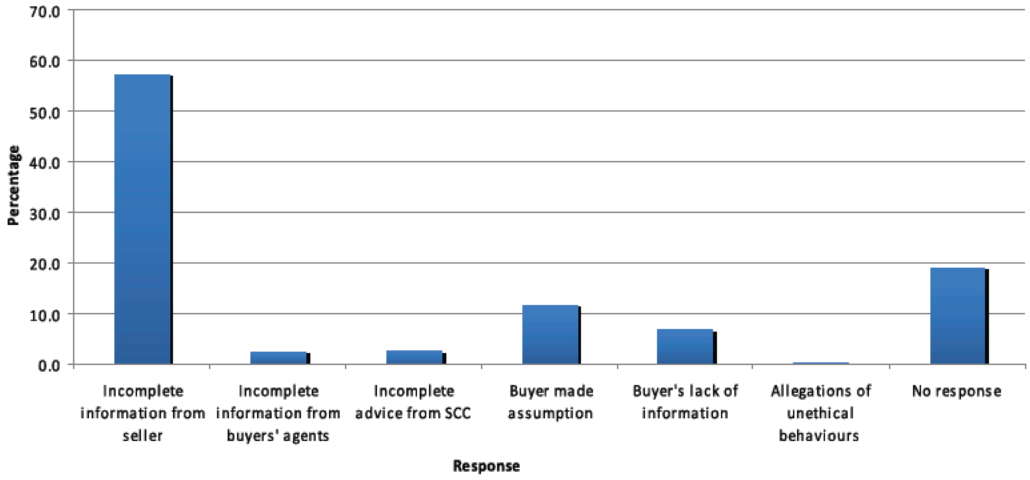


Figure 4.10: Reasons for belief that there would be no problems with rezoning

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

Around 60% of survey respondents indicated that they based their belief that there would not be problems with rezoning on incomplete or poor information supplied by the vendor or their agent. Other significant reasons related to assumptions made by the buyer or their general lack of awareness or information.

A very small proportion of respondents (less than 3%) reported that they based their belief on information which they had received from Council. Mr Gordon Clark, (SCC Strategy Planning Manager) recalled that in the late 1980s and early 1990s

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the advice given by Council to prospective buyers was *caveat emptor.* He recounted that Council was consistent in advising prospective buyers that the land was not zoned for residential use, and that Council did not even have a commitment to reviewing zoning at that time[24]. In the event, Council made the decision to instigate the rezoning process on 22 December 1992, with no guarantee that land would be rezoned to allow for residential purposes.

As noted in the following case studies (Section 4), a significant proportion of purchasers spoke little or no English at the time, and appeared to have little if any awareness of NSW environmental law system.

The following sets out examples of remarks made under these themes.

i. Reported was given poor or incomplete information by the **seller** or their agent, eg Real Estate Agent, Heritage Estates Lawyer, other source

> *"There seemed to be no problem with the property and the real estate agent was confident that the land would be rezoned in the future"*
>
> *"We were told that in 5 to 10 years we can build"*
>
> *"The real estate agent suggested that in about 10 years the council would rezone blocks for housing"*
>
> *"The vendor assured us that after 2 or 3 years the area will be rezoned and we believe him"*

ii. Reported was given poor or incomplete information by **buyer's** agents, eg buyer's lawyer, friend, other source (note that it appears from documents reviewed that solicitors to whom the purchasers were referred often appeared to have an interest in minimising the risks associated with the decision to purchase).

> *"Our lawyer was told that the land would soon be rezoned, just as most of the surrounding areas was"*
>
> *"People had told me that I could build a house within 2 years"*
>
> *"From what I was told at the meeting with my solicitors, I formed the impression that the land would ultimately rezoned"*

[24] Personal communication with Gordon Clark, telephone discussion 21 February 2008.

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"I was told by solicitor that will be rezoned in 1 year and that was almost 20 years ago"

iii. Reported was given poor or incomplete information by **SCC**

"I rang planning[ie SCC] before we bought the land. They said they had nothing planned for the near future"

"The real estate agent, solicitor and Council told us that will be rezoned within one to two years"

"I was given advice that the development and rezoning would commence in 5 years time. The property was at stage 4 of rezoning"

"Council said zoning laws change all the time and the area would for sure change zoning to allow building over time"

iv. Buyer made assumptions, e.g. based on existence of surrounding developments, existing infrastructure such as sealed roads,

"I thought it could be okay to build on because the blocks were already made into number and sold by real estate agent"

"Properties in Old Erowal Bay, Huskisson, Vincentia and others also use to be part of old paper subdivisions just like mine and were given permission to develop…."

"Other estates in the area were being sold plus built on"

"It appeared that the development of Erowal Bay would naturally flow onto this area"

v. Buyer's lack of information/ awareness of zoning requirements/ status

"The agent never said I couldn't build a house on the land so I didn't think twice"

" I was not told about not re-build"

"I thought it was an easy process to get it rezoned"

"We were unaware of zoning (law/provisions) so rezoning was something we did not think about"

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vi. Allegations of unethical behaviour

"The real estate agent bribed me and many others".

"We didn't know that the solicitor we saw was also acting for (the vendor)".

4.1.5. Current land use

Landowners were also asked how they currently use their land. As described above, responses were grouped into a number of categories. As shown in the following figure, the most common response (60%) was that the landowner visited the land occasionally. Some landowners specified the number of times they visited each year. Thirty percent responded that they did nothing with their land, with some further qualifying this by pointing out that they were actually restricted by SCC from doing anything at all on their land, including clearing or cleaning-up. Less than 8% indicated that they camped on the land, through they had in earlier years when this was permitted, whist some maintained it or used it to holiday on.

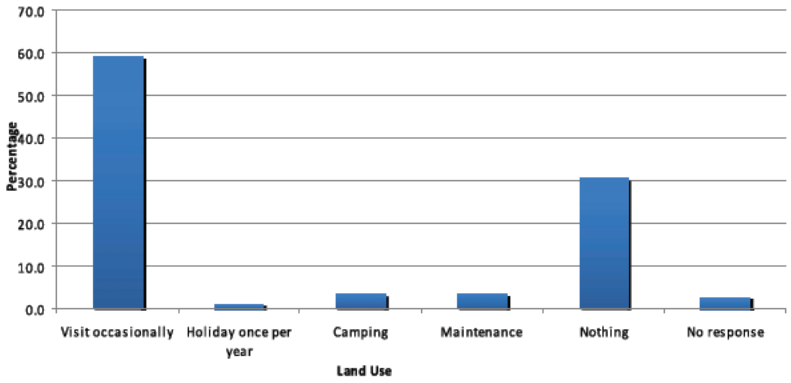


Figure 4.11: Current use of land

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

Comments under these themes were typically as follows.

i. Visit occasionally

"We visit a few times a year – just to go there"

"Just visit – not to do anything else'

"We visit it occasionally but difficult to access now"

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ii. Holiday once per year

"We holiday once per year down there- like to see how it's going"

iii. Camping

"We go camping with friends – love it down there"

"We camp on it 3 – 4 times a year"

iv. Other; e.g. maintain, mow, etc

"My wife and I visit the land 4 times a year to maintain it"

"We visit to clear and clean only"

"We visit occasionally and keep it clean"

"We visit often as possible to tidy up'

v. Nothing

"We can't get in the land any more"

"We're not supposed to do anything now – we used to love going there just to be there"

"We would regularly visit and camp however this was disallowed and stopped approx 15 yrs ago".

4.1.6. Attempted sale of the land

Close to 90% of landowners reported that they had never attempted to sell their land, as shown in the following figure.

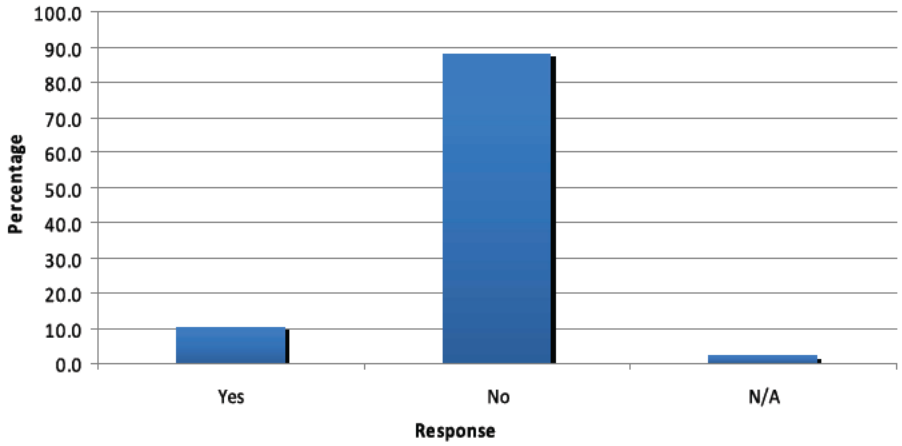


Figure 4.12: Landowners who have attempted to sell their block of land
Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

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Of the small number of landowners (46) who had attempted to sell their land, the main reason nominated for doing so was that the land is not able to be built on (37%), followed by 30% who indicated that it was too expensive for them to keep the land. For some landowners (20%) changed personal circumstances, for example the death of a spouse, were the reason for wanting to sell the land. These findings are shown in the following figure.

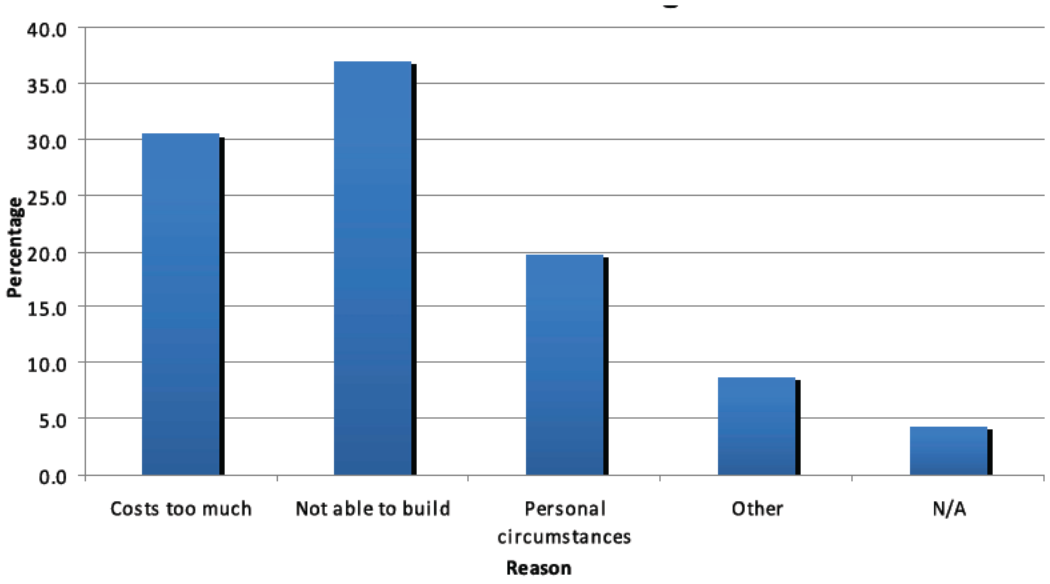


Figure 4.13: Reasons landowners nominated for wanting to sell their land

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

4.1.7. Plans for use if land is rezoned residential

Landowners were asked what they would do with their block if the land were rezoned for residential development. The results are shown in the figure below. Landowners were able to nominate more than one possible action. More than half, 56% of respondents indicated that if the land was rezoned for residential use they would build a house to live in and 37% said that they would build a holiday house. Only 13% indicated that they would now sell the land, and less than 7% indicated that they would build a house to rent or to sell or do nothing.

As such, only slightly more would now sell than those who originally said they would use as an investment (around 10%). However, far more would now build a home to live in rather than as a holiday home, which is likely to indicate the relative aging of owners.

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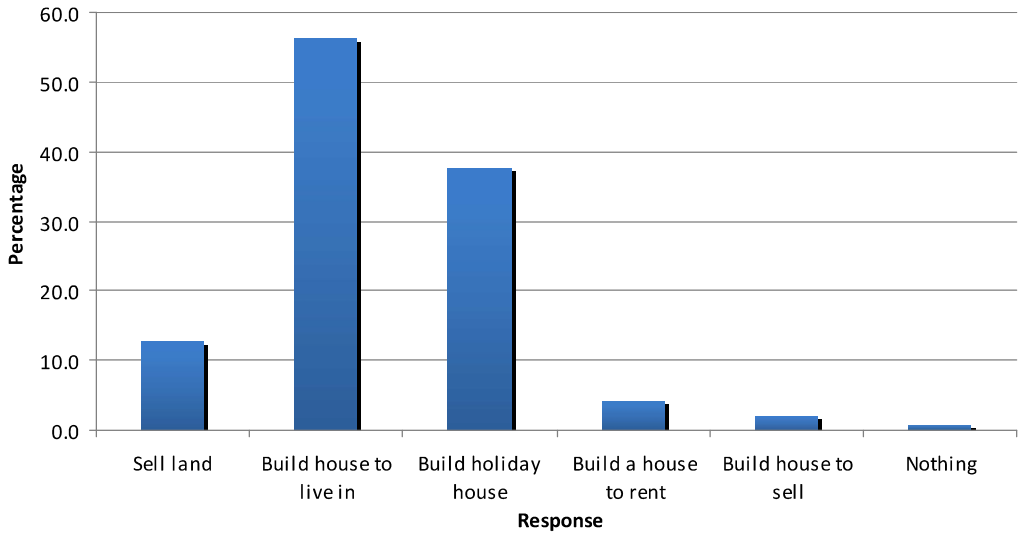


Figure 4.14: Planned land use if rezoned for residential building

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

4.1.8. Main impact if the land is not rezoned

Respondents were asked what the main impact on them would be if the land is not rezoned through the current process. Again, the open-ended responses were grouped under a range of themes for analysis.

Most respondents nominated more than one impact. Though the highest proportion (60%) cited economic loss, this was generally related to a range of social and psychological impacts. The second highest proportion of responses (44%) involved emotional or psychological impacts. Some typical comments around each of these themes are set out below.

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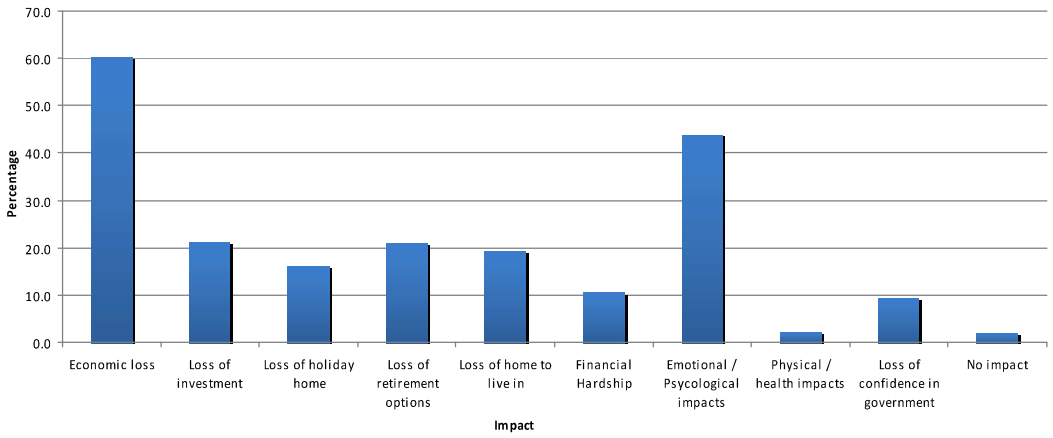


Figure 4.15: Impact if Land is Not Rezoned

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

a. Economic loss

"We will lose the amount of money invested into this block…"

"We will be financially disadvantaged, all those rates being paid for the past 22 yrs…"

"We will lose the money that we bought the land with and the council rates that we have been paying for 20 years"

b. Loss of superannuation/savings/nest egg/investment

"If it's not rezoned the future nest egg I thought I would have for my now wife and 7 children is gone…"

"The block was as an investment for our retirement for superannuation"

"I bought the land for my children and will have nothing…"

"We will have to look elsewhere for retirement funds…"

c. Loss of holiday home/recreational opportunity

"I will now be unable to build holiday home for myself and my grandchildren. This was the dream plan my late husband and myself had"

"I will have lost the opportunity for a place where my family can get away and relax every once in a while…"

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"I'll have lost the opportunity to secure holiday home…"

d. Loss of retirement options

"Our retirement dreams are 'shattered'"

"We have always holidayed in the Shoalhaven area and had planned to retire there"

"If it's not rezoned we have nothing for our retirement…"

e. Loss of home to live in/relocate to (i.e. as primary dwelling)

"Because we rent it would be too difficult for us to build or buy now if the land is not rezoned…"

"We're devastated, we'll never have opportunity to purchase land again…"

"The biggest impact will be the dream house that we've always talked about with my husband…it's never going to come true"

f. Inability to pay off land/maintain repayments/annual fees and rates/financial hardship

"As a pensioner, I can not afford to keep paying these council rates for no return…"

"We face financial difficulty through paying off existing house before wife retires…"

"We face serious financial hardship…we can't keep it up now we're on the pension"

g. Emotional/psychological impacts

"We will be very angry (disappointed). My heart was set on building something that my wife, family and myself could enjoy…"

"I've been so discouraged and distressed with this land, I can't sell it, I can't build. We call it "the land of no hope""

"We so very disappointed"

"It would have a devastating effect…"

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4.2. Selected Cross Tabulations

To gain further understanding of the different type or degree of impacts that may be experienced by landowners with different characteristics, two cross tabulations were performed. These were in relation to those who own a home versus those who are currently renting and do not own a home, and those who originally intended to invest compared with those who were intending to build a home to live in or retire to at some stage. This assists in exploring the impacts for different groups, for example those who currently have some asset versus those who do not, and the difference in impacts that not rezoning Heritage Estates would have on each group. Each of these is explored below.

4.2.1. Cross Tabulations With Current Home Ownership

Landowner Age Compared With Current Home Ownership

As shown above in the following figure, 83% of respondents currently live in premises that they own or are paying off. Seventeen percent (75 respondents) live in rented accommodation, or other circumstances such as living with their parents. In the following discussion this latter group is referred to as "renters". When landowner age is compared with home ownership, as shown in Figure 4.16, those aged 49 years or less are currently more likely to be living in rented accommodation or other circumstances than in their own home. Fifty five percent of respondents aged less than 49 years live in rented or other accommodation, 40% in their own homes. This situation is reversed for those aged between 50 and 74 years; 59% live in there own homes and 32% live in rented accommodation. However, of the 8% of respondents who are 75 years and older, approximately 2% own their homes, while about 6% live in rented or other accommodation.

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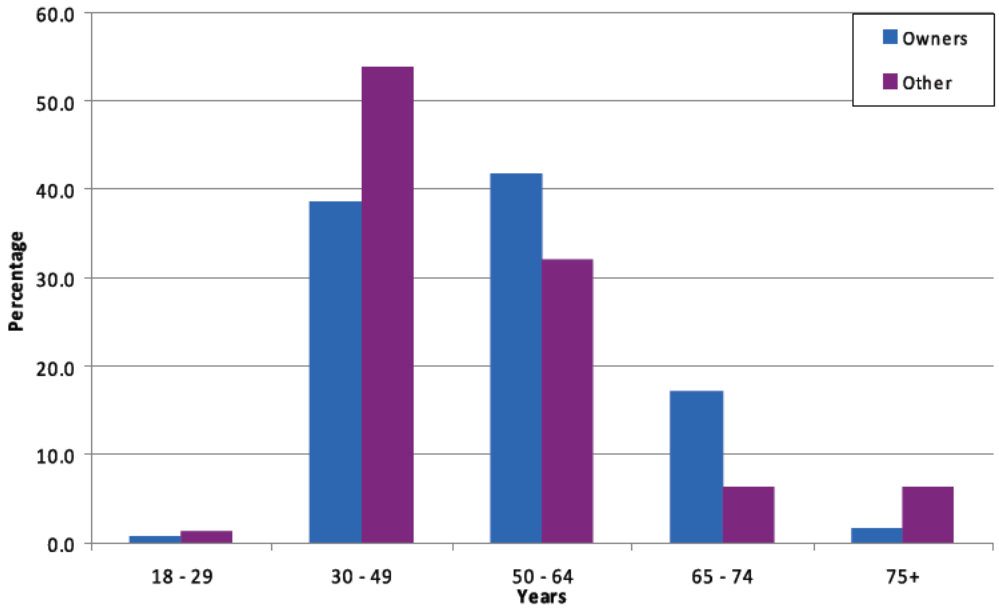


Figure 4.16: Current Land Owner Age Compared with Current Home Ownership

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

Landowner Income Levels Compared With Current Home Ownership

Landowners were asked to provide their current weekly household income, as described above. Income levels were banded using ABS 2006 data for NSW, as follows:

- **Low-income** level based on the fourth decile (lowest 40%) of household income. In this survey the income bands range from $0 to $649
- **Moderate-income** level based on 120% of the median household income. In this survey the income bands range from $650 to $999
- **High-income** level represents the remainder of incomes represented, that is, $1000 or more per week.

As shown in the following figure, those who currently rent were more likely to be in the low- to moderate-income bands than home owners. The majority of renters, 55%, were in the low-income bands, despite being younger. A sizeable proportion of homeowners, 42%, were also in this income level. Only 13% of renters were on higher incomes compared with 33% of homeowners. The difference between the two groups was statistically significant for the higher income band. Seven percent of homeowners and 9% of renters did not provide information about weekly household income.

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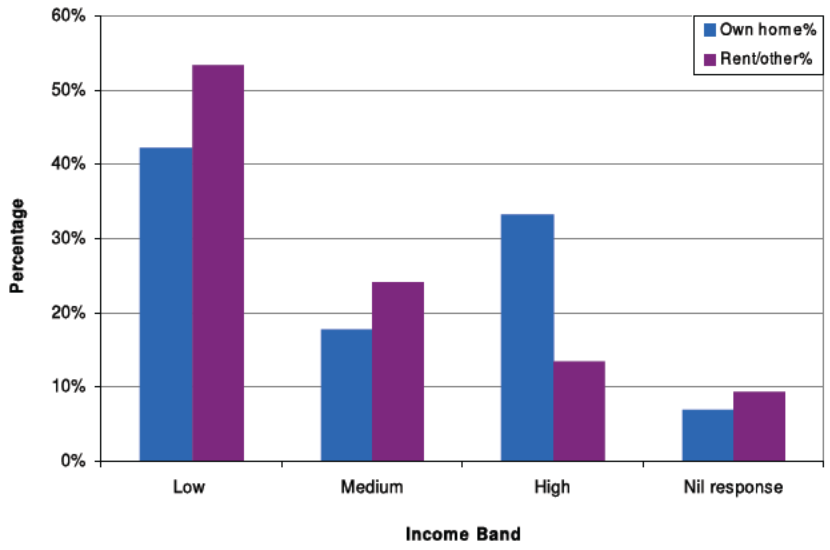


Figure 4.17: Current Income Levels Compared with Home Ownership

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008), ABS 2006

Awareness of Land Zoning at the Time of Purchase

The proportion of current homeowners who reported that they were aware of the land zoning at the time of purchase was somewhat higher than renters, 67% of owners compared with 55% of renters, however this finding was not statistically significant at the 95% confidence level.

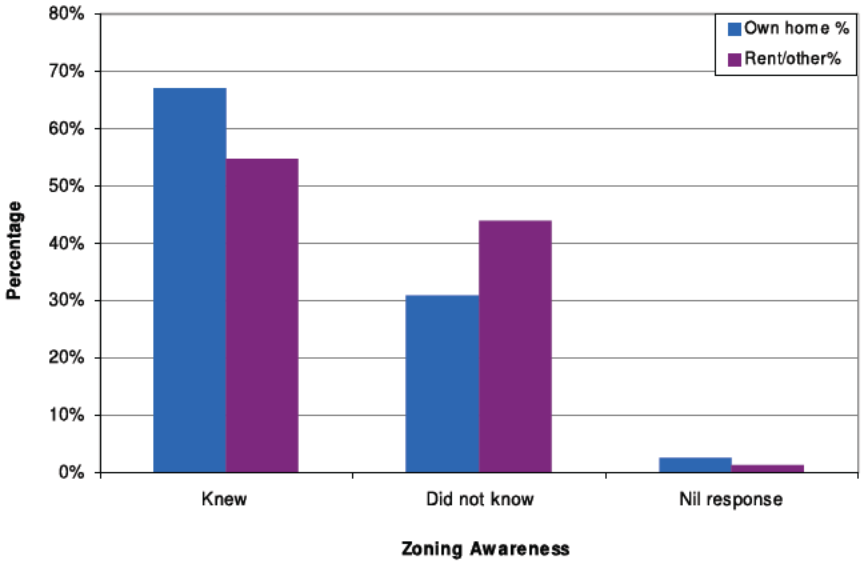


Figure 4.18: Awareness of Land Zoning at Time of Purchase Compared with Current Home Ownership

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

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Anticipation of Problems With Future Land Rezoning

At the time of purchase, the vast majority of landowners (about 90%), did not believe that there would be problems with the land being rezoned for residential use. This was true for both current homeowners and renters. Less than 3% in either category stated that they were aware that there might be some problems with future rezoning, with the balance being unsure or believing that perhaps there would be difficulties. This is shown in the following figure.

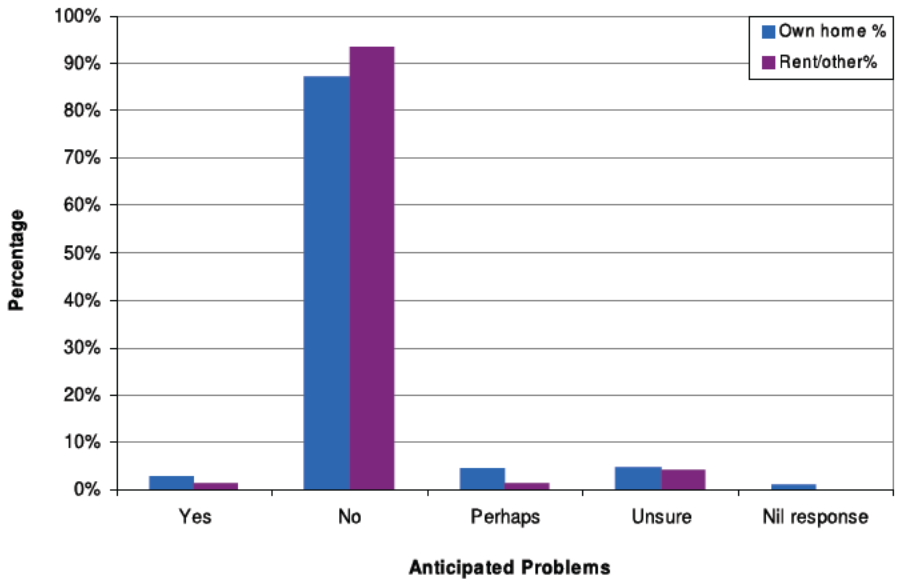


Figure 4.19: Landowners' Anticipation of Problems With Future Zoning

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

Intended Use if Land Rezoned Residential

The following figure compares respondents' intentions about what they will do with their land if it is rezoned for current homeowners and renters. For both groups the most frequently nominated intention was to build a home in which to live, with renters much more likely to have this intention (53% of owners and 75% of renters). This difference is statistically significant at the 95% confidence level.

On the other hand, those who currently own a home were much more likely to intend to build a holiday home if the rezoning occurs (42% compared with 16%). Again, this difference is statistically significant at the 95% confidence level.

The third most frequently nominated intention for both groups was selling the land, in approximately equal proportions (13% for owners and 11% for renters).

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Current home owners were less likely to intend to build a house to rent or sell, 5% compared with 7% of renters.

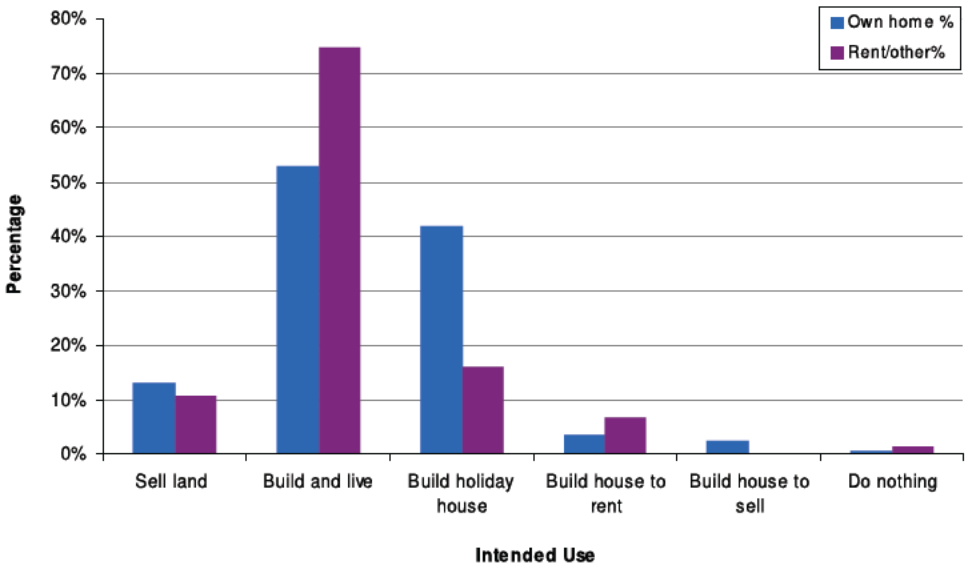


Figure 4.20: Current Home Ownership Compared with Intended Land Use if Rezoned for Residential Purposes

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

Impacts if the Land is Not Rezoned Residential

Existing homeowners and renters reported somewhat different impacts in the event of their land is not being rezoned.

- The impact most frequently nominated by both homeowners and renters was economic loss, though homeowners were more likely to nominate this than renters (64% and 44% respectively). This finding is statistically significant at the 95% confidence level
- The next most frequently nominated impacts for homeowners were those relating to psychological or emotional response. This was higher than for renters, at 35%, though this apparent difference is not statistically significant
- Those currently renting were more likely to indicate that the main impact on them if the land is not rezoned for residential use will be the loss of the opportunity to build a home to live in or relocate to (37% of renters compared with 16% of homeowners). This finding is statistically significant

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- Current home owners nominated the loss of opportunity to build a holiday home and recreational options far more often than renters (19% of owners compared with 4% of renters). Again, this finding is statistically significant
- Home owners were more likely to nominate the loss of retirement options, 22% compared with 15% of renters, though this is not a statistically significant difference.
- Eleven percent of owners indicated that they would experience a loss of faith or belief in the government, justice system or Council. This compared with 3% of renters, but was not statistically significant
- Other impacts, such as loss of superannuation or investment opportunities, financial hardship and physical or health impacts, were fairly similarly reported across both groups.

These findings are shown in the following figure.

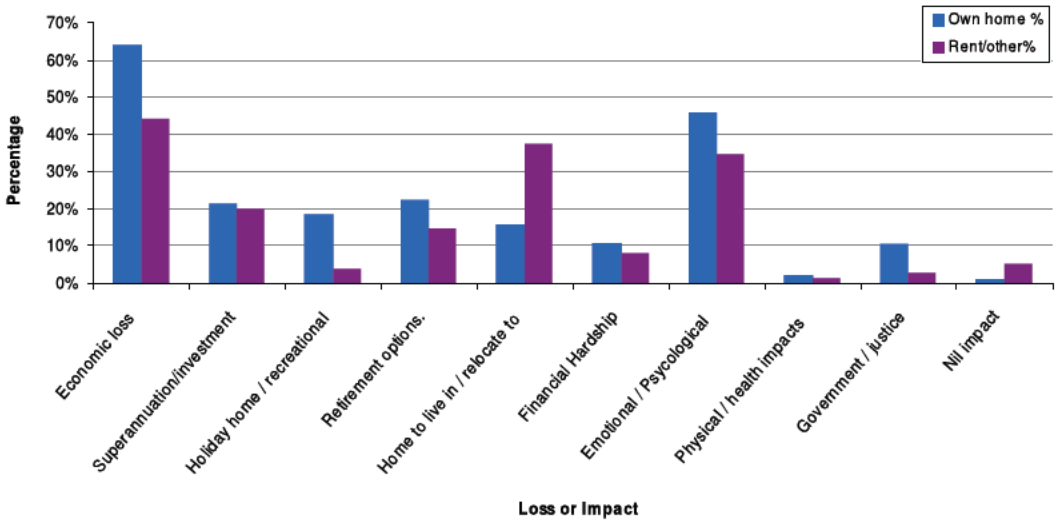


Figure 4.21: Impacts If the Land is Not Rezoned Compared With Current Home Ownership

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

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4.2.2. Cross Tabs Re Intended Land Use at Time of Purchase

Main Reason for Buying the Block of Land

Aggregated data in Figure 4.22 shows that the overwhelming majority of landowners, 92%, purchased their block of land with the intention of building a dwelling on it. Landowners who nominated intending building a home to live in, retire to or use as a holiday home were classified as 'intention to build' . Landowners who nominated building a home as an investment either to sell or rent out or reselling the land were classified as 'intention to speculate or invest'.

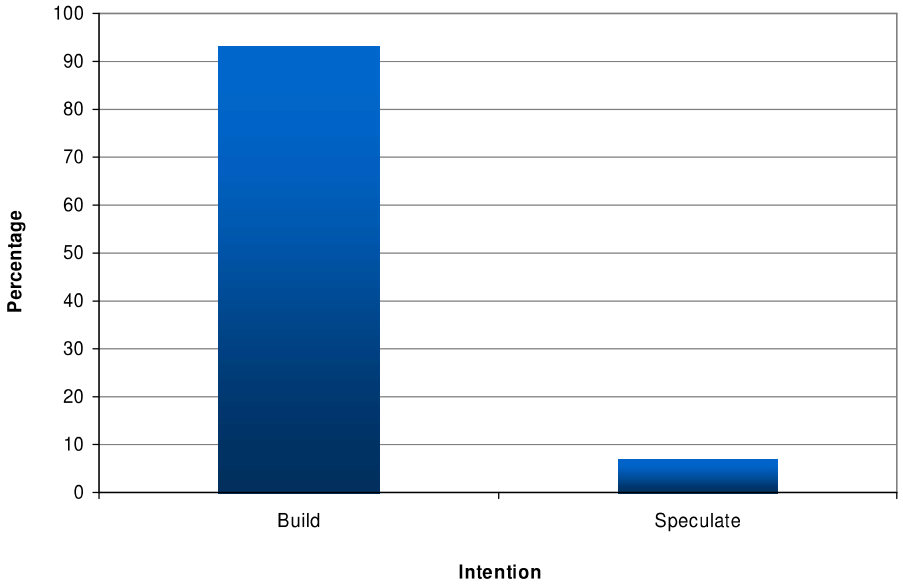


Figure 4.22: Purchasers' Intentions: Build on Land Compared With Speculation

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

As can be seen in Figure 4.23 below, the proportion of renters and homeowners who 'intended to build' at the time when the land was first purchased was very similar, about 90% in each category.

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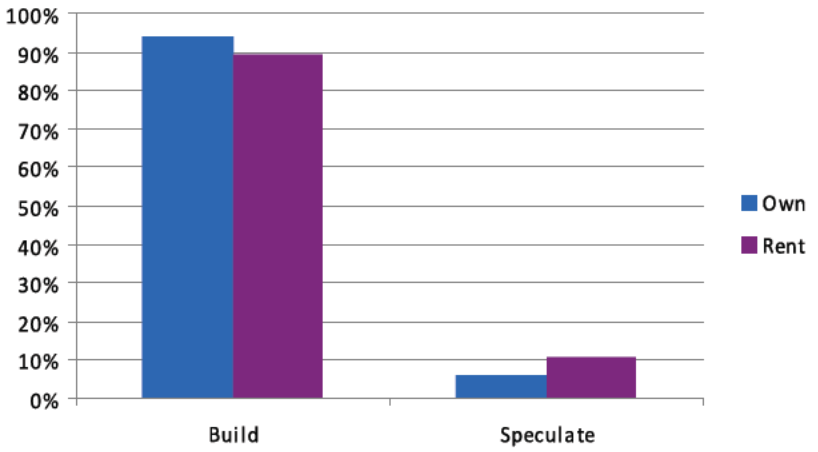


Figure 4.23:Purchase Intention Compared With Current Home Ownership
Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

The intention at the time of purchase was also similar for survey respondents within each income band (that is, high, medium and low income bands as defined above). Aggregated data shown in Figure 3.25 indicates that,

- Of those in the low income bands, 47% intended to build compared with 50% who intended to invest
- Of those in the medium income bands 21% intended to build compared with 15% who intended to invest
- Of those in the high income bands 32% intended to build compared with 35% who intended to invest.

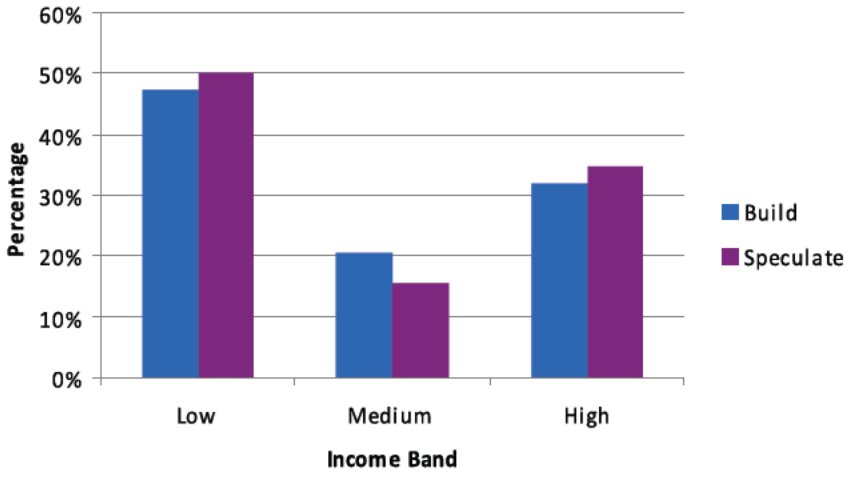


Figure 4.24: Current Income Band With Original Intention of Land Use
Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

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However, comparing the original intention (build or invest) indicates a difference across income bands. Those in the low-income band were more likely to plan to build than those in the medium band, and more likely than those in the high-income band. These findings are statistically significant at the 95% confidence level.

The distribution across income bands is similar for those who intended to speculate or invest.

As shown in Figure 4.25, the majority of respondents were aware of the zoning status of the land at the time of purchase, whether their original purchase intention was to build or invest. Of those who planned to build 65% were aware of the zoning, and of investors, 81% were aware. However, there was no statistical significance between the two groups, that is, builders and speculators.

A sizeable proportion of those planning to build, 35%, reported that they were not aware of the zoning status, compared with 19% of investors. This finding was not statistically significant

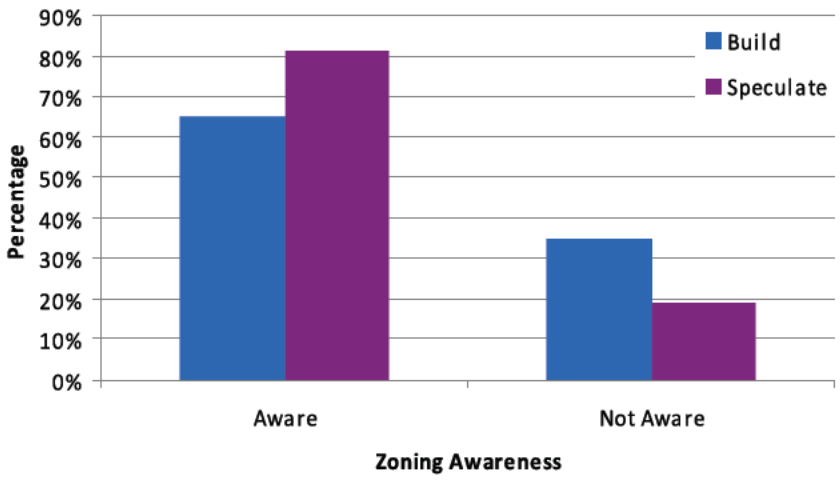


Figure 4.25: Original Intention of Land Use Compared With Zoning Awareness At Time of Purchase

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

A sizeable proportion of those planning to build, 35%, reported that they were not aware of the zoning status, compared with 19% of investors. This finding was not statistically significant.

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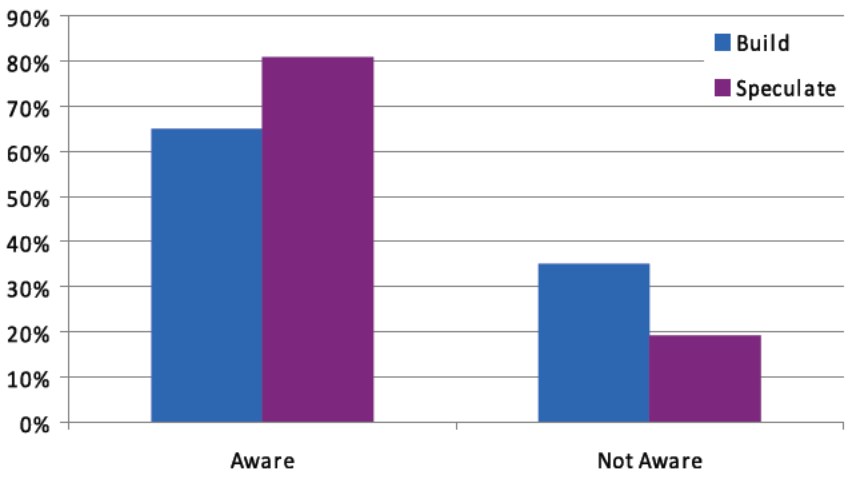


Figure 4.26: Original Intention of Land Use Compared With Zoning Awareness At Time of Purchase

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

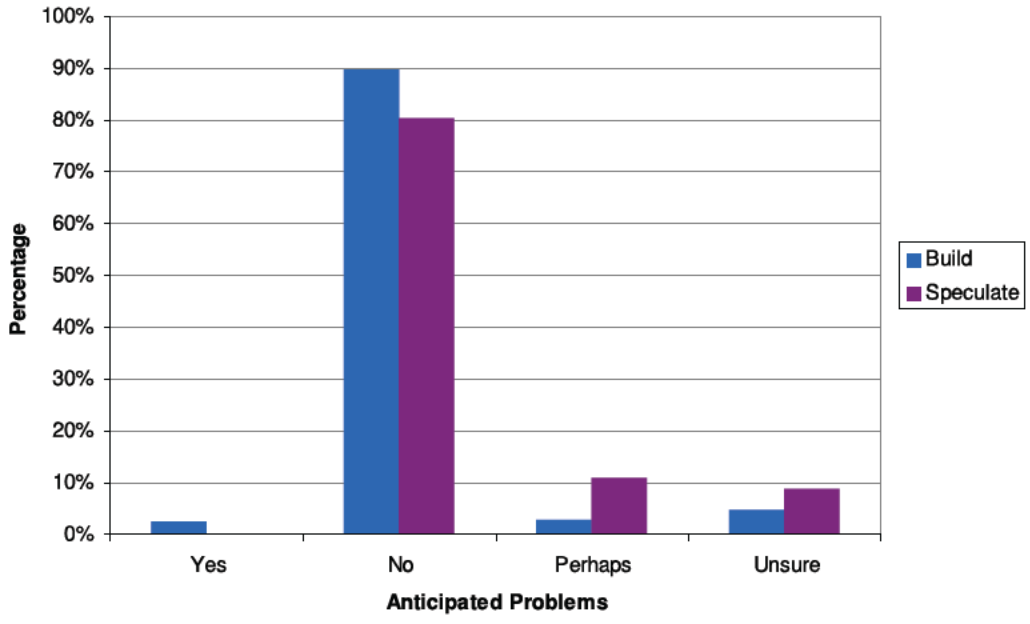


Figure 4.27 Purchase Intention Compared with Anticipation of Problems with Future Zoning

Source: Judith Stubbs & Associates, Heritage Estate Land Owners Survey (2008)

It is noted that some landowners nominated more than one intention, including both build and speculate options.

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The majority of landowners, whether they bought their block of land intending to build or speculate, reported that at the time of purchase they did not anticipate that there would be problems with the land being rezoned. This was reported by 90% of those intending to build, and 80% of those intending to speculate. The difference between those intending to build and those intending to speculate was not statistically significant.

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5. Case Studies

5.1. Overview

This section reports on the structured interviews conducted with a random sample of landowners in order to explore the social and economic impacts related to the decision on rezoning in more detail. As noted above, in all 30 in-depth interviews were conducted with randomly selected survey participants. The landowners interviewed raised and discussed issues which were consistent with those reported in the surveys.

Taken as a whole, the interviews reveal a relatively consistent and often poignant story of disappointment, loss – financial and emotional – amid a continuing hope that some opportunities may still be realised through the eventual rezoning of the land. A common comment, as people age, die or become less able, is that even if not successful *this* time, they will hold on to the land and continue to pay rates so that perhaps their children may eventually benefit. When asked what they would do if the land were never rezoned, it was apparent to the interviewers that this was an inconceivable idea to the majority, and one that they had never considered.

It is perhaps reasonable to take a *caveat emptor* approach to this matter, particularly in relation to the failure of the vast majority of owners to seek adequate and independent advice at the time of purchase. However, the interviews reveal a group of people who had virtually no understanding of the NSW planning system, or who had very different legal systems in their own country. Many had little if any English, and/or relatively limited education, and were not sophisticated or perhaps sufficiently suspicious of the deal they were being offered.

Overwhelmingly, they were not purchasing as investors, but describe in vivid terms their hopes of building a better life for themselves or their families away from the city, and sometimes of recreating the life they had left in smaller villages in their home country. The dream of owning a home, and particularly one close to the coast is seductive for Australians generally, but increasingly unattainable for those who are not well-off. Undoubtedly, it was this dream that led some also to ignore precautions that they may reasonably have taken to ensure that they were purchasing wisely. A great deal of regret was expressed but some interviewed that they did not gain or realise that they needed independent advice at the time of purchase, and anger and bitterness by others about opportunities lost compared with other investment choices they could have made at the time.

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In this context, owners consistently describe the high-powered marketing strategies and plausible marketing team with which they were confronted at the time of their purchase. Most describe being flown or sometimes driven down to inspect the land, shown subdivision plans that appeared to be legal documents, taken to marked lots and graded tracks sometimes with street signs, and overwhelmed with the beauty of the area and the possibility of owning something there. From documents reviewed, it also appears that some were referred to what was reported to be independent solicitors or conveyancers, who later turned out to be associated in some way with the vendor.

A further influence was the fact that nearby areas were being developed quite rapidly, so that it is perhaps not surprising that they believed salespeople and their legal representatives that it would only be 'a few years, 5 or 10 at most' until their land was rezoned as well. Approval of the nearby Stockland development in 2007 by the NSW Minister for Planning as a Major Project also gave renewed hope to some, though there was also considerable anger expressed about the apparent injustice of this approval for a 'large developer' with greater power and profile than a group of individual land owners. Another related theme was anger and/or mistrust of government, and what appeared to be bewilderment with a planning system that permitted some land to be developed but not other land, even if it appeared to the untrained eye to be similar.

Though most talked about financial loss, most appeared to be at least as concerned about related emotional and psychological impacts, some describing how it had or was 'making them sick' and was leading them to think of 'giving up'. A number described the considerable sacrifice of family time or resources that this had meant over some years, which had been made in anticipation of more family time on holidays or moving down with extended family later. An area of particular bitterness related to the position they or their family would now be in had they chosen to pay more for a block in a different location, or invested in a unit or home that they could now live in, sell or rent out. There was also a general lack of understanding about the rationale for continuing to pay Council rates, particularly as they were now unable to use the land for any purpose and did not live in the LGA.

The position of renters is particularly difficult in this regard, as they generally do not have any other asset to fund their retirement or in which to live securely as they get older. Though some may have never been able to do so, an alternative investment decision some 20 years ago would undoubtedly have made a considerable difference to many of these people. It has left some with no ability to

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now own a home, and others with significantly reduced income/assets to rely upon in retirement.

The following provides an edited report of the main issues raised in the Case Studies.

Case Study 1

CS1 is a 40 year old man from a Greek background. He and his brother immigrated to Australia when they were less than two years old. The two brothers were in their early twenties, when they bought the block of land in 1992 for $18,000. At that time, they were living in Sydney and working full-time as apprentices. Neither was married. Now they are both married with children and both still working full-time. One brother owns a house in Condell Park, and the other brother lives in rented accommodation.

The brothers initially heard about the Heritage Estates from a friend who had bought the block next to the one they eventually purchased. The brothers originally intended to build a holiday home on their block, as the land is close enough to Sydney to drive down for the weekend.

The brothers did not seek independent legal advice about the zoning status of the land. CS1 said he took his friend's word that it would be rezoned. He also reasoned that there were developments going on all around the area and that it would therefore only be a matter of time before Heritage Estates was rezoned for residential use.

The brothers have never tried to sell the land, because:

> *We believed it was going to be rezoned soon, and we've worked hard to pay it off.*

In addition to the financial loss, that is, the initial cost, interest on the mortgage, about twenty years' of SCC rates and financial support for the Shoalhaven Landowners Association, the brothers have lost the opportunity to use the land, with their families, including their parents and their children.

CS1 is angry about perceived delays in rezoning the land:

> *Every year we get told it's getting closer to rezoning, they're checking the wildlife, checking the soil; it's all bullshit*

The brothers are angry about having paid Council rates for about 15 years, without Council taking any action towards rezoning. CS1 suggested that:

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Council is probably using the money for investment elsewhere!

The brothers are also *"stressed out, savings gone, waiting, can't do anything with it"*.

At this stage, they are uncertain about what they would do if the land is not rezoned for residential use, but would *"like to sue Council for losses and expenses".*

Case Study 2

CS2 is a 50-year-old man from a Mauritian background. He and his wife came to Australia in 1987. He was then working full-time in Blacktown on the production line for Cadbury Schweppes. He and his wife divorced in 2007. He is currently in full-time employment and lives with his 19-year-old daughter in a house he is paying off in Edensor Park.

CS2 and his wife bought their block of land in 1989, for $15,950. He reported that they were not in a financial position to buy a house in Sydney, as his wife had unexpectedly become pregnant with twins. They bought the land as an investment and were planning to sell when it became rezoned for residential use.

CS2 did not seek independent legal advice about the land purchase. He was aware that the land was not zoned for residential use, as the Heritage Estates salesperson had told them this was the situation, but *"we couldn't see any reason why it wouldn't become residential"*. He was adamant that poor English language skills were not a barrier to their understanding of the situation. He said:

> *We weren't conned, we believed the seller and hoped it would be true. There were residential facilities nearby, residential zoning nearby, we hoped it would be [rezoned] in 6, 7, 8 years.*

CS2 tried to sell the land in 1994, as he wasn't working and the family needed the money. He placed the land with a real estate agent in Liverpool. However, they received no offers.

Financial burden will be the main impact if the land is not rezoned. CS2 is paying off a mortgage, making support payments to his wife, and is financially supporting his daughter through university.

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Case Study 3

Since CS3 and his brother purchased the blocks, there have been many changes in their lives. CS3 is middle-aged, single and living in Dee Why. He is currently an unemployed labourer and landscaper. CS3's brother is in his early thirties and living in Bundanoon and is recently separated from his wife, with joint custody of his two young children. Both brothers are currently living in rental properties.

In the late 1980s, CS3, his brother and their sister purchased three adjoining blocks of land in the Heritage Estates for $17,500 each. Since CS3's brother was only 12 years old at the time, two of the blocks are listed in CS3's name. CS3 explained that one of the properties belongs to his brother. At the time of purchase, the siblings were all living at home with their parents in Canterbury, and CS3 was working at his father's petrol station.

CS3 recalls that the family first heard about the Heritage Estates from his younger brother, after he had read an advertisement about the land. Even at his young age, the idea of having land near the coast appealed to CS3's brother as he had a keen interest in scuba diving. The family was flown down to the south coast to view the property.

> *There was a whole group of us* [flown down to view the property] *and when we arrived they put us on the bus and drove us all straight to the property…There was a big sign outside the property saying that Council is not going to zone residential … So I asked the agents, 'What's that all about?' And they said, 'Council's not going to zone it now. They are going to do it later. But they just want people to know, buying now, that they are not going to do it now.*

Although CS3 questioned the Council's signage on-site, he believed that the signs were there,

> *…To tell us that Council is not looking to do it* [the rezoning] *immediately, but it will be done because its already been subdivided … Now it sounds, you know, ignorant but back then you think, no one would lie to you that blatantly… it was a big scam…They drove us past the signs and straight into the property. So if you weren't really looking out… you would have missed it.*

CS3 commented that he believed that since the land was separated into small lot sized parcels, it seemed logical that it would eventually be rezoned for residential

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development. The real estate agents also told the group of prospective purchasers that there had been some previous land releases and other buyers had already invested in the area. This gave him the impression that he had better *"get in now"* while the opportunity was still available.

The siblings bought the land for investment purposes and hoped to one day build a holiday house on at least one of the properties. They were joined by two sets of family friends who also bought land at Heritage Estates. Like others interviewed, they had hoped to provide opportunities for their family to stay close and to become part of a smaller community.

CS3 is currently paying off a consolidated loan from the purchase of the Heritage Estates land and debt from a failed business venture in 1991. He continues to pay annual Council rates. If the land is not rezoned as residential, he feels that he will have lost not only a large sum of money, but also the only opportunity he has to own a home. CS3 would consider selling the land back to Council if it was an option.

Case Study 4

CS4 immigrated to Australia from Poland about 25 years ago, at a time when his country of origin was under martial law. He now lives with his wife in Chittaway Point, in a home that they are paying off. He works casually. At the time of his purchase in the Heritage Estates (1988), he was aged 36, working full-time as a service engineer for ICI, married with two children and living in his own home in Seven Hills.

CS4 heard about Heritage Estates through friends. He bought the land with the long-term plan of building a holiday house, and eventually retiring there. Based on the Heritage Estates Real Estate Agent's advice he expected that the land would be rezoned in the future.

CS4 paid approximately $8000 for his land, plus interest payments, and a donation to the Shoalhaven Landowners' Association each year.

The main impacts for CS4 if the land is not rezoned will be financial loss, including the annual SCC rates as well as a loss of trust in SCC and the Federal Government. He expressed frustration at the lack of decision in the Heritage Estates matter:

> *We are looking for a decision, and a conclusion.*

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When asked what he would do with the land if it is not rezoned for residential use CS4 became upset. He pointed out that if this is the case there are not a lot of options, "*practically I can't do anything*".

Case Study 5

CS5 immigrated to Australia from Cyprus with her father and two brothers as refugees in 1975. She was aged 18 and found work as a dressmaker. She is now retired and lives with her husband in their own home in Chipping Norton. She and her husband borrowed money to buy their block of land in 1990. Along with two other families they borrowed money to purchase two blocks of land, one for $17,500 and one for $14,950. They were intending to build homes for all three families and relocate to the area, looking for a "*quiet life*" as part of a smaller community.

CS5's brother had seen the Heritage Estates land advertised in a newspaper. The Heritage Estates Real Estate Agent told them that the land was not currently zoned for residential use so they could not build on it, but that they would be able to do so in some years. CS5 said they believed the Real Estate Agent and so did not think that they needed to get information from anyone else. She felt that they were *"tricked into purchase"*, believing that they *"would have no problems building"*. She didn't remember any *"warning signs"*.

One of the outcomes of the many years of waiting to see if this land will be rezoned has been that the three families involved have had to buy homes elsewhere, rather than realising their plans to build homes on the blocks and bring up their families together in a quiet area. In addition to the financial loss, that is, the initial cost, interest on the mortgage, about twenty years' of SCC rates and financial support for the Shoalhaven Landowners Association, the families have lost the opportunity to invest elsewhere. They no longer financially support the Shoalhaven Landowners Association because nothing has changed over the years. They have a sense of futility: the land is of "*no use – just sitting there*".

Case Study 6

CS6 is currently employed as a train driver. He is a 35 year old Australian and speaks English at home. He is married and lives with his wife and three children in privately rented accommodation in the south-west area of Sydney.

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CS6's father bought the block of land in Heritage Estates in 1988. His father did not own his own home at the time and was able to pay the $10,000 outright. However he died in 1992 and the land was passed onto CS6, who reported that his father wanted to build a holiday home on the land, but might have retired there, had he lived.

CS6 was 15 years old when his father bought the property. He was not sure about where his father first heard about the land, but said it was probably from the television. In any event, he recalled that the Heritage Estate Real Estate Agent "*organised everything*", including all the transport for them to visit and inspect the land: the flight down, the taxi out to the land and the site inspection. They were shown around the land and shown plans which had street names and lot numbers. They did not seek independent advice, they "*just took the word*" of the agent who told them that "*everything would be OK in the future*" and that rezoning was "*just a matter of time*".

CS6 and his father did not have any contact with Council at the time of purchase, or since. He has continued to pay his rates and also contributes to the Shoalhaven Landowners Association, including paying an annual subscription of about $80.00. He has attended some of the Association's meetings, for example to try and obtain Council permission to maintain the land.

CS6 would like to keep the Heritage Estates block, even if it is only to camp on, otherwise "*we'll walk away with nothing*". He does not "*want to give up that easily*". The main impact for him if the land is not rezoned will be financial loss, including the annual SCC rates, as well as feelings of disappointment and loss if they cannot build on the land after twenty years of waiting and putting in effort towards having it rezoned.

Case Study 7

[CS7 responded on behalf of his parents who own the block of land].

CS7's parents are a retired Lebanese couple, now living alone in their own home in Hurstville. They speak Arabic at home. They came to Australia about 35 years ago. CS7 was 25 years old when his parents bought the block of land at Heritage Estates in 1989, for $17,500. He accompanied them to view the property and assist them with discussions, as their English language skills were poor. At that time his parents lived in Hurstville, with their 6 children. His father was 56 years old and in full-time employment.

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CS7's parents were looking for a property in the country, and received information from the Heritage Estates Real Estate Agent, who "*was very convincing".*

They were flown down to have a look at the land. They believed that the land would be rezoned for residential use in the "*near future*". The Heritage Estates Real Estate Agent had pointed out nearby residential suburbs, and indicated that their land would be similarly rezoned.

CS7 has paid off the land himself, because with the delays in rezoning "*my parents are too old to use it now".* Apart from the financial losses including the original purchase price, interest payments, ongoing Council rates and contributions to the Shoalhaven Landowners' Association, CS7's parents are deeply disappointed and depressed by the loss of investment opportunities and the lost possibility of building a holiday house for the family which was to become their retirement home eventually. Like others, they commented on their hopes to keep the family together through having a holiday home to go to.

CS7 will seek legal advice regarding their options if the land is not rezoned.

Case Study 8

CS8 is about 38 years old, self-employed, single and living in her own home in Leichhardt. Her sister who also purchased a block is self-employed and living in New York. Their parents came to Australia from Croatia in the 1960's.

CS8 heard about the land from a television advertisement. She, her sister and her father were flown down to the area to have a look at the land. They did not seek information from anyone other than the Heritage Estates lawyer, and the Real Estate Agent prior to purchase:

> *They flew us down; they were really persuasive, it was a very slick operation. We believed it would be rezoned for building in a couple of years.*

CS8 and her sister purchased a block of land each in Heritage Estates in 1989 or 1990, for approximately $20,000 per block. They were about 19 years old, both attending University, casually employed and both living at home with their parents. Both sisters worked while attending University to pay off their blocks of land.

CS8 feels that they "*were conned*". She pointed out that there is a wide range of people who bought these blocks, and that not all of them were uneducated or unaware of legal issues, or had poor English skills. In other words, she noted that

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even people who had good English skills and were educated were tricked into buying this land.

For CS8 and her sister, the land was intended to provide some financial security. Apart from the financial losses including the original purchase price, interest payments, ongoing Council rates and contributions to the Shoalhaven Landowners' Association, if the land is not rezoned for residential use CS8 will be extremely disappointed and left with the feeling that they have been deceived by very slick salesmen, with no recourse as the company which sold them the land no longer exists.

Case Study 9

Case Study 9 (CS9) is a 50 year old Persian who has been in Australia or about 22 years ago. He lives with his wife and two children, aged 15 and 16, in rented accommodation. He and his wife usually speak Persian at home. He currently works full-time as a store supervisor.

CS9 was about 28 years old, married with one child and living in rented accommodation in Brookvale when he bought this block of land for $17,000. He was working full-time, doing the same type of work as now.

CS9 saw the Heritage Estates land advertised on television. He and his brother were flown down to have a look at the land, by the Heritage Estates Real Estate Agent. The Real Estate Agent showed them round the site. They had "*a BBQ and this and that onsite and he have a few guys here working*". They liked the area, and decided to buy land, believing that it would eventually be rezoned for residential purposes:

> *It was near the water and the real estate, the guy from real estate said it was good and you know you can build a house here and there. Not straight away, maybe couple of years' time.*

CS9 and his brother were planning to build, possibly to live in the area or to have holiday homes. If they had known that they would not be able to build for so long, and possibly never, they would not have bought the land. At the time of purchase CS9 and his bother had only fairly recently arrived in Australia and were inexperienced in buying land. CS9 believes that this was the main reason that they did not seek further advice, rather than their level of English language skills, which were not as good then as now. They did not seek independent advice from any source, and believed what they were told by the Real Estate Agent:

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> *You know we trust the guy, he say all this and that you know, that was the thing. We didn't talk to other people, we didn't get any advice from local real estate or anything.*

The Heritage Estates Real Estate Agent "*was very confident*" that the land would be rezoned in 1 to 2 years.

CS9 is no longer financially contributing to the Shoalhaven Landowners' Association because he cannot afford to do so. He recalled discussing the possibility of selling the land with someone once, but was advised:

> *There's no one interested to buy it because this is not, you know you can't build on it, it's in the middle of nowhere.*

The main impacts on CS9 and his family if the land is not rezoned for residential use will be financial and emotional. CS9 has paid his annual Council rates "*for a long, long time*". He does not want to relinquish his land, but neither does he wish to continue paying rates for land he cannot use. He would seek legal advice about his options, and is:

> *Very disappointed and we just lost maybe that money and what can we do?*

Case Study 10

CS10 is Australian-born, currently unemployed and living with her 34 year old son in rented Department of Housing accommodation in Greenacre. CS10 became a widow at the age of 31 in 1987, when her husband died in a motor vehicle accident whilst on the way to work. She was working part-time as a cleaner.

CS10 used the WorkCover NSW compensation in relation to her husband's death, of about $20,000, to buy a block of land in Heritage Estates in 1989 for $18,500. There was also other compensation money to be used exclusively for her sons' upbringing and education. CS10 did not want to squander the compensation money so she looked for investment opportunities.

CS10 saw an advertisement for Heritage Estates, was flown down to have a look at it and purchased a block for about $19,000 in 1989, under the impression "*virtually that we were getting a bargain*". CS10 said:

> *I was so happy at the time that I finally owned a piece of Australia but then ever since it's been devastating.*

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The Heritage Real Estate Agent indicated to CS10 that the land would become zoned for residential use. This included discussion of other development in the local area:

> *They also showed us and there was a big sign there, the land that was opposite ours had a big shopping centre sign. And they said to us there is a new big shopping complex and all that getting built, all in there, so there is no way that they wouldn't release this land. We were right opposite and the sign was there, this big sign like a plan for this shopping centre to go through.*

However, some years later, the sign:

> *was nowhere in sight…there was just this bushland there. So whether the Real Estate Agent put this sign up to con us all a bit more I'm not sure, but that [sign] was there.*

CS10 did not seek advice from any other source about the land:

> *It just seemed so good and being a real estate agent and a lot of people were sort of buying. I was probably a bit of a sheep following them.*

CS10 has paid her Council rates although sometimes this is a financial struggle for her and she has to pay interest on late payments. However, the many years of paying Council rates with no service provision and with no definite decision about zoning have left CS10 with distrust and suspicion about Council's motives. CS10 believes that Council must have given the developers permission to mark out the roads and the blocks in the way that they were shown when buyers were flown down to look at the properties [the streets and blocks were physically marked on the site, allowing for access to each block, and some streets had signage]. She wondered why Council had agreed to this, then refused permission for building:

> *So why did the Council allow all that to go on to make it look like it was going to be developed and sold and then turn around and say no? So it looks like the Council knew that they were just going to get all this money and do nothing, have to put nothing back*.

CS10 expressed distrust and cynicism about the equity of Council's processes:

> *Well if we were big business and we had money it [rezoning] would be done straight away*.

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CS10 will be devastated if she is not able to build on her land, as it represents her only chance to own her own home and reduce her dependence on government welfare benefits:

> *I'd be devastated like, well, that's the only thing, that block of land is sort of my future…if it doesn't come out* [ie be rezoned] *I'll be looking to do stuff in the city on the Housing Commission depending on government. Where if I get that* [home] *I won't be dependant on government housing.*

For CS10, if the land is not rezoned:

> *Well I'll have no future for a home, you know. Like that is what I was hoping for. I was always hoping to eventually be able to get it released and get something built on it and have my home. If it doesn't come out* [i.e. be rezoned] *I will never ever own a home.*

In summary, the impacts on CS10 if the land is not rezoned will be personal distress, financial loss, financial disadvantage and lost opportunity for housing independence. Additionally she expressed distrust and cynicism regarding Council's motives and lack of equity in its dealings with different sectors of the community, favouring "big business" over ordinary rate payers, and issue that was noted by others in relation to the nearby Stocklands development.

Case Study 11

CS11 is a 58-year-old 'naturalised' Australian, who was born in England. He arrived in Australia when he was 4 years old. He has just retired from full-time employment as a motor vehicle assessor for an insurance company. He and his wife now live alone in their own home in Bongaree in Queensland.

CS11 bought a block of land in Heritage Estates in 1988. He was then living in Tahmoor with his wife and three children aged between 14 and 8 years old, paying off his home.

CS11 and his wife found out about the Heritage Estates land from a television advertisement. They went to Heritage Estates to view the land:

> *We actually drove down because my, my wife's mother left her, well she hadn't passed away at that stage but she wanted to give my wife some money prior, well rather then inherit it she wanted to give her $10,000. She had 3 daughters you know and she decided to give each of her 3 daughters $10,000 and just do something*

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> *positive with it and we spent $8,000 of that from memory doing something positive, or what we thought was positive buying that land. That's why we did it. And we did it for our future.*

CS11 did not seek information about the zoning status of the land from anyone other than the Heritage Estates sales person, and the Heritage Estates lawyer. Although he did not expect that there would be rezoning in a short time frame, he has been frustrated by the lack of a decision over the many years since they bought the land:

> *We figured eventually that would be rezoned and then we'd just build a house on it and we'd retire there. Then we'd be near our family and that was more or less our long-term plan. We didn't think they were sort of going to rezone it the next year or anything like that and on the basis of that we just kept up on, even though we were getting pretty cranky with the whole thing… the talk of the rezoning of that land has been going on for a long, long time.*

CS11 believes that they made a wrong decision in buying the land, being deceived by the way in which information was presented, but also pressured by the sales person:

> *I guess we've been sucked in by the TV advertising as probably many have…and the high pressure salesman…I remember the salesman saying 'look you'd better hurry up and do something, there's only two blocks left'. And we were sort of in a bit of a panic and one of the kids was in a pram I remember…and we were trying to run quick up a dirt track kind of thing…we had to get back to the sales office which was a caravan sort of thing in a clearing…trying to run back and hurry up and give them some money to secure it because there were only two left according to the salesman. And we sort of raced back, gave them whatever we had to give them, a deposit to secure it and happy we'd done that thinking that we'd done something good for the future you know. Basically it was just like putting a noose around our neck I think.*

CS11's relatives all live around the Heritage Estates area, and they planned to eventually retire to there. As the land has not been rezoned for residential use they have moved up to Queensland, for cheaper accommodation, which allowed them to get out of debt even though this means they do not have family around:

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> *We wanted to live there [Heritage Estates]. That was our plan…the reason we are up here is because it's cheap. It was clear to us that the land was just going round and round in circles and it looked that they were never going to rezone it and we felt that we had just wasted our bloody money you know. And we were conned, but when that become clear to us we thought…what are we going to do, we were umming and ahhing whether to stop even paying the rates. And we thought it was just a dead loss. I did try to sell it at one stage; no one was interested in buying it.*

Since his retirement, CS11 and his wife continue to pay Council rates in instalments, as they can no longer afford to pay them in a lump sum:

> *I'm currently living on the equivalent of the pension. $2000 a month, which is basically the pension or pretty close to it I've just managed to accumulate that little bit of super and we're just surviving on that. I retired a little bit early because the particular job I was in was stressing me out and I made the decision to get out before I… it knocked me around*.

In summary, CS11 feel that they "*were conned by the media hype and the sales people at the site*"; they now find themselves in financial hardship, living in another state and away from family. CS11's father is now in a nursing home in Blacktown. They cannot afford to travel frequently to see their families and want to come back to NSW to be near them. In addition to the financial costs over the years, including the original purchase price, interest payments, ongoing Council rates and contributions to the Shoalhaven Landowners' Association, they feel that they have been deprived of their retirement plans. Their life would be considerably different had they made a different investment decision.

Case Study 12

CS12 is in her late 50s. She lives with her husband and two sons who are in their late 20s, at the family home in Kingsford. She was born in Australia and is of Greek decent. Her husband was born in Greece and immigrated to Australia when he was 17 years old. The couple speak Greek to each other and English with their sons. The couple are cleaners currently working part time. CS12's husband's workload is limited due to an injury.

In 1989 at the time of purchase, the couple was in their late 30s and working full-time as cleaners. The couple heard about the land for sale at Heritage Estates from

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CS12's brother-in-law, who was purchasing land and suggested that it would be a good opportunity to own a holiday home.

CS12 recalls her initial hesitation about purchasing the land as the real estate agent informed them that they would not be able to build on it for approximately two years.

> *I was a bit hesitant because we asked how soon can we build on it and they said in a couple of years time, not more then 2 years - it'd take about a couple of years before you can start building. And I said to my husband, 'Look you know, I'm not very happy about that. If we can't build now, who knows later on if we can build or not?'*

At the time of purchase, the couple took advice solely from the real estate agent and did not seek information or advice from the Council. They felt that the real estate agent was "*very convincing*" that in two years building would be allowed. Thus despite some initial hesitation, the couple decided to apply for a loan and purchase the land for $9,500. They planned to build a small house on the land to be used as a place to take their children on holidays. They also felt that the purchase would be a good investment for the future, and perhaps a place where they could retire.

Nearly 20 years after the purchase CS12 describes their investment as, "*The biggest mistake we've ever made".*

The couple laments the cost associated with the land that has accrued over the years including interest payments and approximately $400 each year for Council rates. Such costs placed particular difficulties on the family while the children were young. CS12 feels that the children "*missed out*" on holidays due to the constraints of the mortgage. Like others interviewed, they felt that this sacrifice of family time and resources would be worth it in years to come.

CS12 will be very disappointed if the Heritage Estates land is not rezoned for residential development, as they feel that they have suffered for many years by working two shifts to save money for the land with nothing to show for the sacrifice and feeling now that it was all a waste. Whilst CS12 feels that they were taken advantage of by the real estate agents, they also feel that the Council has misled them over the years, as they have continued to pay rates with no services provided in the expectation of eventual rezoning. Moreover, CS12 does not understand how and why the Council would have allowed the land to be sold by the real estate agents under the pretences that it was eventually able to be built upon.

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Case Study 13

CS13 is 51 years old and was born in Australia. She is currently employed full-time in office administration. She lives with her partner in his house. CS13 owns a number of properties elsewhere, one of which she rents to her daughter.

CS13 and her partner at the time, who is of Aboriginal descent, bought the block of land in 1989 for $16,000. They were living in Miller in a house owned by CS13. She was working full-time.

They saw the Heritage Estates land advertised on television, and were flown down to inspect the area. They were planning on relocating there in a couple of years' time. CS13 described the advertising campaign as very sophisticated. Prospective buyers were given an artist's drawing, a map of the area, depicting the blocks and the streets, which were named:

> *And then when the rates started coming in…that was…that was the same name that was on the map that we were given. So it's definitely Council, to me have a lot, you know, they had involvement with this deception...*

However, whilst conceding that the buyers had responsibilities, for example to inform themselves better about the zoning, CS13 clearly feels that she and her partner, along with a wide range of other people were deceived by the Heritage Estates company:

> *We've been conned, and I mean, fair enough it's our fault…*
>
> *But there was deception. I mean, it was a very sophisticated level of campaign to sell this land…we were ripped off. It bordered on corruption…it's deceptive, there's deception, manipulation…you only need to look at the diverse range of people who were taken in by it…I don't classify myself as an idiot and I'm sure June* [co-ordinator of the Shoalhaven Landowners' Association] *doesn't…*

They were informed by the Heritage Estates Real Estate Agent and Heritage Estates solicitors that the land was likely to be rezoned to allow residential use in a couple of years, which suited their plans. They also looked at a nearby block of land which was zoned for residential use, but cost $5,000 more. Based on the expectation that the Heritage Estates block would be rezoned in a couple of years they decided to buy it and save themselves some money.

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CS13 initially supported the Shoalhaven Landowners' Association, but after she and her partner split up she became a sole parent and had to prioritise her finances. CS13 ceased contributing as she

> *… came to the conclusion that buying this land was a total, was just a total flop, and that I wasn't prepared to pour any more money into the… fighting fund I'd call it.*

CS13 had originally planned to relocate to the area for a fresh start, as her daughter was then young enough to do so. However, she was not able to realise this plan, and twenty years on her daughter has grown up and moved on. CS13' personal relationship has also changed. If the land is rezoned she and her ex-partner will have to come to an agreement on what to do with it. The options include selling the land or one partner buying the other out. However this option may be unattractive to both parties because of the significant appreciation in land costs in the area over the past twenty years.

CS13 described herself as being in a relatively fortunate position, as she has been able to continue paying SCC annual rates without financial disadvantage. Also:

> *I suppose I'm one of the lucky ones that the block that I got, that I bought is actually one that is being reviewed [for rezoning].*

CS13 questioned SCC's motives regarding the lack of rezoning and their repossession of blocks for default on rates payment:

> *I mean is it, is that the aim of Council? I mean this has been going on for 20 years, that you know, once they get enough repossessed land that they're going to allow some developer to come in and develop it?*

In addition to the financial losses, that is, the initial cost, interest on the mortgage, about twenty years' of SCC rates and initial financial support for the Shoalhaven Landowners Association, the impact on CS13 if the land is not rezoned will be a loss of plans to relocate with her partner and daughter, as twenty years have passed and her situation has changed. She has also been left with a distrust of SCC's dealings in this matter.

Case Study 14

CS14 is 39 years old, and lives with his wife and four children aged 1, 3, 5 and 16 in the family home in Glenfield, NSW. He was born in Australia and is of Italian decent. He speaks English at home. CS14 works full-time as a carpenter.

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CS14 first heard about the land sale on a television commercial advertising free trips to view the properties. The offer looked quite appealing, so he decided to investigate further.

> *They were just advertising a free aeroplane flight and lunch… being 20, I thought I'm going to do this. And I went down there for my free aeroplane and lunch, and just fell in love with the place as soon as they showed us the white sands and the blue water…*

At the time of purchase in 1988, CS14 was single and working for Taubman's Paint as a paint maker. He describes how growing up in the Botany area, he had never seen a place as beautiful as the land at Heritage Estates. He quickly decided that he wanted to live in this beautiful place and purchased a block of land for $13,000.

The only advice he sought was from the real estate agent and the solicitor that the agent recommended. CS14 acknowledges that he was aware that building was not permitted on the land at the time. However, he was under the impression that it would be allowed at some stage.

> *They said that you couldn't build, but they were just hinting that one day it's going to happen. You'd be able to build it.*

He recalls that the real estate agent and solicitor described how the same person who built Canberra also designed the Heritage Estates area *"to be a major place one day."* On the site visit with the real estate agents, he was shown plans and a subdivision map that further led him to assume that it would only be a matter of time before he would be allowed to build on the land. Upon reflection, CS14 also feels that it was not necessarily his youth and inexperience that led to his decision to purchase, as many people of different ages and nationalities also believed that the land would soon be rezoned for development.

> *Its not like I got suckered 'cause I was young…There [were] all different ages and nationalities and we all bought believing that one day it will be built….*

After nearly 20 years, when asked if he has considered what he will do if the land is not rezoned, CS14 recognises that the initial investment was a gamble.

> *If it's not going to be rezoned…you lose I suppose...it was a gamble in the beginning, they were just hinting that you could build and we all hoped we could build…*

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CS14 still hopes that the land will be rezoned so that he will be able to build a house for his family to live in and enjoy the lifestyle that the area will provide. If the land is not rezoned for development,

> *I'd be very disappointed. Like I said, it would be really lovely, at my children's age… we can build down there … and enjoy the children and the area down there it'd be like heaven, you know beautiful. Out this way at Glenfield, it was nice years ago but now its just so built up…I'd love to be able to put them on a little boat and go out fishing and ride the bikes safely with the less traffic and you know, really enjoy the family.*

Case Study 15

CS15 lives in her own home in Leppington with one child who is a 22-year-old full-time student. CS15 immigrated to Australia from Finland as a small child, whilst her husband was 19 when he arrived. They mainly speak English at home. They both work full-time now, CS15 as a librarian and her husband in the building industry.

The couple bought their block of land in Heritage Estates in 1989, and were married with two children living in the home they still occupy. CS15 was not working then, and saw the Heritage Estates land advertised on television. They knew a little bit about the area, thought it looked like a nice place to live and that it would be lovely to live close to the sea. They travelled independently to the area to view the blocks.

In addition to the information the Heritage Estates Real Estate Agent provided about the land zoning CS15 sought independent legal advice prior to purchasing their block of land. The lawyer advised that the land might not be rezoned for residential use but that he didn't know definitively what would happen with the rezoning.

> *They just said that it might be a bit of time before it's rezoned if it does get rezoned. We just figured if it's a growing area then surely they are going to release land…people have blocks already and its already sub-divided; like they are not going to start dividing new areas when there are areas already sub-divided. That was kind of what we thought at the time, probably a bit of our ignorance*.

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CS15 initially financially contributed to the Shoalhaven Landowners Association, but did not continue to do so as their children became older and they had competing financial demands, such as educational expenses. Also CS15 found that,

> *After a while your enthusiasm peters out...I don't find time to go to the meetings or things like that. It's not that I wouldn't support them, I kind of feel a bit guilty about not supporting them more than we do.*

About four or five years after buying the block, the couple tried to sell it as CS15 wasn't working and they thought they could use the money better elsewhere. However, no interest was shown by prospective buyers.

For CS15 the main impact if the land is not rezoned for residential use will be the financial loss, including initial purchase price and annual Council rates paid over the past twenty years, the loss of opportunity to invest elsewhere and loss of options to build and live in the area. CS15 also suspects that "*a lot of the reasons why it hasn't been released is political*", and that there "*people in the area who have clout and they just don't want it to be that way*".

Like many other landowners she is waiting for a resolution and clear direction about the zoning. CS15 cannot understand how the Council could expect the landowners to continue paying rates indefinitely for land that they cannot use in any way [for example, camping on the land or other uses is not permitted].

Case Study 16

CS16 came to Australia from Croatia about 45 years ago, as a 10 year old. CS16 and her husband live in Casula and are paying off a small mortgage. One son still lives at home with them. They speak both English and Croatian at home. CS16's husband is now 54 years old, and working as a building site supervisor. CS16 has retired.

CS16 and her husband were married, living with their three children in their own home in Lurnea and both working when they bought their block of land in 1989. CS16 could not recall exactly how they first heard about the land, but thinks it was an advertisement either on television or in a newspaper, or they may have been approached by a salesman. The siblings spread the idea by word of mouth. They had some cash available, and "*wanted to make some type of investment for our future*".

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The siblings were flown down to inspect the land by the Heritage Real Estate Agent. CS16 was accompanied by her 6-year-old son, as her husband was working on that day. He told her to buy "*if everyone else is buying and you think it's a good buy…".* She remembers that there were roads and street signs up on the land. CS16 stated that the block they purchased had a tar road at the front, presumably in reference to one of the surrounding roads.

CS16's siblings bought blocks adjoining hers. They had plans to build holiday houses and were anticipating spending time with their families:

> *You know, we were young when we bought our land there and we wanted to…at that time had they zoned it for building we would have had a weekender or holiday home there with my sisters on one side and my late brother was on the other side of me, so we had a really good holiday as well as you know bonding families*.

In the meantime, CS16's brother has died, and the opportunity for the siblings' families to spend holidays together has been lost: "*our dreams were shattered, still are shattered*". CS16 recalled:

> *I was one of the young ones thinking of my retirement and the future and holidaying and…cause we come from the sea, like I was born on the sea, like near the sea and I would love to have a property or a house near the water. I can't afford it in Sydney, but I thought I could afford it there and it was still close enough you know for the drive, for weekends and things like that.*

CS16 and her husband have no other investments. Their main goal in buying the blocks was to have family time together, and set themselves up for later in life. They also wanted to be able to assist their children financially. They regret purchasing the land as they had other opportunities that would have been better investments:

> *We would definitely have been better off had we made the decision to buy the unit in Liverpool…it could have made our lives easier. I mean my husband has had a triple by-pass and he gets up and goes to work even on his bad days...It definitely affected us on a very personal level, you know financially it set us back a lot… We are not going to have a comfortable retirement you know…we'd looked at a unit in Liverpool at the same time, we could have bought a unit which would have been [worth] over $300,000 now*

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and we could have had…maybe, from $150 rent a week to $300-$400 even...per week now.

CS16 and her husband have expenses now, which they had not anticipated:

We have a lot of medical expenses…all these things that were not foreseen then…we could sell it and set ourselves up and get rid of all the debts.

CS16 feel that they were mislead by Council, and the solicitor recommended by Heritage Real Estate, regarding the rezoning potential. They were aware at the time of purchase that the land was not zoned for residential use, but believe that they were told it would definitely be rezoned in a year or two:

We were definitely lead to believe that this land would be rezoned for building…and the way it was set up, why would Council allow for these blocks to be subdivided the way they were at the time and everything like that…

CS16 and her husband continue to financially support the Shoalhaven Landowners' Association, and have attended organised activities such as protests at Council premises.

Case Study 17

CS17 was born in Australia, and English is her first language. She has five children aged 10, 16, 17, 18 and 20. She is divorced and lives with 4 of her children in Cranebrook in western Sydney. She is currently working full-time as a receptionist at for a real estate agent.

CS17 and her former husband purchased a block of land in the Heritage Estates in 1987/8 for $10,000. At the time, CS17 was in her early 20s, newly married and had a new 3-month old baby. The couple was renting in the eastern suburbs of Sydney, and CS17 had ceased work to take care of the baby.

CS17 heard about the land for sale in Heritage Estates from a television advertisement. The couple drove down from Sydney to view the properties. They could not believe that such gorgeous land was being sold for such a good price. The couple planned to build a home on the land for the family to live in, to bring up the children in the coastal environment.

The couple paid in cash...*" it was every cent we owned".*

CS17 recalls asking the developers at the time:

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> *"Why are they selling the land so cheap"? No one gives land away for this price. And he explained that because they had purchased such a large quantity of property they were keen to sell them off at a low price rather than selling them at a higher price and not being able to sell them at all. And it really made sense to us at the time.*

CS17 was aware that the land was not zoned for residential development, but was told by the real estate agent that the land would be rezoned within 1 or 2 years.

> *…even though the contract said that the land wasn't zoned to build on, the solicitor told us that it would be one, possibly two years before it would be rezoned*.

Reflecting on the purchase, CS17 admits that she trusted the advice of the solicitor and as a result did not seek further information from the Council.

> *At the time I trusted the developers and the solicitor…we didn't feel the need to call council and discuss it - as I said because we trusted the solicitor*.

In the event, CS17 said:

> *We were very quick to speak with the solicitor and sign paper work up as quickly as possible. We didn't want to miss out.*

Since the purchase of the property, CS17 and her partner divorced. The property has been transferred to CS17 and she has been solely responsible for the rate payments.

CS17 does not currently own a home, but has been paying rent in Western Sydney for many years. She feels that while renting she has been essentially, paying someone else's mortgage while waiting to build her dream home on the land she purchased in Heritage Estates. If she had invested her money differently, she is likely to have been in a considerably different position now.

If the land is not rezoned for residential development, CS17 feels that she will not be able to sell the land to recoup any of the costs incurred over the many years since the land was purchased. She also feels that she will have lost the opportunity to relocate to the area and will be forced to stay in Western Sydney where home ownership appears to be unattainable.

> *If I owned the land I'm sure I would be able to get a loan to build on it but I can't afford to get a loan to buy a house and land. I'm a low-income earner.*

CS17 has continued to pay the annual council rates and is uncertain as to what her options would be if the land were not rezoned for residential development. She

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assumes that she would be unable to sell the land and is uncertain what legal advice she could afford.

CS17 still dreams of building a house on her land in Heritage Estates, enjoying the type of lifestyle that it would afford her family and the potential financial security it might bring.

> *I want to bring up my family in my own home at Old Erowal Bay, then they will have stability and an asset in the future.*

Case Study 18

[CS 18's daughter participated in the interview on behalf of her father due to his limited English]

CS18) is a 65-year-old man from a Bosnian background who came to Australia in 1969. He is retired and currently lives in his own home with his wife and 28-year-old twins in Kemps Creek. In 1992, he was working as a labourer for the local council. He was married with five children living at the home they owned in Edensor Park. At that time he purchased a block of land in the Heritage Estates for about $15,000 as an investment for himself and his eldest son, with a view to selling it once the area was rezoned for residential use. The sale of the property was intended to fund CS18 and his wife's retirement, but also to assist their five children with purchasing their own properties.

CS18 and his eldest son were flown down to look at the Heritage Estates properties. CS18 did not seek independent legal advice at the time. Based on the information supplied by the Heritage Estates Real Estate Agent, he believed that

> *It would just be in a few years time that the properties would be up for rezoning. I don't think at any point that he thought it was going to be a long and drawn out process or that it would not happen ever.*

CS18 has been disappointed in his choice of investment, now owning a block of land that is essentially worthless unless it is rezoned for residential use. The quality of his retirement and his ability to assist his children will be affected, as he does not have enough superannuation:

> *I've had numerous discussions with my father in regards to this particular issue and he has verbalised obviously that it was really disappointing that he had got involved in that, that situation, and he didn't actually purchase a property in the neighbouring suburb,*

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> *like for argument's sake, like Vincentia which was at the time probably only 45,000 more expensive. You know, which was a lot of money back then I suppose but now he obviously regrets not having done that because he has been holding onto this property and paying rates for so many years and it's not actually worth anything at this point.*

In addition to the above impacts CS18 will sustain financial loss, that is, the initial cost, about sixteen years' of SCC rates and financial support for the Shoalhaven Landowners Association.

Case Study 19

CS19 is a man from an Argentinean background who came to Australia in 1977. He and his wife currently live in their own home in Bossley Park. He continues to work full-time as a surgical supplier, and his wife has retired. In 1989, at the age of thirty, he borrowed money to buy his block of land for $18,000. He was planning to eventually build a home on it and relocate from Sydney.

CS19 had seen the Heritage Estates land advertised on television. They liked the area and were not in a rush to build. CS19 was aware that the blocks were not zoned for residential use. However, the Heritage Estates Real Estate Agent told him that it would be only a matter of 3 or 4 years before rezoning would occur, which suited him at that stage. The blocks were small [urban dwelling sized], and thus would not be suitable for any other purpose such as farming. The Heritage Estates Real Estate Agent also pointed out that other nearby areas had been zoned for residential use. CS19 reported that he rang SCC, who advised that the land was currently zoned for rural use and that they had no comment on whether the land would eventually be rezoned.

CS19 commented,

> *We probably should have got other advice, but my English wasn't as good then as it is now; the majority of people were in this condition. I wasn't as aware of potential problems – a bit naïve.*

There will be a number of impacts on CS19 should the rezoning not occur. Along with all the other landowners, he will sustain financial loss, that is, the initial cost, interest on the mortgage, about twenty years' of SCC rates and financial support for the Shoalhaven Landowners Association. He will lose the opportunity to build on the block and retire to the area or to have invested elsewhere.

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CS19 will also be *"very disappointed"* for other reasons. These include the belief that the landowners have been mislead by the Heritage Estates Real Estate and let down by Council. There is also a perception that Council failed to identify the problems, and that,

> *The system should have prevented people from purchasing land they could never do anything with.*

CS19 expressed feeling a sense of futility, of *"lost hope", "lost faith"* and being *"devastated"* at the manner in which Heritage Real Estate and Council behaved and the loss of their dream to build in the area.

Case Study 20

CS20 is Italian by birth and has been in Australia for about 40 years. She lives with her husband in their own home in an inner western suburb of Sydney. They speak both English and Italian at home. She has retired, but her husband continues to work. They are preparing for his retirement, and said that now would be the ideal time to be able to use their block of land in Heritage Estates. They would love to build a holiday home, and have their grandchildren stay.

CS20 & her husband were about 40 years old when they bought two blocks of land in Heritage Estates in 1987 for $19,000. They had seen the land advertised on television, and in fact were "*bombarded with ads*". They were flown to inspect the land by Heritage Estates Real Estate and "*fell in love with the area*". They were both working then and borrowed $20,000 privately to buy the blocks which they had to pay back in a short time frame, placing them under financial stress. CS20's brother-in-law also bought two blocks.

The Heritage Estates Real Estate Agent put them in touch with a solicitor, who told them they would be able to build on the land in eighteen months' time. Consequently they did not believe that there would be any problems with the land being rezoned.

It was CS20's decision to buy the block of land, and the situation has always placed a strain on their relationship, as CS20's husband blames CS20 for their lost investment, because he wanted to buy a holiday home instead. CS20 pointed out that instead of buying the Heritage Estates block of land they could have bought a holiday home for only an additional $8,000 and they would now have a valuable asset instead of land they cannot use.

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CS20 is puzzled as to why there is obvious development taking place very close to Heritage Estates, and yet they cannot obtain permission to build on their land: "[blocks] *only 50 metres away...subdivided now and have three mansions on them...can see from our land. Logically why can they do it across the road and at Erowal Bay, why not here?"*

If the land is not rezoned for residential use CS20 and her husband will sustain financial loss, including the original loan, interest payments, Council rates over the years and fees paid to the Shoalhaven Landowners Association including fees for legal advice. However, they will also feel very disappointed that they have waited for so long for a decision to be made, and will have lost the opportunity to realise their dream of retiring to an area they love. They will "*feel that the Government has let us down...we are denied the legal right to build on our land*".

Case Study 21

CS21 are both currently working and live in their own home in Greystanes. They are in their 50's and none of their children are still living at home. They usually speak English at home. They were in their 30's, both employed and living in the same home at Greystanes when they bought their block of land at Heritage Estates in the 1980's for $17,500. They planned to build a holiday home on their block and to eventually retire to the area.

They used to visit Erowal Bay, a small coastal village next to Heritage Estates, every year for holidays. They saw the Heritage Estates advertised on a billboard. They phoned the Heritage Estates Real Estate Agent and *"they said 'oh yeah, we'll fly you down', and all this, but I didn't fly down, I drove down".* CS21 inspected a range of blocks with prices from *"real cheap"* to *"the top end"* and decided to buy one of the more expensive blocks. They were aware that the blocks of land were not zoned for residential purposes:

> *The bloke said 'oh yeah, it's only zoned as rural' he said, well his words were 'hopefully in the next few years it would be released'.*

Additionally, residential development in nearby areas lead CS21 to believe that the Heritage Estates land would also be eventually zoned residential:

> *I was of the understanding that, ah yeah, you know there was a lot of building going on there and I thought, oh yeah, it would be rezoned, surely to god you know.*

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CS21 did not seek advice about the zoning from anyone other than the Heritage Estates Real Estate Agent. However, CS21 also recognised with hindsight that perhaps they should have sought more informed advice:

> *maybe I should have looked into it a lot deeper you know, but I didn't, so I suppose I gotta pay the consequences.*

CS21 now distrusts salesmen, but was willing at the time of purchase to take the land offer at face value, partly based on the belief that the Heritage Estates land would be rezoned, as were other nearby areas at the time:

> *Well I wouldn't trust a salesman now, buying a TV or even a washing machine, but I mean, I just took it at face value, you know. And looking around the area there was a lot of building going on. Down at Sanctuary Point* [a neighbouring area] *there was land opening up and you know…it will slowly creep up here.*

CS21 experienced difficulty in securing a loan for the land. His bank, St George, refused a loan for the land, apparently because they valued it as being worth much less than the sale price he had agreed to, reportedly $9,000 rather than $17,500. He visited the Heritage Estates' solicitors in an attempt to withdraw from the sale, but was told that the contract he had signed was binding:

> *He said you'll have to find somewhere to get the money…just like that, he just showed me the door.*

In the event CS21 took out a personal loan for the amount, *at 18.5% or whatever it was. So I got stuck with it, I couldn't get out of it.*

CS21 is aware that if he does not pay his annual rates SCC will eventually reclaim the land. However he also pointed out that he has been paying SCC rates for twenty years for a block of land which he cannot use, with no benefit:

> *What am I paying rates for? Well what's there? There's no roads, there's no garbage, there's no water, no electricity. Why the hell am I paying rates?... I've got a bit of ground down there and I can't do anything with it*

One of the main impacts on CS21 if the land is not rezoned will be financial loss, the initial costs, the interest, contributions to the Shoalhaven Landowners' Association and annual Council rates:

> *Well what am I going to do? If I got my money back I'd be happy, how am I going to get my money back? Council aren't going to give it to me.*

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CS21 no longer contributes to the Shoalhaven Landowners' Association, because despite their efforts there has been no outcome over the past twenty years so he could not see the point: "*in the end I just gave up".*

CS21 does not visit his block of land now, preferring to take holidays in Foster (north of Newcastle) "*because I'm just that depressed going down there".* CS21 is also disappointed and upset that as matters stand he has paid for an essentially worthless block of land to pass onto his children, which will give them no benefit and in fact cost them money on a yearly basis, as they will be obliged to keep on paying the annual Council fees in order to maintain ownership.

CS21 put forward the opinion that SCC must have been complicit in the events of 20 years ago, and has benefited financially from the use of rate payers' money over this time:

> *The Council must have known that they* [Heritage Estates Real Estate] *were selling them blocks.*

CS21 has received letters from Council about the environmentally sensitive nature of the area, but does not credit this information. He believes the issue is political in nature:

> *The Council said the greenies were screaming that it was a corridor for wildlife and I thought to myself…how can it be a corridor where on the other side of the road you have the big water tower there which is land that can't be built on so...I really think it's a political football.*

Case Study 22

CS22 are a couple in their mid-50's who speak English at home and currently live in their own home in Woollamia, west of Huskisson. They have no children living at home now. In 1990 they were in their 30's, working and living in Sydney when they bought their block of land in Heritage Estates for $17,200, intending to build "*a beautiful split level home on it*" and relocate to the area. In fact, they "*bought acreage when we semi-retired and now it's just getting a bit beyond us and we are trying to downsize again".*

CS22 is no longer working as he has had three heart attacks and is quite debilitated:

> *At the moment I'm virtually on a pension, there is nothing I can do. No-one is going to hire me...I can only work for about an*

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> *hour and then I've got to lay down so I can get my oxygen levels back up…'cause I lost 38% of my heart, it doesn't pump as much oxygen as it used to.*

They saw the Heritage Estates land advertised on television one night and were flown down to the land for an inspection. There were "*people galore coming from everywhere*". They had a look at Stage 4 but didn't like any of the blocks. They then looked at Stage 1 and were able to purchase the block from someone who had originally paid $7,000 for it.

CS22 is upset about the lack of rezoning, as he had contacted the Planning Department of SCC and been assured that rezoning would occur. Matt Atkins was then Mayor:

> *And I can't remember who the bloke in the Planning Department was at the time, but we were assured that the land would be rezoned within anything between 12 months to 3 years. And a lot of people were told the same thing.*

CS22 also sought legal advice. The solicitor that CS22 spoke with, ('Peter'), was one he had been directed to by the Heritage Estates Real Estate Agent. He noted that "*a lot of Greeks, they were using Peter at the time as their own family solicitor…and he's been the family solicitor for donkey's years and he still is actually",* although he was not CS22's solicitor.

The solicitor told CS22: "*it was a good investment for the future, blah, blah, blah, it will come ahead you know. But they were signing people up left, right and centre. There's 1200 blocks there…he was making mega bucks out of them*". CS22 did not realise at the time that the solicitor had a relationship with the vendor:

> *I didn't know our solicitor was in cahoots with this Heritage Estate…all he was interested in was …the fees. You know, not advising people what's going to happen and what's not going to happen…You see what they* [Heritage Estates] *did is they signed up five solicitors that I know of in different areas, one in Blacktown, one in Marrickville and other areas.*

CS22 is angry that he has been left with what is a virtually useless piece of land as it stands, because of the extremely limited use allowed by Council. But more than that, he remains perplexed as to why Heritage Estates has not been rezoned, when other close by land has:

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> *what really hurts…is there is other land around this area that has been rezoned. Now they have the same infrastructure, same fauna, same habitat and everything, why is it that it's only our land* [that has not been rezoned]?

CS22 understands that the landowners would be expected to pay for services for their blocks if the land was rezoned, but queried why this would be so expensive, compared with other nearby areas:

> *Council was saying to us…it's going to cost you between $15,000 and $20,000 to rezone land. Well fair enough, you got to pay for your services, but I bought a block of land at Basin View* [a nearby area] *for $21,000 with services on it…and I believe the current value to re-service it* [Heritage Estates] *is between $30,000 and $40,000.*

CS22 has the perception that:

> *there is a lot of collusion going on down here also with developers and councillors. You know, there's so much going on it's not funny…if you've got money you'll get ahead. Why have they allowed 450 blocks of land to be built beside the shopping centre at Vincentia [604 lots approved in the Stockland's development]*?

CS22 has lost faith in the various governing bodies involved in the rezoning process. He heard Greg Watson, current Shoalhaven Mayor, on the radio saying *'"I don't expect this land to be rezoned for a very long time'…why would you say something like that unless you know there is something in the pipeline"?* He remains perplexed at the seeming vagaries of decision making regarding zoning in the area:

> *and then the next minute the shopping complex is going up at Vincentia and 450 surrounding homes…developers get first preference down here making it hard to put faith in councillors, in governments.*

Additionally, CS22 believes that even if the issues get through Federal and State approval process, *"once it gets to Frank Sartor* [NSW Minister for Planning]*, the last stage, you can kiss that goodbye".*

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CS22 suspects that the annual rates collected from all the landowners over the many years, and which he which understood would be kept in a special fund and used towards surveys related to the Heritage Estates have been "*put towards something else".* He believes that "*someone should be held accountable"* for what has occurred.

CS22 continues to pay an annual fee to the Shoalhaven Landowners' Association, of about $60.00, to assist with the cost of phone calls made on their behalf. He was previously very actively involved, but has become disheartened: "*when I moved down here I just lost interest…which a lot of people do*".

CS22 expressed disappointment at the lost opportunities, for themselves and other land owners. When CS22 bought they were

> "*all energetic and ready to go", but time has taken a toll on a lot of people…emotionally…they've been hurt… 20 years have gone past of my life and there were people who bought it when they were 50 and 60…they're in their 70's and 90's now…what chance are they going to see* [the land being rezoned].

Case Study 23

Case Study 23 (CS23) and his wife are in their fifties. They live in their own home in Beaumont Hills with three children, aged 19, 15 and 16. They came to Australia in 1985, "*for a better life*". They mainly speak English at home, but also Turkish. They are both working, and are paying off their home.

CS23 and his wife were in their early thirties when they paid $19,500 for their block of land in Heritage Estates in 1990. They were both working in a petrol station at that time. They saw the land advertised on television and thought it was very reasonably priced. CS23, his wife and father-in-law were flown to the site by Heritage Real Estate to inspect the land. Part of the attraction was that the land was near the water and out of the city. CS23 grew up "*near Mediterranean water, I like the water front…I love quiet area*". CS23 grew up in a small community, and likes that level of interaction rather than in the city where people don't have much to do with each other: "*I prefer living like, where people know each other and …more community like".*

CS23's purchase was part of a long-term plan: "*I was always thinking about the future*". They planned to build and possibly relocate to the area, or retire there:

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> *Once the land is ready we can sell this house and maybe we can move over there and make a small house and without mortgage, might find some part-time job over there or something else, we can have small community area*.

CS23 and his wife were aware at the time of purchase that they could not build on the land. CS23 did not seek independent advice or talk to anyone at SCC, partly because he had only arrived in Australia a few years prior, and "*I didn't speak much English*". The Heritage Estate Real Estate Agent "*said at the moment you can't build a house…but in future maybe we can get some permission*". In any case, the zoning was not an immediate issue as CS23 was not in a financial position to build: "*at that time I can't afford to build a house because I got mortgage too*".

CS23 and his wife joined the Shoalhaven Landowners' Association, paying an annual association fee of about $60. CS23 has regularly attended meetings and worked with the Association towards having the land rezoned for residential use.

CS23 and his wife feel that they have *"done the right thing",* always paying their annual SCC rates and complying with any SCC requirements such as not clearing the land.

In addition to financial loss associated with the original purchase price, loan repayments, solicitor's fees for conveyancing and annual rates, there will be emotional impacts for CS23 and his wife if rezoning for residential use does not happen:

> *I mean if it's not rezoning then all our dream is gone…We came for better life and better condition and if that happens that not rezoning…it's going to be disappointing.*

In particular, CS23 pointed out that the family has lost the opportunity of enjoying the lifestyle in the area, as have "*not only me but 1200 people*". CS23 thinks that most of the people that bought land at Heritage Estates are "*family people*", and that a large percentage came "*from Yugoslavia or Italia or all different, Greeks…all different backgrounds but all same thinking*". The time for sharing the area while the family was growing up has passed in the 20 or so years since they bought the land. CS23 still regularly attends the Shoalhaven Landowners' Association meetings, "*and they are all like 50-60 years old now*". However, CS23 is still planning to move into the area if rezoning occurs, and being aware that there is a large shopping complex being built nearby [Stockland Vincentia] "*was thinking to maybe…give this house [to his son] and we live over there"* and that "*maybe we make a family business*".

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Case Study 24

CS24 is a 45-year-old man who came to Australia as a small child from Macedonia. He currently works full time in Bluescope Steel and his wife works in the retail sector. They live with their children, and CS24's parents. Both English and Macedonian are spoken at home.

In 1989, at the age of 26, CS24 bought two blocks of land, each for about $17,000. He was married with one child at that time. He saw the land advertised on television, and his uncle told him about it as well. Initially, he planned to build a holiday home.

> *I'm a country boy and I just love the country. Yeah, more or less thought I'd buy one up there, just to start with probably just a holiday house…and after a while we'd probably move there.*

CS24 was aware at the time of purchase that the land was zoned for rural use, but expected that he would be able to build on it. He did not understand the implications of the zoning, and feels that he was mislead:

> *No I didn't understand and I, I think if you talk to everybody else, they are all thinking now that we all got tricked, in buying the land.*

At the time, the blocks of land seemed to be an excellent opportunity, and he did not seek information from anyone other than the Real Estate Agent.

> *I didn't think to talk to anybody because, what they were…the prices of the blocks were probably unbelievable…something that you couldn't refuse…but in talking to them [Heritage Estates Real Estate Agent], he did mention that probably in the next 5 years we'd be able to build on it.*

Apart from the blocks of land at Heritage Estates CS24 owns no other assets. In addition to the financial losses incurred over the past twenty years, one of the main impacts for him if the land is not rezoned is the loss of opportunity to invest elsewhere:

> *Like I said, some 20 years ago, $35,000 I could have put, I could have put money on a house for a deposit and I could've been paying my own house off now.*

Not only has CS24's money has been tied up in the blocks of land, but he feels that with the relative increase in land costs over the past twenty years he could not now afford to buy a block of land in a nearby area. These are lasting impacts for his family based on his earlier decision.

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Blocks of land at Shell Cove

> *…just round the corner from where I am… were $60,000 then at that stage. And now, you're looking at over $300,000 a block now. I just can't afford to buy one.*

CS24 expressed a sense of futility about the potential of the land.

> *There's nothing, there is nothing you can do with it. I mean it's your land and obviously you still want to keep it, it's no use selling it, nobody is going to buy it…so I'll just, yeah, I'll just keep it as long as I can and if Jesus, if I can't do nothing with it then I'll just hand it over to my kids and hopefully they'll get something out of it.*

Case Study 25

[Interviewed CS25's daughter with father present due to his poor English]

CS25 are a retired couple in their late sixties who immigrated to Australia from Lebanon about forty years ago. They speak Arabic at home and live in their own home at Greenacre. They have three children, who have all left home.

They bought their block at Heritage Estates in 1989. At the time they were both working and living in their current home.

They saw the land advertised in a local Real Estate Agent's window. CS25 and some friends were flown around in a helicopter to have a look at the properties. From the minute they saw the land they loved the area. They did not speak much English then, and did not seek any advice about the zoning, as the Real Estate agent was very convincing and they trusted that it would be *"alright to build on the block at a later stage".*

CS25 worked overtime in order to pay off the land, as well as supporting the family. Like others, they made sacrifices in time and resources when their family were young hoping for benefits to their family in the future. In addition to the financial loss, including paying council rates for over 20 years, CS25 reported that they will be strongly emotionally affected if the land is not rezoned for residential building. In CS25's own words:

> *If the land I purchased at Terrara Park [Heritage Estates] is not rezoned then this will disappoint and depress me dramatically. My dream ever since I purchased this land was to build a retirement*

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home for me and my wife. We worked very hard and long hours to do this…We retired 5 years ago and we feel we have achieved nothing in life.

If the land is not rezoned for residential use, CS25 will probably keep it because he loves the area so much. He will continue to visit a couple of times a year for a BBQ with the family – at least he will still have it, but "*he'll still be depressed*" because their dreams, for which they have sacrificed a great deal, will not be realised.

Case Study 26

CS26 is 38 years old, from a Maltese background and speaks English at home. He is employed full-time and living in rented accommodation in the north-western suburbs of Sydney. CS26 has never owned his own home or land other than the Heritage Estates block. His father, V_____, is aged 76 years and is retired. He lives with his wife in his own home in the same suburb as his son.

CS26 was 19 years old at the time when he paid $13,500 for the block of land in 1989. He was then working on the farm with his father. His income was being held in trust at that time. CS26 originally owned the land, but sold it to his father when he was going through a divorce in order to pay for his solicitor's fees.

CS26 heard about the Heritage Estates land on the television. He "*jumped in the car*", and drove for 2½ hours down to inspect the land. He bought his block of land that day. He did not seek independent advice because the Heritage Estates Real Estate Agent "*really discouraged [us] from talking to anyone else like an independent solicitor...I was 19, my parents spoke no English*". There were only three blocks left, and they "*jumped at [the chance to buy]*".

CS26 understood at the time of purchase that the land was not zoned for residential use. However, he believed that it would be rezoned shortly, based on the Heritage Estates Real Estate Agent's promise. He also reasoned that the land was "*ordinary land*", similar to other nearby built up areas, and would therefore be rezoned in due course.

CS26 said that he "*always wanted to have somewhere to live by the sea...at the time I could only afford the amount I spent, it was a dream for me*". He dreams of being "*able to sleep on the land sometime and say 'this is my land'*". If the land is not rezoned for residential use he will feel "*very let down*" because of the "*lies, there were many promises about the rezoning from the Real Estate*". He reported that he used to stay on his land, taking a caravan down each visit. However, in

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about 2003 he returned from a trip to the beach to find that the caravan had been vandalised, so he stopped taking it there. He is frustrated at the lack of decision by Council, and feels that landowners have been given "*false hope*", continuing to pay rates and being unable to use the land whilst waiting for a decision. He knows he will "*never see my money again*", but wants a clear answer, so he can either build a home on the land or move on.

In addition to the above impacts CS26 will sustain financial loss, that is, the initial cost, about nineteen years' of Council rates and financial support for the Shoalhaven Landowners Association. He will experience an ongoing financial burden for land which cannot be used and cannot be sold, as "*no-one buys what you can not use*".

Case Study 27

CS27 is 39 years old and Australian born. He is self-employed and lives with his partner and children in a house he is paying off in Earlwood.

CS27 was 17 years old, working as an apprentice in Sydney when he bought his block of land in 1989/1990 for $17,500. His parents bought the adjoining block.

A family friend was familiar with the South Coast area and brought the Heritage Estates to their attention. The Real Estate Agent came to the family home to discuss the land, and then drove them to the land to inspect it. They did not seek advice from any other sources. CS27's parents spoke minimal English, and CS27 was very young. The Real Estate Agent told them that the area was a great investment, and although zoned for rural use, would be rezoned within five years. The family intended to build holiday houses on the blocks.

> *The Real Estate Agent said look if you want to make money this is it, and dad said I don't want to make money I just go down there with the family and keep my family unit together.*

In addition to paying Council rates, when he has had spare money CS27 has continued to make intermittent donations to the Shoalhaven Landowners Association activities.

CS27 discussed a number of impacts that would result from the land not being rezoned. He feels he was deceived by the Real Estate Agent about the zoning possibilities for the land.

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> *…basically I feel that they conned us in, took our money and effing bolted…and now they don't even want to know you, they just laugh at you*
>
> *I feel he was a good con artist 'cause he didn't say to me, no you'll never be able to build. He said, yes, you will, it's just a matter of time and when I threw a figure at him like 10-15 years he laughed, he goes nah, not that long, average is less than 5 years they've been allowed to build. No way in hell he goes, no, no, way before that.*

CS27 feels that he has wasted money that could have been put to other uses, such as paying off the family home or buying an investment property, which would have left him in a much better position than he is currently in.

> *I could easily have put a deposit on something else…it's dead money*

CS27's notes that his father has now passed away, and never saw a resolution to the issue.

> *Mum's a widow and she basically has no interest in it [the land]. She can't build on it. She'll just pass it onto the kids really.*

Case Study 28

CS28 is 41 years old and currently lives with her 8-year-old son. Due to a divorce, CS28 is a single mother caring for her son. She is currently working part time in order to be available for her son before and after school hours. She does not own a home and is renting in the Caringbah area.

CS28 bought a block of land in the Heritage Estates in 1988 for $15,000. At the time of purchase, she was 21 years old and living with her parents in Oyster Bay. CS28 heard about the Heritage Estates land from a neighbour of her parents.

> *There was a gentleman that lived two doors down from us. He was part of the company that took everyone down there…he was having a chat to my Dad one day outside the front yard and my Dad said, "Ah you know my daughter is looking for investments and thing"' and he said that he had a really good deal for you…*

She noted that soon after all the land was sold, her neighbour "disappeared" from the neighbourhood. She never had contact with him again.

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Prior to purchase, she was flown down the south coast to view the property by the real estate agent where they were shown the blocks of land and told that while the land was currently not zoned for residential development it would not be very long before it would be.

> *…we ended up going by light air craft…to Nowra for the day and we got to see the blocks of land and they told us all the facts about it … and told us it was a really good deal and that in a few years you could sell it as an investment … when it becomes rezoned which wouldn't be very far away … that it would be a good sale basically. So being that young I didn't question anything…*

At the time, CS28 was encouraged by her father to invest in the property instead of an automobile, as it was assumed that the land would be a more valuable investment over time. She did not seek further advice about the sale from a lawyer or the Council and admits that she trusted the information provided by the real estate agent.

She had plans to build a holiday house on the property, a project that her parents had agreed to contribute to at the time. CS28 paid off the property five years after the time of purchase. Since then, she has paid annual rates and for some occasional maintenance to the property (eg. cleaning up the blocks).

If the land is not rezoned for residential development, the impacts to CS28 will be disappointment that an investment she made at a young age will not come to fruition and that there would be no opportunity *to "claim anything back"*– when the money could have been invested elsewhere. Her opportunity to own a home at some time in the future also appears doubtful at this stage.

Case Study 29

CS29 is a 54 years old man who lives in the Shellharbour area with his wife and daughter. He also has another daughter who recently married and moved out of the family home to live elsewhere in Shellharbour.

CS29 and his wife immigrated to Australia from Macedonia in 1972 in search of work and a better life. Ever since he arrived in Australia at age 18, he has worked full time. The family speaks both English and Macedonian at home, and are currently paying off the mortgage on their home in Flinders, Shellharbour.

CS29 heard about the land for sale at Heritage Estates from the real estate agents selling the land. In 1989, CS29 purchased a block of land in Heritage Estates for

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$20,000. At the time of purchase, he was 33 years old and the couple was living in Shellharbour. They borrowed money to purchase the land and had plans to build a house there for the family to live in.

When he purchased the land, CS29 was aware that it was not zoned for residential development, though he recalls that the real estate agent told him that it would only be a couple of years before building would be allowed.

Looking back on the purchase now, CS29 feels that the Council should have informed them that the land was not been able to be built on. The inability to build on the land for 20 years has been a continuing source of frustration and emotional stress for him and his wife. In addition, the financial costs associated with the land for the family have been significant and have included solicitor's fees at the time of purchase, the repayment of the loan over many years, 20 years of annual rates to the Council, and occasional maintenance costs including mowing and rubbish removal.

CS29 is very frustrated with what has happened with the land at Heritage Estates, and feels that it has not been fair that he has worked very hard for many years to pay for the land and has not been allowed to do anything with it. He describes feeling frustrated and worried due to the lack of control he feels he has over the situation.

CS29 has not fully considered what he will do with the land if it is not rezoned for residential development. He feels that the council should provide the landowners with a payout, which would allow them to purchase another block somewhere else. However, he recognises that blocks of land in the region now cost considerably more than when they purchased in Heritage Estates, and that inflation has now put them well out of his reach. The continued uncertainty regarding the land has put their *"future plans on hold."*

CS29 retains the view that the block is his land and that his hopes to one day build a house to live in there will be realised.

> *I still in my mind because I know that is my block, you know. I want to do something.*

Case Study 30

CS30 and her husband live with one of their children, aged 25 years, in their own home in Minto. The older child, aged thirty, bought a house and moved out of home, and his wife is expecting a child soon. CS30 came to Australia in 1969. She

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explained that the 1960s "*were very hard in my country…to get a job*". She initially went to Germany but did not like it. Her cousin came to Australia, "*and my mum says follow, then I come here*". CS30 mainly speaks Croatian at home, but finds now that when she goes back to her homeland she cannot understand the modern language very well. CS30 is now 60 years old and retired from work at the age of 52, as she had many illnesses.

CS30 and her husband paid $8,500 for their block of land at Heritage Estates in 1988. Their main reason for buying was to build a home to live in when they retired. CS30's husband was working in a factory and CS30 was a part-time cleaner in an office. CS30's husband, who is now 63 years old, subsequently worked as a carpenter, but unfortunately suffered an accident at work and has not been able to work since he was 60.

CS30 and her husband received some advertising material about the Heritage Estates. They sought advice, because their English skills were poor: "*at that time I wasn't that good with English; I'm not now good at all you know, but you can understand me*". They asked for assistance from a friend's daughter who was working for a solicitor at the time and who showed him the documentation. CS30 couldn't recall what the friend's daughter said the solicitor's advice was, "*but she didn't say something like you can't build…her father said, 'it's alright, you just buy'*".

CS30 believes that SCC advised them that the land would be rezoned for residential use some time in the 1990's. She cannot understand why SCC would give them incorrect advice about the rezoning. They feel that they were able to be tricked by the Heritage Estates Real Estate Salesperson, because "*we didn't understand that guy, but I thought that if the agency tricked us Council shouldn't do it*!"

CS30 and her husband feel they made a mistake investing in this land, and that they could have invested better elsewhere:

> *Look you can't do nothing, why we waste all this time when there are other blocks of lands much cheaper?...why would I buy if that [building] not possible?*

CS30 expressed a strong feeling of distress about the zoning situation. Her perception is that many of the buyers were able to be deceived by the Heritage Estates Real Estate Agent because they did not have good English skills, but that they have also been mislead by Council: "*sometimes I am so sick you know. I feel even throw up believe me, for such a long time*". She pointed out that she would not be so "*stupid if someone said that [regarding the zoning status] in my*

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language...why would I buy if that [building] not possible"? CS30 pointed out also that theirs was not an isolated case, "*it's not like 5 or 6 people, it's thousands people you know*".

CS30 and her husband have experienced financial loss, in terms of the initial cost of the block of land and repayments. But CS30 also feels that there have been lost opportunities because of the money being tied up:

> *Much was waste, waste of years...last year I was overseas for 2 months holiday, that was my last visit, I've been only twice all these years you know, from '69, second time holiday in my country*.

CS30 and her husband are still planning to build a home on the land if it is rezoned for residential use:

> *Oh yes, yes definitely. Straight away, I would sell to my son house [ie their current residence in Sydney]...if we have to borrow $55,000 we can take the loan, kids can help me you know.*

In summary, in addition to the financial loss, and distress related to their perception of having been deceived by SCC and the Heritage Estates Real Estate Agent, CS30 and her husband will be devastated if they are not able to realize their retirement plans, having waited for so long in anticipation of being able to build and relocate to the area.

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6. Examination of Relevant Economic Impacts

6.1. Overview of Findings

As noted above, Council's Project Brief limits the examination of economic impacts to those impacts directly experienced by the Heritage Estates landowners, and particularly those impacts that are likely to be experienced in the event that the land is **not** rezoned for residential use at the present time.

The major economic impact to owners is **foregone expenditure** over the years that they have owned the block/s as a result of having money tied up in Heritage Estates and at the same time receiving no benefit from that ownership. This cost is estimated to be $44,000-61,000 with an average of **$53,000 per landowner** taking into account the opportunity costs of money.

If owners had **put their money elsewhere**, they would have received a benefit from the alternative expenditure and, if invested in land or property, a capital gain would have been expected. Foregone capital gains are estimated to be between a $20,000 loss to a $67,000 gain with an average gain of $24,000. In addition the purchaser would not incur the cost of $44,000-61,000 above, meaning in total they would have been $22,000 to $128,000 better off, or an average of **$75,000 per landowner.**

If **rezoning** had taken place **within one to two years** of purchase and in accordance with people's expectations, an average purchaser would be better off by between $72,000 and $102,000, or an average of **$87,000 per landowner.** This assumes that the capital gain would have been achieved without incurring additional development costs. It is noted that the basis of comparison was nearby developable blocks.

If the **land were to be rezoned today**, an average purchaser would incur a lifetime **cost of $16,000**; however if no section 94 contribution were to be levied, an average purchaser would be **$9,000 better off** over a lifetime, and **$62,000 better off** if costs incurred to date are considered a sunk cost. Across a range of likely development costs and land values, an average purchaser would expect to be between $11,000 and $102,000 better off when costs to date are considered as a sunk cost.

Finally, a significant barrier to development of the estate signalled by the above relates to the servicing of the land in the event of rezoning. Given the economic loss experienced by landowners and the changed circumstances of many since they

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first purchased (including diminished income through retirement, disability, unemployment and the like), the development would be far more feasible if co-ordinated and funded by Council through debt financing, with appropriate rating or cost recovery processes put in place. It is noted in this regard that Council has been collecting rates from the properties over a number of years and it is unlikely that the owners have received any significant services such as maintenance of roads that residents would normally expect to receive, particularly given 97% do not live in the council area. We have calculated that the amount in rates paid per lot in Net Present Value is around $10,000 per lot or around $8.0 million for the Heritage Estates in 2007 dollars over the past 20 years. It would be for Council's consideration as to the extent to which costs for aspects of the development of any land rezoned could be met through rates historically collected from landowners by Council.

If owners were required to pay the full development cost, and using a development cost of $65,000, the annual cost is calculated to be of the order of $6,500 per annum over 25 years. For renters and for people on low incomes, this annual cost may exceed their ability to pay. Such people would be able to access the increase in value of the lot by selling, but would be prohibited from building on their block by financial constraints. At the same time, if an owner could not borrow the development cost or fund it through cash flow, it seems unlikely that they would be able to borrow sufficient funds to construct a house, so that they would be unlikely to be able to build. There is likely to be a group of people who could afford to borrow to build a house but when the development cost is added to the cost of the house, would be unable to fund the total cost through cash flow. As an alternative view, people would generally have $65,000 less to build a house because of the development costs.

If developed privately, it is likely that a significant proportion would struggle to afford the development costs, and may be enticed to sell at below market price to a larger land development, particularly in the earlier years. In the final analysis, those who cannot afford to meet the costs of development on the land are likely to be the least well-off and more vulnerable landowners described elsewhere in this report, who may also feel they have the least bargaining power and be inclined to sell earliest and cheapest.

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6.2. Assessment of Economic Impacts on Heritage Estates Landowners

There are four levels of economic impact to be considered in order to provide the context for comparison and to establish the base case of the economic impact on owners to date. The first is the ongoing economic impact due to the land **not** being rezoned contrary to the expectations of purchasers. The second is the economic impact if complete information had been available to purchasers at the time of purchase. The third is the economic impact to purchasers of rezoning not having taken place in the past, and the fourth is the economic impact if the land is rezoned today.

6.2.1. Economic Loss as a Result of Decision to Purchase Land

As shown in the following table, in present day dollars, ie adjusted for inflation, buying the block of land has cost the average owner between $44,000 and $61,000. The cost to around 10% of purchasers is greater than between $56,000 and $78,000. Based on our survey results, around 90% of respondents expected the land to be rezoned without problem. If the land had been rezoned, and assuming a rational consumer, the purchaser would have expected a benefit equal to or greater than the price paid for the land. However this did not happen and so the purchaser received no benefit from their expenditure. The consumer has foregone other expenditure from which they could have expected to receive a benefit in order to spend money on the purchase of land and so they have suffered an economic loss from the lost benefit arising from alternate expenditure.

Table 6.1: Cost per block of land as Net Present Value (using 2% and 4% discount rates) and including rates of $365 per year. (CPI adjusted)

Price Paid Per Block	$	Year	Standard Deviation
Median	$42,700-$58,841		
Mean	$43,705-$60,779		$12,860-$19,015
Highest	$92,897-$134,774	1987	
Lowest	$4,175-$4,485	2002	

Source: JSA 2008; ABS

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6.2.2. Economic Loss Considering Alternative Investment Decisions

A number of respondents have indicated that at the time of purchase they were considering other options. In the light of more complete information (that is that the land was not going to be rezoned) they may well have made other decisions. Some of the options cited by respondents included a nearby block of land or holiday cottage, or a unit in Sydney's middle or outer ring suburbs.

Anecdotal evidence by respondents is that blocks of land were available in the area in the late 1980's and early 1990's for around $20,000 or around $31,000 in 2007 dollars.[25] Currently such a block of land is valued at between $100,000-130,000.[26] Hence if the purchaser had bought such a block of land in 1990, the rate of capital gain would be between 7% and 9%. Allowing for the social cost of capital of between 2% and 4%, such a purchaser would have made an annual gain of between 3% and 7%, or in total in 2007 dollars, between $20,000 and $67,000. At the same time they would not have incurred the cost of between $44,000 and $61,000 estimated as the cost of expenditure from which the purchaser obtained no value. Hence, a purchaser buying a nearby developable block would be between $66,000 and $128,000 better off today. This is shown in the following table.

Unit prices in the Liverpool area in 1990 ranged from $80,000-100,000 or in 2007 dollars, $123,000-154,000. [27] The median price of such a unit today is $235,000.[28] If a purchaser had invested in a unit rather than in the land, they would have made a capital gain of between 3% and 4%. Allowing for the social cost of capital of between 2% and 4%, such a purchaser may have made an annual loss of 1% to a gain of 2%, or in 2007 dollars, between a loss of $19,000 and a gain of $62,000. In addition, they would not have incurred the cost of between $44,000 and $61,000 discussed above. Hence a purchaser who had full information would be between

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[25] Respondents 173 and 198.

[26] Source: www.domain.com.au, search results for South Coast, Erowal Bay and surrounding suburbs, 6/2/08; average block size: 688sqm.

N.B. First release land in the adjacent Stockland development is advertised as selling from $170,000 per block. Personal communication, 11/2/08 established that this price relates to 400-500sqm blocks. 300 sqm blocks range from $115,000-120,000.

Source:http://www.stockland.com.au/NR/rdonlyres/D870F53B-06D8-4679-8F40-933F34757790/0/Bayswood_BanksiaRelease_SalesPlan.pdf; Telephone: 135263.

[27] Examination of Red Square purchase price data, February 2008

[28] Housing NSW, "*Rent and Sales Report Issue 81",* 2007.

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$25,000 and $123,000 better off if they had purchased a unit in Liverpool rather than purchasing a block in Heritage Estate. This is also shown in the following table.

Table 6.2: Unit Purchase Comparison

Option	Purchase in Heritage Estate 1990	Purchase of a nearby block of land 1990	Purchase of a Unit in Liverpool 1990
Purchase Price in 2007 dollars	$28,000	$31,000	$123-154,000
Capital Gain	Less than zero	$20,000-67,000	-$19,000 (loss) to $62,000
Lost Social Cost of Capital	-($44,000-61,000) (loss)	Zero	Zero
Comparative position	Zero	$66,000-128,000	$25,000-123,000

Source: JSA calculations 2008

6.2.3. Relative Economic Position had Rezoning Occurred within 2 Years of Purchase

If rezoning had taken place within one to two years of purchase in accordance with people's expectations, it is likely the purchaser would have received a benefit from the land commensurate with the purchase price paid. In so far as this purchase price did not contain a proportion for risk or for speculation,[29] the purchaser would today be better off to the extent of the capital gain obtained. The average purchase price paid for blocks in Heritage Estate in 1990 was $28,000 in 2007 dollars. Compared to a price of $31,000 for nearby developable blocks, this suggests a margin for risk of about 11%[30] and is probably reflective of the expected delay in development of 1-2 years or else other physical aspects of the block such as location and availability of services.

Based on current prices for blocks of $100,000-130,000,[31] a purchase would on average have achieved a capital gain of between $72,000 and $102,000. This assumes that the capital gain would have been achieved without incurring

[29] This seems a reasonable assumption as the vast majority of purchasers appear to have purchased with a view to using the land rather than in anticipation of on selling it for later profit.

[30] One could also argue that if the blocks were equivalent, on average consumers were estimating a 90% chance of rezoning.

[31] www.domain.com, ibid.

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additional development costs. It is noted that the basis of comparison was nearby developable blocks.

6.2.4. Economic Position if Land is Rezoned Today

The immediate effect of rezoning of the land would be a rapid increase in land value. Based on sales since 2000, blocks in Heritage Estate are currently selling for around $18,000 in 2007 dollars. Given values of nearby blocks, this suggests a margin for risk of about 15%, suggesting that the general view of purchasers is that the probability of rezoning is of the order of 15%, or about 1 chance in seven. The margin may also contain a component for the expected costs of development if the estate is rezoned such as drainage and road works.

Such costs could be significant and of the order of $35,000 per dwelling for site development including roads, drainage and services and may include another $25,000 per block in section 94 contributions.[32] Using the figure of $35,000 and hence implying a real cost of the block of $53,000,[33] the current estimate of risk could be around 50%,[34] that is the market currently believes on average that there is a one in two chance of the land being rezoned.

If the land was rezoned today and blocks were valued at between $100,000-130,000 in accordance with prices for nearby blocks of land, then the purchaser would be better off as shown in the table below.

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[32] Applied Economics, *"Financing Public Infrastructure for Urban Development",* 2003 accessed 5 February 2008 at: http://www.appliedeconomics.com.au/pubs/reports/rep03_infra.htm

[33] Current value of $18,000 plus development cost of $35,000.

[34] $115,000 (the average of $100-130,000) divided by $53,000.

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Table 6.3: Summary of Costs and Benefits associated with rezoning of land

Item	Lower estimate	Upper estimate	Lower estimate treating Social Cost of Capital as a sunk cost[35]	Upper estimate treating Social Cost of Capital as a sunk cost
Estimated value if rezoned	$100,000	$130,000	$100,000	$130,000
Less Social Cost of Capital	$61,000	$44,000	Not applicable	Not applicable
Less current value	$18,000	$18,000	$18,000	$18,000
Less development costs	$35,000	$35,000	$35,000	$35,000
Less Section 94 costs	$25,000	$25,000	$25,000	$25,000
Net position	-$39,000 (loss)	$8,000	$22,000	$52,000
Average position	-$16,000 (loss)		$37,000	

Source: JSA calculations 2008

This suggests that if the land is rezoned, for the average purchaser across a lifetime, the purchaser will not recover costs incurred to date and in fact will suffer an overall lifetime cost of $16,000. Clearly some purchasers will be in a better position than this and others will be in a worse position, depending on the initial purchase price paid and the length of time they have held the land. The assessment is quite sensitive to the imposition of development costs and section 94 contributions.

It is likely the physical development costs will be difficult to avoid, as owners will either have to pay them or else put up with a lower level of amenity (no drainage, roads and services) with that lower level of amenity reflected in the value of the land once rezoned.[36] Council's development standard may of course preclude a decision to accept a lower standard of amenity or servicing. It is likely that without the imposition of section 94 contributions, an average purchaser will be better off over their lifetime by around $9,000. Ignoring sunk costs, the average purchaser would expect to be $37,000 better off, or $62,000 better off without the imposition of section 94 contributions. However this economic gain would offset economic costs borne by owners over the period of owning the land.

[35] While expenditure in the past may affect the overall costing of a particular proposal, it should not be considered in evaluating choices. The money is a "sunk cost" and cannot be recovered.

[36] The market price of the land would be less than the market price of nearby land by the development cost per lot.

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There is considerable range across estimates. The nearby Stockland Estate is listing land starting at $170,000. If this was representative of the value of rezoned and developed land in the Heritage Estate, then the net position of owners would improve by, on average $55,000.

On preliminary estimates by Council, Section 94 charges (excluding site development costs) are expected to be less than $15,000, hence residents may be an additional $10,000 better off. In 1998, development costs were estimated at around $35,000 per block, or in 2008 dollars, $46,000.[37] On this estimate, residents would be an additional $11,000 worse off than estimated above. This is summarised below showing worse and best cases.

Table 6.4: Sensitivity Analysis using high and low estimates

Item	Low range	High range
Rezoned value	$100,000	$170,000
Less current value	$18,000	$18,000
Less Development costs	$46,000	$35,000
Less Section 94	$25,000	$15,000
Net Position	$11,000	$102,000

Source: JSA calculations 2008

In the worst case, residents would expect to be slightly better off, although not enough to reimburse them for lost consumption over the years. In the best case, residents would be significantly better off, more than offsetting lost consumption over the years.

6.2.5. Meeting the Costs of Development

There is a final barrier against people realising any return on their ownership of the land. Significant infrastructure such as roadworks, drainage and utility services would be required. There would be a difficulty in funding and carrying out such development if this were to be done by landowners acting together or individually.

[37] Patterson Britton and Partners Pty Ltd, Total Water Cycle Management Study, Land Capability and Infrastructure Study.

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The residents would need to fund the development in order to use the land. Using a figure of $65,000 per lot for development costs, residents would need to borrow this amount and then pay it off. Assuming the money was borrowed over 25 years, whether by residents or by council, and then paid off progressively, the annual cost to residents including both paying off capital and interest would be around $6,500.[38] For many owners, this represents a significant proportion of their overall income. Owners who could not afford this payment would not be able to use the block of land, but they would be able to sell it at an appropriate price, probably the market price less the development cost. This is estimated above at $37,000.

If the development was carried out by Council, Council could borrow the money and recover the cost in rates over future years. It is noted that Council has been collecting rates from the properties over a number of years and, while money has been expended in progressing rezoning applications, it is unlikely that the owners have received other significant services such as maintenance of roads in return. As 97% do not live in the Council area, they would also be unlikely to use other Council services such as libraries, recreation or community facilities. Hence by one view, Council has had the use of owner's money over twenty years without commensurate expenditure. On this view it is arguable that Council should bear some proportion of any costs associated with development.

We have calculated that the amount in rates paid per lot in NPV is around $10,000 per lot or around $8.0 million for the 800 lots under consideration in Heritage Estates in 2007 dollars during the past 20 years. It would be for Council's consideration as to the extent to which costs for aspects of the development of any land rezoned could be met through rates collected from landowners over the years.

If on the other hand development was to be carried out privately, it may be difficult for owners to firstly raise the necessary funds, and secondly to co-ordinate the necessary works. As noted above, many of their situations are also quite different from when they first purchased the land around 20 years ago. The alternative is that a developer may seek to purchase all the lots and then carry out the necessary capital works. This outcome may be unlikely as the developer would pay a low price for the land and that price may not be constant. As an example, the last people to sell would be in a powerful bargaining position and so could command quite high prices and with early sellers being offered quite low prices because of the risk to the developer of not purchasing enough land to proceed with the

[38] http://www.financeofaustralia.com.au/Loan%20Simulator/calculator.html using $65,000 loan and 9% interest.

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development. In the final analysis, those who cannot afford to meet the costs of development on the land are likely to be the least well-off and more vulnerable landowners described elsewhere in this report, who have also feel they have the least bargaining power and be inclined to sell earliest.

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Attachment A: JSA Staff CVs

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The expert opinion provided is that of Dr Judith Stubbs, who has also conducted and/or closely supervised the research that forms the basis of this opinion. Relevant qualifications and experience of Dr Stubbs, and other JSA project staff are provided below.

Dr Judith Stubbs, Principal JSA

Dr Judith Stubbs has over 20 years of professional practice in social and strategic planning, social research, human services management and development, and social and economic impact assessment. She has particular expertise in relation to affordable housing, and managed communities including caravan parks, MHEs and retirement villages. Her PhD focussed on social and economic aspects of caravan park and MHE living on residents under relevant NSW planning law, and implications for the housing market and the urban environment. Relevant awards and appointments include the following.

- Appointed Adjunct Professor, Australian Housing and Research Institute, University of NSW (January 2006 to December 2009), in recognition of research and publication in the areas of social and economic impact assessment, urban renewal; housing, labour market and urban issues including impacts of an ageing population; and affordable housing policy;
- Awarded post-doctoral research fellowship in 2004 to support her participatory research into urban renewal, at the Social Justice and Social Change Research Centre, UWS, at which she has been a Senior Research Fellow from 2003 to the present;
- Awarded PhD *RMIT* (Faculty of the Constructed Environment) 2003 prize for interdisciplinary thesis in planning law, housing and land economics. Also awarded a visiting fellowship to UCLA in 2002 as part of thesis PhD Scholarship related to comparative nature of thesis (Californian vs NSW planning law);
- Appointed as Chairperson of the NSW Department of Housing Regional Customer Advisory Council, the advisory body on public housing policy to the NSW Minister for Housing;
- Chairperson of the Illawarra Legal Centre;

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- Board member of Shelter NSW, the peak housing advocacy body for NSW;
- Board member of the Illawarra Area Consultative Committee, the Federal Regional Economic Development Board for the Illawarra advising the Federal Minister for Transport and Regional Services;
- Awarded the *NSW Innovative Planning in Local Government Award 1994* by the NSW Local Government & Shires Associations. The award was for 'significant contribution to the development of community planning and community consultation in NSW' for *Wollongong Profile: A Database for Community Planning*;
- Awarded NSW Law Society's Human Rights Award in 1995 to publish *A Human Right to Justice* based on her study for the Australian Law Reform Commission on the experiences of women and domestic violence, with a Foreword by Justice Mary Gaudron of the High Court of Australia.

Mr John Storer, Senior Research Associate

John Storer has graduate qualifications in Civil Engineering from UNSW, and post-gradual qualifications in Economics from UNE. John has 20 years experience as a professional Engineer, the last 10 years at senior managerial levels. He acted as project manager on a number of high profile Public Private Partnerships for companies including Leighton Holdings Pty Ltd, Walter Constructions Pty Ltd, Transfield Pty Ltd, and the AbiGroup-Leighton Joint Venture Company on diverse projects including the Western Sydney Orbital (M7), Eastern Sydney Distributor, Sydney Harbour Tunnel and South Coast Rail electrification. He has been involved in the commissioning and preparation of EISs for major projects under Part 3 of the EP&A Act 1979 (NSW).

As part of Judith Stubbs & Associates, John regularly conducts peer review on Economic Impact Assessments for the NSW State Government on a contract basis. His expert opinion has been accepted in a number of jurisdictions including the NSW Land and Environment Court, Liquor Licensing Court, Liquor Administration Board, NSW Supreme Court, and Victorian Civil and Administrative Tribunal. John has developed economic impact methodologies for NSW Treasury and the Office of Liquor and Gaming.

John has conducted economic impacts assessments for local, state and federal government, and the private and community sectors in diverse areas, including

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urban renewal, gaming and licensed premises for the past 15 years. His economic impact assessment on public housing renewal in Sydney's Southwest (Stubbs & Storer 1996), is regarded as a seminal study in the application of cost-benefit methodology to social programs. John has also conducted cost-benefit analyses for private developers on proposals to develop age-restricted developments in Sydney and coastal NSW.

Ms Jacquelin Capell, Senior Research Associate

Jacquelin holds qualifications in physiotherapy and completed her Master of Applied Science (Physiotherapy) by Research through Sydney University in 2005. In addition she completed a Graduate Diploma in Adult Education (UTS) in 1992 and Certificate IV in Training and Assessment in 2006.

Jacquelin has experience in qualitative and quantitative research, including research design, data collection and analysis, face-to-face interviews, and report writing on a range of areas including occupational health matters and the provision of health and community services. She has been involved with planning and conducting research related to assessment of developments proposed under various State Environment Planning Policies for JSA, including project managing large scale surveys working with communities from diverse ethnic backgrounds. Of note is her successful project management of the Bonnyrigg Baseline Survey where she was able to gain a very high response rate (85%) in an area where there are very low levels of English proficiency and literacy, and only 30% of respondents speak English at home.

Ms Colleen Lux, Research Associate

Colleen Lux has a Master of Science in Environmental Studies from the University of Montana and a Bachelor of Arts in Environmental Policy from the University of Tulsa. Her Master's thesis research focussed on public participation in decision-making regarding the cleanup of a Montana community contaminated by asbestos following decades of mining.

In 2005 and 2006, Colleen was an Associate Research Fellow in the School of Social Sciences, Media and Communications at the University of Wollongong, researching community consultation strategies to improve public understanding of water recycling.

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Since joining Judith Stubbs and Associates at the beginning of 2007, Colleen has had a major role in the Community Consultation and Community Renewal activities for Bonnyrigg Partnerships – involving the preparation of communication materials, community consultation, presentations and liaison with stakeholders. Colleen is the Senior Research Associate for the Community Wellbeing in Cotton Communities research project which is investigating the relationship between the industry and the socio-economic wellbeing of communities in cotton producing areas. The project has involved extensive consultation with Councils, local businesses, government and non-governmental organisations, and community members of selected cotton communities in NSW and QLD.

Colleen has assisted with Social Impact Assessments and is currently conducting research on housing affordability in both urban and regional areas.

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Attachment B: Letter sent with survey

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SOCIAL PLANNING & RESEARCH, SOCIAL & ECONOMIC IMPACT ASSESSMENT, CONSULTATION & FACILITATION

December 2007

Heritage Estates Owner Survey

Dear Sir/Madam

We are a social planning and research group conducting work on behalf of Shoalhaven City Council (SCC) about the possible rezoning of land, from rural to residential use, in the area known as Heritage Estates. The aim of this project is to research and document the impacts, both social and economic, which landowners at Heritage Estates -might experience **if rezoning does not happen**.

SCC will include this information in a Public Environment Report which will be submitted to the Commonwealth Department of the Environment and Water Resources to assist in the decision about whether the land will ultimately be rezoned. This information may also be provided to the NSW Department of Planning and the NSW Department of Environment and Climate Change as part of this decision-making process. Replies to the survey are confidential. Individual landowners will not be identified in any reports.

To help us gather information, all landowners are being sent a written survey, enclosed with this letter. This survey is designed to help us understand the background to owners' decisions to purchase land at Heritage Estates, and more importantly, the possible impact on landowners if Heritage Estates is NOT rezoned for residential development. We will also telephone a random selection of landowners to seek more detailed feedback about these matters.

We value your feedback, and would greatly appreciate it if you could complete the enclosed survey and return it using the pre-paid envelope by **21 December 2007**.

If you have any specific questions about rezoning matters, please contact SCC's Strategic Planning Group on (02) 4429 3426.

Thank you for your cooperation.

Dr Judith Stubbs

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Attachment C: Survey

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JUDITH STUBBS & ASSOCIATES

Heritage Estates: Rezoning Survey

We are a social planning and research group conducting work on behalf of Shoalhaven City Council (SCC) about the possible rezoning of land, from rural to residential use, in the area known as Heritage Estates. The aim of this project is to research and document the impacts, both social and economic, which landowners might experience if rezoning does not happen. Replies to the survey are confidential. Individual landowners will not be identified in any reports.

We greatly appreciate your taking the time to complete this survey.

1. Date: _____
2. Owner's Name(s): _____
3. Mailing Address: _____
4. Phone Number: _____
5. Age in years: ❒ 18-29 ❒ 30-49 ❒ 50-64 ❒ 65-74 ❒ 75 +
6. Number of owners: ❒ One ❒ More than one
7. Family Type:
   - ❒ Single/widowed/divorced
   - ❒ Couple with no children living at home
   - ❒ Couple with children living at home
   - ❒ Other _____
8. Weekly household income (all adults):
   - ❒ Negative/Nil income
   - ❒ $1-$149
   - ❒ $150-$249
   - ❒ $250-$349
   - ❒ $350-$499
   - ❒ $500-$649
   - ❒ $650-$799
   - ❒ $800-$999
   - ❒ $1,000-$1,399
   - ❒ $1,400-$1,999
   - ❒ $2,000 or more
9. Did you buy your block of land from Heritage Real Estate/ Interpacific Property Corporation Pty Ltd? ❒ Yes ❒ No
10. What year(s) did you buy your block(s) of land? _____
11. How many blocks did you buy and much did you pay for each? _____
12a. Did you borrow money to buy your block(s) of land? ❒ Yes ❒ No
12b. Are you still paying off your block(s) of land? ❒ Yes ❒ No
12c. If Yes to Q.12a, approximately how much is your monthly loan payment now?
   - ❒ $1-$99
   - ❒ $100-$249
   - ❒ $250-$399
   - ❒ $400 +
13. Are you currently paying your Council rates? ❒ Yes ❒ No
14. What was the MAIN reason for buying your block(s) of land?
   - ❒ To build a home to live in
   - ❒ To build a home to retire to
   - ❒ To build a holiday home for you/your family
   - ❒ To build a home to rent out as an investment
   - ❒ To build a home to sell as an investment
   - ❒ To resell the land as an investment when rezoned
   - ❒ Other (specify): _____

Please turn over.

15. At the time of your purchase, who did you seek advice from about the zoning of the land?
   - ❒ Real Estate Agent
   - ❒ Shoalhaven City Council
   - ❒ Lawyer from Heritage Real Estate
   - ❒ Independent lawyer or conveyancer
   - ❒ Family and friends
   - ❒ No-one
16. When you bought your block(s) of land did you realise that the zoning DID NOT allow building on it? ❒ Yes ❒ No
17a. When you bought your block(s) of land did you think there could be problems with it being rezoned? ❒ Yes ❒ No ❒ Perhaps ❒ Unsure
17b. Why/ why not? _____
18. How do you use the land now (eg visit occasionally, holiday once per year, camping)? _____
19a. Have you tried to sell your block(s) of land? ❒ Yes ❒ No
19b. If yes, what year: _____
19c. If yes, why?
   - ❒ Costs too much to keep
   - ❒ Not able to build on it
   - ❒ Changed personal circumstances
   - ❒ Other (specify): _____
20. If the land is rezoned for residential building, what do you now plan to do with your block?
   - ❒ Sell the land
   - ❒ Build a house on it to live in
   - ❒ Build a holiday house for my self or family
   - ❒ Build a house on it to rent out
   - ❒ Build a house on it to sell
   - ❒ Do nothing different
21a. Do you currently own a home (own outright or are paying off)? ❒ Yes ❒ No
21b. If yes, what suburb is your home in? _____
22. What will be the main impact on you if the land is NOT rezoned? (briefly describe)

Thank you for taking the time to complete this survey.

Please return the survey in the envelope provided by Friday, 21 December 2007.

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ATTACHMENT 4. Geotechnical information on the subject land (Coffey Geosciences, 2005)

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ATTACHMENT 4. Geotechnical information on the subject land (Coffey Geosciences, 2005)

A4.1. Geology & Terrain units

According to the Ulladulla 1:250,000 Geological Sheet, the lower footslopes of the site are associated with Quaternary deposits of alluvium, gravel, swamp deposits and sand dunes. The remainder of the site is associated with Permian siltstone, sandstone, shale, conglomerate and shale, while more elevated land immediately to the southeast of the site are associated with undifferentiated Tertiary sediments McIlveen, 1973[i].

Four terrain units were identified as shown in Figure 1. These are briefly described below.

- Terrain unit 1 – alluvial plain. Occurs up to 5m AHD extending along Worrowing Waterway and the lower part of its tributaries. This terrain unit does not extend into the investigation areas. Acid sulphate soils may occur within this unit.
- Terrain unit 2A – sandy topsoil over residual soils. While sandy topsoils occur across the site, the underlying residual soils (which result from weathering of rock) occur in the middle to upper reaches of several drainage lines. Perched groundwater is located within the upper 1.5m in the east and south-eastern areas of this unit.
- Terrain unit 2B – sandy topsoil over colluvium. The underlying colluvium is material that has been transported short distances by wind or water. Vegetation in this unit is characterised by sedge grass and heath species. Sedge grass in particular, proliferates where groundwater occurs near the surface.
- Terrain unit 3 – rock outcrop. A broad band of outcropping sandstone occurs in the eastern portion of the site. Coffey Geosciences suggest this rock outcrop acts as the groundwater recharge zone.

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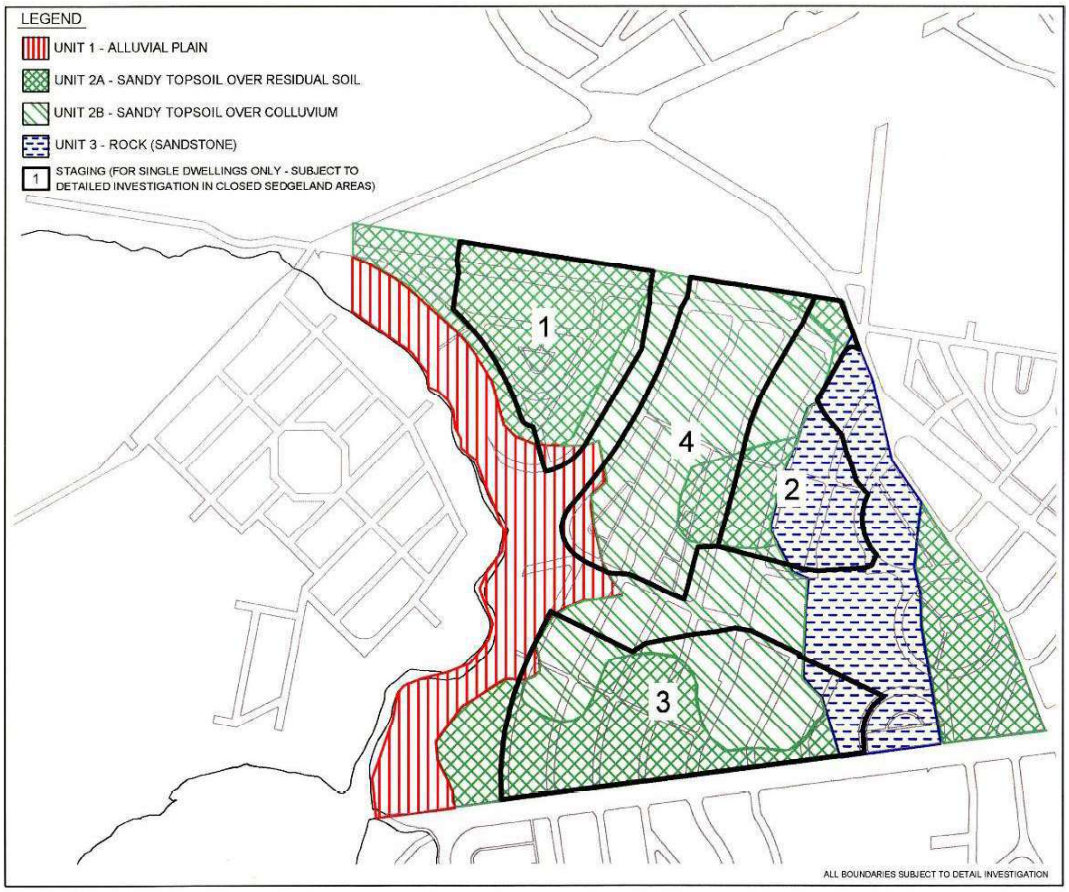


Figure 1 - Terrain units (Source: Coffey Geosciences, 2005).

A4.2. Dispersivity and erodibility

Laboratory testing of soil samples taken from across the site indicated that the upper soil layers are partially to highly dispersive, therefore requiring careful management during the construction phase. The design of roads and stormwater drainage would need to incorporate appropriate erosion and sedimentation controls (Coffey Geosciences Pty Ltd, 2005).

A4.3. Acid sulphate soils (ASS)

Testing undertaken by Coffey Geosciences indicated that ASS are unlikely to occur within the investigation areas. They concluded that ASS are only likely to occur in terrain unit 1, below 2m AHD. Refer to Figure 2 - Contours over the subject land showing 2 metre AHD in relation to the investigation areas.

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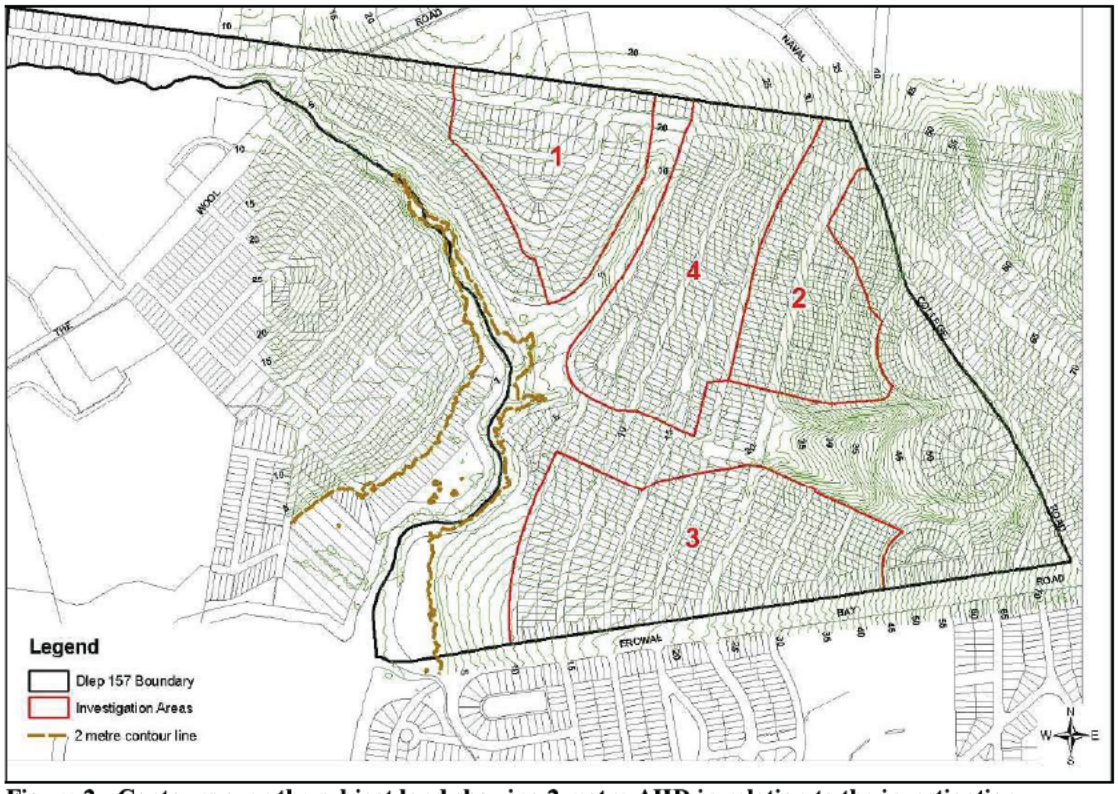


Figure 2 – Contours over the subject land showing 2 metre AHD in relation to the investigation areas.

A4.4. Disturbances & land contamination

The aerial photographs shown in section 1 of the PER indicate the land remained undisturbed from the 1940's through until the land sale began in the late 1980's when numerous lots were cleared. Some minor structures present then have since been removed. It is evident in **Error! Reference source not found.** that some regeneration of cleared areas occurred between 1994 and 2006. However some localised severely disturbed areas remain.

Camping has occurred on parts of the Estate. There has been an increase in trail bike riding and recreational 4WD use in the subject land in recent years and many of the tracks used by these recreational activities have been severely eroded, particularly in terrain unit 2B. Illegal dumping of a range of materials including car bodies, household appliances and builders' waste has been exacerbated by the unrestricted vehicular access.

A Preliminary Contaminated Land Assessment completed on behalf of Council by Coffey Geosciences Pty Ltd identified no specific areas of environmental concern (AEC). Coffey Geosciences Pty Ltd (2005[11]) did however identify some minor localised areas of contamination. They concluded that slightly elevated heavy metal concentrations found in the groundwater were indicative of background concentrations, not influenced by past or current landuse activities.

Bushfires, many of which are deliberately lit, occur frequently in the subject land. However burns tend to be localised rather than broadscale and this is partly attributed

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to the diverse range of vegetation types and mosaic of vegetation disturbances. This mosaic of disturbance may have mitigated habitat and biodiversity loss (BES, 2007).

Despite the disturbances in the subject land, the number of introduced plant and animal species is relatively low (BES, 2007)

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[i] McIlveen, G. (1973). *Ulladulla 1:250,000 Metallogenic Sheet.* Geol. Surv. NSW, Sydney.

[ii] Coffey Geosciences Pty Ltd (2005). *Preliminary Contaminated Land Assessment, Worrowing Heights (Heritage Estates) Erowal Bay, NSW*. Report prepared for Shoalhaven City Council.

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ATTACHMENT 5. Vegetation descriptions & plant species identified on the subject land (BES, 2007)

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ATTACHMENT 5. Vegetation descriptions & plant species identified on the subject land (BES, 2007)

Scribbly Gum-bloodwood Woodland

This is the most extensive vegetation community within the study area. It occurs from the elevated upper slopes through to the footslopes adjacent to Worrowing Waterway. The dominant canopy species are Scribbly Gum *Eucalyptus sclerophylla* and Red Bloodwood *Corymbia gummifera*. Silver-top Ash *Eucalyptus sieberi* is a co-dominant on upper slopes with skeletal soils. A small area of Scribbly Gum Woodland adjacent to Worrowing Waterway contains Woollybutt *Eucalyptus longifolia* as a canopy co-dominant. Other co-dominants include Thin-leaved Stringybark *Eucalyptus eugenioides*. Canopy height varies between 10 and 14 metres and projected foliage cover (PFC) varies between 10 and 25%. A mid-canopy is present in many locations, with common species including Scribbly Gum, Red Bloodwood and Black She-oak *Allocasuarina littoralis*, with occasional Old Man Banksia *Banksia serrata* in shrubby woodland sites. The mid-canopy is relatively open with average PFC of 10%.

The understorey is species-rich and diverse and is dominated by sclerophyllous species. The species composition varies according to soil depth, moisture and topographic position. On the upper and mid slopes the understorey is very dense (average PFC of 75%). Typical species include Heath-leaved Banksia *Banksia ericifolia,* Hairpin Banksia *Banksia spinulosa,* Dagger Bush *Hakea teretifolia,* Jervis Bay Tea-tree *Leptospermum epacridoideum,* Yellow Tea-tree *Leptospermum polygalifolium,* Coral Heath *Epacris microphylla, Leptospermum squarrosum,* Narrow-leaved Geebung *Persoonia linearis,* Fringe Myrtle *Calytrix tetragona,* White Kunzea *Kunzea ambigua,* Heath Kunzea *Kunzea capitata,* Common Phyllota *Phyllota phylicoides* and the Conesticks *Petrophile pedunculata* and *Petrophile sessilis.* On the lower slopes the understorey is dominated by *Leptospermum polygalifolium, Banksia serrata, Banksia ericifolia, and Kunzea capitata.* The average density is less in the footslope position (PFC of 50%) and the average height (3 metres) is greater on the footslopes.

The groundcover is highly diverse and species-rich with up to 63 species in a 20m x 20m quadrat. The most common species are grasses, sedges and rushes. Dominant species include Common Rapier-sedge *Lepidosperma filiforme,* Scale Rush *Lepyrodia scariosa, Leptocarpus tenax, Lomandra gracilis,* Many-flowered Mat-rush *Lomandra mutliflora ssp multiflora,* Swamp Selaginella *Selaginella ulignosa,* Curly Sedge *Caustis flexulosa,* Spreading Rope-rush *Empodisma minus,* Black Bog-rush *Schoenus melanostachys spp pachylepis, Cyathochaeta diandra,* Wiry Panic *Entolasia stricta,* Bordered Panic *Entolasia marginata,* Rock Xanthosia *Xanthosia tridentata, Micrantheum ericoides,* Lesser Flannel-flower *Actinotus minor,* Silky Purple Flag *Patersonia sericea and* Dog Rose *Bauera rubiioides.* Other common species include Kangaroo Grass *Themeda australis, Sprengelia incarnata,* Blue Dampiera *Dampiera stricta,* Germander Raspwort *Gonocarpus teucrioides,* Oat Speargrass *Anisopogon avenaceus, and* Screw Fern *Lindsaea linearis.*

A small section of Scribbly Gum Woodland occurs along the creek corridor south of the confluence of Worrowing Waterway and the unnamed drainage line. Species such

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as Common Reed *Phragmites australis*, Swamp Oak *Casuarina glauca* and Tall Saw-sedge *Gahnia clarkei* are indicative of the riparian influence in this location.

Gallery Rainforest

Gallery Rainforest is located adjacent to Worrowing Waterway east of The Wool Road as a narrow linear band of vegetation confined to the immediate creek corridor. A smaller unnamed drainage line meets approximately halfway along Worrowing Waterway, but this contains riparian vegetation. One other large drainage line occurs in the south-eastern section of the study area. This area is vegetated by eucalypt forest but is not riparian vegetation.

Previous mapping has shown a continuous large corridor of riparian open forest adjacent to Worrowing Waterway. Closer examination of the area alongside Worrowing Waterway indicates a complex pattern of vegetation.

Along the northern half of Worrowing Waterway east of The Wool Road gallery rainforest constitutes a narrow linear area of mesomorphic vegetation dominated by Swamp Oak *Casuarina glauca,* Callicoma *Callicoma serratifolia,* Native Grape *Cissus hypoglauca,* Cabbage-tree Palm *Livistona australis,* NSW Christmas Bush *Ceratopetalum gummiferum*, Lilly Pilly *Acmena smithii* and Blueberry Ash *Elaeocarpus reticulatus* in the canopy. These areas have an almost completely closed canopy which gives the vegetation its rainforest structure In the understorey Tall Saw-sedge *Gahnia clarkei* is dominant. Common groundcover species includes Sandfly Zieria *Zieria smithii, Morinda jasminoides,* Common Maidenhair Fern *Adiantum aethiopicum,* Guinea-flower *Hibbertia dentata,* Wonga-wonga Vine *Pandorea pandorana,* Wombat Berry *Eustrephus latifolius, Cissus hypoglauca* and False Bracken *Calochlaena dubia.* The width of the rainforest is between 5 -10 metres.
Further downstream the floristics and structure changes to a typical dry forest with influences of high water tables.

Bangalay Swamp Forest

Bangalay Swamp Forest occurs at the confluence of Worrowing Waterway and the unnamed drainage line originating from the northern boundary, where the riparian influence widens, and in the south-west corner of the study area.

At the confluence of Worrowing Waterway and the unnamed drainage Dominant canopy species are Bangalay *Eucalyptus botryoides,* Swamp Mahogany *Eucalyptus robusta,* Woollybutt *Eucalyptus longifolia.* Snow-in-Summer *Melaleuca linariifolia* and Callicoma *Callicoma serratifolia* are common understorey species. Pouched Coral Fern *Gleichenia dicarpa* and Tall Saw-sedge *Gahnia clarkei* comprise the majority of the groundcover. Further to the north-east along the unnamed drainage line Bangalay *Eucalyptus botryoides,* Snow-in-Summer *Melaleuca linariifolia,* Tall Saw-sedge *Gahnia clarkei* and Common Reed *Phragmites australis* become the dominant species. Hard-leaved Scribbly Gum *Eucalyptus sclerophylla* occurs sporadically within the drainage line but is considered a transitional species.

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Immediately south of the confluence of Worrowing Waterway and the unnamed drainage line, the swamp forest vegetation in the immediate creek corridor becomes less defined. The canopy species become variable and the understorey and ground layer are dominated by Pouched Coral Fern *Gleichenia dicarpa, Gahnia clarkei* and Heath-leaved Banksia *Banksia ericifolia.* The complex pattern appears to be related to groundwater influences and surface drainage patterns entering from the east.

In the south-west of the study area, Bangalay Swamp Forest is dominated by Bangalay *Eucalyptus botryoides* in the canopy (PFC of 40% and height to 18 m) with occasional sub-dominant canopy species such as Spotted Gum *Corymbia maculata* and Grey Ironbark *Eucalyptus paniculata* ssp. *paniculata* intruding from the east. The sub-canopy is dominated Black She-oak *Allocasuarina littoralis* and Green Wattle *Acacia irrorata* with PFC of 55% to a height of 10m. Characteristic understorey species include Tall Saw-sedge *Gahnia clarkei*, Sweet Pittosporum *Pittosporum undulatum*, and Monkey Rope *Parsonsia straminea*. Other common species include Mock Olive *Notelaea longifolia*, *Morinda jasminoides*, Callicoma *Callicoma serratifolia* and Blueberry Ash *Elaeocarpus reticulatus*. The groundcover is dominated by Common Bracken Fern *Pteridium esculentum*, Bordered Panic *Entolasia marginata*, Spiny-headed Mat-rush *Lomandra longifolia*, Kangaroo Grass *Themeda australis*, False Bracken *Calochlaena dubia*, Paroo Lily *Dianella caerulea* var *caerulea* and Guinea-flower *Hibbertia dentata*.

Woollybutt-Paperbark Swamp Forest

Woollybutt Paperbark Swamp Forest occurs in the upper reaches of Worrowing Waterway in the north-west of the study area adjacent to Birriga Avenue. It comprises a generally narrow band of vegetation adjacent to the creek banks. A wider section of this community occurs on a small floodplain in the west and has a woodland structure. In the east the vegetation is denser and has the structure of open forest.

The canopy is dominated by Woollybutt *Eucalyptus longifolia* to a height of 20m with PFC of 20-30%. Other canopy species such as Spotted Gum *Corymbia maculata*, Grey Gum *Eucalyptus punctata* and Hard-leaved Scribbly Gum *Eucalyptus sclerophylla* intrude into the swamp forest vegetation on occasion but these are considered transitional species. The mid-canopy comprises mature Snow-in-Summer *Melaleuca linariifolia* and Black She-oak *Allocasuarina littoralis* to a height of 8 m with PFC of 20-30%.

The understorey is characterised by Yellow Tea-tree *Leptospermum polygalifolium* and immature mid-canopy species to a height of 2m with PFC of 20-30%. Groundcover species in the west are sclerophyllous and include Thatch Saw-sedge *Gahnia radula*, Scale Rush *Lepyrodia scariosa*, *Ptilothrix deusta*, Wiry Panic *Entolasia stricta* and Spreading Rope-rush *Empodisma minus*. In the east towards The Wool Road, the groundcover is dominated by Tall Saw-sedge *Gahnia clarkei* and Red-fruited Saw-sedge *Gahnia sieberana*, with Sandfly Zieria *Zieria smithii*, Common Reed *Phragmites australis* and Tall Spike-rush *Eleocharis sphacaelata* becoming more common.

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Spotted Gum-Woollybutt Woodland

Spotted Gum-Woollybutt Woodland occurs immediately west of The Wool Road in the study area on the footslopes and mid-slopes to the north of Worrowing Waterway. Parts of this vegetation have been disturbed by existing development for houses and churches. The understorey in these areas is slashed regularly.

The dominant canopy species are Spotted Gum *Corymbia maculata* and Woollybutt *Eucalyptus longifolia* to a height of 20 m with PFC of 20%. The open understorey comprises Mountain Devil *Lambertia formosa*, Carrot Tops *Platysace linearifolius*, White Kunzea *Kunzea ambigua* and Hairpin Banksia *Banksia spinulosa* to a height of 1.5 m with PFC of 5%.

Common groundcover species include Blue Dampiera *Dampiera stricta*, Grey Mat-rush *Lomandra glauca*, Wiry Panic *Entolasia stricta*, Scale Rush *Lepyrodia scariosa* and Oat Speargrass *Anisopogon avenaceus* to a height of 0.5 m with PFC of 80%.

Spotted Gum-Blackbutt Open Forest

Spotted Gum-Blackbutt Open Forest in the study area occurs east of The Wool Road on footslopes adjacent to Worrowing Waterway, predominantly in the northwest and south-west of the study area.

In the northwest and south-west of the study area, Spotted Gum–Blackbutt Open Forest is dominated by Spotted Gum *Corymbia maculata*, Turpentine *Syncarpia glomulifera* and Blackbutt *Eucalyptus pilularis*. Sub-dominant species include Bangalay *Eucalyptus botryoides*, Red Bloodwood *Corymbia gummifera* and Grey Ironbark *Eucalyptus paniculata* ssp *paniculata*. It has a canopy height of 25 m and PFC of 70%. The mid-canopy is dominated by *Syncarpia glomulifera*, Saw Banksia *Banksia serrata*, Green Wattle *Acacia irrorata* and Black She-oak *Allocasuarina littoralis* to a height of 8 m with PFC of 60%.

The understorey is characterised by Sweet Pittosporum *Pittosporum undulatum*, Tall Saw-sedge *Gahnia clarkei*, Common Hop-bush *Dodonaea triquetra*, Hairpin Banksia *Banksia spinulosa*, White Kunzea *Kunzea ambigua*, Yellow Tea-tree *Leptospermum polygalifolium*, Mock Olive *Notelaea longifolia* and Blueberry Ash *Elaeocarpus reticulatus* to a height of 2m with PFC of 50%.

The groundcover is sparse with PFC of 10% and a height of 0.5m. The main species include Kangaroo Grass *Themeda austrails*, Paroo Lily *Dianella caerulea* var *producta*, Common Bracken Fern *Pteridium esculentum*, False Bracken *Calochlaena dubia*, Common Maidenhair Fern *Adiantum aethiopicum*, Wong-wonga *Pandorea pandorana*, Wombat Berry *Eustrephus latifolius*, Native Grape *Cissus hypoglauca* and Bordered Panic *Entolasia marginata*.

Where the community meets the creek, species such as Common Reed *Phragmites australis*, Swamp Oak *Casuarina glauca* and Tall Saw-sedge *Gahnia clarkei* are indicative of the riparian influence.

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Blackbutt-Bloodwood Open Forest

Blackbutt-Bloodwood Open Forest occurs as a wide band of vegetation associated with a large unnamed drainage line extending from the south-eastern corner of the study area through to Worrowing Waterway. The distribution is much wider than the other vegetation associated with drainage lines.

The Blackbutt-Bloodwood Open Forest along the unnamed drainage line is dominated by Blackbutt *Eucalyptus pilularis* and Red Bloodwood *Corymbia gummifera*. Canopy height is to 20 m and PFC varies widely between 20 and 60%. In Some locations there is a mid-canopy of Turpentine *Syncarpia glomulifera*, Saw Banksia *Banksia serrata* and Blackbutt *Eucalyptus pilularis* with PFC of 60%. In the eastern parts of the canopy comprises a pure stand of Blackbutt.

The understorey varies between areas dominated by mesic species in the centre of the drainage line to areas dominated by sclerophyllous species towards the perimeter of the community. The PFC is 40-50% and height is to 2.5m. Dominant species include Common Hop Bush *Dodonaea triquetra*, White Kunzea *Kunzea ambigua*, Yellow Tea-tree *Leptospermum polygalifolium*, Coral Heath *Epacris microphylla*, Hairpin Banksia *Banksia spinulosa* and Fringed Heath-myrtle *Micromyrtus ciliata* to a height of 2.5 m with PFC of 40-50%. Other common species include Blueberry Ash *Elaeocarpus reticulatus*, Sydney Golden Wattle *Acacia longifolia*, Bearded Heath *Leucopogon ericoides*, Bronze Bush-pea *Pultenaea villosa*, Bushy Needlebush *Hakea sericea* and Handsome Flat-pea *Platylobium formosum*.

The groundcover is similarly variable. Areas within the dense canopy in the centre of the drainage line contain more mesic species while the areas towards the perimeter are more sclerophyllous. Dominant species include Silky Purple Flag *Patersonia sericea*, Handsome Flat-pea *Platylobium formosum*, Variable Sword-sedge *Lepidosperma laterale*, Twisted Mat-rush *Lomandra obliqua*, *Lomandra cylindrica*, Kangaroo Grass *Themeda australis*, Scale Rush *Lepyrodia scariosa*, Many-flowered Mat-rush *Lomandra multiflora* and *Darwinia leptantha*. The PFC is 20% in the perimeter areas and 40% in the drainage line locations. Other common species include Wonga-wonga Vine *Pandorea pandorana*, Common Rapier-sedge *Lepidosperma filiforme* and *Schelhammera undulata*.

Heathland

Heathland is located on sandstone outcrops with skeletal soils in the elevated central eastern section of the study area. The canopy is dominated by *Darwinia leptantha*, White Kunzea *Kunzea ambigua*, *Melaleuca thymifolia*, Fringed Heath-myrtle *Micromyrtus ciliata*, Common Fringe-myrtle *Calytrix tetragona* and Jervis Bay Tea-tree *Leptospermum epacridoideum*. Canopy height is 1.5 metres and PFC is variable between 20 and 80%. Some locations have emergent Red Bloodwood *Corymbia gummifera* to a height of 4 m. The groundcover is dominated by *Calytrix tetragona*, Coral Heath *Epacris microphylla*, Variable Sword-sedge *Lepidosperma laterale*, Scale rush *Lepyrodia scariosa*, *Darwinia leptantha*, Three-awn Speargrass *Aristida*

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warburgii, Wiry Panic *Entolasia stricta* and *Micrantheum ericoides*. Other common species includes *Lepidosperma viscidum*, Sundew *Drosera spathulata* and *Epacris obtusifolia* and *Saropsis fastigiata*.

Sedgeland-Shrubland

The Sedgeland-Shrubland community occurs on the lower slopes adjacent to major drainage lines in the study area. In some locations the community comprises shrubland dominated by hakeas or banksias with a sedge understorey/groundcover. However, given the similar herbaceous species composition, soils, high water table, landform and topographic position, the vegetation has been grouped together.
The dominant plants are herbaceous species typical of ephemeral wetlands, swamps or other areas of high water tables. Common species include Roundhead Bristle-sedge *Chorizandra sphaerocephala*, *Lepidosperma limicola*, Spreading Rope-rush *Empodisma minus*, *Leptospermum continentale*, *Leptocarpus tenax*, Swamp Selaginella *Selaginella uliginosa*, *Melaleuca thymifolia*, *Melaleuca squarrosa*, *Baumea rubiginosa*, Pouched Coral Fern *Gleichenia dicarpa*, Dog Rose *Bauera rubioides*, *Xanthorrhoea resinosa*, *Elaeocharis pusilla*. Shrub species include Heath-leaved Banksia *Banksia ericifolia* and Dagger Bush *Hakea teretifolia*.

(* denotes introduced species, bold denotes threatened species).

SCIENTIFIC NAME	COMMON NAME
Acacia elongate var. dilatata	A wattle
Acacia irrorata ssp irrorata	Green Wattle
Acacia longifolia	Sydney Golden Wattle
Acacia mearnsii	Black Wattle
Acacia suaveolens	Sweet-scented Wattle
Acacia subtilinervis	A Wattle
Acacia terminalis	Sunshine Wattle
Acacia ulicifolia	Prickly Moses
Acmena smithii	Lilly Pilly
Allocasuarina distyla	A she-oak
Allocasuarina littoralis	Black She-oak
Actinotus helianthi	Flannel Flower
Actinotus minor	Lesser Flannel Flower
Adiantum aethiopicum	Common Maiden-hair Fern
Andropogon virginicus	Whiskey Grass
Anisopogon avenaceus	Oat Spear Grass
Aotus ericoides	Common Aotus
Aristida vagans	Three-awn Spear-grass
Aristida warburgii	A wire grass
Austrodanthonia sp.	A wallaby grass

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SCIENTIFIC NAME	COMMON NAME
Austrostipa bigeniculata	A spear grass
Banksia ericifolia	Heath-leaved Banksia
Banksia paludosa	Swamp Banksia
Banksia serrata	Old Man Banksia
Banksia spinulosa	Hairpin Banksia
Bauera rubioides	Dog Rose
Baumea rubiginosa	Soft Twig-rush
Billardiera scandens	Apple Berry
Blandfordia nobilis	Christmas Bells
Blechnum cartilagineum	Gristle Fern
Boronia pinnata	A boronia
Bossiaea scolopendria	Broom Bossiaea
Briza maxima	Quaking Grass
Brunoniella pumilio	Dwarf Blue Trumpet
Burchardia umbellata	Milkmaids
Bursaria spinosa	Blackthorn
Caladenia carnea	Pink Fingers
Caesia parviflora	Pale Grass-lily
Calaena major	Duck Orchid
Calochilis paludosus	Red Beardie
Caustis flexuosa	Curly Wigs
Caustis recurvata var recurvata	A sedge
Callicoma serratifolia	Callicoma
Callistemon citrinus	Pink Bottlebrush
Callistemon linearis	Narrow-leaved Bottlebrush
Callistemon rigidus	Stiff Bottlebrush
Calochlaena dubia	False Bracken Fern
Calytrix tetragona	Fringe Myrtle
Cassytha glabella	Slender Devil's Twine
Cassytha pubescens	Devil's Twine
Casuarina glauca	Swamp Oak
Caustis flexuosa	Curly Sedge
Ceratopetalum gummiferum	Christmas Bush
Chorizandra sphaerocephala	Round-headed Bristle-rush
*Cinnamomum camphora**	Camphor Laurel*
Cissus hypoglauca	Native Grape
Citriobatus pauciflorus	Orange Thorn

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SCIENTIFIC NAME	COMMON NAME
Clematis aristata	Old Man's Beard
Comesperma ericinum	Match Heads
Conospermum ericifolium	Smoke bush
Corymbia gummifera	Red Bloodwood
Corymbia maculata	Spotted Gum
Cryptostylis erecta	Hooded Orchid
Cryptostylis hunteriana	**Leafless Tongue Orchid**
Cryptostylis subulata	Large tongue Orchid
*Cupressus sp.**	Cypress*
Cyathochaeta diandra	A Rush
Cymbidium suave	Snake Orchid
Dampiera stricta	Blue Dampiera
Darwinia leptantha	A darwinia
Daviesia ulicifolia	Gorse Bitter Pea
Deuxeia sp.	A bent grass
Dianella caerulea var. caerulea	Blue Flax Lily
Dianella caerulea var.producta	Blue Flax Lily
Dichondra repens	Kidney Weed
Dodonaea triquetra	A Hop Bush
Drosera peltata	A sundew
Drosera spathulata	A sundew
Echinopogon caespitosus	Tufted Hedgehog Grass
Elaeocarpus reticulatus	Blueberry Ash
Eleocharis pusilla	A spike rush
Empodisma minus	Spreading Rope Rush
Entolasia marginata	Bordered Panic
Entolasia stricta	Wiry Panic
Epacris microphylla	Coral heath
Epacris paludosa	Swamp Epacris
Epacris pulchella	NSW Coral heath
Epacris obtusifolia	Blunt-leaved Heath
Eragrostis brownii	Brown's Love Grass
Eragrostis leptostachya	Paddock Lovegrass
Eriochilus autumnalis	Parsons Bands
Eucalyptus botryoides	Bangalay
Eucalyptus saligna x botryoides	Blue Gum-Bangalay Hybrid
Eucalyptus eugenioides	Thin-leaved Stringybark

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SCIENTIFIC NAME	COMMON NAME
Eucalyptus globoidea	White Stringybark
Eucalyptus longifolia	Woollybutt
Eucalyptus paniculata ssp paniculata	Grey Ironbark
Eucalyptus pilularis	Blackbutt
Eucalyptus punctata	Grey Gum
Eucalyptus robusta	Swamp Mahogany
Eucalyptus scias	Large-fruited Red Mahogany
Eucalyptus sclerophylla	Hard-leaved Scribbly Gum
Eucalyptus sieberi	Silver-top Ash
Eurycorda complenata	A rush
Eustrephus latifolius	Wombat Berry
Exocarpos cupressiformis	Native Cherry
Gahnia aspera	Rough Saw-sedge
Gahnia clarkei	Tall Saw-sedge
Gahnia radula	Thatch Saw-sedge
Gahnia sieberana	Red-fruited Saw-sedge
Gastrodia sesamoides	Cinnamon Bells
Genoplesium baueri	**Bauer's Midge Orchid**
Glochidion ferdinandi	Cheese Tree
Glycine clandestina	Love Creeper
Grevillea macleayana	Jervis Bay Grevillea
Grevillea baueri ssp baueri	Bauer's Grevillea
Gleichenia dicarpa	Pouched Coral Fern
Gompholobium grandifolium	Large Wedge Pea
Gompholobium latifolium	Broad-leaved Wedge Pea
Gompholobium pinnatum	Pinnate Wedge Pea
Gonocarpus micranthus ssp micranthus	A raspwort
Gonocarpus teucrioides	Germander Raspwort
Goodenia heterophylla ssp eglandulosa	Variable-leaved Goodenia
Goodenia ovata	Hop Goodenia
Gymnoschoenus spherocephalus	Button Grass
Haemodorum planifolium	Bloodroot
Hakea dactyloides	Broad-leaved Hakea
Hakea teretifolia	Dagger Hakea
Hakea sericea	Needlebush
Hardenbergia violacea	Native Sarsaparilla
Hibbertia acicularis	Prickly Guinea Flower

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SCIENTIFIC NAME	COMMON NAME
Hibbertia aspera ssp. aspera	Rough Guinea Flower
Hibbertia cistiflora	A guinea flower
Hibbertia dentata	Twining Guinea Flower
Hibbertia scandens	Golden Guinea Flower
*Hypochaeris radicata**	Flatweed*
Hypoxis hygrometrica	Yellow Stars
Kennedia prostrata	Running Postman
Kennedia rubicunda	Dusky Coral Pea
Kunzea ambigua	White Kunzea
Kunzea capitata	Heath Kunzea
Imperata cylindrica	Blady Grass
Isopogon anemonifolius	Drumsticks
Lagenifera stipitata	Blue Lagenophora
Lambertia formosa	Mountain Devil
Lepidosperma filiforme	A Rapier Sedge
Lepidosperma laterale	A Rapier Sedge
Lepidosperma limicola	A Rapier Sedge
Lepidosperma viscidum	A Rapier Sedge
Leptocarpus tenax	
Leptospermum continentale	A tea-tree
Leptospermum epacridoideum	A tea-tree
Leptospermum polygalifolium	Tantoon
Leptospermum squarrosum	A tea-tree
Leptospermum trinervium	Paperbark Tea-tree
Lepyrodia scariosa	Scale Rush
Leucopogon ericoides	Bearded Heath
Leucopogon esquamatus	A Beard Heath
Leucopogon juniperinus	A Beard Heath
Leucopogon lanceolatus	Lance Beard Heath
*Ligustrum sinense**	Small-leaved Privet*
Lindsaea linearis	Screw Fern
Lobelia alata	A Lobelia
Lomandra cylindrica	Needle Mat-rush
Lomandra gracilis	A mat-rush
Lomandra glauca ssp glauca	Pale Mat-rush
Lomandra longifolia	Spiny-headed Mat-rush
Lomandra multiflora ssp multiflora	Many Flowered Mat-rush

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SCIENTIFIC NAME	COMMON NAME
Lomandra filiformis ssp filiformis	Wattle Mat-rush
Lomandra obliqua	Fish Bones
Lomatia ilicifolia	Holly Lomatia
Livistona australis	Cabbage Tree Palm
Melaleuca biconvexa	**Biconvex Paperbark**
Melaleuca ericifolia	Swamp Paperbark
Melaleuca linearifolia	Snow-in-Summer
Melaleuca thymifolia	Thyme Honey Myrtle
Micrantheum ericoides	-
Microlaena stipoides	Weeping Meadow Grass
Micromyrtus ciliata	Fringe-myrtle
Mirbelia rubiifolia	Heath Mirbelia
Mitrasacme polymorpha	Mitrewort
Monotoca elliptica	Pigeon Berry
Morinda jasminoides	Jasmine Morinda
Notelaea longifolia	Native Olive
Olearia viscidula	Daisy Bush
Opercularia aspera	Thin Stink Weed
Opercularia diphylla	Stink Weed
Oplismenus aemulus	Basket Grass
Oplismenus imbecillis	Basket Grass
Oxalis perennans	Wood Sorrel
Ozothamnus diosmifolium	White Dogwood
Pandorea pandorana	Wonga-wonga Vine
Panicum simile	Two-colour Panic
Parsonsia straminea	Common Silkpod
*Paspalum urvillei**	Vasey Grass*
Patersonia sericea	Silky Purple Flag
Patersonia glabrata	Leafy Purple Flag
Patersonia sericea	Silky Purple Flag
Persoonia levis	Smooth Geebung
Persoonia linearis	Narrow-leaved Geebung
Petrophile penduculata	Conesticks
Petrophile pulchella	Conesticks
Petrophile sessilis	Conesticks
Phragmites australis	Native Reed
Phyllota phyllicoides	Common Phyllota

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SCIENTIFIC NAME	COMMON NAME
Pimelea linifolia	Slender Rice Flower
*Pinus radiata**	Radiata Pine*
Pittosporum undulatum	Sweet Pittosporum
Platylobium formosum	Handsome Flat Pea
Platysace linearifolia	Carrot Tops
Podolobium ilicifolium	Native Holly
Pomax umbellata	Pomax
Poranthera corymbosa	-
Prasophyllum australe	Austral Leek Orchid
Pratia purpurascens	Whiteroot
Pteridium esculentum	Bracken Fern
Pterostylis baptistii	King Greenhood
Pterostylis erecta	A greenhood
Ptilothrix deusta	-
Pultenaea daphnoides	Large-leaved Bush Pea
Pultenaea dentata	Clustered Bush pea
Pultenaea hispidula	
Pultenaea microphylla ssp microphylla	
Pultenaea palacea	
Pultenaea rosmarinifolia	
Pultenaea villifera	
Pultenaea villosa	Bronze Bush Pea
Pultenaea viscosa	Sticky Bush Pea
Schoenus lepidosperma ssp pachylepis	A bog-rush
Saropsis fastigiata	A rush
Schelhammera undulata	Lilac Lily
Schoenus melanostachys ssp. pachylepis	Black Bog-rush
Selaginella uliginosa	Swamp Selaginella
Smilax glyciphylla	Sweet Tea
Sowerbaea juncea	Vanilla Plant
Sprengelia incarnata	-
Stackhousia viminea	Slender Stackhousia
Styphelia triflora	-
Syncarpia glomulifera	Turpentine
Telopia speciosissima	Waratah
Thelymitra ixioides	Sun Orchid
Themeda australis	Kangaroo Grass

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SCIENTIFIC NAME	COMMON NAME
Thysanotus juncifolius	Fringed Lily
Trichostularia pauciflora	Needle Bog Rush
Trochocarpa laurina	Tree Heath
Viminaria juncea	Golden Spray
Viola hederacea	Native Violet
Xanthorrhoea resinosa	Grass Tree
Xanthosia pilosa	Woolly Xanthosia
Xanthosia tridentata	Rock Xanthosia
Xyris bracteata	Yellow Eye
Zieria smithii	Sandfly Zieria

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ATTACHMENT 6. Fauna species recorded on the subject land (BES, 2007)

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ATTACHMENT 6. Fauna species recorded on the subject land (BES, 2007)

(* denotes introduced species, bold denotes threatened species, all records by BES unless otherwise indicated).

CATEGORY	COMMON NAME	SCIENTIFIC NAME	DETECTION METHOD
Mammals	Agile Antechinus	*Antechinus agilis*	Elliott trapping/Hair funnels
	Brown Antechinus	*Antechinus stuartii*	Direct observation (Andrews.Neil 1993)
	Bush Rat	*Rattus fuscipes*	Elliott/cage trapping
	Chocolate Wattled Bat	*Chalinolobus morio*	Harp trapping
	Common Brushtail Possum	*Trichosurus vulpecula*	Direct observation
	Common Ringtail Possum	*Pseudocheirus peregrinus*	Direct observation
	Domestic Dog *	*Canis familiaris*	Direct observation
	Eastern Bentwing Bat	***Miniopterus schreibersii***	**AnaBat (probable)**
Mammals (cont'd)	Eastern Broad-nosed Bat	*Scotorepens orion*	AnaBat (probable)
	East Coast Freetail Bat	***Mormopterus norfolkensis***	**AnaBat (confident)**
	Eastern False Pipistrelle	***Falsistrellus tasmaniensis***	**AnaBat (probable)**
	Eastern Grey Kangaroo	*Macropus giganteus*	Direct observation
	Eastern Pygmy-possum	***Cercartetus nanus***	**Pitfall trapping**
	European Rabbit *	*Oryctolagus cuniculus*	Direct observation
	Freetail Bat sp.	*Mormopterus sp 2*	AnaBat (probable)
	Gould's Long-eared Bat	*Nyctophilus gouldi*	Direct observation
	Gould's Wattled Bat	*Chalinolobus gouldii*	Direct observation
	Greater Broad-nosed Bat	***Scoteanax rueppellii***	**AnaBat (probable)**
	Greater Glider	*Petauroides volans*	Direct observation
	Grey-headed Flying-fox	***Pteropus poliocephalus***	**Direct observation**
	House Mouse*	*Mus musculus*	Elliott trapping
	Large-footed Myotis	***Myotis adversus***	**Harp Trapping**
	Lesser Long-eared Bat	*Nyctophilus geoffroyi*	Harp trapping
	Large Forest Bat	*Vespadelus darlingtoni*	Harp trapping
	Little Forest Bat	*Vespadelus vulturnus*	Harp trapping
	Long-nosed Bandicoot	*Perameles nasuta*	Cage trapping
	Red Fox*	*Vulpes vulpes*	Direct observation
	Short-beaked Echidna	*Tachyglossus aculeatus*	Direct observation (Andrews.Neil 1993)
	Sugar Glider	*Petaurus breviceps*	Direct observation
	Swamp Rat	*Rattus lutreolus*	Elliott/cage trapping

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CATEGORY	COMMON NAME	SCIENTIFIC NAME	DETECTION METHOD
	Swamp Wallaby	*Wallabia bicolor*	Direct observation
	White-footed Dunnart	***Sminthopsis leucopus***	**Pitfall trapping**
	Yellow-bellied Glider	***Petaurus australis***	**Direct observation**
	White-striped Free-tailed Bat	*Tadarida australis*	Call recognition
Birds	Australian King Parrot	*Alisterus scapularis*	Direct observation
	Australian Magpie	*Gymnorhina tibicen*	Direct observation
	Australian Owlet-nightjar	*Aegotheles cristatus*	Call recognition
Birds (cont'd)	Australian Pelican	*Pelecanus conspicillatus*	Direct observation
	Australian Raven	*Corvus coronoides*	Call recognition
	Azure Kingfisher	*Alcedo azurea*	Direct observation
	Black Bittern	***Ixobrychus flavicollis***	**Direct observation**
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	Direct observation
	Black-faced Monarch	*Monarcha melanopsis*	Call recognition
	Black Swan	*Cygnus atratus*	Direct observation
	Brown Cuckoo-dove	*Macropygia amboinensis*	Call recognition
	Brown Goshawk	*Accipiter fasciatus*	Direct observation
	Brown Quail	*Coturnix ypsilophora*	Direct observation
	Brown Thornbill	*Acanthiza pusilla*	Direct observation
	Buff-rumped Thornbill	*Acanthiza reguloides*	Direct observation (Andrews.Neil 1993)
	Channel-billed Cuckoo	*Scythrops novaehollandiae*	Direct observation
	Chestnut Teal	*Anas castanea*	Direct observation
	Chicken*	*Gallus gallus*	Direct observation
	Common Bronzewing	*Phaps chalcoptera*	Direct observation
	Common Koel	*Eudynamys scolopacea*	Call recognition
	Common Mynah*	*Acridotheres tristis*	Direct observation
	Crescent Honeyeater	*Phylidonyris pyrrhoptera*	Direct observation (Andrews.Neil 1993)
	Crimson Rosella	*Platycercus elegans*	Direct observation
	Dollarbird	*Eurystomas orientalis*	Direct observation
	Eastern Bristlebird	***Dasyornis brachypterus***	**Direct observation**
	Eastern Rosella	*Platycercus eximius*	Direct observation
	Eastern Spinebill	*Acanthorhynchus tenuirostris*	Direct observation
	Eastern Whipbird	*Psophodes olivaceus*	Direct observation
	Eastern Yellow Robin	*Eopsaltria australis*	Direct observation

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CATEGORY	COMMON NAME	SCIENTIFIC NAME	DETECTION METHOD
	Fan-tailed Cuckoo	*Cacomantis flabelliformis*	Call recognition
	Galah	*Cacatua roseicapilla*	Direct observation
	Gang-gang Cockatoo	***Callocephalon fimbriatum***	**Direct observation**
	Glossy Black-cockatoo	***Calyptorhynchus lathami***	**Direct observation**
Birds (cont'd)	Golden-headed Cisticola	*Cisticola exilis*	Direct observation (Andrews.Neil 1993)
	Golden Whistler	*Pachycephala pectoralis*	Direct observation
	Grey Butcherbird	*Cracticus torquatus*	Direct observation
	Grey Goshawk	*Accipiter novaehollandiae*	Direct observation
	Grey Fantail	*Rhipidura fuliginosa*	Direct observation
	Grey Shrike-Thrush	*Colluricincla harmonica*	Direct observation
	Ground Parrot	***Pezoporus wallicus***	**Direct observation**
	Hooded Robin	***Melanodryas cucullata***	**Direct observation (Andrews.Neil 1993)**
	Horsfields Bronze-cuckoo	*Chrysococcyx basalis*	Call recognition
	Latham's Snipe	*Gallinago hardwickii*	Direct observation
	Laughing Kookaburra	*Dacelo novaeguineae*	Direct observation
	Leaden Flycatcher	*Myiagra rubecula*	Direct observation
	Lewin's Honeyeater	*Meliphaga lewinii*	Direct observation
	Little Lorikeet	*Glossopsitta pusilla*	Direct observation
	Little Black Cormorant	*Phalacrocorax sulcirostris*	Direct observation (Andrews.Neil 1993)
	Little Pied Cormorant	*Phalacrocorax melanoleucos*	Direct observation (Andrews.Neil 1993)
	Little Wattlebird	*Anthochaera chrysoptera*	Direct observation
	Magpie-lark	*Grallina cyanoleuca*	Direct observation
	Masked Lapwing	*Vanellus miles*	Direct observation
	Masked Owl	***Tyto novaehollandiae***	**Call recognition**
	Musk Lorikeet	*Glossopsitta concinna*	Direct observation
	Nankeen Night-heron	*Nycticorax caledonicus*	Direct observation
	New Holland Honeyeater	*Phylidonyris novaehollandiae*	Direct observation
	Noisy Friarbird	*Philemon corniculatus*	Direct observation
	Olive-backed Oriole	*Oriolus sagittatus*	Direct observation
	Pacific Black Duck	*Anas superciliosa*	Direct observation
	Pallid Cuckoo	*Cuculus pallidus*	Call recognition

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CATEGORY	COMMON NAME	SCIENTIFIC NAME	DETECTION METHOD
	Peaceful Dove	*Geopelia striata*	Call recognition
	Pied Currawong	*Strepera graculina*	Direct observation
Birds (cont'd)	**Powerful Owl**	***Ninox strenua***	**Direct observation**
	Rainbow Lorikeet	*Trichoglossus haematodus*	Direct observation
	Red Wattlebird	*Anthochaera lunulata*	Direct observation
	Red-browed Finch	*Neochmia temporalis*	Direct observation
	Rose Robin	*Petroica phoenicea*	Direct observation
	Rufous Fantail	*Rhipidura rufifrons*	Direct observation
	Rufous Whistler	*Pachycephala rufiventris*	Direct observation
	Sacred Kingfisher	*Todiramphus sanctus*	Direct observation
	Sacred Ibis	*Threskiornis aethiopica*	Direct observation (Andrews.Neil 1993)
	Satin Bowerbird	*Ptilonorhynchus violaceus*	Direct observation
	Scarlet Honeyeater	*Myzomela sanguinolenta*	Direct observation
	Silvereye	*Zosterops lateralis*	Direct observation
	Southern Boobook	*Ninox novaeseelandiae*	Call recognition
	Spotted Pardalote	*Pardalotus punctatus*	Call recognition
	Square-tailed Kite	***Lophoictinia isura***	**Direct observation**
	Spotted Turtledove*	*Streptopelia chinensis*	Call recognition
	Striated Thornbill	*Acanthiza lineata*	Direct observation
	Sulphur-crested Cockatoo	*Cacatua galerita*	Direct observation
	Superb Fairy-wren	*Malurus cyaneus*	Direct observation
	Swamp Harrier	*Circus approximans*	Direct observation
	Tawny-crowned Honeyeater	*Phylidonyris melanops*	Direct observation (Andrews.Neil 1993)
	Tawny Frogmouth	*Podargus strigoides*	Direct observation
	Variegated Fairy-wren	*Malurus assimilis*	Direct observation
	Whistling Kite	*Haliastur sphenurus*	Call recognition
	White-bellied Sea Eagle	*Haliaeetus leucogaster*	Direct observation
	White-browed Scrubwren	*Sericornis frontalis*	Direct observation
	White-faced Heron	*Ardea novaehollandiae*	Direct observation
	White-naped Honeyeater	*Melithreptus brevirostris*	Call recognition
	White-throated Gerygone	*Gerygone olivacea*	Direct observation (Andrews.Neil 1993)
	White-throated Needletail	*Hirundapus caudacutus*	Direct observation
	White-throated Treecreeper	*Cormobates leucophaeus*	Direct observation

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CATEGORY	COMMON NAME	SCIENTIFIC NAME	DETECTION METHOD
Birds (cont'd)	Willie Wagtail	*Rhipidura leucophrys*	Direct observation
	Wood Duck	*Chenonetta jubata*	Direct observation
	Yellow-faced Honeyeater	*Lichenostomus chrysops*	Direct observation
	Yellow Robin	*Eopsaltria australis*	Direct observation
	Yellow-tailed Black-cockatoo	*Calyptorhynchus funereus*	Direct observation
	Yellow Thornbill	*Acanthiza nana*	Direct observation
Reptiles	Bearded Dragon	*Amphibolurus barbatus*	Direct observation (Andrews.Neil 1993)
	Wall Lizard	*Cryptoblepharus virgatus*	Direct observation (Andrews.Neil 1993)
	Dark-flecked Garden Skink	*Lampropholis delicata*	Direct observation
	Eastern Water Dragon	*Physignathus lesueurii*	Direct observation (Andrews.Neil 1993)
	Eastern Water Skink	*Eulamprus quoyii*	Direct observation
	Red-bellied Black Snake	*Pseudechis porphyriacus*	Direct observation
	Diamond Python	*Morelia spilota spilota*	Direct observation
	She-oak Skink	*Cyclodomorphus casuarinae*	Direct observation
	Jacky Lizard	*Amphibolurus muricatus*	Direct observation
Amphibians	Bibron's Toadlet	*Pseudophryne bibronii*	Call recognition
	Bleating Tree Frog	*Litoria dentata*	Call recognition
	Brown-striped Frog	*Limnodynastes peronii*	Call recognition
	Common Eastern Froglet	*Crinia signifiera*	Call recognition
	Eastern Banjo Frog	*Limnodynastes dumerilii*	Call recognition
	Eastern Dwarf Tree Frog	*Litoria fallax*	Direct observation (Andrews.Neil 1993)
	Freycinet's Frog	*Litoria freycineti*	Direct observation
	Haswell's Froglet	*Paracrinia haswelli*	Call recognition
	Jervis Bay Tree Frog	*Litoria jervisiensis*	Call recognition
	Peron's Tree Frog	*Litoria peronii*	Call recognition
	Tyler's Toadlet	*Uperoleia tyleri*	Direct observation (Andrews.Neil 1993)
	Verreaux's Tree Frog	*Litoria verreauxii*	Call recognition

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ATTACHMENT 7. Information provided by BNP

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LEX 83485 Document 20

Australian Government
Director of National Parks

Your ref 1446-07

Gordon Clark
Strategy Planning Manager
Shoalhaven City Council
PO Box 42
Nowra NSW 2541

19 October 2007

Dear Gordon

RE: Heritage Estate Rezoning Investigations
Information Required for Preparation of Public Environment Report

Thank you for your letter dated 9 October 2007 in which you request information for the above PER. In your letter you have requested the following:

1. Description of the environment on and adjacent to Commonwealth land that is likely to be impacted by the proposal, including but not restricted to:

    - listed threatened, rare or geographically restricted species and ecosystems that occur within the Booderee National Park.
    - species of conservation significance to the BNP, including the species' regional status, population and distribution.
    - any non-threatened species that occur within the Booderee National Park which may be impacted by the potential fragmentation and disturbance of habitat corridor values.

2. Context and importance of regional habitat corridors, including:

    - Booderee National Park Management point of view on the adequacy of identified regional habitat corridors
    - requirements for effective habitat corridors on the Bherwerre Peninsular, including recommended lengths and widths of corridors, and species requirements for habitat diversity

Following is some introductory material relating to your request. I suggest you contact Dr Martin Fortescue to obtain geographic data on relevant species distribution and density.

1. BOODEREE NATIONAL PARK

Booderee National Park is a small and diverse coastal national park consisting 5,504 ha of terrestrial and 875 ha of marine environment. It lies between bioregions, and consequently it is unusually rich in natural resources with 625 native plant, 26 mammal, 200 bird, 17 reptile, 14 amphibian, and 308 fish species recorded. Many species are at their northern or southern limit of distribution. Booderee is on the Commonwealth Heritage List. It consists of 80% of the Jervis Bay Territory, the southern peninsular of Jervis Bay (BNP Management Plan 2002).

Legislative protection for the Park is under the EPBC Act (1999). It provides for the protection of Commonwealth land, which includes actions taken outside Commonwealth land that is likely have a

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significant impact on the environment in Commonwealth land (26 (2)(b)). Detailed management prescriptions are in the Booderee National Park Management Plan (2002), a statutory instrument under the EPBC Act 1999.

Significant vegetation communities in Booderee include **littoral rainforest** containing *Acmena smithii*, *Syzygium paniculatum*, *Ficus coronata*, and *Livistona australis* (poorly conserved in NSW, Benson 1989), **mangrove and saltmarsh** containing *Avicennia marina* (mangrove), *Sarcocornia quinqueflora* (saltmarsh herbland), and *Juncus kraussi* (saltmarsh rushland) (all having limited occurrence in NSW), *Ceratopetalum apetalum* **rainforest** (small patches highly susceptible to fire damage and weed infestation), and *Eucalyptus paniculata* **dry mallee** (unusual in distribution and form).

Significant plant species are at Table 3 (Taws 1997). Following is a description of the distribution and conservation significance of each significant plant species.

Significant Plant Species Descriptions

Acacia elongata* var. *dilatata (Fabaceae - Mimosoideae) is the coastal variety of *Acacia elongata*, a widespread Acacia in New South Wales. The variety *dilatata* is restricted to heaths along the coast, reaching its southern limit in the Jervis Bay Territory where it is grows in wet heath communities.

Atriplex cinerea (Chenopodiaceae) is a blue-grey shrub of coastlines along the southern States. At Jervis Bay it is close to its northern limit, and in the Territory it is found occasionally along the southern beaches in the *Spinifex hirsutus* grassland zone.

Austrostipa stipoides (Poaceae, formerly *Stipa stipoides*) is a coastal perennial grass of the southern States. It reaches its northernmost limit at Jervis Bay and occurs in the Territory along sea cliffs and rocky headlands, although it also grows at the upper fringe of saltmarshes along the New South Wales south coast (Adam and Hutchings 1987).

Bacopa monnieri (Scrophulariaceae) is a prostrate herb of damp ground around fresh or brackish water. Previously recorded as occurring north from Royal National Park (Harden 1992), *B.monnieri* was found in the Jervis Bay Territory growing at the edge of the swamp in the boat ramp carpark. This record provides a new southern limit for the species, however, the carpark is a heavily used area and it is possible that this species may have been introduced on a vehicle or boat.

Blechnum ambiguum (Blechnaceae) is a fern of wet areas in rock crevices and moist open forests, particularly in sandstone areas of the central coast. It was found in the Jervis Bay Territory under sandstone rock ledges along the north-west shoreline of the Territory.

Blechnum camfieldii (Blechnaceae) is a fern widespread in low-lying coastal areas (Harden 1990), but recorded by Mills (1993) as being rare in New South Wales. In the Jervis Bay Territory, *B.camfieldii* is found occasionally along streams in *Eucalyptus pilularis* wet sclerophyll forest and *Ceratopetalum apetalum* rainforest.

Blechnum indicum (Blechnaceae) is a fern of sandy soils in swampy areas along the coast. It reaches its southern limit at Jervis Bay, and in the Territory it is an uncommon species recorded *from Casuarina glauca* swamp forest.

Canthium coprosmoides (Rubiaceae) is a small tree of littoral and dry rainforest in New South Wales and Queensland. Previously its southernmost occurrence was believed to be on Beecroft Peninsula (Mills 1988), however it has been found in most of the small rainforest patches on St Georges Head, Jervis Bay Territory.

Callistemon linearis (Myrtaceae) is a rigid shrub, widespread on the coast and ranges of New South Wales. It is close to its southern limit at Jervis Bay where it grows on poorly drained sandy or clayey

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soils. It is an uncommon species in the Jervis Bay Territory, only occasionally found in the heaths. Its major occurrence is in a swamp close to the lighthouse where it grows partly underneath *a Melaleuca linariifolia* swamp woodland and partly over a *Schoenus brevifolius* swamp sedgeland.

Caustis recurvata* var. *recurvata (Cyperaceae) is a sedge of sandy coastal areas growing north from Jervis Bay. It is less common than the more widespread *C.flexuosa*, but can be found occasionally in dry woodland, mallee and heaths.

Chloanthes stoechadis (Chloanthaceae) is a low shrub with green tubular flowers growing north from the Jervis Bay area. Within the Territory it is found occasionally, growing in *Eucalyptus pilularis* dry open forest, and dry woodland communities.

Conospermum ericifolium (Proteaceae) is a slender shrub most commonly found on sandstone on the central coast, but with a southern occurrence from Nowra to Jervis Bay. In the Territory it is a common component of dry woodland and mallee, and dry and intermediate heath communities.

Conospermum longifolium subsp. *mediale* (Proteaceae). *C. longifolium* is a slender shrub of sandstone on the central coast and ranges. The subspecies *mediale* grows mainly in the Blue Mountains but reaches its southern limit at Jervis Bay. In the Territory it is found in dry woodland and heath but is not common.

Corybas undulatus (Orchidaceae) is a small terrestrial orchid of coastal areas north from Jervis Bay. It is listed as a ROTAP species with a risk code of 3KC- (Briggs and Leigh 1996). The "K" indicates that the species is poorly known but is suspected to be rare, vulnerable or endangered. It is found in conservation reserves but the size of the reserved population is unknown. *C. undulatus* has been recorded for Jervis Bay Territory, in the vicinity of the Jervis Bay village store. It was found in the mid 1980s (F. Kristo pers. comm.) but has not been recorded at the same site, nor elsewhere in the Territory, since this time.

Crinum pedunculatum (Amaryllidaceae) is a large lily-like herb of stream sides and swamps close to the coast. It reaches its southernmost limit in the Jervis Bay area. In the Territory it is a common species, found at the mouth of streams and near fresh water seeps scattered around the coastline.

Cyathea cooperi (Cyatheaceae) is a tree fern of warm coastal rainforest. Jervis Bay is close to its southern limit, and in the Territory it is found along stream lines and swampy ground in littoral rainforest and *Casuarina glauca* swamp forest. *C.cooperi* is common in the understorey of the *Casuarina glauca* forest along Elmoos Rd.

Cyclosorus interruptus (Thelypteridaceae) is a fern of freshwater swamps along the coast.

Daviesia alata (Fabaceae - Faboideae) is a prostrate leafless shrub of poor soils on the coast and ranges from Nelson Bay south to the Budawang Range. On the coast it is close to its southern limit in the Jervis Bay Territory. Here it is an uncommon shrub in *Eucalyptus sclerophylla* dry woodlands.

Dillwynia brunioides (Fabaceae - Faboideae) is a shrub of sandstone ranges from the Blue Mountains to the Budawangs, but also occurs on the sandstone in the Jervis Bay areas. In the Territory it is found in dry heath and woodland communities but is not common.

Eriostemon buxifolius subsp. *buxifolius* (Rutaceae). *E.buxifolius* is a shrub of coastal sandstone on the New South Wales central and south coast. *E.buxifolius* subsp. *buxifolius* occurs mainly in the Sydney area with a southern occurrence at Jervis Bay. In the Territory it is a common and widespread species of heath, dry woodland and mallee communities.

Eucalyptus imitans (Myrtaceae) is a small tree of sandstone areas in the Tallong-Nerriga-Nowra area. An interesting occurrence of *E.imitans* was found in the Jervis Bay Territory on Steamers Head. Here it

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grows as a low mallee on skeletal soils with mallee-form *E.paniculata*, *Allocasuarina distyla* and other dry heath species.

Eucalyptus obstans (Myrtaceae) is a mallee of heath on sandstone in coastal areas from Kuringai Chase to Jervis Bay. It is common in Jervis Bay Territory, scattered through the intermediate heath, and occasionally occurring in the dry mallee communities.

Eucalyptus sclerophylla (Myrtaceae) is a tree of poor sandy soils of the central and south coast and ranges. It reaches its southern limit at Jervis Bay where it is common and widespread, often dominating dry sclerophyll woodlands.

Gahnia filum (Cyperaceae) is a tall tussock sedge, characteristic of the upper fringe of saltmarshes. In New South Wales it reaches its northern limit in Sydney, however is very rare here. *G.filum* is locally abundant in Jervis Bay saltmarshes and this appears to represent its northern limit as a common species (Adam and Hutchings 1987). In the Jervis Bay Territory, *G.filum* is found at the upper edge of saltmarshes scattered amongst the Juncus kraussii rushland, and occasionally as an understorey of Casuarina glauca swamp forest. Suitable saltmarshes are commonest on the flats along Sussex Inlet. A disjunct occurrence of *G.filum* was found in the upper Stoney Creek catchment in a swampy area with *Eucalyptus botryoides, Melaleuca linariifolia* and other *Gahnia* sp.

Galium australe (Rubiaceae), a small creeping herbaceous plant that prefers moist gullies in tall forest, . It has only been found at one location in Booderee, by the shores of Lake Windermere, where six plants were discovered. It is listed as Vulnerable under the New South Wales Threatened Species Conservation Act.

Gompholobium grandiflorum (Fabaceae - Faboideae), an erect shrub found mainly in the Sydney region. Its southern limit is the Jervis Bay area and in the Territory it is an occasional component of *Eucalyptus sclerophylla* dry woodlands.

Goodenia heterophylla **subsp.** ***eglandulosa*** (Goodeniaceae) is a herb of coastal dry sclerophyll forest and woodland, reaching its southern limit at Jervis Bay. In the Territory it is found in *Eucalyptus pilularis* dry forest and *E.sclerophylla* dry woodland.

Grevillea barkleyana **subsp.** ***macleayana*** (Proteaceae) is a spreading shrub with a restricted distribution in New South Wales, mostly from Nowra to Ulladulla with a concentration in the Jervis Bay area. It is classified as Rare by Briggs and Leigh (1996) with a risk code of 3RCa, indicating that it is found over a greater than 100 km range and more than 1000 plants occur in conservation reserves. In the Jervis Bay Territory, *G.barkleyana* is commonly found in *Eucalyptus sclerophylla* dry woodland, often in disturbed areas.

Leptospermum epacridoideum (Myrtaceae) is a nationally rare shrub restricted to the Jervis Bay region. It has a ROTAP risk code of 2RC- (Briggs and Leigh 1996) indicating that it is found in conservation reserves but the extent of the reserved population is unknown. In the Jervis Bay Territory it is a common component of *Allocasuarina distyla* rocky heath, and is also found in dry and intermediate heaths.

Leucopogon amplexicaulis (Epacridaceae) is a straggling shrub of sheltered sites in sandstone areas. It reaches its southern limit in the Jervis Bay Territory where it is found only in the Summercloud Bay area growing along a sandstone cliff above a stream.

Leucopogon rodwayi (Epacridaceae) is a low heath shrub growing in scattered locations along the New South Wales north coast with a disjunct occurrence in the Jervis Bay area. In the Jervis Bay Territory, *L.rodwayi* is found most commonly in *Allocasuarina distyla* rocky heath, but it is never common.

Melaleuca capitata (Myrtaceae) is a tall shrub common on the sandstone of the Budawangs, but more unusual on the coast. In the Jervis Bay Territory it is found in *Allocasuarina distyla* rocky heath, where

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it may form a significant component of the canopy, as on Bowen Island. It is also occasionally found in the intermediate heaths.

Mirbelia rubiifolia (Fabaceae - Faboideae) a small shrub of coast and tablelands with Jervis Bay at its southern limit. In the Jervis Bay Territory it is occasionally found in intermediate and dry heath communities.

Olearia axillaris (Asteraceae) is a common coastal daisy bush of the southern states, reaching its northern limits in the Jervis Bay Territory where it is found occasionally on the Bherwerre dunes.

Peperomia leptostachya (Peperomiaceae) is a small semi-succulent herb usually found growing on rocks in moist coastal areas, recorded as occurring north from the Illawarra district (Harden 1990). During the vegetation survey, *P.leptostachya* was found on rocks along the shoreline of St Georges Basin in the north west of Jervis Bay Territory. This represents the southernmost limit of the species distribution.

Persoonia mollis* subsp. *caleyi (Proteaceae). *P.mollis* is a variable shrub of coastal southern New South Wales for which nine subspecies have been defined. Subspecies *caleyi* occurs in the Jervis Bay to Durras Lake area. In the Jervis Bay Territory it is a common and widespread shrub of dry open forest, dry woodlands and the drier heath communities.

Petrophile sessilis and ***P. pulchella*** (Proteaceae) are rigid shrubs of near coastal sandstone areas of New South Wales. Both species reach their southern limits at Jervis Bay and are widespread in the Territory in dry woodlands and heath communities.

Phebalium squamulosum* subsp. *argentum (Rutaceae). *P.squamulosum* is a variable shrub found in a variety of habitats in the eastern States. Subspecies *argenteum* is a coastal subspecies, most common from Jervis Bay north to Port Stephens. In the Jervis Bay Territory it is common in coastal heath.

Pisonia umbellifera (Nyctaginaceae) is small tree of littoral rainforest in New South Wales, Queensland, Pacific Islands and Africa. In New South Wales it is uncommon and reaches its southernmost occurrence in the Jervis Bay Territory where it is only found in the rainforest at Paradise Gardens.

Platysace stephensonii (Apiaceae) is a low shrub found in dry sclerophyll forest and heath on sandstone from Broken Bay to the Jervis Bay Territory. A risk code of 3RC- has been given to this species (Briggs and Leigh 1996) indicating that it is a nationally Rare plant which does occur in conservation reserves, but the size of the total reserved population is unknown. In the Territory, *P. stephensonii* is known from the heath communities on Bowen Island and from heaths. It occurs most frequently in the rocky heaths where the canopy is open and the soil is drier than the wet heaths.

Pultenaea villifera (Fabaceae) is a low shrub found in New South Wales from the Blue Mountains to Eden. *P.villifera* is listed as a Rare plant by Briggs and Leigh (1996), with a risk code of 3RC-, indicating that it occurs over a range greater than 100 km, and is found in a conservation reserve but the size of the reserved population is not known.

Rulingia hermanniifolia (Sterculiaceae) is a straggling prostrate shrub of sandstone cliffs and rock faces in coastal areas from Broken Bay to its southern limit in the Jervis Bay Territory. Here it occurs on the sea cliffs at Governors Head and on Bowen Island. *R. hermanniifolia* is listed as a Rare plant by Briggs and Leigh (1996) with a risk code of 3RCa. It is found in a number of conservation reserves and the population is known to be greater than 100 plants.

Sarcochilus olivaceous (Orchidaceae) is an epiphytic orchid growing on trees, or more rarely rocks, from Tathra in southern New South Wales north into Queensland. A single population of this species occurs in the Territory, in rainforest near the Bherwerre Trig. This occurrence is significant for the size of the population and the distance to the nearest known population.

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Styphelia triflora and ***S. tubiflora*** (Epacridaceae) are both shrubs of dry sclerophyll woodlands, and reach their southernmost limits in the Jervis Bay area. *S.triflora* is the more widespread of the two, while *S.tubiflora* is restricted to sandstone in the Sydney, Blue Mountains and Jervis Bay area. Both are found in the Jervis Bay Territory, most commonly in *E.sclerophylla* dry woodland, and sometimes in *E.pilularis* dry forest or mallee or dry heath communities.

Syzygium paniculatum (Myrtaceae) is a small tree of littoral rainforest. It is listed as Vulnerable in the New South Wales Threatened Species Conservation Act 1995, Vulnerable in the Commonwealth Endangered Species Protection Act 1992, and Endangered in the ROTAP list (Briggs and Leigh 1996) where it is given a risk code of 3ECi. *S.paniculatum* is found within several conservation reserves however the known size of the populations within these reserves is less than 1000 plants, and despite being reserved, it is considered that *S.paniculatum* is still at risk of disappearing from the wild. It is found at a few widely separated localities between Bulahdelah and its southernmost occurrence in the Jervis Bay Territory along St Georges Basin. Here it is restricted to a small rainforest patch and a few isolated individuals along Elmoos Rd.

Zieria laevigata (Rutaceae) is a shrub widespread in heath and dry forest of eastern NSW and reaching its southern limit in the Jervis Bay area. In the Territory it is occasionally found in *Allocasuarina distyla* rocky heath and dry heath communities.

Zieria arborescens* subsp. *decurrens (Rutaceae) was previously considered to be a subspecies restricted to the Jervis Bay area (Harden 1991), however recent taxonomic study does not recognise *Z.a.* subsp. *decurrens* as a subspecies distinct from the rest of *Zieria arborescens* (A.Lyne, Australian National Herbarium, pers. comm.).

Signifiant animal species description

Locally extinct and vertebrates at risk are at Tables 1 and 2. Following is a description of the distribution and conservation significance of each significant vertebrate species.

Pseudomys gracilicaudatus (Eastern Chestnut Mouse) is listed as Vulnerable in the New South Wales Threatened Species Conservation Act 1995. It is very rare in the Park, found mostly in recently (2-3 years) burnt heath.

Sminthopsis leucopus (White-footed Dunnart) is listed as Vulnerable in the New South Wales Threatened Species Conservation Act 1995. It had not been recorded in the Park for over 20 years, but was re-discovered in 2005 in small isolated populations in Sedgeland/*Casuarina glauca* swamp forest at the back of Bherwerre Beach. Its rediscovery may be related to intensive fox control.

Cercartetus nanus (Eastern Pygmy-possum) is listed as Vulnerable in the New South Wales Threatened Species Conservation Act 1995. Eastern pygmy-possums are very small arboreal marsupials that feed largely on nectar. They are found in a broad range of habitats from rainforest through sclerophyll forest and woodland to heath. At Booderee they are most commonly encountered in heath.

Litoria aurea (Green and Golden Bell Frog) is listed as Endangered in the New South Wales Threatened Species Conservation Act 1995, and Vulnerable in the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. It was previously relatively common in permanent , and sometimes ephemeral water bodies in the Park (Bowen Island, Murrays swamp, Frog Hollow), but has not been recorded despite intensive searching since 2003.

Heleioporus australiacus (Giant Burrowing Frog) is listed as Vulnerable in the New South Wales Threatened Species Conservation Act 1995. They generally live in burrows in heath or forest and will travel several hundred metres to creeks to breed. In Booderee it has been recorded in woodland and heath. It is heard calling in late summer and autumn by streams. Given the substantial area of heath at Booderee it is likely that Booderee is a stronghold for this species.

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Dasyornis brachypterus (Eastern Bristlebird) is listed as Endangered in the New South Wales Threatened Species Conservation Act 1995, and Endangered in the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. Whilst is appears it has been suppressed to heathland due to predation by the fox in the past, the species is much more widely distributed throughout a range of habitats in the Park since intensive fox baiting. Jervis Bay has the major population of the species, extending from the Park through NSW Jervis Bay National Park to north of Vincentia. Heritage Estates contains important habitat and populations of the species.

Pezoporus wallicus (Ground Parrot) is listed as Vulnerable in the New South Wales Threatened Species Conservation Act 1995. It is found in small pockets of heathland in the Park, and is locally very rare. The species occurs in adjacent NSW JBNP west of Hyams Beach, and in the Heritage Estates.

Calyptorhynchus lathami (Glossy Black Cockatoo) is listed as Vulnerable in the New South Wales Threatened Species Conservation Act 1995. It has a large home range, and is found rarely in the Park, feeding on *Allocasuarina sp*.

Ninox strenua (Powerful Owl) is listed as Vulnerable in the New South Wales Threatened Species Conservation Act 1995. It has a large home range (1,000 ha per pair), requiring extensive areas of suitable habitat and prey. The Park contains the highest density of the species known, with 8 breeding pairs recorded. Adjacent habitat such as Heritage Estates is important for this species, especially when prey is scarce following fire.

Stagonopleura bella (Beautiful Firetail) is an uncommon, granivorous finch from coastal south-eastern Australia with Jervis Bay being at the northern extremity of its range. It occurs in coastal heaths and tea-tree scrubs and has decreased by > 20% in parts of its range over the last two decades, particularly at the western and northern extremities.

Stipiturus malachurus (Southern Emu Wren) is threatened in several parts of its range. It is generally confined to dense low vegetation such as heath and has a slow breeding rate.

Tyto novaehollandiae (Masked Owl) is listed as Vulnerable in the New South Wales Threatened Species Conservation Act 1995. It is very rare in the Park. It has a large home range (500-1000 ha per pair), requiring extensive areas of suitable habitat and prey.

Tyto tenebricosa (Sooty Owl) is listed as Vulnerable in the New South Wales Threatened Species Conservation Act 1995. This bird occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. There has been several records of this bird from Booderee at the Cave's Beach car park, Steamers carpark, and along Jervis Bay Road.

2. Regional Habitat Corridors

The Heritage Estate, a subdivision dating from 1915, was sold as 1200 individual lots in the late 1980's and 1990's. The blocks are zoned rural, and clearing and building are currently not permitted. This land is located on the northern end of the narrow isthmus of land of the Bherwerre Peninsula, which connects Booderee National Park to NSW Jervis Bay National Park and surrounds. The Estate is in reasonable ecological condition, and has been burnt frequently. It contains a diverse array of vegetation communities which have been found to provide vital habitat for a range of vulnerable and endangered species.

The Estate borders the NSW Jervis Bay National Park on their southern boundary, and then extend as a contiguous area of native coastal bushland a further 3 kms southwards to the border of the Jervis Bay Territory and Booderee National Park. The area has been identified by the Commonwealth Government as a vital link to maintaining biodiversity in Booderee and the region since zoning discussions commenced in the late 1980's, and there has been

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numerous correspondence with NSW State agencies on the issue. Booderee National Park commissioned a study by CSIRO scientist Judy Caughley in 1993 which identified the very high conservation value of the Estate.

The Heritage Estate Commission of Inquiry in 1999 (COI) into possible rezoning recommended that the land identified as having ecological significance be zoned for environmental protection and remaining lands, an estimated 800 lots, be subject to further investigation.

The subsequent investigations commissioned by the Shoalhaven City Council and undertaken by local environmental consultants Bushfire and Emergency Services (BES) into threatened biodiversity found all habitats as having high environmental value. They reported "the study area contains diverse vegetation communities and fauna habitats, and is considered to hold a high level of conservation value due to the high species richness and diversity, high number of threatened, migratory and other species of conservation significance and occurrences of an endangered ecological community. The landscape position of the study area, its connectivity to adjoining areas of habitat and function as a wildlife corridor increase its conservation significance. In considering the sum of the values and extent of ecological constraints, it was concluded that none of the study area should be rezoned for residential development."

The BES study is comprehensive, detailed, and rigorous, although the true range and extent of threatened species is likely to be underestimated due to the relatively short period of data collection. The Park has reached similar conclusions about the value of habitat in the Heritage Estate and neck of the Bherwerre Peninsular.

The Booderee National Park Management Plan (2002) identifies development or activities which are likely to pose a direct threat to the habitat corridors linking the Park and the larger Jervis Bay region, and requires the Director of National Parks to pursue with appropriate agencies the maintenance of these corridors (prescription 9.11.5).

Both the northern (Beecroft) and southern (Bherwerre) peninsula's of Jervis Bay are pristine, protected area, and hold much of the biological diversity of the region, but are characterized by narrow necks, making them vulnerable to genetic isolation, habitat fragmentation, and species extinction. Their protection requires careful planning and cooperation of the regions landowners. The narrowest point of the Bherwerre Peninsular is close to the boundary of Jervis Bay Territory with NSW, and is 3 km's in width. Vegetation communities at the boundary are typically diverse over a small scale and include littoral rainforest, forest, woodland, mallee, heathland, sedgeland, and scrubland (Taws 1997).

For many of Booderee's species, contiguous habitat is important in maintaining viable populations because it allows the free flow of individuals between the Park and the broader Jervis Bay environment, allowing for example for recolonisation of the Park after major disturbances such as wildfire. Furthermore, the free flow of individuals through contiguous habitat helps to maintain healthy levels of genetic diversity within the Parks fauna and flora. Contiguous habitat is also important because individuals of some species have a large home range requirement and the park is not big enough on its own to sustain a viable population of some species.

Habitat corridors are designed to maintain contiguous habitats. The usefulness of these habitat corridors is affected by factors including their length, width, habitat type, the management regime in the corridors and adjacent disturbance. Adjacent disturbance might include factors such as the presence of foxes and other pests, domestic cats, introduction of weeds, pathogens, changes in fire and hydrology regimes, changes to the ground water table from drainage works, or large volumes of traffic along nearby roads. Taken together these factors form a complex set of interacting variables, which will affect different species in different ways.

It is very likely that the inadequate nature of existing habitat corridors, which includes the undeveloped Heritage Estate, has contributed significantly to the local extinction of some species and continues to contribute to some species being unable to reoccupy suitable habitat in the park. Several species have been lost in the Park in recent times such as yellow-bellied glider, and tiger quoll. Table 1 lists some of the species of concern, and illustrates the sensitivity of the Bherwerre Peninsular to fragmentation. Clearly the current level of connectivity is inadequate for some species, which have been unable to colonise the Park after localised extinction events (e.g. fire and predation by foxes).

The corridors identified in the local Jervis Bay Regional Environment Plan 1996 are inadequate for maintaining maintenance of contiguous habitat, genetic diversity, and viable populations of species. NSW DEC state in information for planners in NE NSW "Regional corridors are primary landscape connections between larger important areas of habitat. They are generally substantial in width (>500m) and provide not only for dispersal of

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individual species but act as habitat in their own right for a range of species. Ecological principles indicate that ideally regional corridors should be at least twice the width of the average home range area of the animal species identified as potential users of the corridor". For the Eastern Bristlebird, which has a small home range, this would mean at least 600m, or for the Yellow-bellied Glider which has a large home range, a much larger area than is available (>3 km).

Corridors need to contain the range of representative vegetation assemblages as habitat for species which occur in the area. Within the development site this includes rainforest, swamp forest, sedgeland, open forest and heathland. Because of the regions biogeography, it is important the necks of both peninsula's remain undeveloped and are managed for conservation. Any further development in the neck of the Bherwerre Peninsular with restrict the ability of locally extinct species to re-colonise adjacent areas, and increase the risk of extinction of species of concern in both the Park and NSW (Table 1).

We are able to provide distributional and density data for a number of the species of concern, which may assist you in estimating lengths, widths and habitat requirements for individual species of concern. Further primary research to establish home range may be required. However we believe the high diversity of vegetation assemblages and habitats over a small scale, a feature of this area due to changes in soil depth and hydrology, will exclude a planning exercise which would allow for retention of some habitat as effective corridors and development of some blocks within the estates. There is compelling evidence that current habitat corridors are insufficient for some species, and it is clear from the BES report that the habitat requirements of endangered species alone would prevent the rezoning of these lands.

The EPBC Act (1999) provides for the protection of Commonwealth land, which includes actions taken outside Commonwealth land that is likely have a significant impact on the environment in Commonwealth land (26 (2)(b)). The Booderee National Park Management Plan, a statutory instrument under the EPBC Act 1999, identifies development or activities which are likely to pose a direct threat to the habitat corridors linking the Park and the larger Jervis Bay region, and requires the Director of National Parks to pursue with appropriate agencies the maintenance of these corridors (prescription 9.11.5).

The Park is concerned that rezoning and consequent development of the Heritage Estates will impact on the following values, which have been identified by BES:

1. *Listed Migratory Species which occur in Booderee*

The area contains important habitat for migratory species, and five species have been recorded by BES (2007) within the relatively short time frame of their assessment. These are the Black-faced Monarch, Latham's Snipe, Rufous Fantail, White-bellied Sea eagle, and White-throated Needle tail. Two species are reported by BES as likely to breed in the area. These species are particularly susceptible to changes in drainage, which would be unavoidable to accommodate a large residential housing development.

2. *EPBC Listed threatened species and Communities (Section 18 (3))*

Two species of threatened flora, *Melaleuca biconvexa, and Cryptostylis hunteriana* and two species of threatened fauna, *Eastern Bristlebird, and Giant Burrowing Frog,* have been recorded at the site. Suitable habitat exists and it is likely the *Green and Golden Bell Frog* has occurred/occurs on the site.

The Eastern Bristlebird is of particular concern, and the direct impacts on this species alone (direct loss of habitat) would be considerable. Booderee National Park and the adjoining Jervis Bay Nature Reserve contain the largest remaining population of the Eastern Bristlebird (approximately 50%), but this population is under pressure through development in the area. Recent research indicates loss and fragmentation of habitat and the fox, particularly after fire, are principal endangering processes for the species. The entire development site contains important habitat for this species including heath, sedgeland, and woodland. The site provides vital contiguous habitat for Bristlebird populations in Booderee, NSW Jervis Bay National Park, and populations to the west as far as Tomerong. Without effective habitat corridors, the largest remaining population of the species within Booderee and the adjoining NSW Jervis Bay National Park will become fragmented and be under significant threat.

The Giant Burrowing Frog has been recorded and has potential primary habitat over a large percentage of the development site. Current status of the Green and Golden Bell Frog in the development site is unknown. This species has not been located in Booderee National Park for 2 years, but was previously recorded in a range of wetland sites in the Park and in adjacent wetland areas including within the development site. Both species are in

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serious decline, and the destruction of very limited ephemeral wetland habitat is likely to contribute to the local extinction of these species.

The loss of habitat for highly specialised orchids with characteristic small distribution and specialised needs is a major concern, and will require considerably more research to prevent the extinction of these very rare species.

3. *Listed NSW species and Communities*

Four Rare Or Threatened Australian Plants (ROTAP) occur on the site.

The site contains TSC Act 1995 NSW Endangered Ecological Community Swamp Sclerophyll Forest.

The entire development area is exceptional in containing primary habitat for a wide range of NSW threatened fauna, most of which occur in Booderee National Park. This primary habitat needs to be conserved for future conservation of the species. Notable fauna species include the Greater Glider, Yellow Bellied Glider, Sugar Glider, Eastern Pigmy Possum, White-footed Dunnart, Ground Parrot, Powerful Owl, Masked Owl, Glossy Black Cockatoo, Black Bittern, Rufous Fantail, Black-faced Monarch, Latham's Snipe, Southern Emu Wren, Beautiful Firetail, Giant Burrowing Frog, and a range of microchiropteran bats. The Yellow bellied glider and white-footed dunnart are particularly susceptible to local extinction through loss or degradation of habitat, and increasing predation. The collective primary habitat of these species cover the entire site, and BES conclude and we concur there is no area remaining for development.

4. *Impacts on Commonwealth Land (EPBC Section 26 (2b))*

Development of the site will have a significant impact on the biodiversity of Jervis Bay Territory (Commonwealth Land) including Booderee National Park as outlined above.

Should you require further information please contact Dr Martin Fortescue on 02 44422225

Yours sincerely

Scott Suridge
Park Manager

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Table 1. Vertebrate species which have become locally extinct in Booderee National Park

SPECIES	COMMON NAME	Status
Mammals		
Phascolarctos cinereus	Koala	Locally extinct 1920's
Dasyurus maculatus	Spotted-tailed Quoll	Locally extinct 1990's
Vombatus ursinus	Common Wombat	Locally extinct 1990's
Isoodon obesulus (sub-fossil record)	Southern Brown Bandicoot	Locally extinct 1970's
Petaurus australis	Yellow-Bellied Glider	Locally extinct 1980's
Herpitofauna		
Veranus varius	Lace monitor	Locally extinct 1970's
Litoria aurea	Green and Golden Bell Frog	Locally extinct 2006

Table 2. Vertebrate species of concern if habitat corridors are impacted

Mammals		
Sminthopsis leucopus	White-footed Dunnart	Long term viability of BNP population if no habitat links exist
Perameles nasuta	Long-nosed Bandicoot	Long term viability of BNP population if no habitat links exist
Petauroides volans	Greater Glider	Long term viability of BNP population if no habitat links exist. Note this species is in sharp decline since the 2003 Windermere fires. Species requires large home range
Petaurus breviceps	Sugar Glider	Long term viability of BNP population if no habitat links exist. Note this species is in sharp decline since the 2003 Windermere fires
Cercartetus nanus	Eastern Pygmy-possum	Long term viability of BNP population if no habitat links exist
Acrobates pygmaeus	Feathertail Glider	Long term viability of BNP population if no habitat links exist
Macropus rufogriseus	Red-necked Wallaby	Long term viability of BNP population if no habitat links exist. Note this species appears to have increased following intensive fox baiting
Wallabia bicolor	Swamp Wallaby	Long term viability of BNP population if no habitat links exist. Note this species appears to have increased following intensive fox baiting
Rattus lutreolus	Swamp Rat	Long term viability of BNP population if no habitat links exist
Pseodomys gracilicaudatus	Eastern Chestnut mouse	Long term viability of BNP population if no habitat links exist
Birds		
Ninox strenua	Powerful Owl*	Long term viability of BNP population if no habitat links exist. Species requires large home range
Ninox connivens	Barking Owl	Long term viability of BNP population if no habitat links exist
Pezoporus wallicus	Ground Parrot	Long term viability of BNP population if no habitat links exist
Stipiturus malachurus	Southern Emu Wren	Long term viability of BNP population if no habitat links exist
Stagonopleura bella	Beautiful Fire Tail	Long term viability of BNP population if no habitat links exist

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Reptiles		
Morelia spilota	Diamond Python	Long term viability of BNP population if no habitat links exist
Heleioporus australiacus	Giant Burrowing Frog	Long term viability of BNP population if no habitat links exist

EPBC SPECIES LISTED

Dasyornis brachypterus	Eastern Bristlebird	Long term viability of BNP population if no habitat links exist

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Table 3 Significant plant species of Jervis Bay Territory (Taws 1997)

ROTAP = Rare or Threatened Australian Plant (Briggs and Leigh 1996)
TSC = Listed in a Schedule of the NSW Threatened Species Conservation Act 1995
Limit = Species at or close to the limit of their natural distribution.
Rare = Rare in southern New South Wales, or New South Wales as a whole.

Species	ROTAP /ESP/ TSC	Limit	Rare	Location in Jervis Bay Territory	Communities in which species occurs
Acacia elongata var. *dilatata*		southern		Widespread in wet heath	HwLj
Atriplex cinerea		northern		Occasional along beaches	GcSh
Austrostipa stipoides		northern		Frequent on sandstone cliffs around the coastline	HcBi GcSv
Bacopa monnieri		southern		Restricted to Murrays Swamp	VsBa
Blechnum ambiguum			rare	Restricted to wet sandstone crevices along nw shoreline of Territory	FwEp
Blechnum camfieldii			rare	Restricted to streamsides in *Ceratopetalum* rainforest and *E.pilularis* wet sclerophyll forest.	RpCa FwEp
Blechnum indicum		southern		Restricted to swampy ground. Found in *Casuarina glauca* swamp forest.	FsCg
Callistemon linearis		southern		Uncommon. Largest stand is in a swamp near the lighthouse.	WsMl VsSb
Canthium coprosmoides		southern		Occasional in littoral rainforest on St Georges Head	RlAFL
Caustis recurvata var. *recurvata*		southern		Occasional in dry woodland and mallee	Wd, HdAd
Chloanthes stoechadis		southern		Occasional in *E.pilularis* dry forest and *E.sclerophylla* dry woodland	FdEp WdEscEg
Conospermum ericifolium		southern		Widespread in *E.sclerophylla* dry woodland and intermediate heath.	WdEscEg Hi
Conospermum longifolium subsp.		southern		Occasional in *E.sclerophylla* dry	WdEscEg

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mediale				woodland.	
Species	**ROTAP /ESP/ TSC**	**Limit**	**Rare**	**Location in Jervis Bay Territory**	**Communities in which species occurs**
Corybas undulatus	3KC-			Rare	HiBe
Crinum pedunculatum		southern		Occasional beside freshwater close to the coast.	RlAFL FwEb, FwEp
Cyathea cooperi			rare	Occasional in swamp forests and swampy areas of littoral rainforest.	RlAFL, FsCg
Cyclosorus interruptus		southern		Rare	
Daviesia alata		southern		Occasional in *E.sclerophylla* dry woodland.	WdEscEg
Eriostemon buxifolius subsp. *buxifolius*		southern		Widespread in heath and woodland	Wd Hd, Hi
Eucalyptus imitans			rare	Restricted to *E.paniculata* mallee on Steamers Head.	MdEpan
Eucalyptus obstans		southern		Widespread in intermediate heath	Hi, HkAd
Eucalyptus sclerophylla		southern		Widespread in *E.sclerophylla* woodland	WdEscEg
Gahnia filum			rare	Occasional in saltmarsh rushland and swamp forests.	JaJk FsCg
Gompholobium grandiflorum		southern		Occasional in *E.sclerophylla* dry woodland.	WdEscCg
Goodenia heterophylla subsp. *eglandulosa*		southern		Occasional in dry forest and woodland.	FdEp WdEscCg
Grevillea barkleyana subsp. *macleayana*	3RCa			Widespread in *E.sclerophylla* dry woodland	WdEscCg
Leptospermum epacridoideum	2RC-			Widespread in intermediate heath, rocky heath and occasional in *E.sclerophylla dry* woodland.	HkAd Hi WdEscCg
Leucopogon amplexicaulis		southern	rare	Restricted to rock ledges in forest near Summercloud Bay.	FdEp
Leucopogon rodwayi		southern	rare	Occasional in	HkAd

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				Allocasuarina distyla rocky heath.	
Species	**ROTAP /ESP/ TSC**	**Limit**	**Rare**	**Location in Jervis Bay Territory**	**Communities in which species occurs**
Melaleuca capitata		southern		Frequent in *Allocasuarina distyla* rocky heath, and on Bowen Island.	HkAd SkAdMc, SsMc
Mirbelia rubiifolia		southern		Occasional in intermediate to dry heaths	Hi HdAd
Olearia axillaris		northern		Restricted to the foredunes along Bherwerre Beach.	ScAsLl
Peperomia leptostachya		southern		Restricted to sandstone ledges and boulders along nw shoreline of Territory.	FwEp
Persoonia mollis subsp. *caleyi*		northern		Widespread and common in dry woodland, occasional in dry forest or heath.	Wd FdEp Hd, Hi
Petrophile pulchella		southern		Occasional in heath and woodland	Wd, Hi, Hd
Petrophile sessilis		southern		Widespread and common in heath and woodland	Wd, Md Hd, Hi
Phebalium squamulosum subsp. *argentum*		southern		Common in coastal heath.	HcBi
Pisonia umbellifera		southern	rare	Restricted to littoral rainforest at Paradise Gardens.	RlAFL
Platysace stephensonii	3RC-			Restricted to rocky heath and shrublands on Bowen Island.	SkAdMc HcBi
Pultenaea villifera	3RC-			Occasional in *E.sclerophylla* dry woodland.	WdEscCg
Rulingia hermanniifolia	3RCa			Rare, restricted to sandstone clifftops at Governors Head and Bowen Island.	HcBi
Sarcochilus olivaceous			rare	Rare, restricted to rainforest near Bherwerre Trig	RlAFL
Styphelia triflora		southern		Occasional in dry woodland and heath.	Wd, Hd, Hi
Styphelia tubiflora		southern		Occasional in dry	Wd, Hd, Hi

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				woodland and heath.	
Syzygium paniculatum	3ECi; Vulnerable (ESP & TSC)			Restricted to small rainforest patch along Elmoos Rd.	RlAFL
Zieria laevigata		southern		Occasional in *Allocasuarina distyla* rocky heath.	HkAd

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Table 4 Threatened and endangered species with potential (eg suitable habitat) to occur in Booderee National Park

Common name	Scientific name	Habitat
Southern Myotis	*Myotis adversus*	riparian
Common bent wing bat		Riparian
Giant Pipistrelle		riparian
Yellow bellied glider	*Petaurus australis*	forest
Southern brown bandicoot	*Isoodon obesulus*	Low scrub
Spotted tailed quoll	*Dasyurus maculatus*	forest
Koala		
Broaded headed snake	*Hoplocephalus bungaroides*	Shattering sandstone
Water skink	*Eulamprus tenuis*	Rainforest, wet sclerophyll
Water skink	*Eulamprus heatwolei*	Rainforest, wet sclerophyll
Black bellied swamp snake	*Hemiaspis signata*	Marsh, can tolerate salt
	Drysdalia rhodogaster	Rainforest, wet sclerophyll
Mountain dragon	*Tympanocryptis diemensis*	Dry & wet sclerophyll
Heath monitor	*Varanus rosenbergi*	heath
	Acacia subtilinervis	Heath and dry sclerophyll forest on rock outcrops
	Dodonaea camfieldii	Sunny sandstone rocky outcrops
	Goodenia glomerata	Swamps and seepages
	Melaleuca biconvexa	Often near streams

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Table 5 Threatened species excluding marine species which occur or are likely to occur (SPRAT) in Booderee National Park including records of all species, communities or populations that occur in Booderee National Park and are listed as Threatened under the:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act); or
- NSW *Threatened Species Conservation Act 1995* (TSCA).

Scientific name	**Common name**	**Booderee List**	**Flora / Fauna**	**EPBC (Cwlth) Listing**	**NSW Listing (* Indicates FMA, Otherwise TSCA)**	**EPBC Recovery Plan**	**NSW Recovery Plan (* Indicates FMA, Otherwise TSCA)**
Xanthomyza phrygia	Regent Honeyeater	Likely to Occur - SPRAT	Fa	END	END	(VIC) Regent Honeyeater Recovery Plan 1999-2003	
Syzygium paniculatum	Magenta cherry	Significant Species - PoM	Fl	VUL	VUL		
Potorous tridactylus tridactylus	Long-nosed Potoroo (SE mainland)	Likely to Occur - SPRAT	Fa	VUL	VUL		
Polytelis swainsonii	Superb parrot	Significant Species - PoM	Fa	VUL	VUL		
Heleioporus australiacus	Giant burrowing frog	Significant Species - PoM	Fa	VUL	VUL		
Dasyurus maculatus maculatus (s. lat.)	Spot-tailed Quoll	Likely to Occur - SPRAT	Fa	VUL	VUL		

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Scientific name	Common name	Booderee List	Flora / Fauna	EPBC (Cwlth) Listing	NSW Listing (* Indicates FMA, Otherwise TSCA)	EPBC Recovery Plan	NSW Recovery Plan (* Indicates FMA, Otherwise TSCA)
Caladenia tesselata	Thick-lipped Spider-orchid	Likely to Occur - SPRAT	Fl	VUL	VUL		
Tyto novaehollaniae	Masked owl	Significant Species - PoM	Fa		VUL		
Sminthopsis leucopus	White-footed dunnart	Significant Species - PoM	Fa		VUL		
Rostratula benghalensis	Painted Snipe	Likely to Occur - SPRAT	Fa		VUL		
Pseudomys gracilicaudatus	Eastern chestnut mouse	Significant Species - PoM	Fa		VUL		
Phascolarctos cinereus	Koala	Significant Species - PoM	Fa		VUL		
Pezoporus wallicus	Ground parrot	Significant Species - PoM	Fa		VUL		
Petroica rodinogaster	Pink robin	Significant Species - PoM	Fa		VUL		
Ninox strenua	Powerful owl	Significant Species -	Fa		VUL		

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Scientific name	Common name	Booderee List	Flora / Fauna	EPBC (Cwlth) Listing	NSW Listing (* Indicates FMA, Otherwise TSCA)	EPBC Recovery Plan	NSW Recovery Plan (* Indicates FMA, Otherwise TSCA)
		PoM					
Lophoictinia isura	Square-tailed kite	Significant Species - PoM	Fa		VUL		
Ixobrychus flavicollis	Black Bittern	Significant Species - PoM	Fa		VUL		
Haematopus longirostris	Pied oystercatcher	Significant Species - PoM	Fa		VUL		
Haematopus fuliginosus	Sooty oystercatcher	Significant Species - PoM	Fa		VUL		
Crocethia (Calidris) alba	Sanderling	Significant Species - PoM	Fa		VUL		
Charadrius mongolus	Mongolian plover	Significant Species - PoM	Fa		VUL		
Calyptorhynchus lathami	Glossy black cockatoo	Significant Species - PoM	Fa		VUL		
Litoria aurea	Green and golden bell frog	Significant Species - PoM	Fa	VUL	END		
Hoplocephalus bungaroides	Broad-headed	Likely to Occur -	Fa	VUL	END		

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Scientific name	Common name	Booderee List	Flora / Fauna	EPBC (Cwlth) Listing	NSW Listing (* Indicates FMA, Otherwise TSCA)	EPBC Recovery Plan	NSW Recovery Plan (* Indicates FMA, Otherwise TSCA)
	Snake	SPRAT					
Lathamus discolor	Swift Parrot	Likely to Occur - SPRAT	Fa	END	END		
Dasyornis brachypterus	Eastern bristlebird	Significant Species - PoM	Fa	END	END		
Charadrius (Thinornis) rubicollis	Hooded plover	Significant Species - PoM	Fa		END		
Prototroctes maraena	Australian Grayling	Likely to Occur - SPRAT	Fa	VUL			
Zieria laevigata	Angular zieria	Significant Species - PoM	Fl				
Vanellus miles novaehollandiae		Known to Occur – SPRAT	Fa				
Tringa nebularia	Common Greenshank, Greenshank	Known to Occur – SPRAT	Fa				
Thinornis rubricollis rubricollis	Hooded Plover (eastern)	Likely to Occur - SPRAT	Fa				

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Rulingia hermanniifolia		Significant Species - PoM	Fl				
Rhipidura rufifrons	Rufous Fantail	Likely to Occur - SPRAT	Fa				
Pultenaea villifera	Yellow bush pea	Significant Species - PoM	Fl				
Platysace stephensonii		Significant Species - PoM	Fl				
Pisonia umbellifera	Birdlime tree	Significant Species - PoM	Fl				
Philotheca buxifolius subsp. *buxifolius*	Waxflower	Significant Species - PoM	Fl				
Phebalium squamulosum subsp. *argenteum*	Scaly phebalium	Significant Species - PoM	Fl				
Petrophile sessilis		Significant Species - PoM	Fl				

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Petrophile pulchella Conesticks		Significant Species - PoM	Fl				
Persoonia mollis subsp. *caleyi*	Soft geebung	Significant Species - PoM	Fl				
Peperomia leptostachya		Significant Species - PoM	Fl				
Olearia axillaris	Coastal daisy bush	Significant Species - PoM	Fl				
Numenius madagascariensis	Eastern Curlew	Known to Occur – SPRAT	Fa				
Notolaea ovata		Significant Species - PoM	Fl				
Myiagra cyanoleuca	Satin Flycatcher	Likely to Occur - SPRAT	Fa				
Monarcha melanopsis	Black-faced Monarch	Likely to Occur - SPRAT	Fa				
Mirbelia rubiifolia		Significant Species -	Fl				

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Heathland mirbelia		PoM					
Melaleuca capitata		Significant Species - PoM	Fl				
Lomandra cylindrica	Needle matrush	Significant Species - PoM	Fl				
Limosa lapponica	Bar-tailed Godwit	Known to Occur – SPRAT	Fa				
Leucopogon rodwayi	Rodway's bearded heath	Significant Species - PoM	Fl				
Leucopogon amplexicaulis		Significant Species - PoM	Fl				
Leptospermum epacridoideum		Significant Species - PoM	Fl				
Hirundapus caudacutus	White-throated Needletail	Likely to Occur - SPRAT	Fa				
Hieraaetus morphnoides	Little Eagle	Known to Occur – SPRAT	Fa				

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Haliastur sphenurus	Whistling Kite	Known to Occur – SPRAT	Fa				
Haliaeetus leucogaster	White-bellied Sea-Eagle	Likely to Occur - SPRAT	Fa				
Grevillea macleyana (barkleyana)		Significant Species - PoM	Fl				
Goodenia heterophylla subsp. *eglandulosa*		Significant Species - PoM	Fl				
Gompholobium grandiflorum	Large wedge pea	Significant Species - PoM	Fl				
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	Likely to Occur - SPRAT	Fa				
Falco peregrinus	Peregrine Falcon	Known to Occur – SPRAT	Fa				
Falco	Australian	Known to Occur –	Fa				

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longipennis	Hobby	SPRAT					
Falco cenchroides	Nankeen Kestrel	Known to Occur – SPRAT	Fa				
Falco berigora	Brown Falcon	Known to Occur – SPRAT	Fa				
Eucalyptus sclerophylla	Scribbly gum	Significant Species - PoM	Fl				
Eucalyptus obstans	Port Jackson mallee	Significant Species - PoM	Fl				
Endiandra sieberi	Hard corkwood	Significant Species - PoM	Fl				
Elanus notatus (*Elanus axillaris*)	Black-shouldered Kite	Known to Occur – SPRAT	Fa				
Egretta sacra	Eastern Reef Egret	Known to Occur – SPRAT	Fa				
Egretta alba (*Ardea alba*)	Great Egret, White Egret	Known to Occur – SPRAT	Fa				
Daviesia alata	Winged bitter pea	Significant Species -	Fl				

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		PoM					
Cygnus atratus	Black Swan	Known to Occur – SPRAT	Fa				
Crinum pedunculatum	Swamp lily	Significant Species - PoM	Fl				
Corybas undulatus	Tailed helmet orchid	Significant Species - PoM	Fl				
Conospermum longifolium subsp. *mediale*		Significant Species - PoM	Fl				
Conospermum ericifolium		Significant Species - PoM	Fl				
Circus aeruginosus (*Circus approximans*)	Marsh Harrier	Known to Occur – SPRAT	Fa				
Chloanthes stoechadis	Common cloanthes	Significant Species - PoM	Fl				
Chenonetta jubata	Australian Wood Duck	Known to Occur –	Fa				

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		SPRAT					
Charadrius ruficapillus	Red-capped Plover	Known to Occur – SPRAT	Fa				
Charadrius melanops (*Elseyornis melanops*)	Black-fronted Plover	Known to Occur – SPRAT	Fa				
Charadrius bicinctus	Double-banded Plover	Known to Occur – SPRAT	Fa				
Caustis recurvata var. *recurvata*		Significant Species - PoM	Fl				
Canthium coprosmoides	Coast canthium	Significant Species - PoM	Fl				
Callistemon linearis	Narrow-leaved bottlebrush	Significant Species - PoM	Fl				
Calidris ferruginea	Curlew Sandpiper	Known to Occur – SPRAT	Fa				
Calidris canutus	Red Knot, Knot	Known to Occur – SPRAT	Fa				

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Blechnum indicum	Swamp water fern	Significant Species - PoM	Fl				
Biziura lobata	Musk Duck	Known to Occur – SPRAT	Fa				
Baeckea ramosissima	Rosy heath myrtle, Rosy baeckea	Significant Species - PoM	Fl				
Bacopa monnieri		Significant Species - PoM	Fl				
Aythya australis	Hardhead	Known to Occur – SPRAT	Fa				
Austrostipa stipoides		Significant Species - PoM	Fl				
Atriplex cinerea	Grey saltbush, Coast saltbush	Significant Species - PoM	Fl				
Arenaria interpres	Ruddy Turnstone	Known to Occur – SPRAT	Fa				
Aquila audax	Wedge-tailed	Known to Occur –	Fa				

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	Eagle	SPRAT					
Apus pacificus	Fork-tailed Swift	Known to Occur – SPRAT	Fa				
Anous stolidus	Common Noddy	Known to Occur – SPRAT	Fa				
Anas superciliosa	Pacific Black Duck	Known to Occur – SPRAT	Fa				
Anas gibberifrons (*Anas gracilis*)	Grey Teal	Known to Occur – SPRAT	Fa				
Anas castanea	Chestnut Teal	Known to Occur – SPRAT	Fa				
Amyema cambagei	Sheoak mistletoe	Significant Species - PoM	Fl				
Accipiter novaehollandiae	Grey Goshawk	Known to Occur – SPRAT	Fa				
Accipiter fasciatus	Brown Goshawk	Known to Occur – SPRAT	Fa				
Accipiter cirrhocephalus	Collared Sparrowhawk	Known to Occur –	Fa				

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		SPRAT					
Acacia elongata	Swamp wattle, Slender wattle	Significant Species - PoM	Fl				

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ATTACHMENT 8. Information provided by NSW Department of Environment and Climate Change (DECC)

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General Manager
Shoalhaven City Council
PO Box 42
Nowra NSW 2541

D
1446-07
32971

Our ref: 07/8289 Les Mitchell
Your ref: 1446-07 & 32971

Shoalhaven City Council
Received
23 NOV 2007
File No. 1446-07
Referred to: E. Hollinger

NSW 172931
NSW NATIONAL PARKS AND WILDLIFE SERVICE
(the NPWS is part of the Department of Environment and Climate Change)

Attention: Eric Hollinger

Dear Eric,

RE: *Heritage Estates Rezoning Investigations*
Information Required for Preparation of Public Environment Report

I apologise for the delay in responding to your request for DECC's views about the adequacy of identified regional habitat corridors as they relate to the Heritage Estates Rezoning Investigations.

I have conferred with DECC's Climate Change & Environment Protection Group in Queanbeyan and I can advise you that DECC's current position on this issue remains as outlined in the attached combined NSW Government Agencies' submission to the Commission of Inquiry on Heritage Estates in 1999. I refer you also to DECC's letter to Gordon Clark of Council dated 29th August 2007 which provides this agency's general position on any rezoning of Heritage Estates. *The latter correspondence updates DECC's position on* the intrinsic conservation values of the site, the understanding of which has been significantly enhanced as a result of the report by BES February 2007.

Please contact me or Miles Boak of the CCEP group tel: 62989708 if you wish to discuss any matters pertaining to the attached document, or any other matters relating to habitat corridors in the Jervis Bay area.

Yours faithfully

Les Mitchell
For Greg Tedder
Nowra Area Manager.

20/11/2007

Nowra Area
South Coast Region
PO Box 707
Nowra NSW 2541
Tel 02 44 286 300
Fax 02 44 286399

Department of Environment & Climate Change NSW

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Questions from the Commissioner

1. Please further address the sub-regional/regional corridor position in relation to vegetation and fauna on the Heritage Estate.

This issue is also dealt with in the response to questions 2, 3 and 4 below.

The Government Agencies consider that the sub-regional/regional corridors are essentially an issue of biodiversity management for the region. The Bherwerre Peninsula contains the largest area of reserved lands in the region, within the Commonwealth managed Booderee National Park. North of the border, the lands of the NSW Jervis Bay National Park stretch northward around Jervis Bay. Gazetted habitat corridors (the old HC1, HC2 and HC3) link the NSW Jervis Bay National Park with Crown lands to the west, including the proposed Parma Creek Nature Reserve. The critical link between the Bherwerre Peninsula and these other reserved lands and habitat corridors is a narrow area between the towns of Vincentia and Erowal Bay. (Maps illustrating this will be included in the Submission in Reply from the Government Agencies). Wildlife movement through this link is essential to the long-term survival of the biodiversity of the Bherwerre Peninsula.

While the eastern part of the area between Vincentia and Erowal Bay is part of NSW Jervis Bay National Park, the western part is formed by the Heritage Estates. The distribution of vegetation communities through this area is not even, with the eastern National Park area dominated by heathlands and sedgelands, while the Heritage Estates is made up primarily of timbered communities (Riparian Open Forest, Blackbutt Open Forest and Scribbly Gum Woodland). Therefore, the provision of habitat varies from east to west, and as a result so will the distribution of species (both flora and fauna) and the capacity for the movement of species through the landscape. Those species which are reliant on forest or woodland communities for habitat would be dependant upon the Heritage Estates land for movement between the Bherwerre Peninsula and the other reserved lands of the Jervis Bay Region.

Within the Heritage Estates, the distribution of vegetation communities and, to a lesser extent, the impacts of clearing and development, mean that two major linkages have been identified. The first of these, along the Worrowing Waterway, forms part of a disturbed linkage on to forested lands north of St Georges Basin, then northward to the old HC3 as well as west and then south around St Georges Basin and on to the Cudmirrah-Conjola National Park. The second passes through the south-eastern corner of the site and links with other timbered lands to the south and north within the NSW Jervis Bay National Park.

Those species recorded on the Heritage Estates site (see Andrews.Neil 1993 and AES 1995) form a subset of the species which could potentially utilise the corridor. Other species recorded on the Bherwerre Peninsula and elsewhere in the region (such as some listed on table 4.1 of the Government Agencies Primary Submission) could potentially utilise the corridor in the long term. It is important to recognise that the values of the linkages apply not only to threatened species but also to other more common species in the region, including less mobile bird species and, in the long-term, flora species as well.

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In examining this issue the Commissioner may wish to review publications such as Bennett (1990) and Harris and Scheck (1991) which provide greater background to the issue.

2. ***In relation to habitat corridors across the Heritage Estate, please revisit the DUAPs 1995 "Report on the Jervis Bay Habitat Corridors" and the position adopted in the Jervis Bay REP in light of the Government Agencies position put to the Inquiry.***

BACKGROUND

The 1995 DUAP report was prepared following public input to the "Jervis Bay - Our Heritage Our Future" discussion paper. The discussion paper had proposed a habitat corridor system based upon the earlier work of Mills (1991), and at the time incorporated habitat corridor 4 (HC4) which passes through the western section of the Heritage Estates. It also included a north-south corridor passing through the south-east corner of the same area which linked to habitat corridor 3. As a result of submissions, DUAP prepared the 1995 report as a precursor to the draft REP. It should be noted here that the report was only ever internally circulated and as such was never released to other agencies or to the public for comment.

The report concluded that HC4 should be omitted from the finalised habitat corridor system on the basis that there were several bottlenecks or weak points along it, rather than because of the actual quality and/or significance of habitat within it. At the same time it also excluded the south-east corner of the Heritage Estates from the same corridor system on the basis that it had not been included in the Jervis Bay National Park. The resultant proposed corridor system was exhibited as part of the draft REP and subsequently gazetted in 1996. HC4 was instead given the status of "Disturbed habitat and vegetation".

At the Heritage Estates COI the Joint Agencies position was that two parts of the Heritage Estates site, namely the south-east corner and the vegetation along the Worrowing Waterway, were acting as part of a regional network of linked habitat (or corridors). Indeed, the south-eastern part of the Heritage Estates contributes part of a contiguous north-south timbered link between the southern section of Jervis Bay National Park and the central section west of Vincentia and Huskisson. In turn, the habitat along Worrowing Waterway establishes an east-west link through to the forests north of St Georges Basin and on to Yerringyong State Forest and the proposed Parma Creek Nature Reserve.

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NORTH-SOUTH CORRIDOR

On the issue of the north-south corridor (through the south-eastern corner of the Heritage Estates) there is little or no difference between DUAP (1995) and the Government agencies position. DUAP (1995) simply did not recognise this area on the basis that most of the north-south corridor had become proposed NSW Jervis Bay National Park. Although the south-eastern section of the Heritage Estates had been identified as part of this linkage in "Our Heritage Our Future", it had not been earmarked for purchase by NPWS as part of the NSW Jervis Bay National Park (see response to Shoalhaven City Council question 1) and DUAP (1995) omitted it on this basis (see p9 of DUAP 1995). The only consideration of the this part of the site was in relation to the functioning of HC4, no consideration of its values for the north-south movement of tree-dependant fauna was given.

The maps included in DUAP (1995) indicate that at the time the report was written, not all information relating to the location of the proposed Jervis Bay National Park was available to the authors in deriving the finalised habitat corridor system. This may have contributed in part to the designation of the resultant north-south corridor. The area immediately south of St George Avenue (shown as part of the habitat corridor system on DUAP 1995 Map 1), is now zoned 8(b) proposed national park. The area further south again (shown blank on DUAP 1995 Map 1), was then Gurumbi Nature Reserve and is now part of NSW Jervis Bay National Park. With both these areas as part of proposed National Park, there is a much stronger linkage to the south-eastern section of Heritage Estates.

An additional reason given by DUAP (1995) for downgrading the status of HC4 was that it essentially served the same purpose as HC3, that is, by providing a link from the Bherwerre Peninsula (Booderee National Park) and the southern sections of NSW Jervis Bay National Park to the western crown land areas. If this is the case, then the north-south link provided by the NSW Jervis Bay National Park and the south-eastern section of the Heritage Estates is critical in a regional context. As pointed out in the Government agencies position, this section of the Heritage Estates provides the only opportunity for a contiguous timbered linkage between the Bherwerre Peninsula and the central and northern sections of NSW Jervis Bay National Park (and therefore, HC3).

In preparing the report, DUAP staff utilised the vegetation cover mapping (Map 7 of DUAP 1995) to consider the vegetation continuity of the habitat corridors but this only distinguished between Pine, Pine/Eucalypt Regeneration, Disturbed Native Vegetation and Native Vegetation categories. Therefore, no differential within Native Vegetation categories, for example between heathland, sedgeland, woodland or forest communities, was identified. As such, no consideration of the different habitat provisions between these communities was given, and the value of the south-eastern section of the site was not recognised.

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WORROWING WATERWAY CORRIDOR

DUAP (1995) omitted HC4 from the final corridor system on the basis that: (i) it had seven identifiable bottlenecks or "choke points", (ii) it served the same purpose as HC3 in that it provided an east-west link between larger areas of reserved habitat, (iii) 67% of its area was in private land ownership, and (iv) it was pressured from urban expansion around St Georges Basin. Despite these apparent deficiencies the report did acknowledge that HC4 had several intrinsic values, including the fact that it contained regionally significant flora and fauna. In view of these values it recommended that rehabilitation of the area should be encouraged to promote biodiversity conservation. It is important here to note that the report failed to identify the additional potential role of HC4 as a link between lands on the western and southern shore of St Georges Basin, and those occurring within adjacent Cudmirrah - Conjola National Park (as this area was excluded from the boundary of the study area).

In its submission to the draft REP, the NPWS concurred that HC4 was too fragmented to warrant habitat corridor status in the REP, however it indicated that the lands:

> *".....continue to provide wildlife habitat in their own right and despite some fragmentation, they are still likely to be critical for the dispersal of many species of flora and fauna"*

In view of these values NPWS sought to have habitat corridor provisions apply to HC4 and recommended that following rehabilitation it should be re-instated as part of the formal corridor system for the region.

Regardless of the assessments and the zoning in the REP, the reality is that the linkage formed by HC4 functions both as habitat and as a conduit for movement for some species of wildlife. For example, a population of the threatened arboreal possum, the Yellow-bellied Glider, has been recorded as occurring along the Worrowing Waterway within the Heritage Estates site for a number of years (Andrews.Neil 1993 and AES 1995). Consultant Biologist, Garry Daly (pers. comm., 1999) has recently recorded definitive Yellow-bellied Glider feeding incisions on the bole of a red bloodwood (*Eucalyptus gummifera*) tree located immediately on the western side of the Wool Road, on Birriga Avenue alongside the waterway: these foraging activities are from one or more individuals and were made within the past 12 months. Further records of the Yellow-bellied Glider exist further westward along the former HC4 (Garry Daly, pers. comm. and NSW Wildlife Atlas). Unless proven otherwise it must be assumed that the species is utilising habitat in the immediate area and that the population has persisted over time, attesting to the viability and importance of the remnant vegetation (see also further comment on the Wool Road chokepoint below). Given this, it can be reasonably assumed that other species of fauna, both threatened and non-threatened, will also be using this linkage in a similar way.

In considering the potential importance of the habitat provided by HC4 the Commissioner should be aware that in order to function as a wildlife corridor there needs only to be wildlife movement and/or genetic flow on an irregular basis for the

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linkage to be essential in a local context. Of course, the more frequently movement occurs, the more useful the link. Whilst choke points no doubt impinge on the current ability of HC4 to function efficiently, they do not in themselves render the corridor useless for biodiversity conservation.

An additional value of the Worrowing Waterway linkage so far unrecognised is its potential to provide an alternative to the existing north-south link, which itself has a major chokepoint immediately west of Vincentia (at the Leisure Centre site). Placing faith in the ongoing viability of only one linkage is a significant risk, as a single catastrophic event (or a sequence of events such as too frequent wildfire) may alter the structure or habitat value of a linkage to the point at which it no longer functions for one or more species which are reliant upon it.

OVERVIEW

DUAP (1995) considered formal zoning issues for the REP, whereas in the Government agencies position we are seeking to maximise retained linkages within a particular development site. While the value of habitat corridors for biodiversity conservation has been unequivocally demonstrated by the scientific community and in turn by land managers, much remains to be learned about the optimum configuration or dimensions of such corridors given a specific management objective. In considering the issue of the Heritage Estates, given these uncertainties, the Government agencies are of the view that the Heritage Estates is positioned at an important, if not critical, part of the overall Jervis Bay landscape. The extensive reserved lands of the Bherwerre Peninsula are undoubtedly reliant upon adjacent linkages through areas such as the Heritage Estates for the dispersal of wildlife and genetic material. In the absence of such linkages the Bherwerre Peninsula would otherwise perhaps become an island for many species, both threatened and non-threatened. In theory, given time, an end result of this process would be a significant reduction in biodiversity on the Peninsula. Given this potential, a precautionary approach has been taken which seeks to maximise habitat retention in an area otherwise earmarked for development. This includes habitat in both the south-eastern section and the Worrowing Waterway linkage. Both these areas additionally provide different attributes of habitat to that provided by the NSW Jervis Bay National Park.

3. Please comment on the York (1992) corridor report.

This report was undertaken as a review/critique of two previous report, that of Mills (1991) and Whelan and Ooi (1991), which examined habitat corridor systems for the Jervis Bay region. It dissects the component parts of both reports and compares their conclusions. Although York is critical of much of the methodology of the reports, and particularly of Mills, he conclusions do not greatly effect the issue of habitat corridors on the Heritage Estates site. York is especially concerned that the theory of corridors is yet to be matched by "empirical evidence", but still goes on to support the concept of corridors in the Jervis Bay Region.

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With respect to the conclusions on page 11 of York (1992) and their relation to the Heritage Estates site, the following comments can be made (the numbers relate to the numbering used by York on page 11):

1. It is indeed important to assess the adequacy of the reserve network in examining a corridor system. Comments made in the Government Agencies submission and in question 2 (above) illustrate the role of the Heritage Estates for wildlife movement in relation to and compared with the NSW Jervis Bay National Park, Booderee National Park and other reserved areas in the region. The conclusion is that the areas of the Heritage Estates identified as habitat corridors are providing different linkages to that provided by the NSW Jervis Bay National Park, and are supporting, and are likely to be critical to, the functioning of the reserve system in the region.

2. See the comment made in the "Overview" section of the response to question 2 (above). In the absence of detail on the optimum configuration of corridors for the species known from the region, it can still be concluded that the Heritage Estates site is strategically important for the dispersal of wildlife and genetic material, particularly to and from the Bherwerre Peninsula. Given this, a precautionary response would ensure the retention of those parts of the site likely to be acting as conduits.

3. The Government Agencies consider that east-west linkages remain an important resource for species, especially birds, that move seasonally from the mountainous hinterland areas to the coast following available food resources. However, it is agreed that coastal corridors are also likely to be important for coastal species. The NSW Jervis Bay National Park and adjacent areas (including the south-east corner of the Heritage Estates site, form one such coastal corridor.

4. Please address habitat corridor issues for the Wool Road/Birriga Avenue intersection.

Clearly this intersection is acting as a major choke point for the former HC4. Yet, as pointed out in the response to question 2 (above) the evidence points to the conclusion that wildlife, including the threatened Yellow-bellied Glider, continue to utilise this linkage. This would not be unexpected, as this species has been recorded undertaking glides of around 100 metres, including glides more than 50 metres across a road (Goldingay and Kavanagh 1991).

As pointed out in the response to question 2 (above), wildlife movement and/or genetic flow only needs to take place on an irregular basis for the linkage to perform a conservation function. A linkage may even only be utilised by some species during an extreme event such as a wildfire. Although undoubtably wildlife movement will have been reduced by the use of the roads, clearing and associated impacts at the Wool Road/Birriga Avenue intersection, it does not appear to have been eliminated. DUAP (1995) indicated that the two culverts under the bridge at this intersection would aid the movement of some species.

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There is precedence in the region for habitat corridors gazetted across major roads. In assessing the four habitat corridors, DUAP (1995) did not remove HC1 and HC3 because they were crossing the Princes Hwy. These were eventually gazetted as corridors in the Jervis Bay REP.

Whilst this choke point is already causing some difficulty for wildlife movement through this area, further development in this part of the Heritage Estates will inevitably place greater stress on the wildlife which utilise it. Much of the remaining vegetation will be removed to make way for the development of housing. Other impacts highlighted in the Government Agencies Primary Submission, including those which will arise from the introduction of greater numbers of domestic pets, will occur. Increasing populations and usage of the roads will lead to more road kills, and probably pressure to widen the intersection, making wildlife movement less likely.

7. What are the environmental and development objectives for the land?

Some additional environmental objectives for the Heritage Estates include:

- the maintenance of viable habitat corridors along the Worrowing Waterway and through the south-east corner of the Heritage Estates;
- the protection of individuals of Melaleuca biconvexa along the Worrowing Waterway;
- the maintenance of known habitat and areas considered to be of connective value for the Yellow-bellied Glider;
- the maintenance and protection of all potential nest sites and feeding trees for the Glossy-black Cockatoo;
- the protection and enhancement (by preventing burning and further clearing) of potential habitat of the Easter Bristlebird;
- giving priority to threatened species habitat during the rehabilitation and ongoing management of the retained habitat system; and,
- the protection of all known Aboriginal sites.

References

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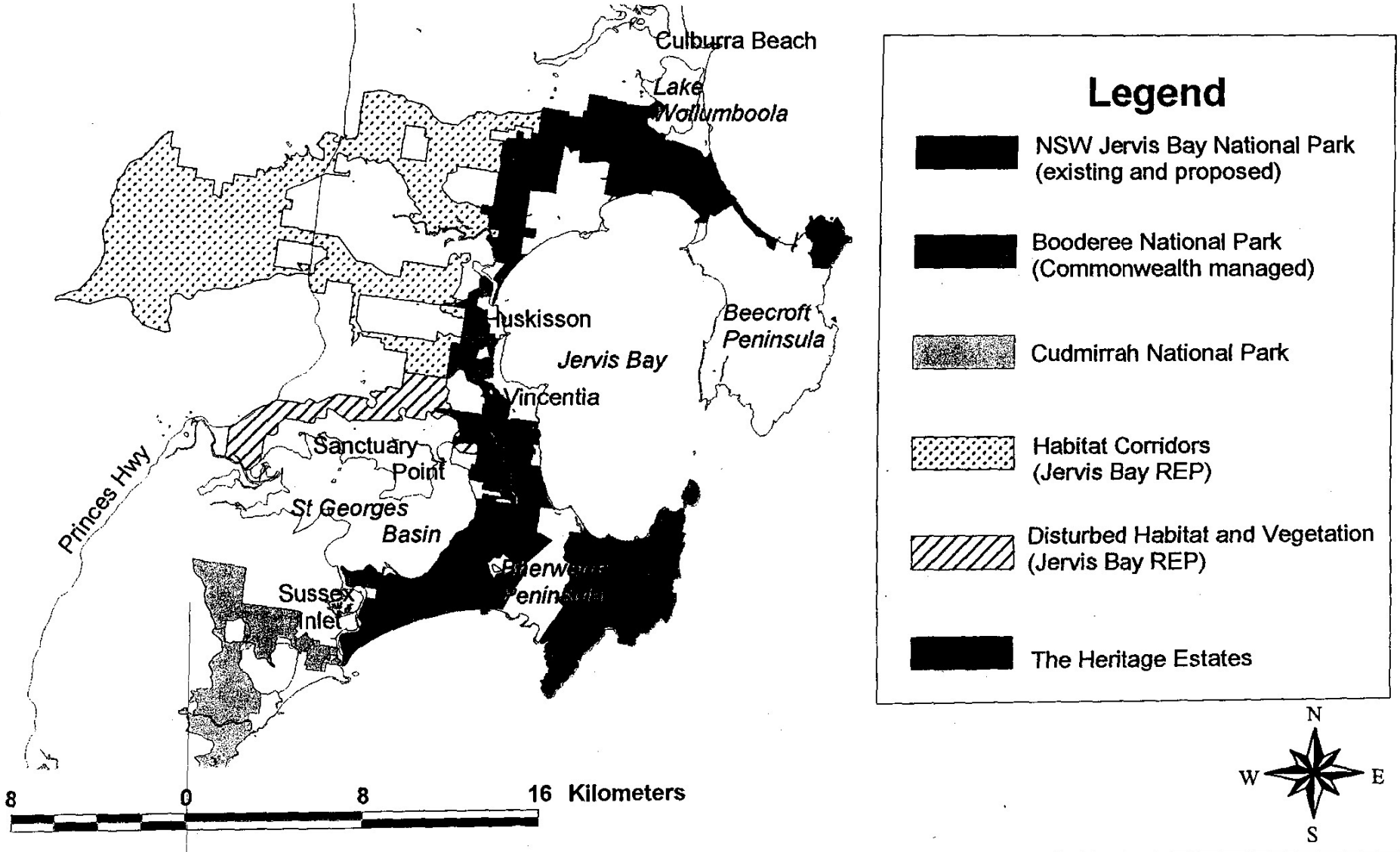
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Figure 3.1: National Parks and Habitat Corridors in the Jervis Bay Region

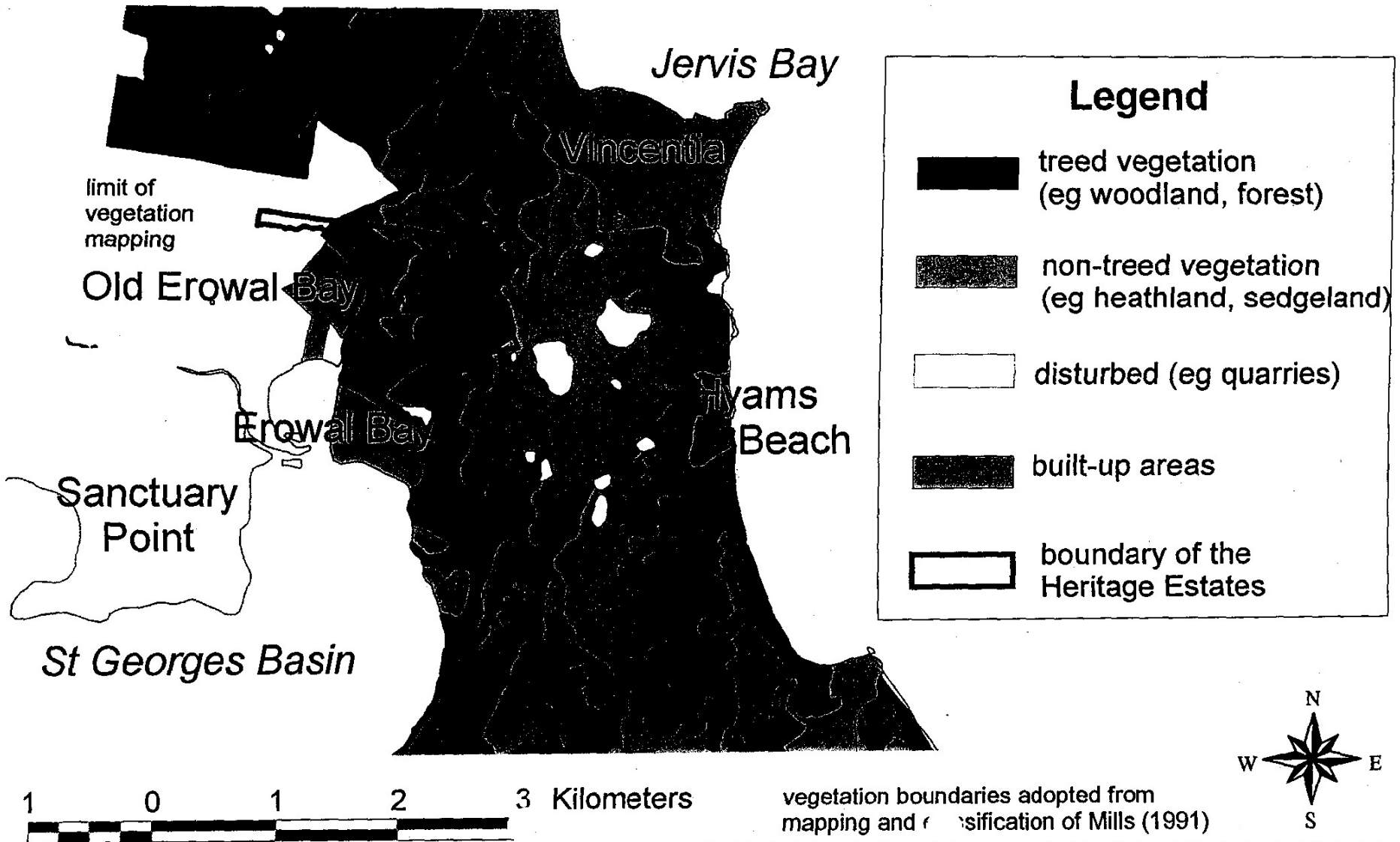


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Figure 3.2: Structure of native vegetation in the Vincentia - Erowal Bay area



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The Registrar
Office of the Commissioners of Inquiry
for Environment and Planning
GPO Box 3415
SYDNEY NSW 2001

3 May 1999

Re: Submission by NSW Government Agencies to the Commission of Inquiry on the Heritage Estates, Jervis Bay

Please find attached the joint submission to the Heritage Estates Commission of Inquiry prepared by and on behalf of the Department of Urban Affairs and Planning, Environment Protection Authority, National Parks and Wildlife Service, Department of Local Government and Department of Land and Water Conservation. These NSW Government Agencies were represented on the 1996-97 Task Force into the future development of the Heritage Estates, established by the Director-General of the Department of Urban Affairs and Planning.

DAVID PAPPS
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Department of Urban Affairs and Planning

LISA CORBYN
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Director, Southern Region
National Parks and Wildlife Service

JOHN SCOTT
Director, Policy and Reform
Department of Local Government

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Director, Sydney-South Coast Region
Department of Land and Water Conservation

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Commission of Inquiry

Heritage Estate, Jervis Bay

Joint Submission by

Department of Urban Affairs and Planning
Environment Protection Authority
Department of Land and Water Conservation
National Parks and Wildlife Service
Department of Local Government

May 1999

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EXECUTIVE SUMMARY

There has been a long history to the Heritage Estate and several attempts have been made in recent years to resolve the concerns of landowners in their desire to develop their land. The most recent was by way of a Taskforce comprising representatives of the landowners, Shoalhaven City Council and government agencies which examined a range of issues associated with any future development of the Estate. These issues included the desire of landowners to have certainty over the future of their land, councils strategic planning for the area and the Government's policies in relation to land development, environmental protection and sustainability, the provision of infrastructure and the equitable distribution of costs for the provision of the infrastructure in development of the land.

The Taskforce considered previous reports and proposals for the land and a consultant's report commissioned to provide specific advice on the issues of water quality management, land capability and infrastructure requirements. Seven options for development were considered in attempting to balance the various conflicting views. The options included estimates of costs to the landowners for provision of infrastructure and the future of the land not suitable for development. They also identified areas which required environmental protection because of their intrinsic environmental characteristics as well as their regional significance.

The government agencies consider that the options provided a reasonable range of development possibilities for the Estate while meeting the requirements of Government policies, particularly in regard to environmental protection and ecologically sustainable development.

Following this exhaustive process of consultation and negotiation, the landowners and the Council have appeared unwilling or unable to accept or reach agreement on the appropriate means for development of the Estate within these parameters. The Commission of Inquiry is a direct result of the position taken by the Council and the landowners following the Taskforce's report.

Neither the State, regional nor local policy planning frameworks would support the rezoning and development of the Estate at this stage. At the very least, any decisions on the future of the Estate should await the finalisation of the Jervis Bay Settlement Strategy.

If a decision were made now or in the future to develop the Estate, there are a number of environmental management and infrastructure funding issues that will have to be considered. The future ownership and management of lands that may not be suitable or capable of development will need to be addressed.

The studies and reports prepared so far indicate that parts of the Estate have environmental values and qualities which must be conserved and/or protected. The Government agencies consider that Option 4 in the Taskforce report represents the minimum requirement for a balance between development and conservation of the Estate.

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This option represents a comprise position and involves the development of about 730 lots with the rest set aside for environmental protection and the infrastructure. Protection of the environment is a responsibility of the community as well as of the government. It should not be ignored or isolated as a relevant consideration in development proposals. The agencies believe that this option provides the most reasonable option for development in the interests of both the landowners and the community.

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1. INTRODUCTION

This submission is made on behalf of the Department of Urban Affairs and Planning (DUAP), the Environment Protection Authority (EPA), the National Parks and Wildlife Service (NPWS), the Department of Land and Water Conservation (DLWC) and the Department of Local Government (DLG) to the Commission of Inquiry into the Heritage Estate. The Departments have made this joint submission on the basis that the agencies have a common view as to the future for development in the Heritage Estate. This is based on government policies giving particular regard to the questions of protecting the environment, both for the present and into the future and ensuring a minimal environmental impact as a result of any development of the Heritage Estate.

The key issues addressed by the submission and the contribution of the agencies are as follows:

(a) strategic planning considerations (DUAP);
(b) environmental considerations
  (i) nature and cultural conservation (NPWS/DLWC)
  (ii) water and air quality, access and waste management (EPA/DLWC); and
(c) funding infrastructure (DLG).

The Heritage Estate is one of the many paper subdivisions created in NSW before planning controls were introduced. It epitomises the challenges of developing and managing paper subdivisions in NSW and other States. Over the last ten years there has been a concerted effort by the landowners to have their land rezoned for residential development. Over the same period, Shoalhaven Council has on several occasions unsuccessfully sought to prepare and exhibit draft local environmental plans to enable the majority of the Estate to be developed for residential purposes.

A number of strategic planning and environmental management studies and reports have been prepared about the suitability, need, timing and infrastructure provision for the Estate. These studies and reports include:

(a) a local environmental study (LES) and supplementary flora and fauna report prepared in 1994. These documents concluded that development based on the existing subdivision pattern should not be permitted. They also cast doubt on the need for, and timing of, any residential development of the Estate.

(b) a strategic flora and fauna study prepared in 1995 which concluded, among other things, that a conservation corridor through the Estate was appropriate and that residential development within such a corridor could not realistically conserve the natural vegetation; and

(c) a report by a Government/landowner Taskforce, which identified a number of possible development scenarios under which between 510 and 995 lots could be developed for residential purposes. There was no agreement between the Government agencies, on one hand, and the Council and the landowners, on the other hand, on the most appropriate scenario. The Council and the landowners subsequently decided to pursue a scenario that would allow more intensive development than contained in any of the seven options in the Taskforce report.

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Apart from raising doubts about the need and timing, a clear feature of these studies and reports is that any development could not take place on all of the constituents lots within the Estate. There is a lack of agreement between the Government agencies, the Council and landowners as to:

(a) how much development could be ecologically sustained in the Estate; and

(b) the future ownership and management of any lands incapable or unsuitable for development and the level of, and responsibility for, compensation of affected landowners.

It is against this background that the former Minister for Urban Affairs and Planning decided to establish the Inquiry. The Minister considered that the Inquiry was an appropriate forum for public debate and an independent assessment of the issues associated with any development of the Estate. In this context, the key challenge for the Inquiry is to achieve an outcome that:

(a) can be justified in strategic planning terms;

(b) is environmentally sustainable;

(c) imposes a minimum risk to the community in terms of funding the necessary infrastructure; and

(d) provides a framework for dealing with similar cases elsewhere in the State.

A review of State, regional and local planning policy frameworks suggests that there are no strategic planning benefits of rezoning and developing the Estate in the short term. If, for other reasons, the outcome of the Inquiry were a recommendation supporting the rezoning and development of the Estate, there are a number of environmental management and infrastructure funding issues that would have to be addressed. The environmental management issues relate to natural and cultural environment conservation and water quality management. The infrastructure funding issues relate to the ability of either the Council and/or the landowners to fund the necessary infrastructure which would also form part of environmental management. Similarly, any such decision would have to be capable of being applied to similar cases throughout the State.

Past studies and reports have demonstrated that parts of the Estate have environmental values. They have concluded or recommended that the most appropriate method of conserving these values is by precluding those parts of the Estate from development. The key questions are the amount of land necessary to optimally conserve these values and the long-term management of these lands. The Government agencies consider that the minimum number of lots that should be set aside for environmental conservation is about 430 lots consistent with Option 4 in the Taskforce report.

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The Patterson Britton report recommended a range of water quality measures. However, evidence suggests that even with Best Practice Management (BMP), the development of the Estate could still pose significant risks to the water quality of the St Georges Basin and in particular Worrowing waterway.

The cost per lot of providing infrastructure has been estimated at between $30,000 and $35,000 (total about $30 million). There is uncertainty as to whether or not the Council and/or the landowners would be able to fund that necessary infrastructure. Under these circumstances, it is considered that a critical outcome of the Inquiry should not potentially create a situation where the State Government may be asked to underwrite the provision of the infrastructure.

The uncertainty about the effectiveness of environmental management and the provision of infrastructure strengthen the argument against rezoning and the developing of the Estate, at least, in the short term.

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2. BACKGROUND

2.1 Paper subdivisions and the Heritage Estate

The Heritage Estate is one of the many paper subdivisions created on rural zoned land in New South Wales before planning controls were introduced. Across the State, it is estimated that there are about 30,000 lots which fall within this category. The largest concentration of these lots is around the Jervis Bay area (map 1) where about 10,000 lots are estimated to exist. The other notable locations are in Blacktown, Blue Mountains, Helensburgh and the North Coast.

These subdivisions are not limited to New South Wales. They are also found in South Australia, Victoria and Queensland. There are also subdivisions which are similarly affected by planning controls elsewhere in the State and Australia. These include Crown Portions and Soldier Settlements.

The lots in paper subdivisions are held either in consolidated holdings in single ownership (for example Realty Realizations) or in fragmented ownership (such as the Heritage Estate). Most of these subdivisions:

(a) are generally located on the coastal strip in environmentally sensitive areas;
(b) have few design relationship to existing natural attributes of the land;
(c) are unsuitable for development because of lack of services, or lack of timing or environmental factors or are isolated from neighbouring townships facilities and services;
(d) have been purchased on the premise that there is urban development potential now or in the future;
(e) for fragmented lots in particular, environmental degradation has become a problem as landowners have undertaken ad hoc land clearing; and
(f) there is ongoing pressure from landowners on local and State Government to develop these areas.

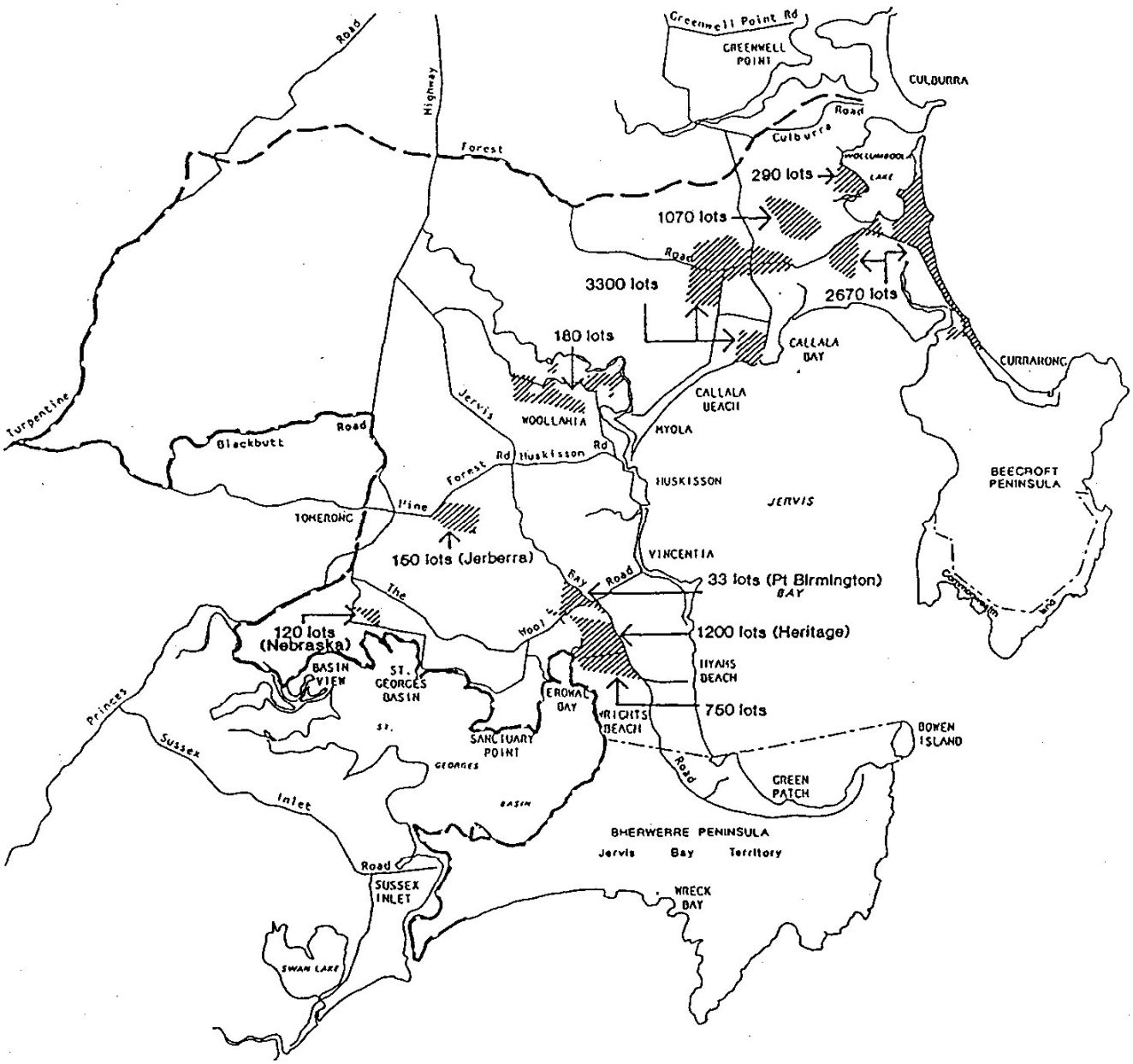
The Heritage Estate epitomizes the challenges facing government, landowners and the community in developing a long-term solution to the land use planning, development and management of paper subdivisions.

The Estate, created in 1915 and covering an area of 166 hectares, and the part comprises 1,263 lots owned by about 1,100 individuals who have formed the Shoalhaven Landowners' Association as a lobby group. Over the last 10 years, the Association has unsuccessfully lobbied the Government to support the rezoning of the Estate for residential development. The Association has previously held the Government and the Council responsible for the landowners' dilemma and suggested that the Government should have stopped the land from being traded in. This is despite the concerted effort of the Council to warn prospective purchasers of the absence of dwelling rights.

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OLD NON-URBAN SUBDIVISIONS (REGISTERED)

NOTE: FIGURES ARE APPROXIMATE ONLY.

MAP PREPARED BY SHOALHAVEN CITY COUNCIL
NOTE: MAPS ARE INDICATIVE ONLY

MAP 1
PAPER SUBDIVISIONS IN THE JERVIS BAY AREA

Source: JERVIS BAY
OUR HERITAGE OUR FUTURE
A DISCUSSION PAPER
Prepared by NSW Department of Planning
In Association with Shoalhaven City Council

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Those parts of the Estate in public ownership comprise the land immediately adjacent to the waterway and is a Reserve for Public Recreation dedicated on 17th September, 1920. On the eastern side of the waterway, the reserve is of variable width and extends from the Wool Road to the Erowal Bay foreshore and beyond. As a Public Recreation Reserve, the day to day care, control and maintenance of the reserve has devolved upon Shoalhaven City Council under the Local Government Act, 1993. Administration of the reserve however, remains with Land NSW, Department of Land and Water Conservation under Part V of the Crown Lands Act, 1989.

2.2 The 1994 Local Environmental Study

In 1992 the Council resolved to prepare a draft Local Environmental Plan (LEP) for the Estate to assess the capability and suitability of the area for some form of residential development. In July 1993 it appointed Hassell Planning Consultants to undertake a Local Environmental Study (LES). The key findings and recommendations of the study were, inter alia:

(a) to achieve a balance between urban development and the protection of the habitat to secure the survival of flora and fauna substantial modification to the existing plan of subdivision was necessary resulting in a significant reduction in the number of lots that could be developed;

(b) the cost of creating the infrastructure would be about $32,000 per lot;

(c) the supply of vacant land zoned for residential development in the region surrounding the Estate was sufficient to meet demand for at least 10-15 years (at the time 45% of all zoned residential land in neighbouring township was undeveloped);

(d) considered in conjunction with the cost of improving land and providing infrastructure, it would be some years before the overall land values in the Estate appreciated to a level which was comparable to land in the nearby township; and

(e) development would have a significant impact on the environmental qualities of the locality.

The key emerging conclusions/recommendations from the Study were that:

(a) development based on the existing subdivision pattern should not be permitted;
(b) planning controls and policies must focus on protecting the environmental values and sensitivities of the land;
(c) the most appropriate use of the land would be specialty recreational/tourist related development;
(d) there is a need for an urban development strategy which at least encompasses the region to provide a framework to co-ordinate urban development and ensure protection of sensitive environments; and
(e) if the land cannot be developed it should be publicly managed/owned.

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Allen Price and Associates (APA) on behalf of the landowners disagreed with the studies' findings, conclusions and recommendations. APA considered that the Estate was capable of rational development to meet the needs of the owners. This position contrasted with key Government agency views which supported the conclusion that the development of the Estate in accordance with the existing subdivision pattern should not be permitted.

Following the exhibition of the study and consideration of submissions, the Council resolved to appoint AES Environmental Services to undertake a supplementary strategic flora and fauna study of the Estate. The study, completed in 1995, identified 3 endangered fauna on the Estate with a high probability of a further 7 occurring. The report concluded that a conservation corridor (map 2) was appropriate and that residential development within the corridor could not realistically conserve natural vegetation.

Despite the findings of the LES and Fauna/Flora Studies, the Council resolved to prepare a draft LEP to rezone virtually the whole of the Estate to residential. In making its decision, the Council argued, inter alia, that the economic and social factors outweighed the ecological concerns raised in the studies. The nature and extent of the economic and social factors were never documented.

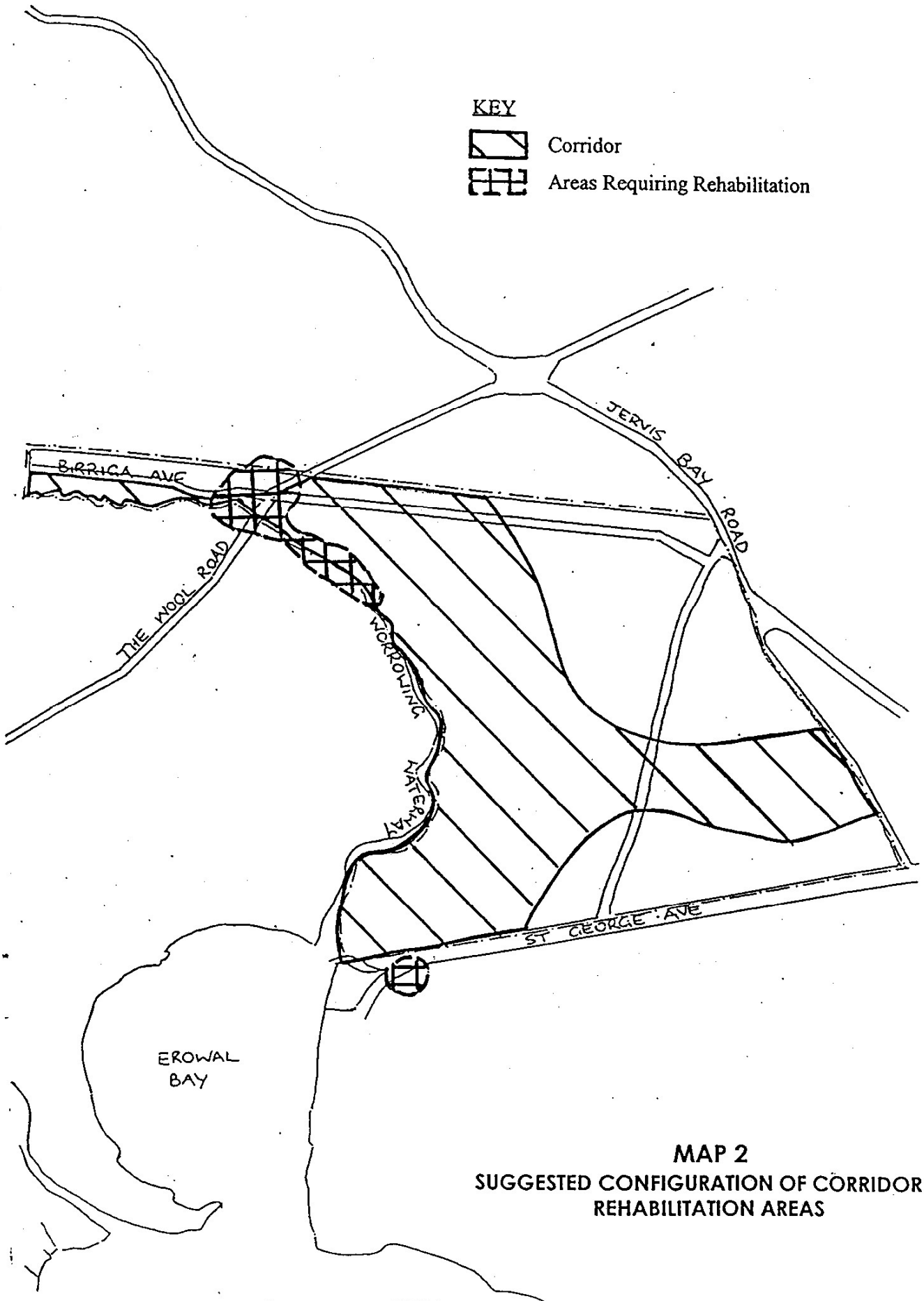
The then Director-General of the Department of Urban Affairs and Planning supported Council's initiative in trying to achieve a long-term solution to the future of the Estate. However, she considered that the draft LEP, as proposed by the Council, raised significant issues, the implications of which the Council needed to seriously consider before it proceeded further. She also reminded the Council of the need to ensure that the draft Plan reflected the outcome of the studies that had been undertaken and the environmental capacity of the area to sustain the type and level of development that would result from the proposed draft Plan. Furthermore, the Council needed to consider the potential effect of such a draft LEP on the proposed Settlement Strategy for the Jervis Bay region. These issues were outlined in the Director-General's letter of 18 June, 1996, to the Council.

2.3 The Taskforce Report

Despite the Director-General's concerns, the Council proceeded to request her in August, 1996, to issue a certificate to enable the exhibition of the draft LEP.

The Director-General advised the Council that she was not prepared to issue the certificate at the time and instead suggested the establishment of a Taskforce to advise on a number of issues associated with any future development of the Estate. The Taskforce, established in late 1996, comprised representatives of the Council, the landowners (and APA as their advisors) EPA, NPWS, DLWC, DLG and DUAP. The

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MAP 2
SUGGESTED CONFIGURATION OF CORRIDOR & REHABILITATION AREAS

Source: DRAFT STRATEGIC FLORA & FAUNA STUDY
HERITAGE ESTATES - CITY OF SHOALHAVEN
Prepared for Shoalhaven City Council by
AES – 24 Alberta Ave, Cowan, NSW, 2081

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Terms of Reference required the Taskforce to report on the potential development of the Estate with specific reference to:

(a) the environmental management of the area;

(b) the scale and timing of any development;

(c) the funding and timing of infrastructure provision; and

(d) the future of any lands found to be unsuitable for development.

To assist in its work the Taskforce employed Patterson Britton & Partners Pty Ltd to advise on water quality management, land capability and infrastructure issues. Some of the key findings and conclusions by Patterson Britten were that:

(a) while it had not been established whether or not the long-term survival of endangered or threatened species within the Jervis Bay region was dependent on the preservation of the habitat within the Estate, under the precautionary principle, the preservation of identified ecologically significant areas which provide both linkage and habitat values, should be an essential element of any future development within the Estate;

(b) the extent of the ecologically significant areas that are necessary to achieve (a) above will determine how much development may take place;

(c) the cost of providing infrastructure would range between about $30,000 and $35,000 per lot depending on how much of the Estate was developed. $5,000 of these costs would be to compensate landowners unable to develop their land; and

(d) water quality management systems would need to be provided.

On the basis of its investigations, Patterson Britton identified 7 development scenarios which are reproduced in Table 1. There was no specific recommendation on a preferred option.

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Table 1 – Wetland Size and Lot Yield for Each Development Scenario

Development Scenario		Size of Wetland	Number of Lots		Undeveloped Lots		
No.	Description	(ha)	Developed	Remainder	Ecologically Significant Area	Water Quality Controls	Other
1	Maximum Development without stormwater management controls	NA	937	326	326	-	-
2	Maximum Sustainable Development	7.0	876	341	280	61	-
3	Maximum Sustainable Development with Water Sensitive Urban Design	5.0	884	333	280	53	-
4	Ecologically Significant Areas proposed by the NPWS	6.0	730	487	431	56	-
5	Ecologically Significant Areas proposed by Allen, Price & Associates	8.5	995	222	135	87	-
6	Scenario 2 with drainage problem areas excluded	5.0	670	547	280	53	214
7	Scenario 4 with drainage problem areas excluded	2.5	510	707	431	22	254

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The key features of the Taskforce's report to the Director-General of the Department of Urban Affairs and Planning and the Council were:

(a) that not all landowners would be able to develop their lands due to the need to protect ecologically significant areas and to provide for water quality control and infrastructure needs. However, there was no specific recommendation on how much land was required for these purposes;

(b) owners who could not develop their land needed to be compensated;

(c) the need for further studies particularly in relation to a drainage trial of the closed sedgeland areas and assessment of potential acid sulphate soils (ASS) to be funded by the Council;

(d) studies relating to species impacts to be undertaken at the rezoning stage; and

(e) the ability of the landowners to fund the necessary infrastructure was a matter for them and the funding mechanism was a matter for Council.

The expectation was that following receipt of the report, the Council would decide whether or not to:

(a) proceed with its original LEP; or

(b) proceed with an amended plan which took into account the work of the Taskforce; or

(c) in view of the significant unresolved issues, maintain the existing situation; or

(d) defer a decision until those issues are resolved.

Following the Taskforce's report the landowners at a meeting of 27 June, 1998, chose to bypass the options identified by the Taskforce and instead opt for a new "Option 8" which would allow the maximum development of the Estate. The details of this option are unknown to the Government agencies. The landowners also resolved that any lands that could be developed and were not required for a public purpose would have to be acquired.

The Council proceeded to resolve to prepare a draft LEP in accordance with "Option 8". This is despite the Director-General of the Department of Urban Affairs and Planning having asked the Council at a meeting of 31 October, 1998, to work with her within the range of options identified by the Taskforce. The Council's resolution resulted in lobbying of the Government to support the Council's proposed draft LEP. There were also representations to the then Minister for Urban Affairs and Planning and the Director-General of the Department of Urban Affairs and Planning opposing the Council's proposal.

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2.4 The Inquiry – Role and Expectations

It is against the above background, that the former Minister for Urban Affairs and Planning decided to establish the Inquiry. The Minister considered that the Inquiry represented an appropriate mechanism for assisting in the development of a long-term solution to the future of the Estate. It also provides a forum for public debate as well as an independent assessment of the issues associated with the future of the Estate.

The outcome of the Inquiry will serve three linked procedural purposes, namely:

(a) assist the Council in reconsidering its future strategic planning for the Estate, particularly in reviewing its proposed draft LEP;

(b) assist the Director-General of the Department of Urban Affairs and Planning in considering any request by the Council for approval to exhibit a draft LEP for the Estate; and

(c) assist the Minister in the consideration of any draft LEP for the Estate that may be referred to him.

The key challenge for the Inquiry therefore is to recommend an outcome that:

(a) provides landowners with certainty about the future of their lands;

(b) can be justified in regional and local strategic planning;

(c) imposes a minimum cost to the community particularly in relation to infrastructure funding; and

(d) provides a framework for dealing with similar cases elsewhere in the State.

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3. STRATEGIC PLANNING CONSIDERATIONS

Four fundamental questions underpin broad strategic considerations, namely:

(a) is the development of the Estate required;

(b) if it is required, by when;

(c) can the Estate be developed in an ecologically sustainable way; and

(d) would development raise implications for similar cases.

The answers to these questions in part lie in examining the regional and local strategic planning frameworks which form the focus of this section. The other answers lie in Environmental Considerations in Section 4 of the Submission.

3.1 State and Regional Planning Frameworks

There are two regional policy frameworks which are critical in this case – the Jervis Bay Regional Environmental Plan (REP) gazetted in January, 1997, and the NSW Coastal Policy 1997. There are also the obligations placed on the Council by the Local Government Act 1997.

NSW Coastal Policy 1997

The Policy sets directions for coastal zoned management, planning and conservation. It is an amalgam of individual policies and programs and its value lies in co-ordinating the activities of key stakeholders in coastal management, in identifying the Government's major concerns for coastal planning and management and in providing an overriding philosophy for coastal zone management. The policy responds to the challenge of providing a balance between population growth, economic development and the natural cultural and heritage values. A central focus is the ecologically sustainable development of the NSW coast.

One of the goals of the policy is to provide for ecological sustainable human settlement. This goal is supported by a number of objectives and strategic actions against which the development of the Estate would need to be assessed. A key strategic action is the requirement for local government to prepare land release/settlement strategies prior to major rezoning of rural land or to ensure that any such rezonings are consistent with endorsed regional settlement strategies.

The Council is preparing a Settlement Strategy for the Jervis Bay region. Any decision to rezone the Estate ahead of the completion of the strategy would be premature and therefore inconsistent with the Policy.

Jervis Bay REP

The Plan identifies a number of areas for potential urban development (map 3). The Heritage Estate is not one of these areas. These areas were identified on the basis of the amount of investigation work that had already been undertaken by the Council at the

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time. Since the plan was made, only the planning of the Vincentia area has progressed. If the outcome of the Inquiry were support for the rezoning of the Estate, a review would be necessary of the potential impact on Vincentia and the need and timing of the other two areas for future urban development.

When the plan was gazetted, the Minister also decided to place a moratorium on major land use changes in the region until the Council had prepared and exhibited at least a draft Settlement Strategy.

The moratorium was based on the premise that demand at the time indicated that there was an adequate supply of urban land in the short to medium term and that any additional demand could be met at least in the short term from the areas identified in the REP. The moratorium allows the opportunity for controlled or planned urban development of the Jervis Bay region.

The Settlement Strategy will identify the areas for future residential and rural residential development as well as the timing and the necessary social and physical infrastructure. It is understood that the Council has commenced the preparation of the Strategy, but the timing of its completion is unknown.

Any decisions to rezone the Estate should at the minimum await the completion of the Settlement Strategy. If the Estate were rezoned ahead of the Strategy, it would have significant impacts on the direction and form of the Strategy particularly by creating a new major development frontier in addition to Vincentia. The related issue is whether or not the land market could support two fairly large development frontiers in the locality.

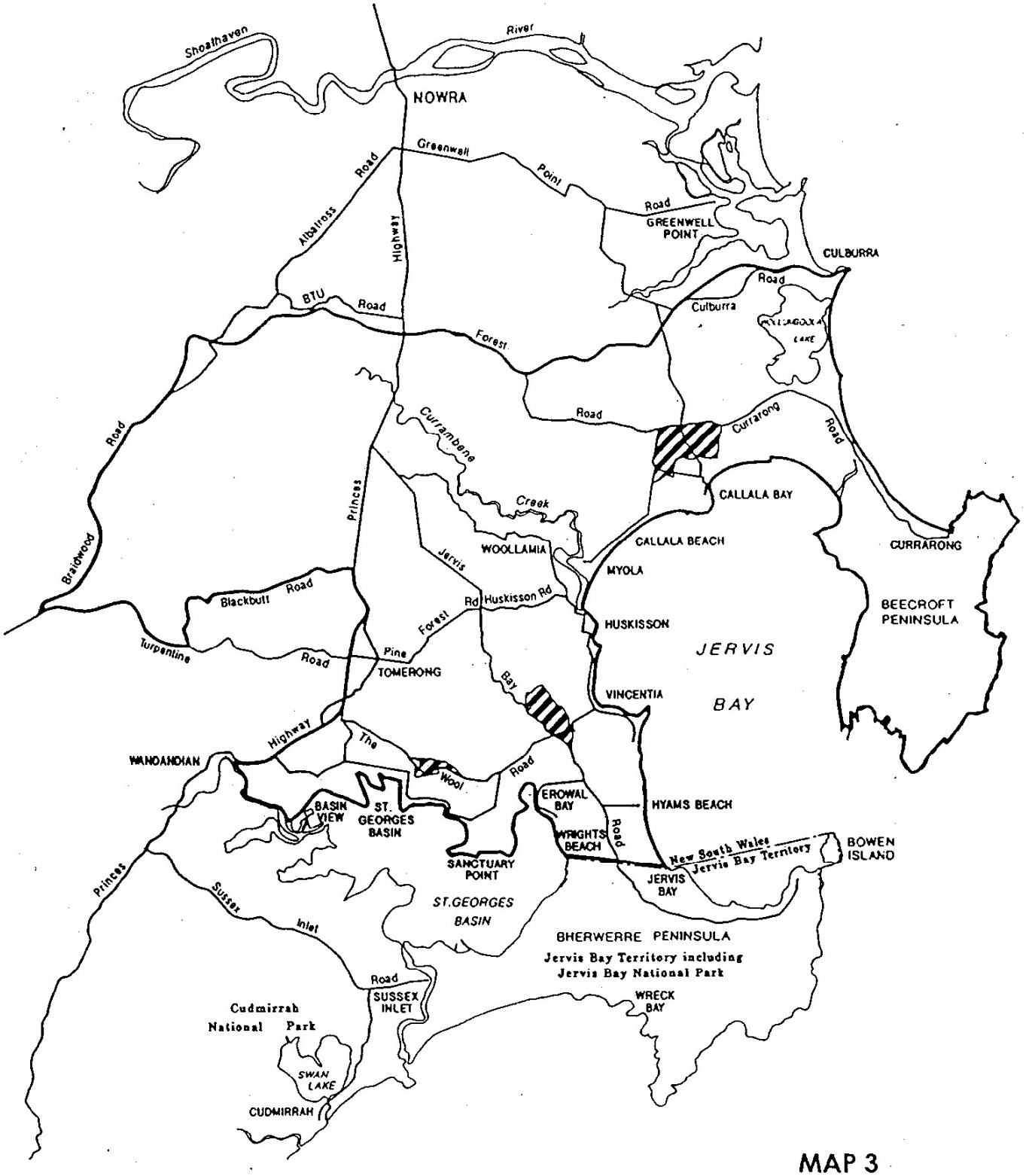
Local Government Act 1997

The Local Government Amendment (Ecologically Sustainable Development) Act 1997 requires Councils to adopt a strategic approach towards the recognition of ecologically sustainable development and to respond positively to environmental problems in their areas. This requires Councils to properly manage, develop, protect, restore, enhance and conserve the environment of the area for which they are responsible, in a manner that is consistent with, and promotes the principles of ecologically sustainable development.

Were the rezoning of the Estate to proceed this would automatically invoke the obligation on Shoalhaven City Council to apply the principles of ecologically sustainable development in exercising any of its approvals functions, including when determining issues such as the basic infrastructure needs.

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MAP 3

NEW URBAN RELEASES
JERVIS BAY REP 1996

BOUNDARY OF JERVIS BAY REGIONAL ENVIRONMENTAL PLAN 1996

OPPORTUNITIES FOR URBAN DEVELOPMENT

0 1 2 4 6 8 10
KILOMETRES

19.2.96

Source: JERVIS BAY REGIONAL ENVIRONMMENTAL PLAN 1996 GG No. 4 of 10.01.1997

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It is considered that any approval for the development of the Heritage Estate to proceed must be made conditional upon the provision of infrastructure to a standard that satisfies all technical and environmental requirements consonant with principles of ecologically sustainable development.

3.2 Local Planning Frameworks

The Shoalhaven has in the last decade or so has been one of the fastest growing local government areas in NSW and the Illawarra. From a 1996 base of 76,726, the Department has previously projected that this population is likely to reach between 100,000 and 108,000 in the next 10 years. The Department is currently reviewing these projections and it is anticipated that these figures will be revised downwards. This is because the growth rates experienced between the 1991 and 1996 census indicated lower rates of growth than had been projected. Preliminary indications are that the likely population would be closer to the lower end i.e. 101,000 rather than 108,000.

The primary local planning framework document is "Shoalhaven Beyond 1990 – Policies for Planning and Development" published in June 1990. The key policy for this case is Policy No 2 which applies to new development areas. The aspects of this policy are that new development:

(a) conforms with the "Main Centre Strategy";

(b) must be extensions to existing towns and villages provided the character of settlement is maintained;

(c) completely new settlements when population pressures and other circumstances warrant; and

(d) in either case decisions must be guided by the ability to provide public infrastructure in an economic manner, no impact upon sensitive natural environment and fit within an overall social and communication structure for the city.

The development of the Estate would at the best support the viability of a new urban centre at Vincentia promoted by the "Main Centre Strategy". It would be difficult to justify whether or not the development of the Estate is viewed as an extension of existing townships because there is no strategic context or timing of the decision. If it were considered as new settlement, there is no evidence that population pressures are such that development of the area is required; nor are other circumstances (articulated in the policy), sufficiently documented to justify the development now. More importantly, the ability to provide infrastructure in an economical manner remains unresolved; there is no agreement on the extent of impact on the sensitive natural environments and how those impacts can be managed and finally, and in the absence of a settlement strategy for the region, it is unknown how the development of the Estate would fit within an overall social and communication structure for the city.

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For purposes of resources distribution, the local government area is divided into 5 major urban catchment areas. The Heritage Estate is within Area 3 which includes the Huskisson/Vincentia and the St Georges Basin districts as well as a number of small rural clusters. This area, with an annual average compound growth rate of about 4.2% has been the most rapidly growing part of the local government area particularly St Georges Basin, Basin View, Sanctuary Point and Erowal Bay. The population of the area has almost doubled between the 1986 and 1996 census periods from 7,917 to 14,217.

According to Council, the area could again double its population in the next 10 years with projections of between 20,800 and 27,550. There are doubts as to whether or not these levels of population growth will be achieved. In the first instance, these projections and those beyond the 10 year timeframe assume that the area has unlimited environmental capacity to accommodate growth and that such growth can be efficiently financed in terms of both social and physical infrastructure as well as employment needs. These issues can only be properly considered as part of the settlement strategy for the region.

In 1991 it was estimated that there was capacity for about 10,700 dwellings in Area 3 of which about 6,600 was developed and about 4,100 used.

Between 1991 and 1996 1,411 dwellings were established in Area 3 therefore reducing the potential capacity to about 2,700. At the average occupancy rate of 1.6, the remaining potential has capacity to accommodate about 4,400 people and therefore to meet Council's needs to at least the year 2006.

The potential unused capacity needs to be considered in terms of housing type demand and the Council's broad strategic programs.

A major feature of the Shoalhaven housing market is the high proportion of unoccupied dwellings. These unoccupied dwellings primarily represent holiday homes. While there is a declining trend (47% in 1986, 41% in 1991 and 36% in 1996) holiday homes still represent a significant proportion of residential development. Most of the holiday homes are provided as detached housing. Against diminishing land supply, detached dwellings may not be the most appropriate response to providing holiday homes. This is an issue most appropriately addressed through the Settlement Strategy.

The decline in holiday homes reflects either an increasing number of owners permanently moving into the area or holiday homes being purchased by permanent residents. In either case, the occupancy ratios are likely to increase.

Another consideration must be Council's overall strategic planning for housing. The Council is in the process of finalising its Nowra Bomaderry and Milton Ulladulla Structure Plans. There is also the draft LEP for the expansion of the Vincentia area with potential for about 600 dwellings as well as the draft rural lands LEP which set aside land for about 1,500 rural residential lots. Any rezoning and development of the Heritage Estate must be considered in the context of these major strategic initiatives and therefore the Council's overall settlement program.

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Conclusion

The above discussion leads to the conclusion that at State, regional or a local level the rezoning and development of the Heritage Estate cannot be justified at least until the Jervis Bay Settlement Strategy is finalised. If the outcome of the Inquiry were a recommendation for the rezoning and development of the Estate, there are a number of fundamental questions that would also have to be addressed, namely:

(a) how much of the Estate was capable of development;

(b) what principles would guide development, including staging and monitoring;

(c) the future use and management of land incapable/unsuitable for development; and

(d) the precedent for similar cases.

The Taskforce identified seven options each with varying amounts of land capable /suitable for development. Option 4 remains the Government agencies' preferred position. This option, which represents a compromise position, involves the development of about 730 lots with the remainder being designated as ecologically significant areas (431 lots) or required for water quality management (56 lots). The estimated cost per lot for infrastructure provision is estimated at about $35,000.

To ensure that the development met particular environmental objectives, the development of the Estate would need to be staged so that the environmental impacts of each stage were monitored. The outcome of the monitoring would determine the progress of the subsequent stages or lead to a review and revision of the environmental management goals.

For any land identified as incapable or unsuitable for residential development the most appropriate zoning would have to be environment protection. This suggestion takes into account the Land and Environment Court's decisions that environment protection zones should not be used as de facto reservations of private land for public use (Blue Mountains). However, that Court has also held that there are cases where an environment protection zone is appropriate where land is incapable or unsuitable for development (Sandon Point and the North Coast); provided development rights are not totally extinguished.

The Heritage Estate is not unique. Therefore the outcome of this Inquiry has implications for similar lands elsewhere in the State. If the outcome of the Inquiry were to support the rezoning of the Estate, the justification and principles for any such decision must be capable of universal application. It is considered that four principles would be fundamental to such a decision; namely:

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(a) any rezoning could be justified within State, regional or local planning frameworks;

(b) that the provision of infrastructure could be achieved in an economically viable way without an unreasonable impost on the rest of the community;

(c) any development could be undertaken in an environmentally sustainable way; and

(d) not all land may be capable or suitable for development and that there were justifiable and equitable ways of dealing with these lands.

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4. ENVIRONMENTAL CONSIDERATIONS

4.1 Nature Conservation

4.1.1 Previous studies undertaken on the Heritage Estate

Two major studies have been undertaken on the Heritage Estate which together provide sufficient information to determine the nature conservation values of the site, consider the potential impacts of rezoning for residential development and examine options for protection of the significant nature conservation values.

The first of these, entitled *Flora and Fauna Assessment, Heritage Estates Jervis Bay* was carried out by Andrews.Neil in October 1993 as part of the preparation of the Local Environmental Study (LES) by Hassell Planning Consultants. The study identified four distinct vegetation communities and recorded three fauna species now listed as threatened. Further details on the vegetation and species of significance are provided in section 4.1.2. It also identified the site possessed significant values as part of a regional corridor.

The second, *Strategic Flora and Fauna Study, Heritage Estates* was prepared by AES in 1995 following discussions between Shoalhaven City Council and NPWS regarding the assessment of endangered fauna on the Heritage Estate. Council had originally proposed to prepare a Fauna Impact Statement (FIS) under the Endangered Fauna Interim Protection Act 1991. NPWS advised Council that this would be legally inappropriate as these were only required at the development application stage. Instead, NPWS advised that a strategic assessment be undertaken which could, if needed, form the basis of a FIS at a later stage.

The report by AES provided further information on the areas of significance for flora and fauna conservation (especially endangered species). After additional survey work, AES concluded that all four communities had regional conservation significance and these were ranked in order of importance (see 4.1.2 for more detail). The report also provided further consideration of the corridor issues (particularly in relation to the then draft REP) and concluded that the site was functioning as a regional corridor.

4.1.2 The nature conservation values of the Heritage Estate

The Heritage Estate site is of nature conservation significance both for its intrinsic values and also for its value in the wider region because it provides essential linkages between other parts of the landscape

Intrinsic values

The reports of Andrews.Neil (1993) and AES (1995) provide detailed descriptions of the vegetation communities on the site, where they occur, the species of flora and fauna which commonly occur within them and their value as habitat for significant species. It is important that the Commission is familiar with these reports.

Table 4.1 is a summary of the significant species known or considered to have the potential to occur in each of the four vegetation communities. This is adaptation and

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expansion of tables found in AES (1995). For the purposes of this submission, species are considered significant if they are listed as threatened under the Threatened Species Conservation Act 1995 (marked as "TSC-E" if listed on Schedule 1 - Endangered, or as "TSC-V" if listed on Schedule 2 - Vulnerable), as rare or threatened flora in Briggs and Leigh (1996) (marked "RoTAP") or as botanically significant by Mills (1993) (marked as "Mills"). A TSC listing is most significant, followed by listing as a RoTAP and lastly listing by Mills.

Since the preparation of the AES report no further surveys have been undertaken on the Heritage Estate site. The only additional records of threatened species on site on the NPWS Wildlife Atlas since 1995 are two records of Glossy-black Cockatoos in the reserve alongside the Worrowing Waterway in Riparian Open Forest in late 1998, and a recent record of *Melaleuca biconvexa* (three plants) on the Greek Orthodox church site on Birriga Ave. Additionally, there have been sitings of Eastern Bristlebirds and Ground Parrots adjacent to the site in similar habitat to that found on the Heritage Estate.

For the purposes of assessing conservation significance, it is reasonable to include those fauna species considered likely to occur but which have not yet been recorded on site. The surveys by Andrews.Neil and AES, although adequate to meet their stated aims, were only conducted for a few nights at a similar time of year. In the absence of comprehensive survey data, and based upon a knowledge of the habitat requirements and regional distribution of those species listed in the "high probability" column of Table 3.1 (many have been recorded immediately adjacent to the site), it is more likely that not they would occur on the site. It may be, that they only utilise available habitat intermittently. It should be noted however that intermittent use is not necessarily unimportant in the lifecycle of species.

There is an additional group of threatened fauna for which potential habitat exists on the site but which have a low probability of occurrence. These are shown in column 3 of Table 4.1. However, given the low likelihood of occurrence on site, they have not been considered further in this assessment.

Table 4.1 demonstrates that all four communities support species which are of regional and/or national conservation significance. Figure 2 in Andrews.Neil (1993) and Figure 1 in AES (1995) illustrate that most of the site is of conservation significance for significant flora and/or fauna.

In attempting to determine the relative conservation significance of the communities, Table 4.1 provides some of the picture. In terms of those species recorded or with a high potential to occur on the site, the two forested communities (riparian open forest and blackbutt open forest) are of greater value for the conservation of significant fauna species, whilst the scribbly gum woodland, and to a lesser extent closed sedgeland, sample more of the significant flora species. If the conservation of threatened species is deemed most important, then the two forested communities would be most significant as they provide habitat for eight of the eleven threatened species expected to occur on the site. However, the only endangered species likely to occur on the site, the Eastern Bristlebird, would most likely be found in

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Table 4.1 Significant species recorded or with the potential to occur at the Heritage Estate

	RECORDED	HIGH PROBABILITY	LOW PROBABILITY
Riparian Open Forest			
Fauna:	Glossy-black Cockatoo (TSC-V) Yellow-bellied Glider (TSC-V)	Common Bent-wing Bat (TSC-V) Square-tailed Kite (TSC-V) Powerful Owl (TSC-V) Large-footed Mouse-eared bat (TSC-V)	Masked Owl (TSC-V) Tiger Quoll (TSC-V)
Flora:	*Melaleuca biconvexa* (TSC-V) *Gahnia filum* (Mills)		
Blackbutt Open Forest			
Fauna:	Yellow-bellied Glider (TSC-V) *Common Bent-wing Bat (TSC-V)*	Glossy-black Cockatoo (TSC-V) Square-tailed Kite (TSC-V) Powerful Owl (TSC-V) Giant Burrowing Frog (TSC-V)	Masked Owl (TSC-V) Tiger Quoll (TSC-V)
Flora:	*Pultenaea villifera* (RoTAP) *Eucalyptus resinifera* (Mills)		
Scribbly Gum Woodland			
Fauna:	nil	Glossy-black Cockatoo (TSC-V) Eastern Bristlebird (TSC-E) White-footed Dunnart (TSC-V)	Tiger Quoll (TSC-V) Southern Brown Bandicoot (TSC-E) Eastern Chestnut Mouse (TSC-V)
Flora:	*Acacia subtilinervis* (RoTAP) *Grevillea barklyana* (RoTAP) *Leptospermum epacridoideum* (RoTAP) *Pultenaea villifera* (RoTAP) *Conospermum longifolium* (Mills) *Dillwynia ramossimia* (Mills) *Eriostemon buxifolius* (Mills) *Eucaluptus sclerophylla* (Mills)		

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Table 4.1 (cont)

	RECORDED	HIGH PROBABILITY	LOW PROBABILITY
Scribbly Gum Woodland			
Flora (cont):	*Gompholobium grandiflorum* (Mills) *Mirbelia baueri* (Mills) *Mirbelia rubiifolia* (Mills) *Persoonia mollis* ssp. *caleyi* (Mills) *Platysace linearifolia* (Mills) *Styphelia triflora* (Mills)		
Closed Sedgeland			
Fauna:	nil	Ground Parrot (TSC-V) Giant Burrowing Frog (TSC-V) White-footed Dunnart (TSC-V)	Southern Brown Bandicoot (TSC-E) Eastern Chestnut Mouse (TSC-V)
Flora:	*Leptospermum epacridoideum* (RoTAP) *Acacia elongata* var. *dilata* (Mills) *Callistemon linearis* (Mills) *Lepidosperma quadrangulatum* (Mills) *Melaleuca capita* (Mills)		

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the scribbly gum woodland, and is less likely to occur in the forested communities. Similarly, the Ground Parrot would only occur outside the forested communities.

Assessments such as these do not take into account that some of these species are reliant on different communities for different stages of their life-cycle. For example, the Glossy-black Cockatoo has been recorded roosting in an old-growth spotted gum in the riparian open forest which may also provide nesting sites for the species (Andrews.Neil 1993). However, the Glossy-black Cockatoo would also be likely to utilise *Casuarina* trees in the woodland and open forest communities for feeding.

Regional Corridor Values

Of at least equal value to the intrinsic values of the Heritage Estate site is the role that it plays in providing part of a regional network of linked habitat. The reports of Andrews.Neil (1993) and AES (1995) discuss this issue in detail, which is not repeated here, except to state that the conclusions of both reports on this matter are consistent with each other generally supported.

The site forms part of two important regional linkages. Both were identified as part of Habitat Corridor 4 in Mills (1991) and in the joint report of NSW Department of Planning and Shoalhaven City Council (1992). The first is an east-west link from the southern section of Jervis Bay National Park through to the forests north of St. Georges Basin and on to Yerrinyong State Forest and the proposed Parma Creek Nature Reserve. The western section of the Heritage Estate forms part of this linkage. Secondly, Heritage Estate provides the only contiguous north-south timbered link between the southern section of Jervis Bay National Park (which connects to Booderee National Park on the Bherwerre Peninsula) and the central section west of Vincentia and Huskisson. The south-eastern section of the site forms part of this linkage.

When the draft Jervis Bay Regional Environmental Plan was published by DUAP in 1995 most of Habitat Corridor 4 was downgraded to the status of "Disturbed Habitat and Vegetation", and the north-south link (including the south-eastern part of the Heritage Estate) was removed. It is worth reviewing this change in status, as this issue has been previously raised as a rationale for development to proceed unimpeded at the Heritage Estate. The downgrading of the corridor link to the west was because it was generally agreed that the lands were too fragmented to warrant full habitat corridor status. However, as pointed out in the NPWS submission to the draft REP, these lands were (and are)

> "...*considered very important for the long term integrity of the conserved lands of the Bherwerre Peninsula..... and despite some fragmentation, they are still likely to be critical for the dispersal of many species of flora and fauna...*".

The final wording of the REP reflects the view that lands classified as Disturbed Habitat and Vegetation still provide an important regional resource for wildlife and that maximising the retention of vegetation and the rehabilitation of degraded areas remains a priority.

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The north-south linkage was removed as in the REP most of this corridor was zoned as 8(b) Proposed Jervis Bay National Park. There is now a continuous linkage of lands that are either gazetted as part of, or proposed to be added to (subject to negotiations with the local Aboriginal community), the NSW Jervis Bay National Park, arching around Jervis Bay from Beecroft Peninsula in the north to the Federal Territory in the south (linking directly with Booderee National Park). However, the section through the south-eastern section of the Heritage Estate remains the only opportunity to maintain a eucalypt-dominated (woodland) link between the northern and southern parts of the National Park. The areas to the east zoned 8(b) Proposed National Park are comprised of predominantly of heathland communities.

Impacts From Recent Disturbance

Recent activities carried out by landholders on the site have resulted in disturbance to existing native vegetation. These disturbances have included burning, slashing and clearing to parts of the site. Examination of the sequence of aerial photographs of the site from the late 1980s to the present demonstrates a localised decline in vegetation cover on parts of the site due to these activities. Most of this degradation occurred in the period between 1986 and 1993, although some further clearing is evident from 1997 photography. A recent (April 1999) aerial inspection of the site showed little evidence of clearing since 1997.

Whilst these unauthorised activities have certainly had some impact on the site and possibly directly impacted on the individuals of some species, they have not greatly reduced the overall conservation values of the site, and the conclusions of AES and Andrews.Neil with respect to those values remain valid. Most of the disturbed areas would readily regenerate. Active rehabilitation would be appropriate in some places (such as identified in AES (1995) p.17) to improve the value of the linkages to other areas.

Both DLWC and NPWS have received reports of a number of instances of disturbance to existing native vegetation during the last few years. Council has also been made aware of these activities.

DLWC undertook investigations under the provisions of the Native Vegetation Conservation Act (NVC Act) and formerly SEPP 46. Both the NVC Act and SEPP 46 allow for the clearing of up to two hectares per annum for any contiguous land holding in the same ownership without the need to obtain consent. These exemptions applied to the Heritage Estate on the basis that individual lots were/are owned by individual landholders and are only between 500 and 1600 square metres in area.

Under normal circumstances, where a subdivision is being proposed on land in single ownership (which is not zoned residential), the provisions of the Native Vegetation Conservation Act 1997 would apply to the management of native vegetation on the site. Therefore, development consent from DLWC would be required for clearing to establish roads, fencelines, house sites etc. Following sale of individual lots within the subdivision to various owners, clearing native vegetation from less than 2 ha. per lot would be exempt from the NVC Act.

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Where the clearing of native vegetation is exempt or excluded from the NVC Act, as in this case, such activities are then subject to the requirements of any other relevant legislation. Consequently, clearing of native vegetation on the Heritage Estate site is subject to local government planning instruments such as Tree Preservation Orders and consideration of other relevant legislation such as the Threatened Species Conservation Act.

In respect of threatened species, it is an offence under Part 8A of the National Parks and Wildlife Act to harm or pick threatened species, populations or ecological communities, or damage critical habitat or the habitat of threatened species, populations or ecological communities unless the action has been authorised under the EP&A Act or a licence has been issued by the Director-General of NPWS. No such licence has been issued in relation to the Heritage Estate, nor has any authority been issued under the EP&A Act.

However, given the potential difficulties in achieving a prosecution under this clause, the NPWS determined that the best way to manage the issue of unauthorised clearing was, in the short term, through Council enforcing its Tree Preservation Order and, in the long term, through achieving a resolution to the overall issue. NPWS wrote to Council seeking that they take action to prevent unauthorised activities taking place which degraded the environmental values of the Heritage Estate.

Earlier this year the Government agencies became aware of a letter being circulated by the Shoalhaven Landowners Association which advocated the clearing of all land on the Heritage Estate as soon as possible (prior to the inspection which will be carried out by the Commissioner as part of the COI). The letter stated that the "areas sought by NPWS for a corridor" should be the first targeted. NPWS responded by making the author of the letter aware of the potential legal implications of clearing in known threatened species habitat. A copy of both letters are included in Appendix 1. The Department of Urban Affairs and Planning also wrote to the author of the letter expressing concern about the content and implications.

4.1.3 Threats to nature conservation values posed by the development of a housing estate

Prior to consideration of the proposed rezoning to allow residential development and/or setting aside areas for the protection of nature conservation values, the potential impacts of development on these values need to be addressed. The impacts can be divided into two types, direct and indirect.

Direct impacts result from the removal of vegetation to allow houses, roads and other infrastructure to be developed. Depending on the degree of development, this will result in further fragmentation of habitat and linkages (conduits) between habitat, or complete removal of habitat. Either will probably result in the loss of species, given the density of development and infrastructure requirements. Additionally, development will increase the edge (perimeter) to area ratio of retained habitat. The higher this ratio, the higher the likelihood of so-called 'edge effects' (summarised in Lindenmayer 1993). For example, retained vegetation may be subject to altered micro-climatic conditions, such as increased wind speed. In some cases this may result in windthrow of overstorey trees, further degrading the corridor by reducing canopy cover. For arboreal animals

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such as the Yellow-bellied Glider, which range widely, movement patterns may be altered.

Indirect impacts result from activities associated with the development and ongoing use and management of the area. This may include ongoing degradation of habitat through the alteration of the water table (in this case the closed sedgeland will in all likelihood be greatly impacted through alterations to drainage patters caused by infrastructure associated with urban development), dumping of rubbish, introduction of weeds, recreational pressures, noise impacts and an increasing need for repeat burning or clearing of bushland for fire control purposes. The introduction of domestic pets will result in increased predation on native fauna, including threatened species.

Additionally, large scale residential development has the potential to result in significant off-site impacts through, for example, a decline in water quality. In this case, potential impacts on the values of St. Georges Basin must be considered (see section 3.6). Also, the introduction of a large urban development would result in greater pressure on the NPWS to increase hazard reduction burning in neighbouring areas of National Park, resulting in an eventual decline in biodiversity in these areas as well. These areas would also face increasing recreational pressures and weed and feral pest introductions.

4.1.4 Options for protection of the nature conservation values

In considering options for protection of the identified nature conservation values of the Heritage Estate, it is important to firstly review the conclusions of the independent studies carried out by consultants for Council.

Andrews.Neil
The report of Andrews.Neil (1993) concluded that should all the areas possessing significant natural heritage values be protected from development, then only a small area in the south-western corner of the site could be developed and then even this small area may be required for corridor purposes.

Hassell
The natural heritage component of the LES (Hassell 1994) was based upon the Andrews.Neil (1993) report. The findings of the LES were that development of the site based upon the established plan of subdivision should not be permitted for a number of reasons, including the natural heritage values. The LES proposed that Environmental Protection zoning would be the most appropriate zoning in the LEP, with the possibility of a small area to be set aside where a specialist recreational/tourist related development could be permitted.

AES
The report of AES confirmed the conservation values of the site both in terms of provision of habitat for significant species and its wider role as part of regional wildlife corridors. It went on to recommend that a substantial part of the site be set aside if the area was to be rezoned.

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NPWS provided responses to Council on all three of the above documents and supported the conclusions of each, especially the primary findings that the site possessed both intrinsic conservation values as well as wider regional significance. Importantly, following the AES report, NPWS wrote that Council now had sufficient information on the natural heritage values of the site to allow an informed decision concerning rezoning of the subject land.

Given the strength of this advice, it was disappointing when Council determined to ignore these studies (including the LES) in preparing its draft LEP for the site. During this period the NPWS became very concerned about ongoing degradation of the site while debate continued about its future. Therefore, as the joint State/Local Government Taskforce was established, NPWS determined that a compromise was needed to break the deadlock which would ensure protection and proper management for the sites of high conservation value while allowing for a degree of development at the same time.

It was on this basis that the NPWS prepared its submission on this issue to the Taskforce, which is shown at Appendix 2. The map is shown in the Taskforce report as Option 4. NPWS considers this proposal, (allowing for minor amendments for infrastructure) still represents the maximum level of development that should be permissible whilst retaining important, though not all, nature conservation values. Even with this level of development there is a degree of environmental risk. Species loss will probably occur and corridor function will be compromised to some degree given the edge effects associated with development.

Additionally, this option will not negate the legal requirement for site by site threatened species assessment. Each development application will be required to address section 5A of the Environmental Planning and Assessment Act, and the possibility of species impact statements being required cannot be ruled out. This prospect would however be minimised by a conservation design, such as that proposed by NPWS, that protected the significant components of threatened species habitat.

4.1.5 **Management of conservation areas**

If areas are to be set aside from development then the issue of ongoing management needs to be resolved. NPWS has previously (in its letter of 10 March 1995) indicated that the Heritage Estate lands were worthy of inclusion within Jervis Bay National Park if they were available, however other areas had higher priority. This was based upon consideration of the conservation values of the entire site some level of development was approved, the remaining lands set aside as part of a retained habitat system would be most appropriately managed by Council on a cooperative basis with the NPWS and with provision for community involvement. Zoning as environmental protection and management as community land by Council would be most appropriate. This would be in line with actions 1.1.5, 1.1.9 and 1.1.11 of the NSW Coastal Policy 1997. NPWS would be interested in having input to the plan of management for the lands as they remain crucial to the ongoing management of the surrounding Jervis Bay National Park.

Management objectives for the retained habitat system should be based upon protection of the conservation values for which they were set aside in the first place. In this case that would mean protection from habitat degradation caused by adjacent

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development and maintenance of the corridor/linkage values to Jervis Bay National Park and other neighbouring reserved lands. The placement of infrastructure associated with housing development in areas designed for habitat protection would not be appropriate.

To progress integrated management of the conservation values of the Jervis Bay area, the NPWS, with assistance from a Commonwealth grant and in-kind assistance from Council, is undertaking a two year project to develop guidelines for cooperative and consistent management by the three levels of government and the community. Management of wildlife corridors is a key component of this project.

4.1.6 **Closed Sedgeland Communities**

Whilst National Parks and Wildlife Service acknowledges that sedgeland communities are represented in the Jervis Bay National Park, it is still appropriate and necessary to consider the sedgelands in light of the NSW Wetlands Management Policy. This policy provides for the ecologically sustainable use, management and conservation of wetlands in NSW.

Specifically, the policy relates to land that is temporarily or permanently covered in water so that flora and fauna living there are adapted to, and are often dependant on, living in wet conditions for at least part of their life cycle.

The Policy principles which are relevant to any development of the Heritage Estate include:

- water regimes needed to maintain or restore the physical, chemical and biological processes of wetlands will have formal recognition in water allocation and management plans;
- land use and management practices that maintain or rehabilitate wetland habitats and processes will be encouraged;
- new developments will require allowance for suitable distribution to and from wetlands;
- water entering natural wetlands will be of sufficient quality so as to not degrade the wetlands;
- the construction of purpose-built wetlands on the site of viable natural ones will be discouraged;
- natural wetlands should not be destroyed, but when social or economic imperatives require it, the rehabilitation or construction of a wetland should be required;
- degraded wetlands and their habitats and processes will be actively rehabilitated as far as is practical;
- wetlands of regional or national significance will be conserved; and
- the adoption of a stewardship ethos and cooperative action between land and water owners and managers, government authorities, non-government agencies, and the general community is necessary for effective wetland management.

The above principles would need to be considered in conjunction with the physical constraints imposed by the sedgeland sites. These include potential ASS and inherently unstable soils for development which are described in Section 4.3.8 of this submission.

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4.2 Cultural Heritage

4.2.1 Aboriginal sites recorded on the Heritage Estate

The NPWS Register of Aboriginal sites shows that two sites have been recorded on the Heritage Estate. These are the sites referred to in Stone (1995) along the Worrowing Waterway, originally identified by Attenbrow (1981). Both are open campsites. This area is not proposed for development based on the layout of the "paper" subdivision.

Following a letter from NPWS on 10 March 1995 Council had an archaeological report prepared (Stone 1995) for the Heritage Estate. This report did not locate any new sites but did identify what areas on the Estate were considered to be of moderate-high archaeological potential. It recommended that no further investigation was required but that care should be taken to avoid disturbing sites in the area of moderate-high archaeological sensitivity.

NPWS provided a response to Council on the report on 18 December 1995. NPWS considered that several shortcomings in the report meant that it could not confidently determine the likelihood of potential impact upon Aboriginal heritage within the proposed subdivision area. Council has not provided further information on this matter, so these concerns still stand. Of particular relevance to this Inquiry was that the presence of 12 other sites in the surrounding area indicated that there may be a high potential for sites, particularly artefact scatters, within areas described in Stone (1995) as having a low potential for Aboriginal sites.

On this basis, there remains the possibility that Aboriginal sites will occur in areas identified by Stone (1995) as having low potential for sites. This may mean that development could be delayed, modified or even prevented on individual blocks should rezoning proceed if sites are found. In such a case, a consent to destroy from the NPWS would be required under s.90 of the National Parks and Wildlife Act.

4.2.2 Aboriginal Community Consultation

The report of Stone (1995) includes reference to the involvement of Ms Margaret Lonesborough, a Jerringa elder and representative of the Jerringa Local Aboriginal Lands Council in the survey and in discussions on the significance of the area to the Aboriginal people. The report concluded that the Heritage Estate was of no particular significance to the local Aboriginal community.

Given the period of time which has passed since the investigation and consultations with the local Aboriginal community, it is important that the community be re-engaged and their views on the significance of the site as well as the rezoning proposal sought.

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4.3 Water Quality

4.3.1 Ecological Attributes of St Georges Basin & the Importance of Water Quality Issues

The Estate is located in the water catchment of St Georges Basin. The site drains immediately into Worrowing Waterway which flows into Erowal Bay (which is part of St Georges Basin). The Heritage Estate is described in the reports as being 166 hectares in area. This corresponds to approximately 27% of the catchment draining into the Worrowing waterway. The existing settlement of Old Erowal Bay comprises approximately 8% of the Worrowing waterway catchment.

St Georges Basin is listed in the "Directory Of Important Wetlands in Australia" (Australian Nature Conservation Agency (1996)) and is identified as having high ecological value for the following reasons:

- due to the relatively large area of seagrasses (about 850 hectares) it is considered to be a representative example of estuarine wetland on the south coast;
- the site contains a complete transition from seagrasses to mangroves to saltmarsh to spagnum marsh;
- it provides potential habitat for migratory waders, but is poorly studied; and
- it provides important nursery habitat for commercial fish species.

In its Estuary Management Plan, the Council (1998) has identified the following natural values for St Georges Basin:

- a wide range of highly productive habitat types which maintain a diverse and abundant ecological system;
- there are sixteen SEPP 14 –Coastal Wetlands associated with the Basin and a number of additional non-SEPP14 wetlands reported in the area;
- extensive seagrass beds;
- generally good water quality that satisfies relevant water quality guidelines such as ANZECC, however the tributaries of the Basin are exhibiting some water quality degradation, especially from elevated faecal coliform levels and depleted dissolved oxygen levels; and
- considerable sections of foreshore which remain in a naturally vegetated condition.

A study undertaken by the EPA (1998) shows that the maximum depth of water at which seagrass grows in an estuary appears to be a sensitive and integrating indicator of some water quality parameters (for example turbidity and total suspended solids). Hence it has application as a management tool for assessing estuarine health in NSW. St Georges Basin was included in the study. From the results of this investigation it would appear that seagrass in St Georges Basin grew to the greatest depths found in the study, implying that the Basin has a high standard of water quality. These investigations support the view that water quality is good in St Georges Basin.

In a study undertaken by the EPA (1997a), an initial qualitative estimation of acceptable loads of nutrients to seventeen (17) coastal wetlands was attempted. St Georges Basin was included in this study. The study indicates that St Georges Basin currently shows

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few symptoms of environmental degradation but, in common with all coastal lagoons, there is a risk of degradation associated with increased loads of nitrogen and to a lesser extent phosphorous.

Unless its associated pollution is prevented or adequately controlled, urbanisation of the St Georges Basin catchments presents risks to the ecological attributes of the lake and its associated embayments. Long term impacts of urbanisation include an increased generation rate of pollutants and an increase in runoff volumes, both of which contribute to an increased loading of pollutants on the receiving waterways. The greatest increase in pollutant loadings generally occurs for frequent small storm events, due to the more significant increase in runoff volumes under these conditions. Increased loadings of nutrients will lead to increased biomass of macro and micro algae which can in turn lead to a loss of productive seagrass beds.

Deoxygenation of waters can occur due to respiration of the algae and decay of organic matter. This is exacerbated where there is little regular water exchange, a common situation in enclosed bays adjoining coastal waterways. An example of this degradation is evident in Griffins Bay in Lake Illawarra where naturally poor flushing conditions have contributed to the poor water quality in that area. As well as these local effects the combined cumulative impacts of many "small" developments can lead to substantial degradation of even large waterways. Unless there are appropriate controls implemented at the Heritage Estate the adverse impacts noted above are likely.

At present about 5 per cent of the St Georges Basin catchment in general and 8 per cent of Worrowing Waterway catchment is urbanised. Assuming that all the land covered by the Heritage Estate is developed, urbanised areas will account for about 40 per cent of Worrowing Waterway catchment. This has the potential to impact on the water quality in the Basin because of:

- the erosive (and possibly dispersive) nature of soils in the catchment;
- the higher pollutant export rates from urban activities compared to the forested catchment that exist at present;
- the restricted tidal exchange through the inlet between the Basin and ocean gives a considerable residence time (approximately 80 days for a full exchange) for Basin water and will result in collection of pollutants in the underlying sediments to some extent off-setting the dilution factor;
- the slow exchange rates for waters in shallow bays or semi enclosed lagoons, such as Worrowing Waterway and Erowal Bay which make these waters particularly susceptible to pollutant accumulation;
- possible seasonal stratification of the deeper basin waters; and
- sediment deposition at drainage outlets and general sedimentation from Tomerong Creek into Eworal Bay with an increase in seagrass coverage over the last 40 years and a change in foreshore from sand to shallow mud. (Note: there is no evidence of increases in the extent of seagrass cover because of increased nutrients).

In conclusion it would seem that water quality in the vicinity of the Heritage Estate, and in St Georges Basin generally, is fairly good. However, the lake, and Worrowing Waterway and Erowal Bay in particular, are susceptible to substantial environmental degradation resulting from increases in pollutant loads which can be associated with urbanisation of the catchment. Development of the Heritage Estate therefore presents

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risks to the environmental health and sustainability of aquatic ecosystems as a result of water quality degradation.

4.3.2 The Water Reforms Process & Environmental Goals

Regional growth and development is placing increased stress on the region's rivers, estuaries and groundwater resources. Increased pollution can jeopardize human health, fishing and farming industries, tourism and a range of valuable natural ecosystems. Preventing and minimizing pollution and environmental degradation requires a range of appropriate and effective planning and environmental management strategies.

The NSW Government has initiated the Water Reform process to set clear and agreed objectives and management plans for water quality and river flows in order to improve the health of NSW rivers, estuaries and ground water. The main steps in the process are as follows:

i. following extensive public consultation, the Government is in the process of setting interim water quality and river flow objectives for all waterways. (See below);

ii. A Water Management Committee, formed from Government and community representatives, will develop detailed water management plans to meet long-term objectives, strategies and actions for each catchment. The Shoalhaven/Illawarra Water Management Committee is expected to commence in the next financial year; and

iii. all resource and planning decisions will need to take relevant Water Management Plans and Waterway objectives into account.

A further aspect of the Water Reform process is the preparation of stormwater management plans for Council's urban areas. These plans must be developed by April 2000. Stormwater management plans should take into account all existing and planned urban areas.

The Government is currently considering objectives, developed through community consultation, for water quality and river flow as part of the Water Reforms. These objectives are described below.

<u>Water Quality Objectives for freshwater streams</u>
Protection of:
- aquatic ecosystems
- visual amenity;
- other objectives may apply in various parts of the catchments such as primary and secondary contact recreation, livestock, irrigation and homestead water supply, and aquatic foods (fish, shellfish and crustaceans for human consumption).

<u>Water Quality Objectives for most estuarine waters</u>
Protection of:
- aquatic ecosystems
- visual amenity

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- secondary contact recreation
- primary contact recreation
- aquatic foods

River Flow Objectives for freshwater streams
(every objective may not apply everywhere in catchments, in particular the last two rarely apply in catchments lacking major dams)

- protect pools in dry times
- protect natural low flow
- protect important rises in water levels
- maintain wetland and floodplain inundation
- mimic natural drying in temporary waterways
- maintain natural flow variability
- maintain natural rates of change in water levels
- manage groundwater for ecosystems
- minimize the effects of weirs and other structures
- minimize effects of dams on water quality
- make water available for unforeseen events

River Flow Objectives for estuarine waters

- maintain wetland and floodplain inundation
- manage groundwater for ecosystems
- minimize the effects of weirs and other structures
- maintain or rehabilitate estuarine processes and habitats

Several of these objectives have the potential to be significantly affected by the Heritage Estate development in the St Georges Basin catchment. All of the water quality objectives may be affected, with primary contact recreation and aquatic foods being particularly sensitive to changes in water quality with development, and these have major human health implications. River flow objectives that may be affected include mimicking natural drying in temporary waterways, maintaining natural flow variability, maintaining natural rates of change in water levels and maintaining or rehabilitating estuarine processes and habitats, largely due to the increased volume and speed of runoff from built-up areas."

In terms of guiding the COI, should development proceed, the EPA recommends that the water quality goals as specified in *Jervis Bay Regional Environmental Plan 1996* ("the REP") would have to be satisfied. The most relevant part of the REP in this regard is Section 11 which states:

> *"A proposal must...(a) for the water quality in any waterbody 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 waterbodies does not at that time sustain the uses identified on Map 2...".*

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Map 2 of the REP does not name a specific "use" for the receiving waters affected by Heritage Estate (namely Worrowing Waterway and its tributaries). However, the "protection of aquatic ecosystems" is the appropriate "use" of waters in this case.

Further advice on determining water quality goals can be found in the EPA's Draft Managing Urban Stormwater, Council Handbook (1997b). These guidelines discuss the relative merits of a number of potential water quality assessment criteria. The "no net increase" criterion is the most appropriate in the current case as it is consistent with the REP and with the current high receiving water quality i.e.

> *"No increase in the average annual load of key pollutants above the current load from the site".*

As such the appropriate goal for such developments is no net increase in pollutant export, compared to existing conditions.

The 'no net increase' in pollutants suggested by the REP is regarded as a suitable goal, and is consistent with the overall framework of the environmental objectives proposed for water quality and flow. A major principle underlying the objectives is to "protect good quality water and improve water quality where necessary". The limited data on water quality presented show that the area has good water quality. It is essential for such water quality to be maintained, when close downstream there is St Georges Basin, an aquatic environment that would be considered to be highly sensitive to increased inputs of nutrients, because of its limited flushing.

4.3.3 Water Pollution Control Strategy: Modelling & Best Management Practices Proposed

Patterson Britton (1998) proposed a water pollution control strategy which incorporates Water Pollution Control Ponds (WPCPs) and Water Sensitive Urban Design Principles (WSUD). These are recognised as current Best Management Practices (BMP).

Whilst it is not possible to reliably quantify the impact of different development scenarios on ambient water quality in the receiving waters, it is possible to estimate changes in pollutant loads. The above EPA stormwater guidelines for Councils discuss modelling techniques suitable for determining whether the above "no net increase" criterion will be met.

Patterson Britton (1998) undertook modelling to predict pollutant loads generated and demonstrate compliance with the "no net increase" goal. This modelling focussed on suspended solids, phosphorus and nitrogen. The modelling undertaken by Patterson Britton (1998) appears to be in accordance with recognised protocols and the inputs to the model generally accord to data available at the time.

For the "status quo" (Scenario 0) and maximum development option (Scenario 1) Patterson Britton (1998) have shown that unless appropriate water quality controls are implemented:

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i. the existing uncontrolled land use practices (for example clearing of land and unsealed roads); and

ii. the future residential development (for example 1200 lot urban subdivision)

is currently and will in the future have a significant impact on pollutant export from the site. Hence the EPA cannot support the option put forward by the landowners and the Council for maximum development (Scenario 8) of the Estate cannot be supported.

Patterson Britton (1998) assessed other development options (Scenarios 2 to 7) and suggested that adopting BMP such as WPCPs in conjunction with Water Sensitive Urban Design Principles, impacts can be reduced and the "no net increase" goal could potentially be satisfied. There are a number of questions and limitations regarding the modelling undertaken (see below) however it must be kept in mind that BMP relates to design and practices and not the achievement of environmental outcomes.

The accuracy of estimates as to the effectiveness of the BMPs are dependent upon a number of factors. Modelling is not an exact science and many assumptions need to be made and this increases the risk of error in the estimates. Because of the limited local runoff data, there is some uncertainty as to:

i. the predicted increase in runoff volume as a result of the development. *For example Patterson Britton (1998) states for some subcatchments, the 2 year ARI flow will increase by over 300 percent*; and

ii. the existing and likely future pollutant export, as expressed by the Event Mean Concentrations (EMC) employed in the modelling.

These uncertainties are discussed in more detail below. In such circumstances a precautionary approach is warranted.

4.3.4 Limitations in Proposed Soil and Water Management Strategy

Subdivision works and house construction have the potential to be very polluting activities, with the concomitant risk of exceeding the water quality goal. While it is not reasonable at this stage of the planning process to expect the preparation of a detailed soil and water management plan, it is reasonable to expect an assessment of the constraints and opportunities for meeting the water quality goal during the construction phase and the preparation of a conceptual soil and water management plan.

If such an assessment is not carried out, construction phase soil and water management may pose significant problems of technical and economic feasibility (for example, space requirements for the construction of stormwater controls, soil dispersibility, flocculant dosing) later in the planning and development assessment process.

It is recommended that at both the development phase and the housing construction phase, soil and water management controls should be in accordance with the EPA's Managing Urban Stormwater guidelines. Experience shows these required controls are not always installed, operated and maintained, in either the subdivision or housing

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construction phase. Given the sensitive nature of the downstream environment, it is suggested that assurances of effective quality control procedures (both on the part of Council and the developers) are needed to feel confident that problems would not result. Options here may include financial assurances (performance bonds), environmental auditing systems, quality assurance/quality control systems and staging the development.

No conceptual details on soil and water management during the construction phase have been provided by Patterson Britton (1998) for Heritage Estate. Section 6.11 of the report states this will be done at the development phase. The ability to comply with the water quality goal during construction thus remains unclear and a conceptual Soil and Water Management Plan is an essential requirement at this stage of the assessment.

4.3.5 Limitations in Sediment Controls and Water Pollution Control Ponds

Sediment controls and WPCPs can treat stormwater runoff prior to water entering St Georges Basin and are considered current BMP. The Patterson Britton (1998) report provided information on WPCPs and their predicted nutrient "take up". However several issues require further consideration as outlined below:

1. The design and in particular sizing of tertiary treatment systems such as WPCPs is a relatively new and evolving field. There has been comparatively limited comprehensive monitoring of the pollutant retention performance of these systems particularly in Australia. As the results of further performance monitoring become available design criteria are expected to be refined. Hence it needs to be recognised that there is inherent uncertainty as to the effectiveness of WPCPs. Furthermore there needs to be provision for evolving technology over time.

2. The modelling studies by Patterson Britton (1998) only examines the nutrient removal via WPCPs. The modelling results indicate that about a 75 per cent reduction in phosphorous export is required to ensure that the "no net increase" goal is met. However few examples of WPCPs in service have found it practicable to provide the long residence times necessary to achieve this high level of pollutant removal. This raises the concern that the "no net increase" goal may not be achievable based upon the use of WPCP alone and places a higher reliance on water sensitive urban design. This adds to the risks for the potential for water quality deterioration.

3. No detailed information was provided in the Patterson Britton (1998) report on the design of the WPCPs. The EPA (1996) draft Stormwater Guidelines was referred to as the basis for design. These guidelines contain design curves for sizing WPCPs. The EPA considers the approach used in preparing the design curves in its final EPA (1997c) stormwater guidelines to be more rigorous and generally recommends it to be adopted in preference to the EPA (1996) draft guidelines.

4. Stormwater bypasses of the WPCPs will flow directly to St Georges Basin. While the flow of water involved does not appear to be great in relation to total yearly volumes, the reduced soil infiltration in the latter phase of heavy storms, and their greater erosive capacity, can result in significantly greater pollutant loads being transported.

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5. A significant factor in the effectiveness of sediment construction controls and WPCPs are the characteristics of soils within the catchment. In particular erodible and dispersive soils will significantly reduce the effectiveness of the sediment construction controls and WPCPs.

   The Hassell report (1994) states that the soils on the site have a high level of susceptibility to erosion. Additionally they state "the reactive nature of the soil arises because of its chemical susceptibility to water" (Page 24). This therefore suggests that the soils on the site are both erosive and dispersible. In the process of undertaking rehabilitation works in the vicinity of the Estate, the DLWC found that soils in the area are indeed dispersible and highly susceptible to erosion, particularly when runoff in concentrated.

   It is unclear whether the WPCPs proposed by Patterson Britton (1998) took these apparent soil factors into consideration in their design, operation and maintenance requirements. If these factors (particularly dispersive soils) were not taken into consideration it is likely that pollutant reductions in the WPCPs will be significantly less than modelled.

   If soils are fine and dispersible, flocculation of WPCPs may be necessary to meet the water quality goal. Not only is this a significant on-going commitment but it should be noted that flocculants can also have environmental effects such as toxicity.

   In order to resolve the above issues, prior to rezoning, the actual soil characteristics on site need to be confirmed by appropriate testing and appropriate controls based on the soil characteristics be included in the conceptual soil and water management plan.

6. The uncertainties regarding the proposed locations of the WPCPs need to be addressed prior to rezoning. Figure 4.1 of the Patterson Britton (1998) report indicates areas with potential drainage problems. These coincide with the location of WPCPs. The relationship between surface and groundwaters, especially in proximity to any wetlands or watercourses potentially affected by sediment ponds/water pollution control ponds is also unclear. These issues need to be resolved prior to rezoning to demonstrate the proposed WPCP locations are feasible or whether the site constraints may make construction difficult and hence affect the area needed to construct appropriately operating structures.

7. The figures in the Patterson Britton (1998) report do not show any WPCPs on the north-western area proposed for development. This area represents a significant number of allotments and the need for site specific controls, such as WPCPs should be addressed at the rezoning stage and not deferred to the detail design phase.

8. Maintenance of WPCPs is essential to their ongoing performance. Without regular maintenance, pollutant removal efficiencies are likely to be significantly less than assumed. A mechanism needs to be established at the rezoning stage giving certainty to the necessary ongoing maintenance.

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The above issues highlight a number of limitations in regard to sediment controls and WPCP including their design, operation and maintenance. These issues need to be resolved as part of the above conceptual Soil and Water Management Plan prior to the rezoning.

4.3.6 Limitations of Water Sensitive Urban Design

The EPA endorses and actively promotes the use of water sensitive urban design principles such as filter strips and grass swales, however these principles need to be interpreted and implemented appropriately. The following points identify the potential limitations of these measures for pollutant control:

1. Water Sensitive Urban Design systems such as grass swales and filter strips are secondary stormwater treatment systems. They principally remove sediment with some retention of nutrients and bacteria also occurring. These types of treatment measures are currently not widely used in Australia. There are no comprehensive guidelines available on the designs available and there has been a limited number of studies on their performance in urban areas. High failure rates have been reported, attributed to poor maintenance and vegetation cover and difficulties achieving sheet flow and avoiding channelisation.

2. Section 6.9 of the Patterson Britton (1998) report indicates water sensitive urban design measures will be required to cater for the increased pollutant loads reported to occur in wet years. Section 3.3 of the report raises concerns about the feasibility of implementing measures such as swales because of the difficulty in maintaining grass cover. Soil particle size distribution and dispersibility are also potential constraints to the effectiveness of swales. The soils on site should be assessed in relation to the above constraints prior to rezoning as well as concern about the potential constraints posed by site slopes and the limited space likely to be available for swales. The DLWC considers that top soils in the area are generally shallow and hardsetting top soils of low fertility which presents difficulties in establishing and maintaining a healthy and adequate level of ground cover, particularly on disturbed sites.

3. Apart from discussion of the use of swales, the water sensitive design principles proposed in the Patterson Britton (1998) report consist primarily of preservation of existing vegetation and drainage channels within the habitat corridor (Section 6.9). There appears to be conflict between sections of the report regarding the use of habitat corridors along drainage lines. Section 2.4.4 "Constructed Wetlands" states the proposed corridor links will not be used to provide water quality controls. In contrast Section 2.5.4 (Scenario 3) however adds pollutant assimilation within the habitat corridors and natural drainage lines. Section 3.4 also details the possible multiple use of drainage reserves for stormwater management and habitat requirements. Section 5.6 also states detention storage such as rock bars and minor weirs will also be located in these habitat corridors.

   The preservation of these habitat features is an important requirement as noted above. Accordingly the use of this area to assimilate some of the nutrient load from the urban development could adversely affect the ecological attributes of these

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important areas. A further concern is that these waterways should be protected from scouring and erosion as a result of development.

Unless the waterways are currently severely degraded, stormwater treatment structures should not displace existing instream and riparian habitats. Additionally, existing aquatic habitat needs to be protected from both water quality and flow changes resulting from the development. This means that stormwater treatment structures should be located upstream of the habitats and natural waterways to be protected.

4. Modelling undertaken by Patterson Britton (1998) predicts an increase in runoff volume for all development scenarios. Water Sensitive Urban Design principles such as onsite stormwater retention tanks can allow for the reuse of stormwater in non potable ways, such as toilet flushing and garden watering. These measures can reduce runoff volume and intensity as well as increase the effective hydraulic residence times (that is nutrient removal capacity) of the WPCPs. It is therefore proposed that such measures be required in the relevant planning controls.

Given the issues raised in (1) to (4) above, it is not appropriate to rely on water sensitive urban design features as a primary mechanism to achieve the water quality goal. However the EPA strongly encourages the continued investigation of the scope for using water sensitive urban design principles within the actual urbanised area. Council or the body responsible for maintenance of the stormwater infrastructure for the life of the development would need to accept the maintenance requirements for water sensitive urban design features, as their effectiveness is related to regular maintenance. This important issue needs to be resolved at this rezoning stage.

4.3.7 **Need for Water Quality Monitoring**

Uncertainty in the prediction of water quality impacts from urban development is in part due to the lack of reliable data on receiving water quality before and after development. The lack of data makes it extremely difficult to assess whether modelling predictions (as to whether or not there will be an increase in pollutants discharged from a developed site) have been accurate.

The resulting uncertainty makes assessment of the impacts of urban development proposals more difficult for government agencies and other stakeholders concerned with water quality and ecologically sustainable development. Good quality, accessible 'before and after' water quality data will help to reduce this uncertainty, and streamline the assessment process, over time.

Whilst data is limited, the results of water quality sampling programs to date indicate that receiving water quality is high and generally meets ANZECC criteria for protection of aquatic ecosystems. The REP requires that water quality be maintained or improved. In order to determine whether the REP has been complied with, it is necessary to have a reasonably accurate picture of current water quality as well as water quality during and after development.

It needs to be appreciated that water quality data in the receiving waterway cannot be used to directly verify the water quality modelling. Event based monitoring of runoff from

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the developed area is necessary to directly verify the modelling predictions, and this can be an involved and costly exercise.

With these points in mind, it is recommended that Council develop a water quality monitoring program for the area. This recommendation is consistent with Section 6.10.4 of the Patterson Britton (1998) report.

4.3.8 Acid Sulphate Soils

ASS result from marine sedimentation processes, and can occur in "lowland" soils. When exposed to oxygen, pyritic material within the soil oxidizes to produce sulphuric acid. This acid is toxic in itself, and can indirectly release metals such as aluminium and iron from the soils in concentrations which may be toxic to aquatic life. There is ample evidence in the Shoalhaven region of adverse environmental effects from ASS.

Section 4 of Patterson Britton (1998) report states that Potential Acid Sulphate Soils (PASS) have been identified in the closed sedgeland areas of Heritage Estate; even though the DLWC ASS Risk maps indicate that the potential for ASS is low. Low risk areas have been known to contain highly localised occurrences of ASS which could represent an environmental risk that will vary with the depth and extent of soil disturbance. The test pits where the PASS were found are located in areas proposed to be drained and developed for urbanisation and siting of WPCPs. No new testing for ASS has been undertaken. The Patterson Britton (1998) report (Section 4.4.3) recommends if development occurs in closed sedgeland areas, further testing be undertaken.

Patterson Britton (1998) proposed that specific ASS testing will be deferred to detailed design stage and there are significant risks in this approach. These risks may relate to: acid drainage, unforeseen costs to landowners if ASS management or specialized drainage techniques are required; question over the number of developable lots (and hence infrastructure costs to landowners); the capacity of the closed sedgeland area to accommodate WPCPs or urban development and the environmental impact of draining the sedgelands.

Any development of Heritage Estate should comply with the Acid Sulfate Soil Manual published by the Acid Sulfate Soil Advisory Committee in August 1998. The Manual forms part of a whole of government approach to the management of ASS in NSW and provides advice on best practice in planning, assessment and management of activities in areas containing ASS. It also provides best practice advice on laboratory methods for testing, drainage, groundwater monitoring and management.

Development scenarios that include the development of the closed sedgeland should not be favoured. This is because of the risk of disturbance of PASS, and because of potential public liability issues and additional water quality impacts of permitting development in land prone to flooding or with poor drainage. There is also the problem of the ongoing disposal of drainage water from these areas, if they are drained, as such water could be of poor quality

It is recommended that more detailed laboratory testing of soil samples be undertaken prior to rezoning in order to determine whether the observed acidity is due to ASS or

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some other source. If PASS are found in potential urban areas these areas may need to be excluded from further consideration and be included into the buffer zones.

4.3.9 Sewerage

4.3.9.1 Sewage treatment

Patterson Britton (1998) propose that sewage from the development be processed at the existing sewage treatment plant at Huskisson. The plant, which is operated by SCC, would be upgraded, and the processed effluent would ultimately be re-directed from the existing bay outfall to a land irrigation site and ocean outfall as part of SCC Northern Regional Effluent Management Scheme (REMS).

There do not appear to be significant environmental problems associated with this plan, providing Council can provide assurances that this plant has adequate capacity to meet the proposed expansion and is consistent with the environmental and public health performance objectives for REMS.

4.3.9.2 Sewage overflows

The EPA recommends that a sewage overflow structure should only be approved where it can be demonstrated that such a structure is necessary to protect public health and all relevant best management practices have been applied. Best management includes standby pumps and backup power supply, break-down telemetry, storage capacity (to be determined on case by case basis), and emergency response management plans.

In relation to storage capacity, should the development be approved, the EPA will liaise closely with Shoalhaven City Council to look at systems that will be put in place to respond to failures. This, combined with specifics of the area, for example, sensitivity of receiving environment, likelihood of total power failure and how long this will take to restore, will determine the volume of storage capacity needed in/adjacent to pump wells.

4.3.10 Chemical Contaminants

At present, much of the catchment of St Georges Basin is in a relatively undisturbed state, with native vegetation predominant. The use of agricultural chemicals such as pesticides or fertiliser is considered minimal.

If development were to proceeds pesticides could used in urban areas; for example termite treatments and insect control. The cumulative use of such chemicals could influence the quality of surface runoff, and consequently both the quality of Basin water and the levels of pesticides in food chains in local ecosystems.

Insufficient data is available to quantify this effect; however, it should be born in mind when considering the sensitive nature of downstream ecosystems.

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4.3.11 Conclusions: Water Quality

Heritage Estate is located in the water catchment of St Georges Basin. St Georges Basin is identified as having high ecological value. Water quality in the vicinity of the Heritage Estate and in St Georges Basin generally is high. However the Basin, Worrowing Waterway and Erowal Bay in particular, are susceptible to substantial environmental degradation resulting from increases in pollutant loads which can be associated with urbanisation of the catchment.

Development of the Heritage Estate therefore presents risks to the environmental health and sustainability of aquatic ecosystems as a result of water quality degradation. Preventing and minimizing pollution and environmental degradation requires a range of appropriate and effective planning and environmental management strategies. The 'no net increase' in pollutants suggested by the REP is regarded as a suitable goal for these strategies.

Patterson Britton (1998) have stated that unless water quality controls are implemented, existing uncontrolled land use practices and future residential development have and will result in excessive levels of pollutants being exported from the site. They indicate that if BMP such as WPCPs are used, in conjunction with Water Sensitive Urban Design Principles, these impacts can be reduced and the "no net increase" goal could potentially be satisfied. It is important to understand there are many uncertainties involved in this approach. Environmental outcomes, such as the protection of the estuary ecosystem, cannot be guaranteed at this stage with BMP.

A number of issues have been identified regarding the effectiveness of these BMPs and their design, operation and maintenance. These include:

- concerns regarding the existing level of information available on site constraints, for example soils, to effective soil & water management;
- the feasibility of employing these BMPs on the available area of land given site constraints;
- one large area of the proposed subdivision does not appear to have been provided with WPCPs;
- much faith is being placed in WPCPs to reduce pollutant loads from the proposed subdivision. However few examples of WPCPs in service achieve this high level of pollutant removal;
- water Sensitive Urban Design principles such as grass swales have been proposed to assist in pollutant removal. High failure rates of these systems have been reported and
- the successful operation of BMPs is contingent upon regular ongoing maintenance. Experience indicates this is rarely achieved in practice.

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These issues may affect the ability of the proposed strategy to meet the desired water quality goal.

The lack of water quality data makes it extremely difficult to assess whether modelling predictions have been accurate. Further monitoring would also be necessary to determine the impact of the proposal if it proceeded. There are risks in deferring ASS testing to the detailed design stage. This is because if ASS are confirmed, this land may need to be excluded from further consideration as potential urban areas.

In such circumstances a precautionary approach is warranted. These issues need to be resolved prior to rezoning to ensure, amongst other things, the "no net increase goal" is satisfied. In some cases these risks have to be acknowledged, and weighed against the possible benefits of the proposal.

4.4 Air Quality

4.4.1 Dust

The proponent has proposed using BMP in soil and water management, both during the subdivision construction phase and during the later housing construction phase. Although soils on the site are identified as being highly erodible, the use of BMP should address short term dust control issues.

4.5 Access and Transport Issues

Land use patterns and transport requirements are closely related. When planning for residential developments, the implications for public access including strategies to reduce overall transport requirements should be carefully considered. Planning strategies that can minimise vehicle use and dependence should be encouraged and developed. Planning for efficient transport systems can have a range of environmental, economic and social benefits including:

- providing ready access to essential services (schools, hospitals, retails services, etc)
- reduced vehicle based emissions including particulate matter and greenhouse gases
- minimise Council expenditure on road construction and maintenance.

Planning strategies such as sub-division location and design and provision of well targeted public transport services can help to improve community access and also reduce vehicle use and dependence.

4.6 Solid Waste Disposal and Recycling

Disposal of garbage should be addressed within the overall framework of Council's waste management strategy.

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5. FINANCING DEVELOPMENT

5.1 Funding Infrastructure

According to Patterson Britton the following physical infrastructure would be required:

(a) the construction of approximately 15.5 km of internal kerbed guttered and drained roads at an estimated cost of $10,000 per lot;

(b) trunk drainage, together with the provision of gross pollutant traps and outlet works to enable the construction of wetland areas estimated at $2,350 per lot;

(c) reticulated sewerage, including the Council's headworks costs estimated at $4,800 per lot;

(d) reticulated water supply estimated at $4,400 per lot;

(e) below ground reticulated electricity estimated at between $2,000 and $3,000 per lot; and

(f) telephone services estimated at between $200 and $300 per lot.

In addition to the above costs, Patterson Britton has identified additional costs of about $3,650 per lot as section 94 contributions and $5,000 per lot as contribution towards the compensation to landowners whose land is unsuitable for development or required for infrastructure.

The aggregate cost per lot, depending on which option was chosen, from those identified by the Taskforce, would range between $30,000 and $35,000.

5.2 Possible funding streams

The options available to finance the development of the Heritage Estate would depend on who took on the role of the developer of the land.

<u>The landowners exercise the role of developer</u>

The landowners could decide to form a company (or a similar body) to act as the developer and to take full responsibility for financing the required works and all costs associated with upgrading the Council's infrastructure beyond the site (e.g. sewerage headworks, roads intersections and the like).

In this case, the Council's role would be limited to primarily that of a consent authority, and it would not be required to provide financial assistance towards the development.

This option would mean that the landowners might be able to exercise a greater degree of control over the pace of development (e.g. by staging the development); control over both debt levels and the rate of repayment of borrowings, and like factors.

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The terms and conditions for obtaining finance and repaying debt would be entirely a matter for the landowners to determine among themselves and their lenders.

The Council provides the required finance (and virtually assumes the role of developer)
Under this scenario the Council would assume responsibility for financing the development of the Heritage Estate to the point where the landowners would be capable of submitting development and building applications in respect of their individual lots.

Initially it needs to be understood that there is no statutory requirement that councils must assist in financing private developments within their areas. Nor is the Government empowered to direct a council in regard to such a matter.

The funding streams that might be accessible to the Council are discussed below.

1. Loan Borrowings

The Department of Local Government, on behalf of the Minister for Local Government, oversights significant loan borrowing proposals. Among other things, the Department seeks to satisfy itself that the council can meet the loan repayments.

In 1998, it was estimated by the Council that it would need to undertake loan borrowings of at least $30M in order to provide the requisite roads, and water and sewerage and related infrastructure to the Heritage Estate. The Council envisaged that the loan borrowings would be repaid by rates levied on landowners within the Estate. The Council also envisaged that the rating revenue that would be required to repay the loan borrowings would be additional to the general income entitlement of the Council under the Government's rate pegging restrictions. The rationale for this was to ensure that existing services provided to residents and ratepayers could continue be financed.

However, the Council's proposal did not contain details concerning the period over which the loan funds would be required and a proposed rating structure. This meant that it was unable to proceed.

Were rezoning of the land to occur and the Council to re-affirm its willingness to assume responsibility for financing the development of the Heritage Estate, it would need to submit a fresh application for Ministerial approval to undertake the proposed loan borrowings.

Furthermore, if the Council proposed to increase its overall general income entitlement by the amount required to service its loan borrowings, it would also need to seek and obtain Ministerial approval for a special rating variation. The submission of a special rating variation application for Ministerial approval would need to be accompanied by a draft rating and revenue plan. Accordingly, it would be incumbent upon the Minister in granting an approval for a special rating variation to be satisfied that the proposed rates and charges (if any) may legally be made and are reasonable in the particular circumstances.

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Were Shoalhaven City Council to finance development through loans, it has a wide range of rating and revenue raising options that could be applied to land within the Heritage Estate in order to meet loan repayments. In brief, the Local Government Act provides that Councils may levy the following types of rates and charges.

2. Rating and Revenue raising Options

Ordinary rates

All rateable land whether built upon or vacant is subject to an ordinary rate (section 494 of the Local Government Act). The level of, and liability for, the ordinary rate are not based upon the provision of specific services to the land or consumption of services by landowners. A council may either levy a uniform ordinary rate upon all land regardless of its categorisation or it may determine to levy a different level of ordinary rate for one or more different categories (section 528). This means that the Council could levy an ordinary rate for the Heritage Estate in a different amount than any other ordinary rate applying elsewhere in its area.

Special rates

While the making and levying of ordinary rates is a mandatory requirement of the Act, councils have a discretion whether to make and levy special rates in terms of sections 495 and 551-553 of the Act. Special rates levied in terms of section 495 have a fairly broad application whereas special rates levied in terms of sections 551-553 are limited to water supply, sewerage and drainage revenue raising, and only in situations where the infrastructure relating to the services is already in place and services are actually being provided

Furthermore, a council may levy:-

* different special rates for different kinds of works, services, facilities or activities;
* different special rates for the same kind of work, service, facility or activity in different parts of its area; and,
* different special rates for the same work in different parts of its area.

If the rezoning of the Heritage Estate were to occur and the Council assumed responsibility for the provision of roads, water supply and sewerage and related infrastructure, it would be likely to seek the implementation of a rating and revenue raising structure that features the use of special rates to help finance some or all of the costs of these types of services within that locality.

Charges

The Local Government Act also provides councils with a wide degree of flexibility in the making and levying of charges. Charges may be annualised or based upon a unit of service or measure of commodity used, and a charge may be made in relation to specified services provided by a council (eg provision of water, sewerage or drainage

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services). Furthermore, a charge may be set at a level that enables part or full cost recovery or, in some cases, that exceeds costs.

A council may impose charges in addition to ordinary rates and special rates or in substitution for special rates that may be made for the same purposes as a charge. The level of a charge can be differentiated according to a broad range of criteria such as-

- ⋆ the purpose for which the service is provided;
- ⋆ the nature, extent and frequency of the service;
- ⋆ the cost of providing the service;
- ⋆ the categorisation, for rating purposes, of the land to which the service is provided;
- ⋆ the nature and use of premises to which the service is provided; and
- ⋆ the area of land to which the service is provided.

Pensioners' concessions

As the affordability of council rates and charges may be an issue for any pensioners who own land within the Heritage Estate, it is important to note that the Government provides a range of concessions to eligible pensioners. These include a 50% rebate on their council rates, up to a maximum of $250 under the Mandatory Pensioner Rates Rebates Scheme and rebates of up to $87.50 each on water and sewerage charges, if councils provide such services. The mandatory rebate is only provided to pensioners who reside at their property and is designed to assist these pensioners to retain home ownership.

3. Section 94 contributions under the Environmental Planning and Assessment Act and section 64 contributions under the Local Government Act 1993.

Section 94 contributions represent a payment towards the provision or improvement of amenities or services generally benefiting the community reflecting the potential for additional demand upon amenities or services as a consequence of the development being carried out. Councils are entitled to impose section 64 contributions on developers for water and sewerage headworks that will be required as a consequence of the development .

These types of contributions are usually payable by developers. In a situation where the council of the area has assumed the role of the developer it would be anticipated that the council would pass costs equivalent to these contributions onto the benefiting landowners.

Furthermore, the imposition of section 94 contributions automatically entails the application of appropriate development consent procedures and conditions to be formulated as a condition of rezoning. (i.e. require the submission by a landowner of a Development Application to erect a dwelling).

As it would be necessary for significant infrastructure works to already have been constructed in order for any development on individual lots to become permissible, in cases where councils have failed to secure up-front payment of developer contributions their capacity recover these contributions will be directly linked to the pace of

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development of individual lots. Patterson Britton raised the concern that this might mean that the Council would have no guarantee of the time frame within which any money it borrowed would be able to be recouped from landowners within the Estate, since the timing of the development of individual lots would be at each landowner's discretion.

4. Lump sum capital contributions by landowners

Section 565 of the Local Government Act allows councils to enter into written agreements with ratepayers whereby the payment of a special rate may be waived either in whole or part for one or more years in favour of the payment to the council of a capital contribution as an alternative. The purpose of these provisions is to facilitate the reduction of debt and to generate savings for persons willing to make up-front capital payments. If landowners within the Heritage Estate have concerns about the level of Council loan borrowings that they may be required to repay, a section 565 scheme could be used to either reduce the level of Council borrowing or to expedite loan repayments.

5. Different mixes of loan borrowings, rates and charges, developer and lump sum capital contributions

The Local Government Act provides the Council with a significant degree of discretion and flexibility in devising appropriate revenue raising strategies to suit specific circumstances, and take the needs of their ratepayers into consideration in determining what is the best strategy in any particular case. Whatever strategy the Council choses should have the least cost and risk to the community.

6. Conclusion

The joint Government agencies consider that the Council should adhere to the following broad principles-

* the whole of the costs incurred by the Council in developing the Heritage Estate should be borne by the benefiting landowners within the Heritage Estate and not passed onto other ratepayers of the area; and ,

* the mix of rates and/or charges that are proposed to be levied upon landowners within the Heritage Estate should be determined on the basis of careful consideration of factors such as equity, affordability and what represents a reasonable loan repayment term.

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6. CONCLUSION

The Government understands the landowners' desire to develop their land. However, that desire must be considered in the context of the Government's policies and Council's strategic planning for the area. Any development must also be thoroughly considered for its environmental management implications.

Neither the State, regional nor local policy planning frameworks would support the rezoning and development of the Estate at this stage. At the very least, any decisions on the future of the Estate should await the finalisation of the Jervis Bay Settlement Strategy.

If a decision were made now or in the future to develop the Estate, there are a number of environmental management and infrastructure funding issues that will have to be considered. The future ownership and management of lands that may not be suitable or capable of development will need to be addressed.

The studies and reports prepared so far indicate that parts of the Estate have environmental values and qualities which must be conserved and/or protected. The Government agencies consider that Option 4 in the Taskforce report represents the minimum requirement for a balance between development and conservation of the Estate.

Any development of the Estate would require appropriate water quality controls to manage the potential impact on St Georges Basin, Erowal Bay and Worrowing waterway. The Patterson Britton report suggested that a combination of Best Management Practice (BMP) and water sensitive urban design would achieve the necessary water quality goals, particularly, the "no nett increase in pollution load" goal. However, there are concerns about the BMP approach which suggest uncertainty about the goals being met. Under the circumstances, a precautionary approach is required which implies that more information is required before any rezoning is achieved.

Due to its sensitive location, it is critical that a level of infrastructure is provided that does not contribute to any adverse impact of the development of the Estate on the environment. The funding of any such infrastructure is a matter for the Council, but must not impose an unacceptable burden on the community.

Regardless of what level of development were to take place, a number of landowners will be unable to develop their land as it will be needed for environmental management or infrastructure provision. The minimum requirement for the management of environmentally significant lands would be to rezone them to an environment protection zone with appropriate landuse controls. Any issues of compensation would be a matter for the landowners.

Paper subdivisions are a Statewide issue. There is a need for a broad strategic approach to their future planning, development and management. The outcome of this Inquiry should have broad application. This submission considers that the key elements of such a broad application must be:

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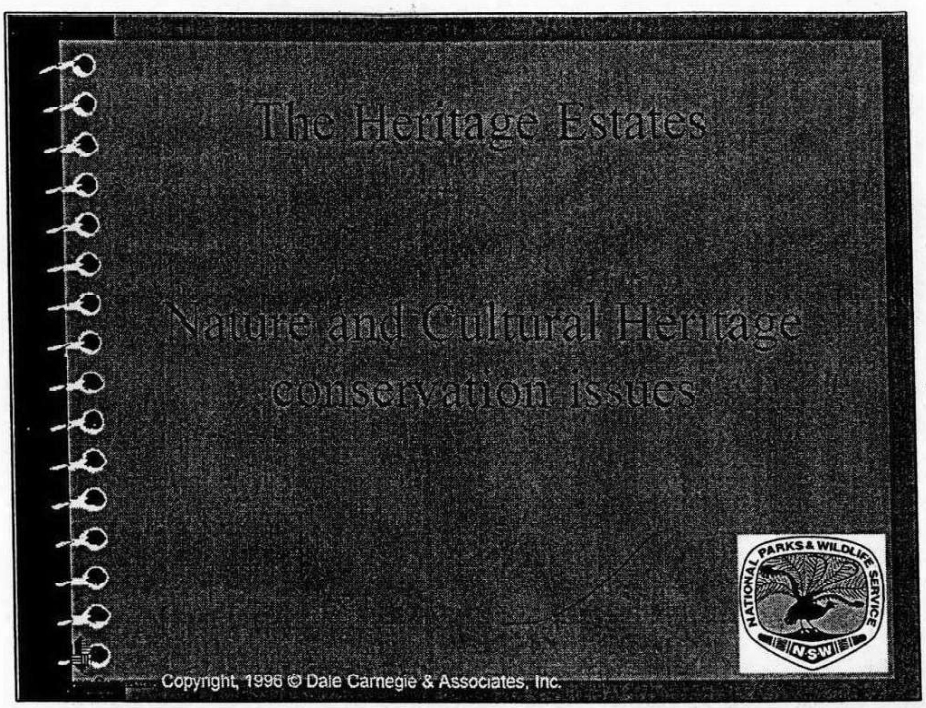
(a) any decisions to change landuse controls of paper subdivisions must form part of regional and/or local strategic planning policy framework. These frameworks must identify the need, timing and suitability;

(b) by virtue of their general locations and designs, not all lots in subdivisions will be capable or suitable for development. Any proposals for landuse change must therefore be accompanied by detailed environmental studies;

(c) appropriate infrastructure must be provided but at minimal cost or risk to the community; and

(d) in cases of fragmented holdings, the compensation for land unsuitable or incapable of development must be the responsibility of the constituent landowners.

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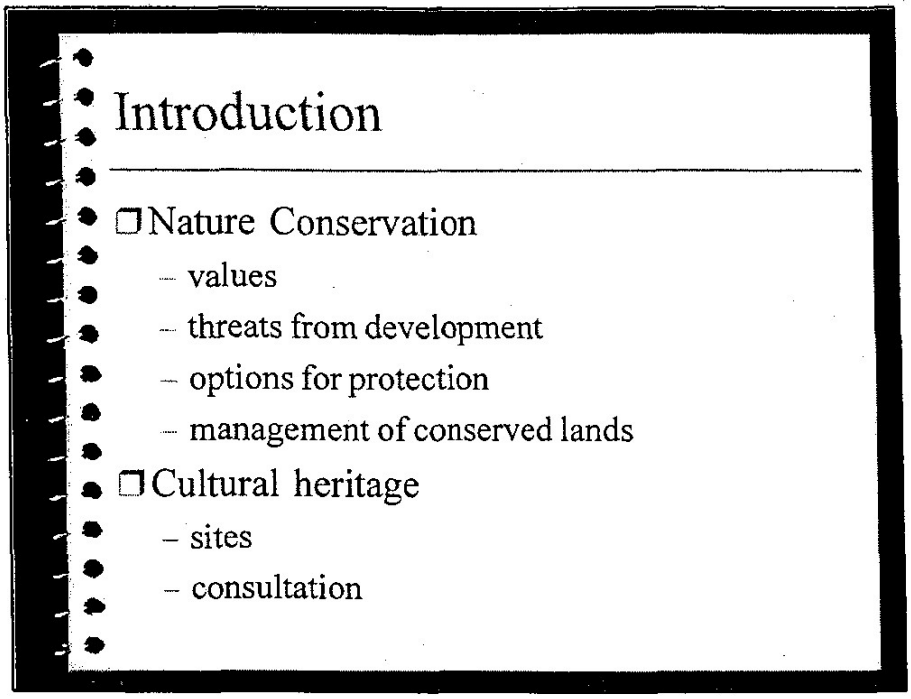
•Mr Commissioner, thank you for the opportunity to present on behalf of the National Parks and Wildlife Service · My name is . I am the FPM for NPWS Sobtten R.

•Our interests - management of NSW Jervis Bay National Park, responsible for management and conservation of flora and fauna including threatened species outside reserves, responsible for management and protection of Aboriginal sites across NSW

•NPWS considers the Jervis bay Region very important for the conservation of natural and cultural heritage, as well as a significant tourism drawcard, aiding the economic health of the Shoalhaven Region. Because of this, the NPWS has been deeply involved in planning and conservation initiatives in the Region during the 1990s including the creation, mainly through the significant investment by the NSW Government in the purchase of private lands, of the NSW Jervis bay national park. The JB REP was another major government initiative that deeply involved the NPWS.

•Lengthy involvement in this Heritage Estates process as discussed in our submission. The NPWS considers the site has significant conservation values and has been concerned for some time about its ongoing degradation while the question of its future hung in the balance. Hope that this process will result in a final decision as to its future management.

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•overview of this presentation

•NATURE CONSERVATION ISSUES

values of the site as shown in the two major studies

intrinsic values

wider regional values

impacts caused by recent disturbance

threats from development as housing estate

options for protection of conservation values on the site

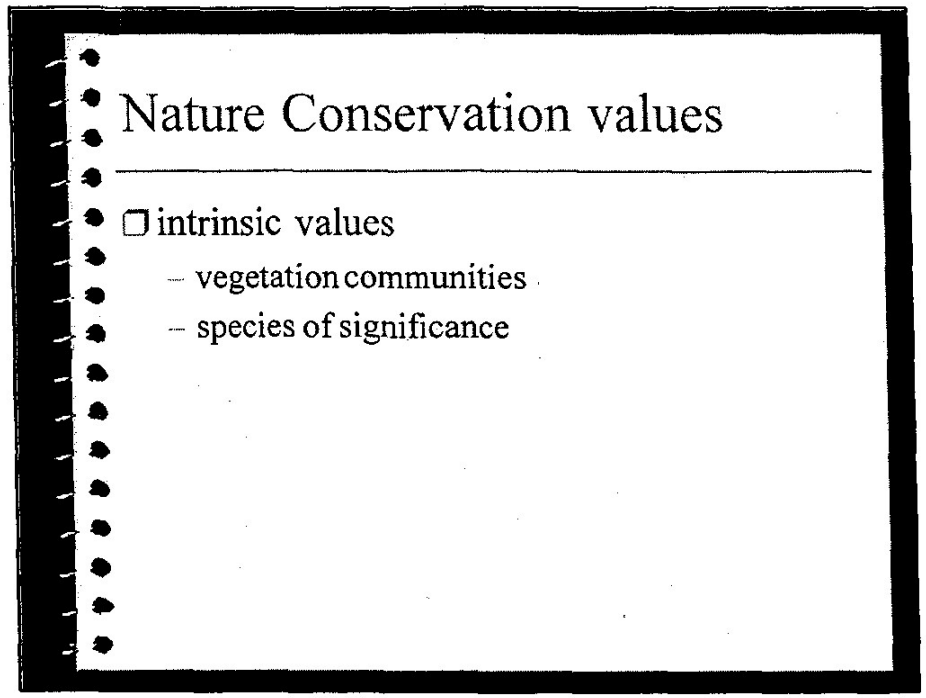
management of lands set aside from development CLICK

•CULTURAL HERITAGE ISSUES

known Aboriginal sites and potential for others

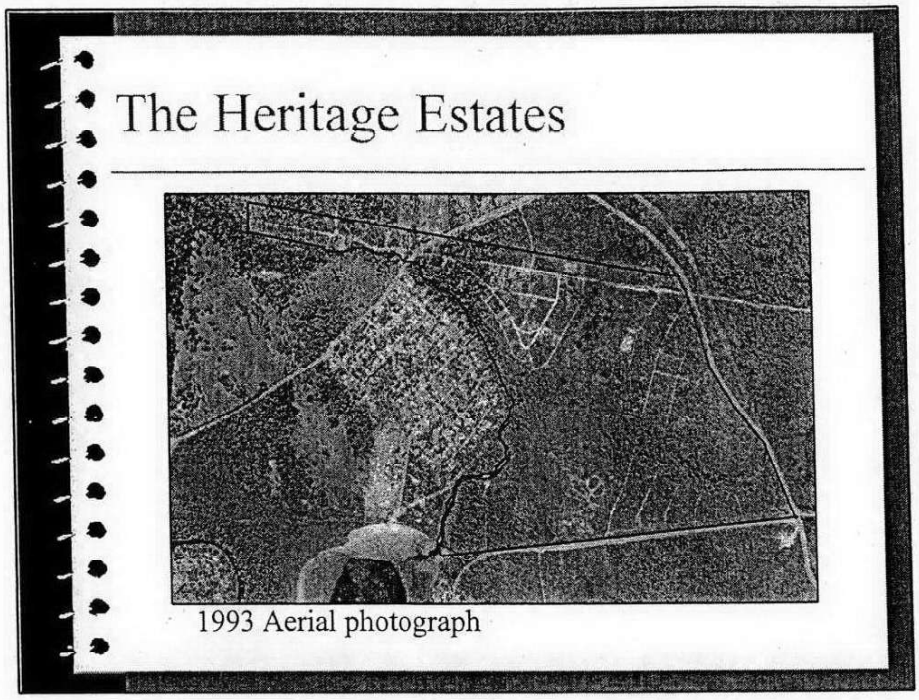
consultation/involvement of the local Aboriginal community

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•In examining the intrinsic values of the site, I will first summarise the distribution of vegetation communities across the site, Pages 22 and 23 of our submission list those species of significance recorded, considered to have high probability of occurrence and considered to have low probability of occurrence by vegetation community.

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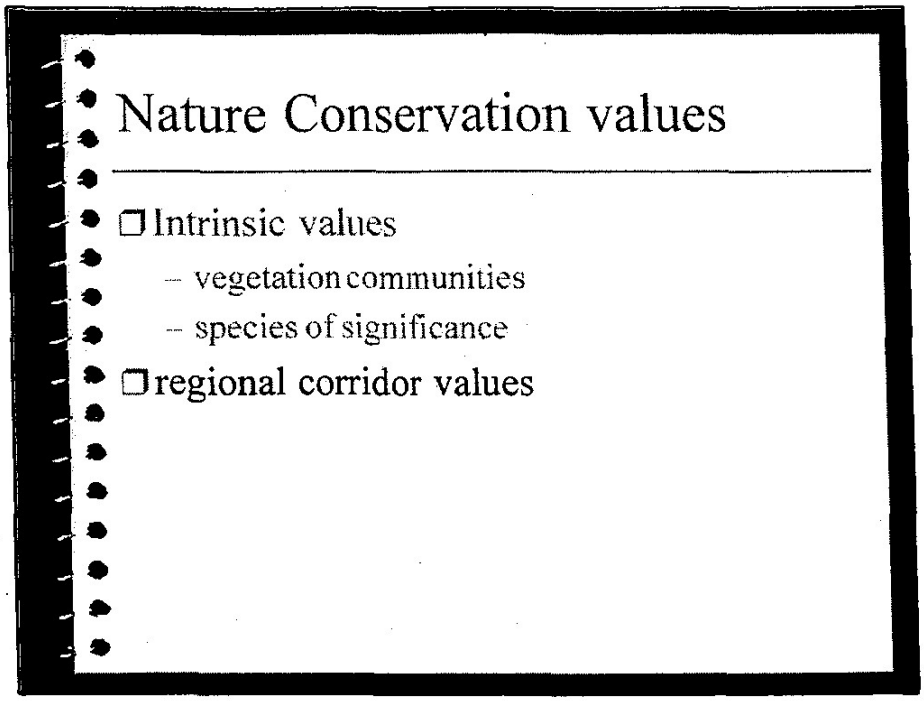
run through the distribution of the four vegetation communities (using the mouse)

•the four veg communities at the heritage Estates are Riparian open Forest, Blackbutt Open Forest, Scribbly Gum Woodland and Closed Sedgeland.

•As shown in our submission, each has either recorded or a high probability of occurrence of threatened and other significant species. Whilst most of these values have been highlighted in other reports that the Commissioner has access to (including the local environmental study), it is important to note that there has been a recent new record, Melaleuca biconvexa, on the Greek Orthodox church site at Birriga Ave.

•Essentially, the entire site is of conservation significance based upon the provision of habitat for threatened species.

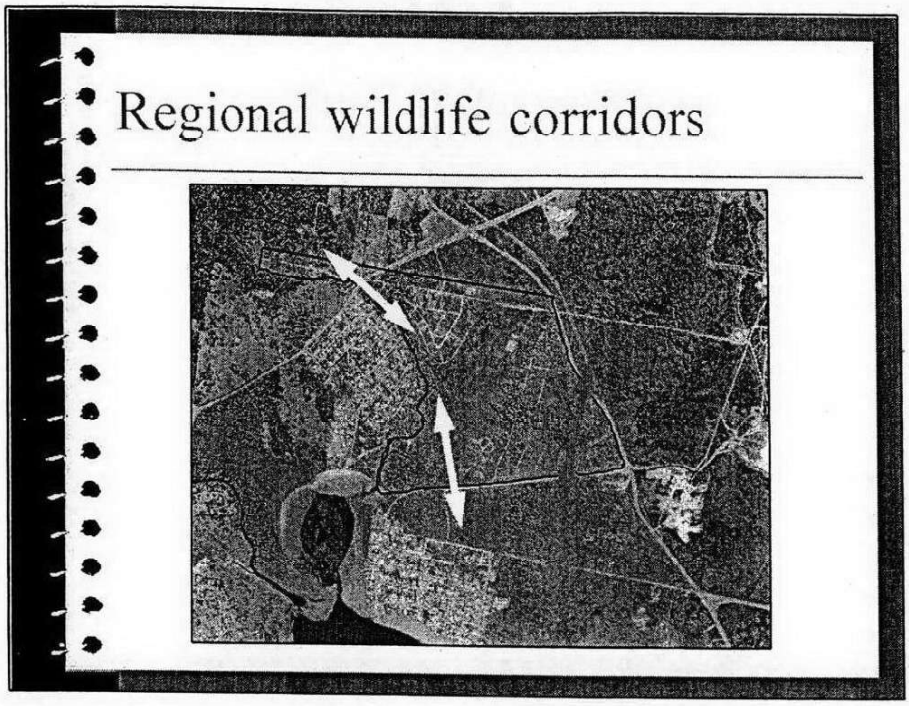
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•The other major value of the site is the role it plays as part of regional wildlife corridors, linking with other areas including two national parks and corridors identified in the Jervis Bay REP

•these values also identified in previous reports including the Local Environmental Study, also background reports for the JB REP, although for reasons discussed in our submission and to which I will refer later, they were removed as formal corridors in the REP

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•The first of these linkages, indicated by the green arrow above, provides the only contiguous north-south timbered link from the Bherwerre Peninsula to the areas of JBNP west of Huskisson and Vincentia. To the north and south of the Heritage Estates site, it links with areas zoned 8(b) which will form part of the NSW Jervis Bay national park. Although there is a continuous linkage of national park to the east, it is comprised only of heathland and sedgeland and would not enable the movement of tree dwelling species such as the Yellow-bellied glider.

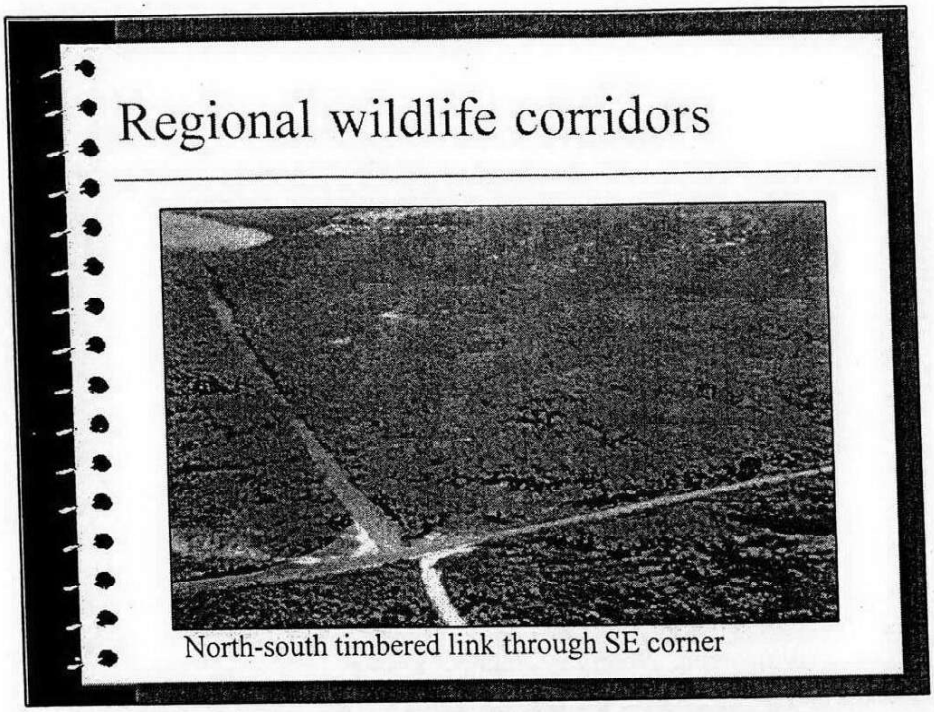
•The section of this linkage running through the south-east corner of the Heritage Estates was removed from the habitat corridor in the REP as most of the north-south corridor was zoned 8(b)proposed national park.

•The second is along the Worrowing waterway, and is indicated on the slide by the yellow arrows. This is part of a major linkage from the southern section of Jervis bay National park through to the forests north of St Georges basin and on to Yerrinyong SF and the proposed Parma Creek nature Reserve.

•This linkage, originally proposed as habitat corridor 4 in the background papers for the REP, was instead given a downgraded "Disturbed habitat and vegetation" status. NPWS agreed that the lands were probably too fragmented for full corridor status, however they are still considered to form a very important linkage for the Bherwerre peninsula and to be critical for the dispersal of many species of flora and fauna.

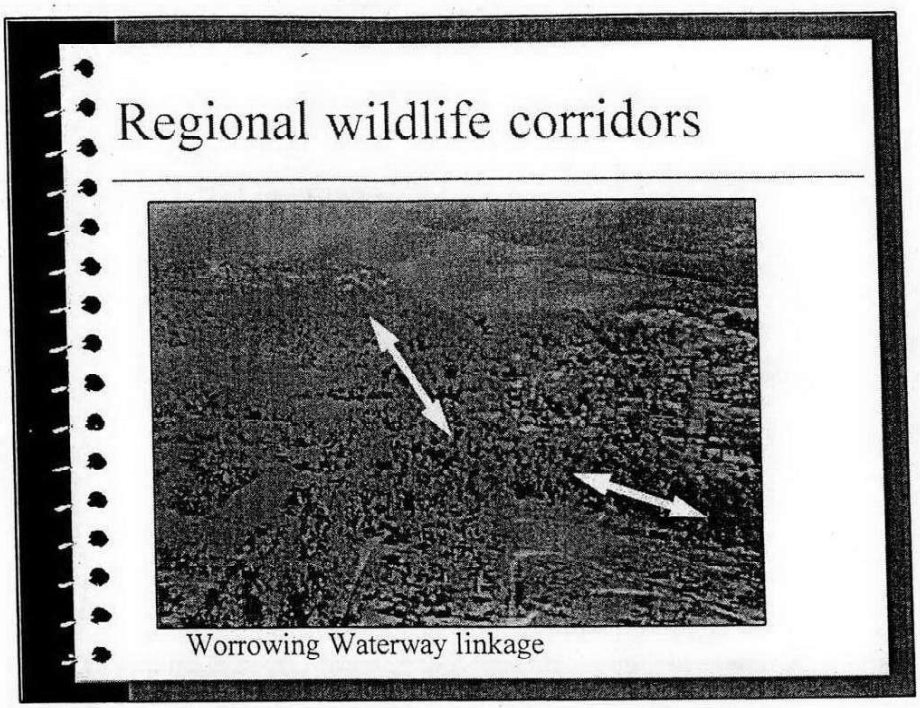
•The REP clause requires maximising the retention of vegetation and the rehabilitation of degraded areas. Given the density of development proposed, it is the opinion of the NPWS that full development of the Heritage Estates would not be able to meet this clause.

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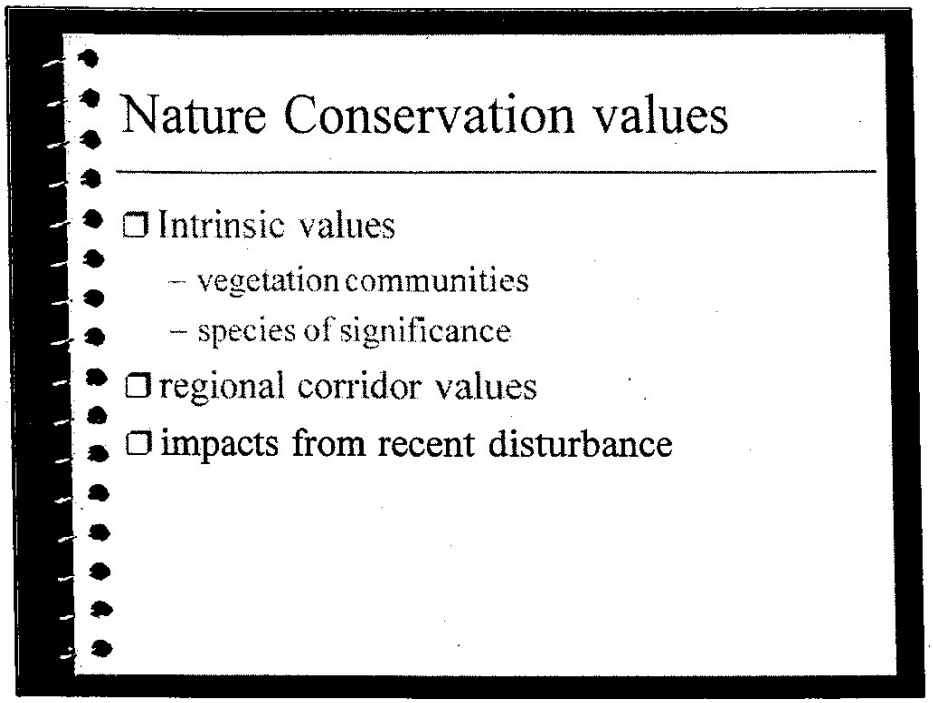
•this slide is an aerial oblique picture of the south-east corner of the Heritage Estates. The arrows indicate the general direction of the north-south timbered link, the only opportunity to retain a contiguous timbered linkage providing for the movement of tree dwelling species around the edge of Jervis bay.

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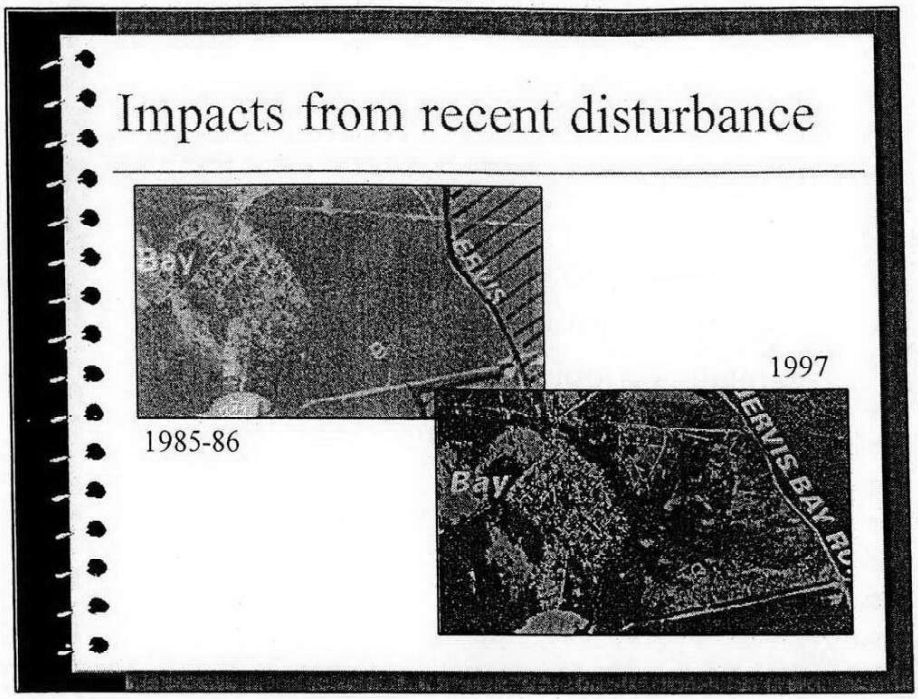
•This is a photo of the linkage that currently has "disturbed habitat and vegetation" clause applying to it in the REP. It is based on the vegetation along the Worrowing waterway, although the clause applies to a much larger area which would be primarily cleared under a full development scenario.

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•Of particular concern to NPWS has been the progressive degradation of the vegetation cover and condition on the site in the period since the blocks were sold into individual ownerships in the last 1980s

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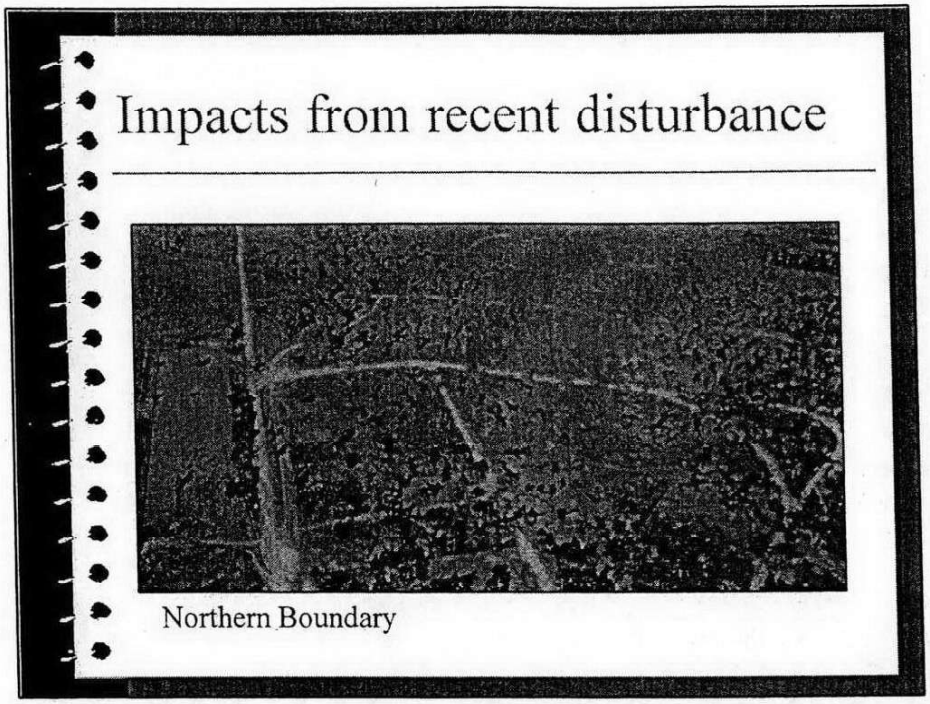


•These two images demonstrate the extent of the decline in vegetation cover on parts of the site. They are taken from aerial photograph overviews of the Jervis Bay region prepared by the Commonwealth in the mid 1980s and mid 1990s respectively.

•The first photo from aerial photography in 1985-86 shows a site nearly fully vegetated and with very few impacts from clearing or roading apparent. The second, taken in 1997 shows a very different story with major loss of vegetative cover through progressive clearing roading and burning of the site.

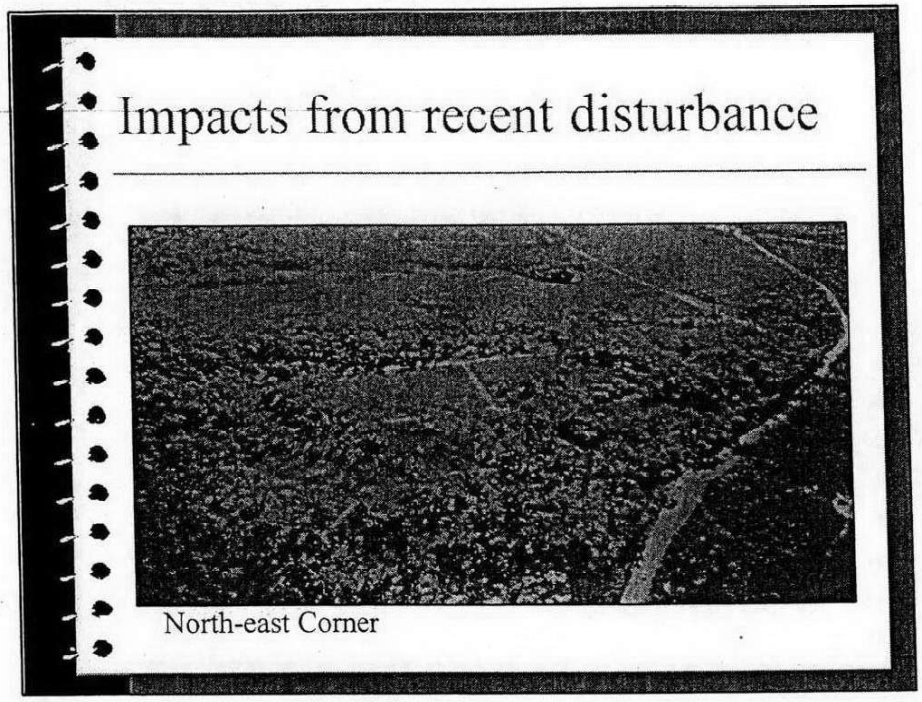
•A Recent aerial inspection of the site showed little evidence of clearing since 1997, despite recent proposals of the SLA since the announcement of the COI.

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•this slide shows impacts from clearing and roading along the northern boundary of the site.

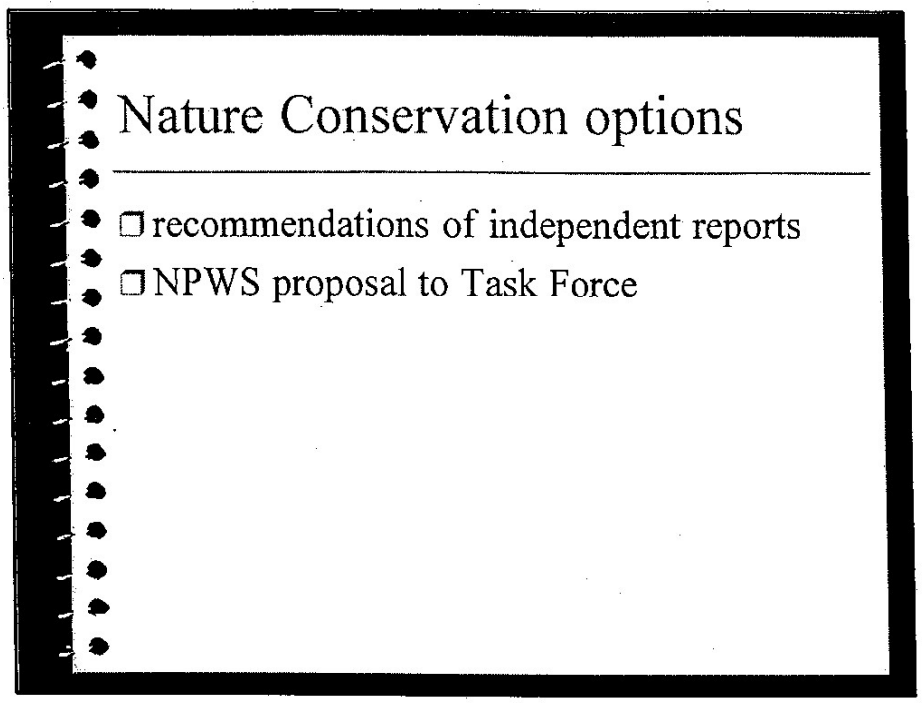
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•similar impact on the north-east corner.

•Fortunately these unauthorised activities, while certainly impacting upon the site, and probably directly impacting on individuals of several species, have not greatly reduced the overall conservation value of the site. The AES report (1995) was done after most of the disturbance had occurred and it still demonstrated high conservation values. Active rehab in some areas would improve the value of the linkages.

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•firstly need to look at the options put forward by the independent studies carried out for Council

•Andrews.Neil & Hassell (LES) - all areas possessing significant nature conservation values should be protected from development. Only a small area in the SW may be appropriate fro development, although it may be needed for corridor. ENv Prot zoning most appropriate zoning, possibly a small tourist facility could be permitted.

•AES - confirmed nature conservation values (intrinsic and regional) and recommended that a substantial part of the site should be set aside if the area was to be rezoned.

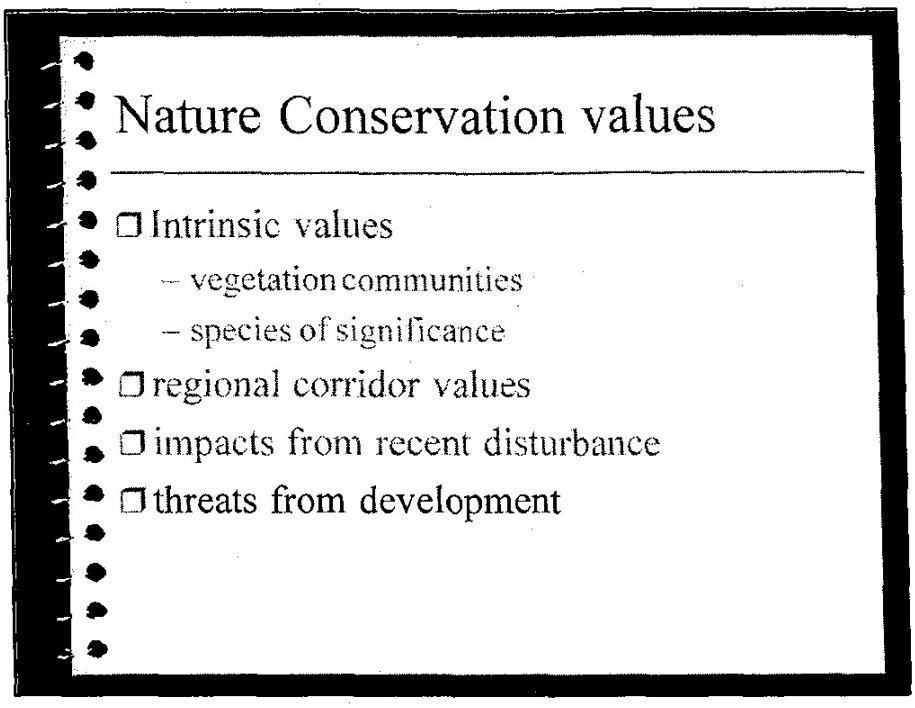
•NPWS told council of its support for these reports and that there was a sufficient body of information on which to make a decision. NPWS took this position again at the taskforce (that no further studies needed). We were criticised in one of the submissions that we did not want an independent study of the area - if these three studies were not independent then what were they?

CLICK

•During the time leading up to the taskforce, NPWS became most concerned about the extent of the degradation occurring to the site. It was clear that what was needed was a final decision about the long term use of the land or there would be no nature conservation values left to argue about. In order to expedite this, NPWS formulated a compromise position which would permit a large part of the site to be developed whilst conserving the core areas of high conservation value

TASKFORCE PROCESS ATTEMPT TO REACH COMPROMISE POSITION

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•~~we~~ I will now briefly address the potential impacts to the identified values that would be brought about by its development as a housing estate

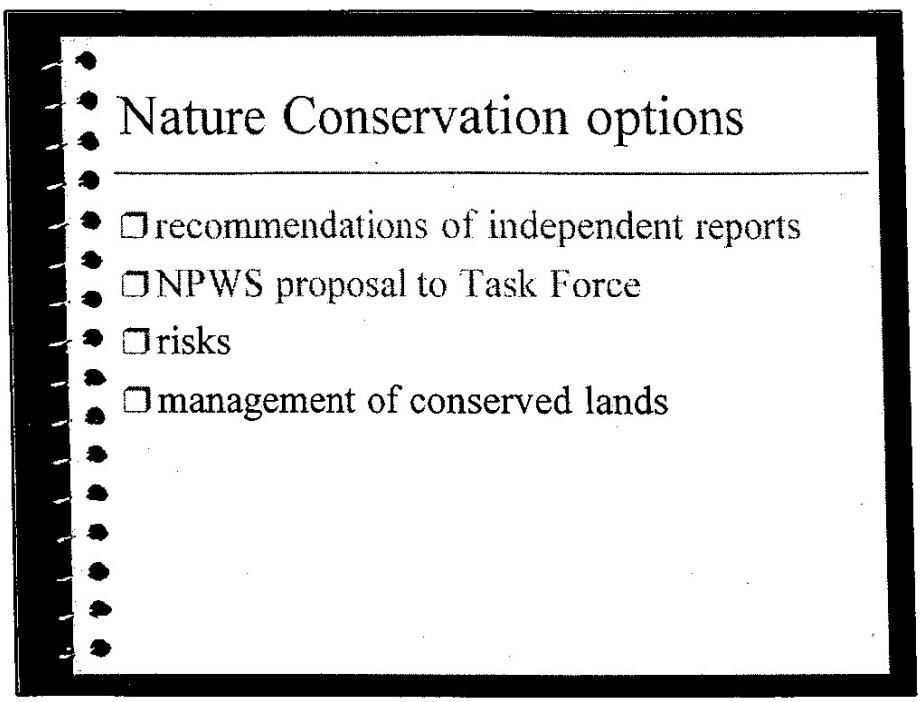
•DIRECT IMPACTS from clearing, roading, housing and infrastructure development resulting in the removal of vegetation. in habitat terms this will result in either further fragmentation of habitat or linkages, or its complete loss. Both will result in the loss of species.

•Additionally, the increase in the edge to area ration of retained habitat will lead to an increase in edge effects, leading to a further decline in the condition of habitat.

•INDIRECT IMPACTS associated with the development and ongoing use and management of the area~~, and~~ include alteration of the water table, rubbish dumping, weeds, recreational pressures, increased burning for bushfire hazard reduction etc. The impacts arising simply from the introduction of domestic pets could have a potentially huge impact on native fauna.

•Given the density of the subdivision, You only need look at what has happened in the development of surrounding areas such as Old Errowal Bay to realise that significant species loss would occur from the site if development as proposed were permitted. The value of the site in a regional context in providing two significant wildlife linkages would be severely compromised in this scenario.

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•However, we must also be clear that , Even if this proposal were to be adopted, there remains significant environmental risk, and significant environmental degradation will probably result from this option. Other threatened fauna species considered likely to occur on site including the endangered Eastern Bristlebird and the vulnerable white-footed Dunnart and Ground parrot would have most if not all of their habitat removed or highly modified by the development. Species loss would inevitably occur given the design and density of the subdivision - there is little or no opportunity for conservation of habitat on individual lots permitted for development. Corridor function will also be compromised to a degree given the edge effects associated with development.

given their size.

•SO, option 4 is truly a compromise in the full meaning of the word.

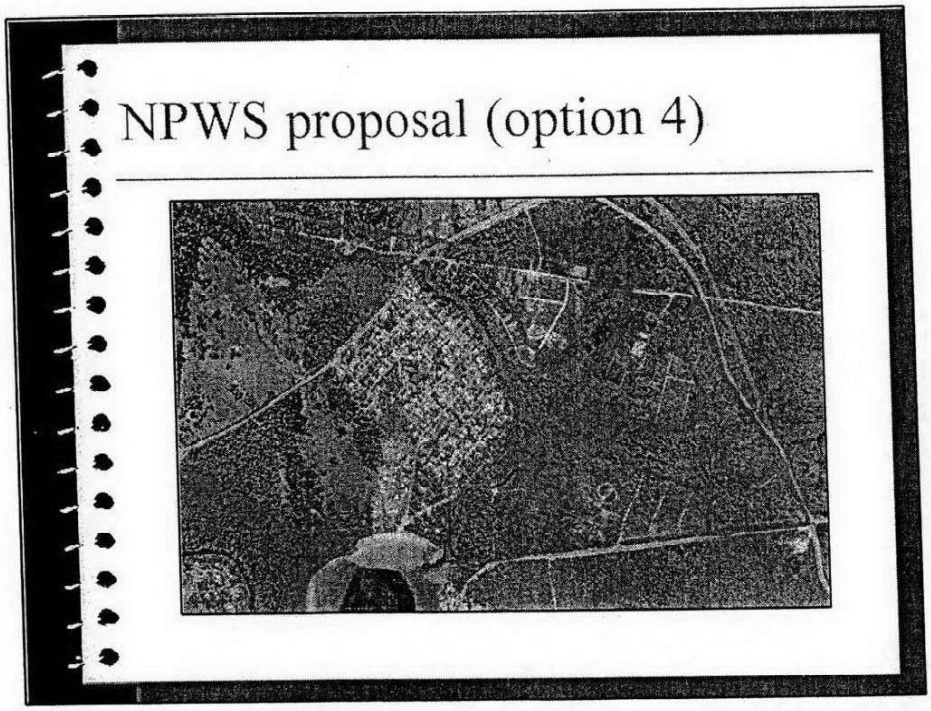
•The appropriateness of any development with respect to the NSW Wetlands management policy also needs to be considered - see p 29 of the submission.

exclude sedgeland result option 4

CLICK

•Ongoing management of the retained habitat system is an important issue to consider as well should a compromise be reached. Retained habitat would best be managed by Council as community land on a cooperative basis with NPWS (given its importance to the JBNP) and opportunity for local community involvement. Zoning as environmental protection with management objectives providing protection from habitat degradation from the adjacent development and maintenance of the linkage values would be desirable. The locating of infrastructure associated with housing development in a retained habitat system is not appropriate.

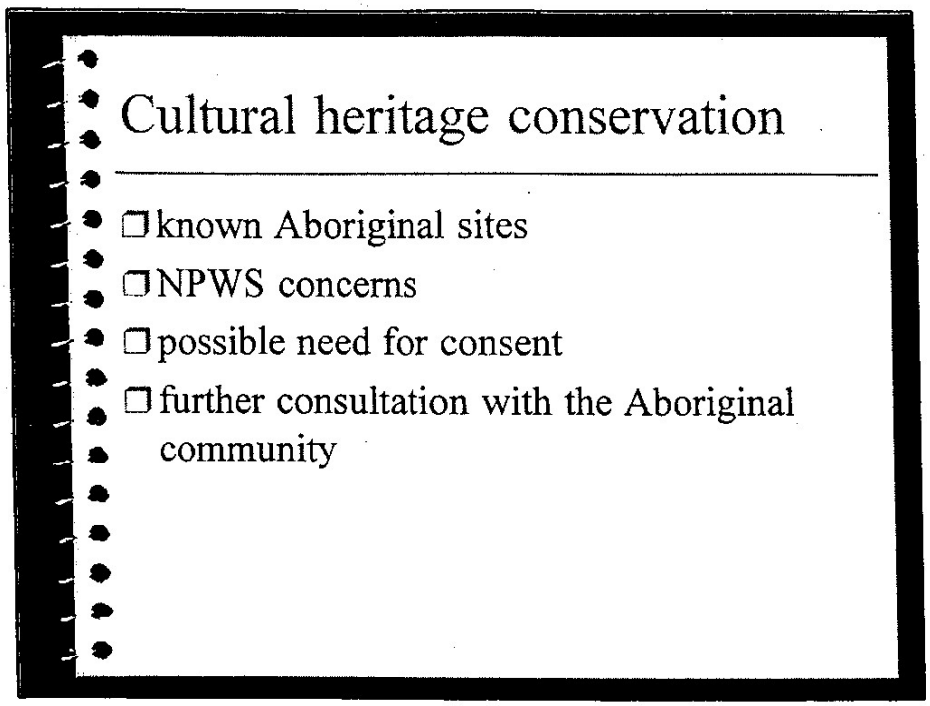
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•This retained habitat system gives priority to the protection of the regional linkages previously discussed, and the known significant fauna habitats. Both the link based on the Worrowing Waterway and the north-south link are protected to a degree, and a link between the two is based upon the Blackbutt Open Forest community.

•The rationale was: regional linkage values are the most significant, threatened species recorded on site were reliant on the forested communities for habitat, closed sedgeland communities are likely to be majorly impacted through changes to the watertable as a result of development, and the closed sedgeland and scribbly gum woodland are better represented in the Jervis Bay national park that the forested communities.

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•there are two recorded Aboriginal archaeological sites on the Heritage Estates, both are along the Worrowing Waterway in areas not proposed to be developed.

CLICK

•the report of Stone (1995) did not identify any new sites but did identify area considered to be of "moderate-high" archaeological potential. NPWS reviewed this report and highlighted several shortcomings, and indicated that it was likely that (given other records in the region) there may be a high potential for sites in areas that Stone described as having low potential.

CLICK

•this means that development could be delayed, modified or even prevented on individual blocks if sites are found following a decision to rezone. In such cases, a s.90 consent to destroy is required under the NPW Act

CLICK

•some involvement of the local Aboriginal community in the 1995 report, NPWS consider it is important that the community be re-enganged and their views sought on the significance of the Heritage Estates and the rezoning proposal.

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ATTACHMENT 9. Report prepared by Eco Logical Australia Pty Ltd (ELA)

"Public Environment Report Biodiversity Impact Assessment – Heritage Estates Rezoning Investigations"

January 2008

Report prepared for Shoalhaven City Council

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ASSESSMENT | PLANNING | MANAGEMENT

Public Environment Report
Biodiversity Impact Assessment

Heritage Estates Rezoning Investigations

Report prepared for:
Shoalhaven City Council

January 2008

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Document Tracking

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1. Introduction

1.1 Description of Project

Heritage Estates (HE) is located at Worrowing Heights approximately 28km south of Nowra immediately to the north of Erowal Bay in NSW. The site is surrounded to the east and south by Jervis Bay National Park, to the west by Worrowing Waterway and Old Erowal Bay township and to the north a mixture of cleared and forested private land and Jervis Bay National Park (MAP 1).

HE comprises 1232 registered lots totalling 180 ha on land zoned as rural. Rezoning of the land was attempted in the mid to late 1990's by Shoalhaven City Council on behalf of the landowners and was unsuccessful. Disagreement about the suitability of the land for development resulted in a Commission of Inquiry (CoI) in 1999 by the NSW Government. The CoI concluded that there was scope for a maximum of 730 lots located within four investigation areas totalling 90 ha, subject to further investigation. The areas identified by the CoI for further investigation were earmarked as 'possible urban expansion' in the Jervis Bay Settlement Strategy (SSC 2003) endorsed by the NSW Government.

The action being assessed in this report is the proposed rezoning of 730 lots for residential subdivision within four Investigation Areas, and protection of the adjacent Environmental Protection areas identified by the CoI within the area known as HE (MAP 1).

HE is a 180ha parcel of land located on the isthmus of Bherwerre Peninsula at Jervis Bay. The vegetation on the site has been disturbed in some areas but is generally of high quality (BES 2007). There is a mosaic of 9 vegetation communities, predominately heath and woodland derivatives, on the site (MAP 2) which provide habitat for a wide range of species.

HE forms part of the isthmus linking Booderee National Park, which is located 2.8km to the south, to other areas of habitat in the region. Additionally, the only continuous forested link through Bherwerre Peninsula to Booderee National Park passes through HE.

The proposal to rezone the HE to facilitate residential development was referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to the Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA) following a detailed flora and fauna assessment (BES 2007). The proposal was determined to be a 'controlled action' with the following controlling provisions:

- listed threatened species and communities (sections 18 and 18A); and

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- Commonwealth land (sections 26 and 27A).

DEWHA determined that the project should be assessed by Public Environment Report (PER). Eco Logical Australia has been commissioned by Shoalhaven City Council (SCC) to prepare an assessment of the potential impacts of the rezoning of HE on identified matters of NES and impacts to Commonwealth land. This assessment is based on a review of a range of reports and documents (including detailed flora and fauna studies). See Section 2.

1.2 Structure of Document

This document has been developed concurrently with the PER being prepared by SCC. The purpose of this document is to solely assess the potential impacts to biodiversity of the HE rezoning proposal and related aspects of the PER guidelines prepared by DEWHA.

Background to this proposal and the species and land considered within it is provided within the PER proper. As a result this report cannot be considered as a stand alone document and must be read in conjunction with the PER.

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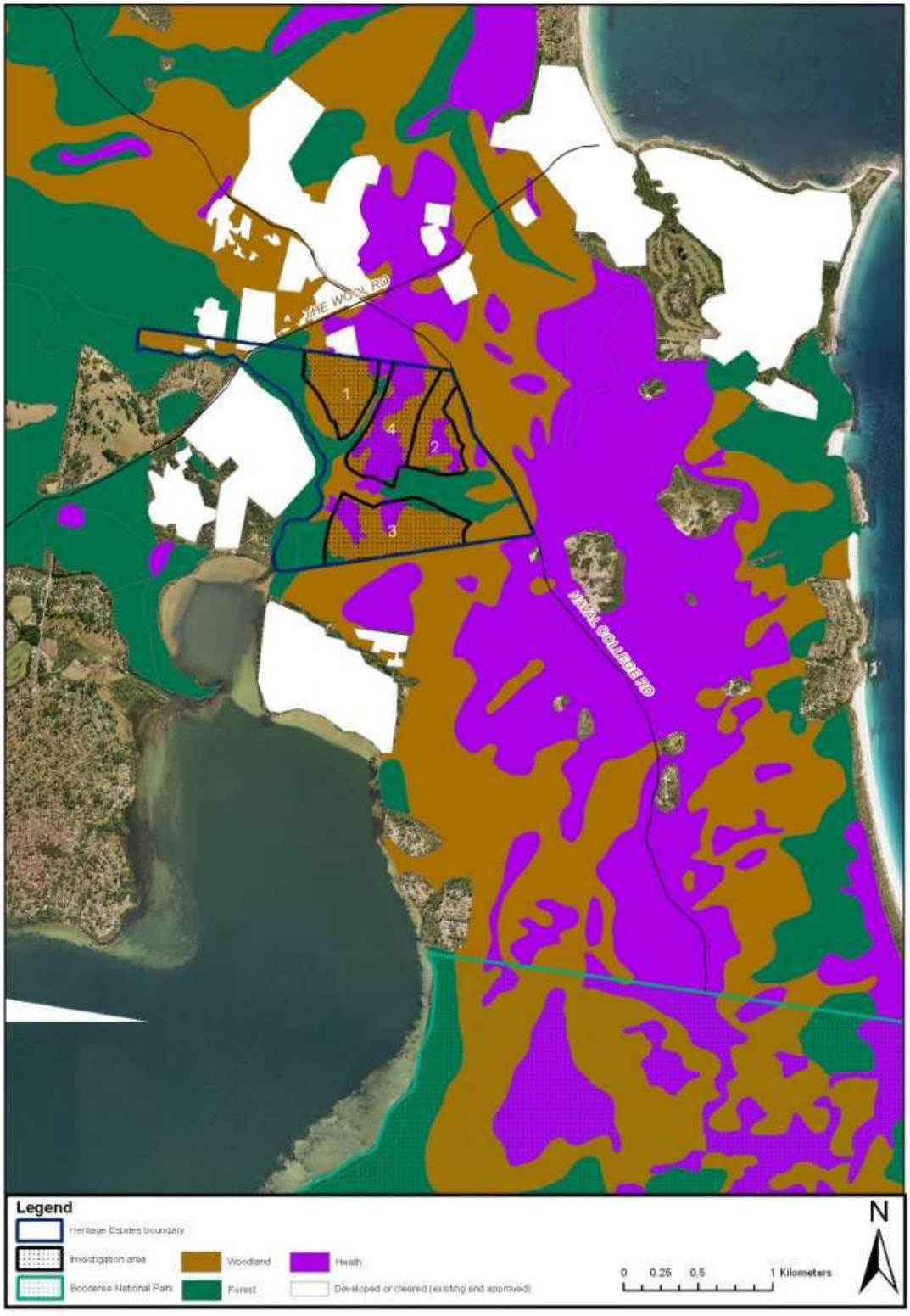
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MAP 1: Location of Heritage Estates study area and CoI Investigation Areas

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MAP 2: Combined vegetation communities, simplified combining BES (2007) and Mills (1993)

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2. Information Review

This section outlines the methods used for the literature review and the review of available mapping data.

2.1 Literature Review

Available literature on previous studies in the area, submissions to SCC and DEWHA regarding the HE proposal and relevant scientific literature have been reviewed. Table 1 below summarises the main findings of pertinent reports. Note that it is not a complete summary of the full literature review.

2.2 Mapping Review

The following mapped data was reviewed to develop an understanding of the environment of the study area and the available resources for species on Bherwerre Peninsula.

Mapping that was reviewed included:

- Aerial photography
- Shoalhaven City Council vegetation mapping
- Regional corridor mapping
- Bionet mapping of flora and fauna species records
- Habitat mapping for selected threatened species
- Land tenure

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Table 1: Literature review of pertinent reports in the area

Report	Purpose	Main outcomes
BES 2007	Flora and fauna assessment of HE	Sandstone, several ephemeral creeks Disturbances such as fire, clearing/slashing, tracks 9 vegetation communities, 1 EEC (TSC Act) 252 flora spp (6 intro, 3 threatened) *Melaleuca biconvexa* and *Cryptostylus hunteriana* (vulnerable TSC and EPBC) 489 hollow bearing trees, sap trees, winter-flowering trees, blossom trees 154 fauna spp (17 threatened TSC) , many identified in Booderee 2007 submission Eastern bristlebird (endangered TSC and EPBC), grey-headed flying-fox (vulnerable TSC and EPBC), black-faced monach, latham's snipe, rufous fantail, white-bellied sea-eagle and white-throated needletail (migratory EPBC) Probably also giant burrowing frog (vunerable TSC and EPBC) Site is an important corridor for a range of species and contains a diversity of habitats
Possingham review of BES 2007	Review	Wide range of impacts to all threatened species. Loss of eastern bristlebird individuals and habitat, loss of movement/connectivity Mitigation measures need to be ongoing and uncertain of outcomes
Lindenmayer review of BES 2007	Review	Proposal should not proceed Can't be redesigned to mitigate Big disruptions to biodiversity of Booderee NP Domestic pets and ferals an issue
Booderee 2007 submission to SCC on HE	Comment	List of species in park Area identified by Commonwealth as a vital link

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Report	Purpose	Main outcomes
		Geography makes the areas susceptible to isolation/fragmentation JBREP corridors inadequate, need bigger (DECC) List of species likely to be affected in/around Booderee
DECC 2007a submission to SCC on HE	Comment	DECC's position on the rezoning of HE remains as outlined in the submission to the COI on HE in 1999
DECC 1999 submission to the COI on HE	Comment	Bherwerre Peninsula contains largest area of reserved lands in the region Critical area of connectivity for wildlife movement for the long-term viability of biodiversity in Booderee NP is the link between the towns of Vincentia and Erowal Bay The western part of this link is within HE and is the only area of timbered communities within the link Those species reliant on timbered communities would be dependent on HE for movement between Bherwerre Peninsula and other reserved lands in the region
KMA 1991	Assessment of Jervis Bay wildlife corridors	Proposed Habitat Corridor No. 4 linking Bherwerre Peninsula to forests north of St Georges Basin and onto the forests of the escarpment west of Princess Hwy. This important corridor is identified in the Vincentia Structure Plan and also in this report. The proposed corridor No. 4, between 50m to 150m wide is to be considered a minimum width for functionality. Any upgrading of roads in the vicinity need to take this corridor into consideration
Andrews.Neil 1993	Flora and fauna assessment of HE	Four vegetation communities present, with important ecological attributes Important 'keystone' winter flowering tree species (Swamp Mahogany) Rare and threatened plants present Threatened fauna present including forest species such as yellow-bellied glider
AES 1995	Strategic flora and fauna study of HE	Whole of HE acting as a wildlife corridor and habitat in its own right The isthmus acts as a major regional wildlife corridor linking Bherwerre Peninsula to other large bushland areas in the region Impacts to the corridor would be likely to lead to a decrease in biodiversity on Bherwerre Peninsula in the long-term The western side of the isthmus (HE) contains a continual band of forest linking the peninsula with the hinterland

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Report	Purpose	Main outcomes
		forests north of the Wool Road.
BES 2005	Flora and fauna assessment of proposed Baptist Church site	Recorded a number of fauna species, including threatened species and those listed in the Booderee 2007 submission Recorded *Cryptostylis hunteriana* (vulnerable TSC and EPBC) on site Concluded proposal to be unlikely to have significant impact to threatened species provided development controls undertaken
ERM 2002	Flora and fauna assessment of Pacific City Estates	Recorded a number of fauna species, including threatened species and those listed in the Booderee 2007 submission Provided some potential options for minor development in the area in degraded quarries

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3. Species of concern

Based on the review of the available information, the proposed rezoning has the potential to have significant impacts on a number of listed threatened species as well as broader biodiversity elements of the environment as they relate to nearby Commonwealth land.

A significant impact is described as an impact that is important, notable, or of consequence, having regard to its context or intensity. This analysis of impacts has been undertaken with consideration of the relevant EPBC Act significant impact guidelines (Policy Statements 1.1 and 1.2).

3.1 Methodology of review

To confirm those species required to be assessed under the HE proposal, all EPBC listed species identified by BES (2007) and those species identified within the Booderee NP submission to SCC (Booderee 2007) were initially considered.

Table 2 lists all potential species of concern in relation to the HE development. For each species, an initial analysis of the potential impacts of the development has been undertaken (Table 2).

The impact to species was rated from Low to High based on whether the species was present or predicted to be present, regional population size, available habitat and corridors in the region, likely use of the HE as a corridor and conservation status. Species that may be subject to medium or high impacts have been identified for further assessment. These are discussed in the following sections.

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Table 2a: Lists all fauna species of concern in Heritage Estates. This table has been used to rationalise species that area likely to be significantly impacted by the proposed rezoning

Species	Legal Status		Extent of primary/secondary habitat				Average home range mode movement	Is the H.E. part of a habitat corridor for the species?	Key Threats in JB region	Biodiversity outcomes if developed				
	TSC Act	EPBC Act	Heritage Estates – investigation areas	Heritage Estates – areas recommended for environmental protection	Present in Booderee	Remaining area of the isthmus (south of the Wool Road to the Booderee NP boundary) based on vegetation mapping				Would the species be likely to move through the Col E.P. area?	Would the species be likely to use other corridors in the area?	Long term viability of population on peninsula	Significance of onsite impacts	Reason for significance
Species recorded in BES 2007														
BIRDS														
Eastern Bristlebird *Dasyornis brachypterus*	E	E	Yes 83.1ha	Yes 67.2ha	Yes	Yes Approx 1100ha	2-5ha Ground/semi-flightless	Habitat corridor	Clearing, feral animals, fire	Marginal	Yes	Good but impacted	High	Loss of large amount of habitat in important population
Black-faced Monach *Monarcha melanopsis*	-	M	Yes 5.5ha	Yes 47ha	Yes	Yes Approx 150ha	Migrant Flying	Habitat corridor	Clearing, feral animals, fire	Yes	Yes	Good	Low	Migratory species, all habitat retained
Latham's Snipe *Gallinago hardwickii*	-	M	Yes 21.6ha	Yes 3.7ha	Yes	Yes Approx 35ha	Migrant Flying	Habitat corridor	Clearing, feral animals, fire	No	No	Unknown	Low	Migratory and non-breeding on site. Impact on small number of individuals
Rufous Fantail *Rhipidura rufifrons*	-	M	Yes 5.5ha	Yes 47ha	Yes	Yes Approx 150ha	Migrant Flying	Habitat corridor	Clearing, feral animals, fire	Yes	Yes	Good	Low	Migratory species, all habitat retained
White-bellied Sea-eagle *Haliaeetus leucogaster*	-	M	No	Yes	Yes	Yes Approx 150ha	3km² defend 130km² hunt Flying	Habitat corridor	Clearing	Yes	Yes	Good	Low	Migratory species, all habitat retained
White-throated Needletail *Hirundapus caudacutus*	-	M	Yes (all)	Yes (all)	Yes (all)	Yes (all)	Unknown but large Fly	Over fly	Clearing	No	Yes	Good	Low	Migratory species unlikely to use resources on site
MAMMALS														
Grey-headed Flying-fox *Pteropus poliocephalus*	V	V	Yes (feeding)	Yes (feeding)	Yes (feeding)	Yes (feeding) Approx 500ha	Travel up to 50km to feed Fly	Habitat corridor	Clearing, fire	Yes	Yes	Good	Low	Not roosting habitat and travels long distances for feeding
AMPHIBIANS														
*Giant Burrowing Frog *Heleioporus australiacus*	V	V	Yes 89.8ha	Yes 73.6ha	Yes	Yes Unknown	Large, can move over 300m per night. Ground	Habitat, can feed distant from breeding habitat	Clearing, feral animals, fire, high nutrients	Yes but sensitive to urban development	Yes	Moderate	Medium	Large area of potential habitat removed and interruption to connectivity
Species in Booderee NP of concern if corridors are impacted (Booderee 2007)														
MAMMALS														
White-footed Dunnart *Sminthopsis leucopus*	V	-	Yes 87.5ha	Yes 83.1ha	Yes	Yes Approx 650ha	Average r between 80 – 720m. Overlap Ground	Habitat corridor	Clearing, fire, feral animals	Marginal	Yes	Good	High	Found on site, significant habitat to be removed and unlikely to use COI EP areas
Long-nosed Bandicoot *Perameles nasuta*	-	-	Yes 87.5ha	Yes 83.1ha	Yes	Yes Approx 650ha	Small – few hectares Ground	Habitat corridor	Clearing, fire, feral animals	Yes	Marginal, in the east	Good	Low	Large populations in the region, likely to use the COI EP areas and probably other corridors
Greater Glider *Petauroides volans*	-	-	Yes 9.6ha	Yes 69.6ha	Yes	Yes Approx 150ha	3ha Arboreal	Habitat corridor	Clearing, fire, feral animals	Marginal due to potential edge effects	Unlikely	Poor	High	COI EP areas only movement corridor

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Species	Legal Status		Extent of primary/secondary habitat				Average home range mode movement	Is the H.E. part of a habitat corridor for the species?	Key Threats in JB region	Biodiversity outcomes if developed				
	TSC Act	EPBC Act	Heritage Estates – investigation areas	Heritage Estates – areas recommended for environmental protection	Present in Booderee	Remaining area of the isthmus (south of the Wool Road to the Booderee NP boundary) based on vegetation mapping				Would the species be likely to move through the Col E.P. area?	Would the species be likely to use other corridors in the area?	Long term viability of population on peninsula	Significance of onsite impacts	Reason for significance
Sugar Glider *Petaurus breviceps*	-	-	Yes 44.6ha	Yes 69.6ha	Yes	Yes Approx 650ha	3ha Arboreal	Habitat corridor	Clearing, fire, feral animals	Yes	Marginal, in the east	Moderate	High	Rely on HE for movement along Bherwerre Peninsula
Eastern Pygmy-possum *Cercartetus nanus*	V	-	Yes 87.7ha	Yes 88.9ha	Yes	Yes Approx 1100ha	0.7ha, overlap Arboreal	Habitat corridor	Clearing, fire, feral animals	Marginal	Yes	Good	High	Significant amount of habitat removed and some impact to connectivity
**Feathertail Glider *Acrobates pygmaeus*	-	-	Yes 9.6 ha	Yes 69.6ha	Yes	Yes Approx 150ha	2ha Arboreal	Habitat corridor	Clearing, fire, feral animals	Yes	Marginal, in the east	Moderate	High	Rely on HE for movement along Bherwerre Peninsula
**Red-necked Wallaby *Macropus rufogriseus*	-	-	Yes all	Yes all	Yes	Yes Approx 2000ha	30ha Ground	Habitat corridor	Clearing, feral animals, fire	Yes	Yes	Good	Low	Other areas of connectivity and presently increasing in Booderee NP
Swamp Wallaby *Wallabia bicolor*	-	-	Yes all	Yes all	Yes	Yes Approx 2000ha	18ha Ground	Habitat corridor	Clearing, feral animals, fire	Yes	Yes	Good	Low	Large population and will use other areas of Bherwerre Peninsula for movement
Swamp Rat *Rattus lutreolus*	-	-	Yes 51.6ha	Yes 17.9ha	Yes	Yes Approx 250ha	0.5 – 4ha Ground	Habitat corridor	Clearing, feral animals, fire	Yes	Marginal	Good	High	Majority of habitat will be lost in HE and requires HE for connectivity
Eastern chestnut Mouse *Pseodomys gracilicaudatus*	-	-	Yes 51.6ha	Yes 17.9ha	Yes	Yes Approx 250ha	0.5ha Ground	Habitat corridor	Clearing, feral animals, fire	Yes	Unlikely	Unknown	High	Majority of habitat will be lost in HE and requires HE for connectivity
BIRDS														
Powerful Owl *Ninox strenua*	V	-	Yes 64.1ha	Yes 83.2ha	Yes	Yes Approx 550ha	>1500ha Flying	Key habitat	Clearing	Yes	Yes	Good but impacted	Medium	Nesting and foraging resources within HE
**Barking Owl *Ninox connivens*	V	-	Yes 90.0ha	Yes 89.5ha	Yes	Yes Approx 550ha	30 – 200ha Flying	Habitat corridor	Clearing, fire	Yes	Yes	Good but impacted	Medium	Nesting and foraging resources within HE
Ground Parrot *Pezoporus wallicus*	V	-	Yes 51.6ha	Yes 17.9ha	Yes	Yes Approx 100ha	10ha Flying	Habitat corridor	Clearing, feral animals, fire	No	Yes	Moderate	High	Significant amount of habitat lost and few areas of habitat on Bherwerre Peninsula
**Southern Emu Wren *Stipiturus malachurus*	-	-	Yes 83.1ha	Yes 67.2ha	Yes	Yes Approx 1100ha	1ha Flying	Habitat corridor	Clearing, feral animals, fire	Marginal	Yes	Good	Low	Other areas of habitat and connectivity on Bherwerre Peninsula
**Beautiful Firetail *Stagonopleura bella*	-	-	Yes 83.1ha	Yes 67.2ha	Yes	Yes Approx 1100ha	- Flying	Habitat corridor	Clearing, feral animals, fire	Marginal	Yes	Unknown	Medium	Significant amount of habitat removed and some impact to connectivity
Eastern Bristlebird *Dasyornis brachypterus*	See previous listing above													

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Species	Legal Status		Extent of primary/secondary habitat				Average home range	Is the H.E. part of a habitat corridor for the species?	Key Threats in JB region	Biodiversity outcomes if developed				
	TSC Act	EPBC Act	Heritage Estates – investigation areas	Heritage Estates – areas recommended for environmental protection	Present in Booderee	Remaining area of the isthmus (south of the Wool Road to the Booderee NP boundary) based on vegetation mapping	mode movement			Would the species be likely to move through the Col E.P. area?	Would the species be likely to use other corridors in the area?	Long term viability of population on peninsula	Significance of onsite impacts	Reason for significance
REPTILES														
Diamond Python *Morelia spilota*	-	-	Yes all	Yes all	Yes	Yes Most areas of Bherwerre Peninsula	125ha Ground arboreal	Habitat corridor	Clearing, feral animals, fire	Yes	Yes	Good	Low	Other areas of habitat and connectivity on Bherwerre Peninsula
AMPHIBIANS														
Giant Burrowing Frog *Heleioporus australiacus*	See previous listing above													
Species recently (<25yrs) extinct from Booderee NP														
MAMMALS														
**Spotted-tail Quoll *Dasyurus maculatus*	V	E	Yes 9.6 ha	Yes 69.6ha	Yes	Yes Approx 550ha	750 - 3500ha Ground arboreal	Habitat corridor	Clearing, feral animals, fire	Marginal	Marginal	Poor	Medium	COI EP areas only movement corridor
***Common Wombat *Vombatus ursinus*	-	-	No	Marginal	Yes	No	5 – 23ha Ground	No	Clearing, feral animals, fire	No	No	No population	Low	Not known from the area, unlikely
Yellow-bellied Glider *Petaurus australis*	V	-	Yes 9.6 ha	Yes 69.6ha	Yes	Yes Approx 300ha	20 – 85ha Arboreal	Habitat corridor	Clearing, feral animals, fire	Marginal due to potential edge effects	Unlikely	Poor	High	Habitat lost and COI EP areas only movement corridor
AMPHIBIANS														
**Green and Golden Bell Frog *Litoria aurea*	E	V	No	No	Yes	No	- Ground	No	Clearing, feral animals, fire, nutrients,	No	No	Unknown	Low	Not likely to occur on site

*not recorded in BES 2007 but highly likely that it occurs
** not recorded by BES 2007 but potential to occur as records around the area
***not recorded by BES 2007 and unlikely to occur as no records in the area

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Table 3b: Lists all flora species of concern in Heritage Estates. This table has been used to rationalise species that area likely to be significantly impacted by the proposed rezoning

Species	Conservation Status			PRESENCE				Pollinator Dispersal mechanisms	Is the H.E. part of 'dispersal corridor' for the species?	Significance of onsite impacts	Reason for significance
	TSC Act	EPBC Act	ROTAP	Heritage Estates – investigation areas	Heritage Estates – areas recommended for environmental protection	Present in Booderee	Remaining area of the isthmus (south of the Wool Road to the Booderee NP boundary)				
Species recorded in BES 2007											
Leafless Tongue Orchid *Cryptostylus hunteriana*	V	V		Yes	No	No (Taws 1997) Not predicted (SPRAT)	Yes	Flying insects Wind	Yes	High	Important populations that will be lost
Biconvex Paperbark *Melaleuca biconvexa*	V	V		No	Yes	Potential (DEW 2007)	No	Birds and insects Wind or water	Yes??	Medium to low	Some individuals will be impacted

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3.2 Listed threatened species

Four species listed as threatened under the EPBC Act were identified for detailed assessment. These species have been found on the HE site or considered likely to occur (due to their occurrence on adjoining land and presence of suitable habitat) and include:

1. Leafless Tongue Orchid (*Cryptostylis hunteriana*)
2. Biconvex Melaleuca (*Melaleuca biconvexa*)
3. Eastern Bristlebird (*Dasyornis brachypterus*)
4. Giant Burrowing Frog (*Heleioporus australiacus*) – not found on site but likely to occur

These species have been separated from those that follow as they are listed on the EPBC Act. Of these species, the biconvex melaleuca, eastern bristlebird and giant burrowing frog are also relevant to the assessment of Commonwealth land as they are found in Booderee NP. However, they have been separated to simplify the assessment process.

3.3 Commonwealth Land

The EPBC Act protects the whole of the environment with respect to actions that may impact Commonwealth land. The environment is defined in the EPBC Act as; ecosystems and their constituent parts, natural and physical resources, qualities and characteristics, and heritage values. This analysis focuses on potential impact to biodiversity and does not assess potential impact to heritage.

The Commonwealth land that has the potential to be affected by the proposed rezoning is the Jervis Bay Territory of which approximately 80% is protected by Booderee National Park. Booderee NP is 2.8km to the south of the proposed HE development area.

Booderee NP is a regionally important area because it has been officially protected as a reserve for over 35 years and contains over 1000 species of plants and animals, many of which are significant for the Jervis Bay region and the local indigenous community. It is also a 'hot spot' for threatened species of the region. The geography of the area is both an aid and restriction for the biodiversity of Booderee NP.

Booderee NP encompasses the southern portion of Bherwerre Peninsula with the isthmus the only terrestrial access to the Park. This provides for limited access into Booderee NP for threats such as introduced pests and fire, however, there is also only limited connectivity for native species. The isthmus connecting Booderee NP through the HE to other natural environments of the region represents one of the two remaining biodiversity corridors for many habitat specific species (MAP 2). This

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connectivity links Booderee NP through the Bherwerre Peninsula isthmus to native vegetation north of St Georges Basin and the Wool Road and to the escarpment vegetation west of the Princess Hwy (KMA 1991). These corridors and linkages have been identified in the Jervis Bay Settlement Strategy (SCC 2003).

Impacts to Booderee NP will result from the restriction of the movement of fauna along the Bherwerre Peninsula isthmus, to and from Booderee NP. Due to the geography of the area and the isthmus being the only terrestrial access to Booderee NP, any impacts to this natural wildlife corridor are likely to have long-term impacts on the environment of Booderee NP.

Potential impacts to Booderee NP have been investigated by concentrating on those species that are likely to be significantly impacted from changes to connectivity. Thirteen species were identified for detailed assessment, only one of these species (spotted-tail quoll) is listed on the EPBC Act.

It should also be noted that 3 of the EPBC listed species outlined previously (section 3.2 - biconvex melaleuca, eastern bristlebird and giant burrowing frog) are also of relevance to this assessment of Commonwealth land, although they have been left out of this section as impacts to those species have been considered separately. The 13 species considered in the assessment of Commonwealth land have been grouped into broad categories based on life history and habitat usage to rationalise the impact assessment and include:

1. Heath or wet area species
    - swamp rat (*Rattus lutreolus*), eastern chestnut mouse (*Pseudomys gracilicaudatus*)
2. Owls
    - powerful owl (*Ninox strenua*), barking owl (*Ninox connivens*)
3. Gliders
    - yellow-bellied glider (*Petaurus australis*), greater glider (*Petauroides volans*), sugar glider (*Petaurus breviceps*), feathertail glider (*Acrobates pygmaeus*)
4. Heath and woodland species
    - eastern pigmy possum (*Cercartetus nanus*), beautiful firetail (*Stagonopleura bella*)
5. Heath and sedge species
    - ground parrot (*Pezoporus wallicus*)
6. Woodland and forest species
    - White-footed dunnart (*Smithopsis leucopus*), spotted-tail quoll (*Dasyurus maculata*)

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3.4 Species of concern

The listed EPBC species and species of concern for Booderee NP are listed in the table below (Table 3) with pertinent life history information that will be directly relevant to the assessment of impacts to the various species.

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Table 3: Pertinent life history information for the species of concern

Species or group	Home range size	Regional population size and/or distribution around study area	Dispersal mechanism
EPBC Species on site			
Leafless Tongue Orchid (*Cryptostylis hunteriana*) **(vulnerable - EPBC)**	-	In total over 400 records on Bherwerre Peninsula and the area adjacent to the Vincentia Leisure Centre. Has not been recorded in Booderee. 211 individuals found on HE (BES 2007) and over 100 just to the north of HE (BES 2005)	Insect pollination and wind dispersed seed
Biconvex Melaleuca (*Melaleuca biconvexa*) **(vulnerable - EPBC)**	-	6 clusters were found on HE (BES 2007) and the area is important for the species. Large population of the species occurs further west, just north of St Georges Basin. Disjunct population at the southern limit of distribution.	Bird or insect pollination and wind or water dispersed seeds
Eastern Bristlebird (*Dasyornis brachypterus*) **(endangered - EPBC)**	2 – 5ha	Distributed throughout Bherwerre Peninsula in suitable habitat, mainly restricted south of Wool Rd although some outlying individuals present in the north (Bain & McPhee 2005, Baker 1997). Population in the order of <700 given recent fire events (Bain *et al* in press, Baker 1997)	Ground (semi-flightless)
Giant Burrowing Frog (*Heleioporus australiacus*) **(vulnerable - EPBC)**	Unknown	Found on Bherwerre Peninsula near Vincentia and 2 records north of Wool Road. Also found in Booderee NP. The habitat at Vincentia and Booderee NP are breeding areas.	Ground
Species of Concern for Booderee NP (excluding the above)			
Heath or wet area species • Swamp Rat (*Rattus lutreolus*)	0.5 – 4ha	Common species in the area known from	Ground

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Species or group	Home range size	Regional population size and/or distribution around study area	Dispersal mechanism
• Eastern Chestnut Mouse (*Pseudomys gracilicaudatus*) **(vulnerable – TSC)**	0.5ha	Booderee NP, Bherwerre Peninsula and north of Wool Road Rediscovered in Booderee NP in 2005. Recorded on Bherwerre Peninsula east of HE. At southern limit of distribution	Ground
Owls			
• Powerful Owl (*Ninox strenua*) **(vulnerable – TSC)**	1500ha	Known widely from around Jervis Bay and Booderee NP. Likely small population due to home range size	Fly
• Barking Owl (*Ninox connivens*) **(vulnerable – TSC)**	30 - 200ha	Recorded on Bherwerre Peninsula just south of Vincentia and known from Booderee NP	Fly
Gliders			
• Yellow-bellied Glider (*Petaurus australis*) **(vulnerable – TSC)**	20 - 85ha	Detected at 28 sites in the region in 2006 (Grarock 2006). Almost all records outside of reserved lands. Extinct from Booderee NP in 1980's. Records from around Erowal Bay and HE.	Arboreal
• Greater Glider (*Petauroides volans*)	3ha	Recorded from most forest communities in the region (KMA 1991) and known from Booderee NP.	Arboreal
• Sugar Glider (*Petaurus breviceps*)	3ha	Common throughout the region in varying habitats (KMA 1991), many records from Bherwerre Peninsula	Arboreal
• Feathertail Glider (*Acrobates pygmaeus*)	2ha	Little is known about the distribution but it is likely widespread, known from Booderee NP. Records from near Tomerong and in escarpment forests west of Princes Hwy	Arboreal
Heath and woodland species			

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Species or group	Home range size	Regional population size and/or distribution around study area	Dispersal mechanism
• Eastern Pigmy Possum (*Cercartetus nanus*) **(vulnerable – TSC)**	0.7ha	Records on Bherwerre Peninsula east of HE (Townley 2007), near Vincentia and in the west near Tomerong. Found in Booderee NP	Arboreal
• Beautiful Firetail (*Stagonopleura bella*)	Unknown but likely in the order of 5ha	Found on Bherwerre Peninsula and north of Wool Road near Tomerong. Also known from Booderee NP	Fly
Heath and sedge species • Ground Parrot (*Pezoporus wallicus*) **(vulnerable – TSC)**	10ha	Found in Booderee NP, Bherwerre Peninsula including HE and north of Wool Road. Only locations around Jervis bay apart from Beecroft Peninsula	Fly and ground
Woodland and forest species • White-footed Dunnart (*Smithopsis leucopus*) **(vulnerable – TSC)**	60 – 720m	Basically at the northern limit of its distribution. It is found in Booderee NP and on Bherwerre Peninsula and north of Wool Road west of Huskisson	Ground
• Spotted-tail Quoll (*Dasyurus maculata*) **(vulnerable – TSC)**	750 - 3500ha	Small, if any. Only sparsely recorded in the region. Extinct from Booderee NP in 1990's	Arboreal and ground

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4. Likely Impacts

The following chapter addresses the likely impacts to the relevant listed threatened species and to the environment of Booderee NP.

4.1 Threats to long-term survival

The following table (Table 4) outlines the key threats to those species likely to be impacted from the HE rezoning.

Table 4: Known threats to long-term survival

Species	Key threats
Leafless Tongue Orchid (*Cryptostylis hunteriana*)	Urban development Road works
Biconvex Melaleuca (*Melaleuca biconvexa*)	Too-frequent fire Clearing for development Alteration of drainage and hydrology Increased pollution and nutrients from development and rubbish dumping Grazing and trampling by stock
Eastern bristlebird (*Dasyornis brachypterus*)	Extensive and intense fire Too-frequent fire Habitat loss and fragmentation from development Predation by introduced animals Road kill Invasion of habitat by weeds
Giant burrowing frog (*Heleioporus australiacus*)	Clearing for development High intensity fire Disease Reduction of water quality near development Roadkill
Commonwealth land (Booderee NP)	Loss of connectivity along Bherwerre Peninsula, the only terrestrial link to Booderee NP Changed fire regimes

4.2 Overview of impacts

The following sections discuss the potential direct and indirect biodiversity impacts relevant to the EPBC Act that would arise from the proposed development of HE. Direct impacts will result from the loss of habitat for those species that occur within the HE site. There are also likely to be a range of indirect impacts. These are discussed below.

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The predominant indirect impact is likely to result from increases in introduced species as a result of proximity to urban development. Increase in introduced species, including birds, mammals and plants, in and around urban areas, is well documented (Tait *et al* 2005). Many of these introduced species are predators, such as foxes (GCC 2005, Meek and Saunders 2000) and cats (Meek 2003), which predate on local indigenous fauna (GCC 2005, Meek 2003, Meek and Saunders 2000). The introduction of weeds is also common in proximity to urban development (Tait *et al* 2005) and can be due to a number of reasons, including changes to the structure of bushland as a result of increased light penetration from clearing, garden escapes and rubbish and green waste dumping (BCC 2007, WMC 2007).

The remaining common indirect impact resulting from proximity to urban development is an increase in fire frequency as a result of arson (AIC 2007) as well as periodic hazard reduction burning. Changes to fire regimes can have significant impacts on many species, resulting from either changes in fire frequency or changes to fire intensity (or in combination, referred to as the fire regime) (Whelan 1995). Proximity to the urban environment is likely to alter the fire regime of the surrounding bushland.

The culmination of both the direct and indirect impacts from the proposed rezoning of HE will be the loss and degradation of habitat as well as the loss or reduction in functionality of connectivity along Bherwerre Peninsula. The functionality of a corridor is directly related to the extent of habitat that it contains and the external influences impacting on this habitat. For Booderee NP, connectivity along Bherwerre Peninsula is critical for the long-term viability of its biodiversity.

4.3 Impacts to EPBC Act listed species

A list of significant impact criteria are given by DEWHA for the assessment of impacts on matters of NES. These criteria are specific to the status of listed species and generally pertain to impacts to populations rather than individuals.

In relation to endangered species, a 'population' is defined under the EPBC Act as an occurrence of a species in a particular area, including; a geographically distinct regional population or collection of local populations; or a population, or collection of populations, that occurs within a particular bioregion.

For vulnerable species, an 'important population' is defined under the EPBC Act as a population that is necessary for a species' long-term survival and recovery, including; a population identified as such in recovery plans; key source populations for breeding or dispersal; populations that are necessary for maintaining genetic diversity; or populations that are near the limit of the species range.

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4.3.1 *Cryptostylis hunteriana* (vulnerable)

Nearly all of the 211 individuals of the leafless tongue orchid (*Cryptostylis hunteriana*) will be lost on the HE as a result of the rezoning proposal, with only 1 of 40 surveyed locations outside of the identified Investigation Areas (BES 2007), although this location was still directly adjacent to Investigation Area 4 (MAP 3). The individuals found on HE are considered by ELA to constitute at least two important populations of the species in the region. These populations have been assessed as 'important populations' as they are likely to be necessary for maintaining genetic diversity in the Jervis Bay region (see discussion below). The first of these populations consists of those individuals in Investigation Area 3 and the second those individuals within the other 3 Investigation Areas (1, 2 & 4) in combination with individuals recorded in Lot 4 DP1015690 north of the site (BES 2005). There are two other known populations immediately to the north of HE (100 individuals) and north of Wool Road within 1km of HE (112 individuals).

While these nearby populations have largely been set aside from recently approved development, there may still be a range of negative impacts due to increased pedestrian activity, changed fire regimes, altered hydrological regimes and rubbish dumping associated with these developments. These pressures are likely to reduce the quality of orchid habitat in those areas and will put those individuals under increased threat of extinction. As a result, the populations within HE have a greater conservation significance.

The species, as with many orchid species, is pollinated by insects. Specifically, the leafless tongue orchid is pollinated solely by the ichneumonid wasp (*Lissopimpla excelsa*) (Bell 2001). Reproduction is largely restricted to seed which is dispersed by wind (RBG 2007; Bell 2001), although dispersal distance is unknown. The species also has the capacity for vegetative reproduction and can form permanent colonies in a location. As a result of these life attributes, the species is unlikely to be dispersed widely and likely to only exchange minimal genetic information between populations within a region. Genetic variability in the species is likely to be greatest across regional populations rather than within populations (Stiling 1996). Therefore all populations within an area are considered important to retain to maximise the level of genetic diversity within a region.

Summary

- Likely that the loss of these important populations would be a significant impact and would be likely to threaten the long-term survival of the species in the region.

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MAP 3: Cryptostylis hunteriana localities in and around Heritage Estates

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4.3.2 *Melaleuca biconvexa* (vulnerable)

Melaleuca biconvexa individuals identified on the HE are confined to areas identified as Col Environmental Protection areas along Worrowing Waterway. It is likely that these individuals form an extension of the larger populations to the north of St Georges Basin. This population is significant as it is a disjunct population from the remaining distribution of this species, on the Central Coast of NSW, and is at the southern limit of its known distribution.

There are unlikely to be direct impacts arising from the proposed rezoning on *M. biconvexa* within HE. However, indirect impacts such as changed fire regimes, alterations to the hydrological regime, rubbish dumping and unrestricted access have the potential to impact on the species.

Melaleuca biconvexa re-sprouts after fire (DECC 2007b) and the species is adapted to infrequent fire. However, changes to the fire regime may occur as a result of increased proximity to urban development. It is likely that fire frequency will be increased from increases in arson around the urban-bushland interface (AIC 2007) and hazard reduction burning. This propensity for higher fire frequency in urban areas may threaten the survival of individuals on HE.

The species requires damp low-lying areas generally on the edge of waterways. The rezoning and subsequent development of HE has the potential to alter the natural runoff and groundwater discharge regimes along Worrowing Waterway as a result of impervious surfaces and stormwater collection.

Rubbish and green waste dumping within urban remnants is a widespread problem in communities around Australia (BCC 2007, WMC 2007). Green waste dumping in particular is a primary agent for the introduction of weeds into urban bushland remnants. These weed species have the potential to compete with native species for nutrients, water, sunlight and other resources. The degree of this impact on *M. biconvexa* is hard to predict, but is likely to only affect individuals.

Unrestricted pedestrian access into urban remnants has the potential to impact on the condition of the vegetation. Apart from indirect impacts previously outlined such as changes to fire regimes and rubbish dumping, direct impacts such as soil compaction, erosion and associated root damage along informal trails has the potential to impact on *M. biconvexa* individuals.

Summary

- The impacts of indirect impacts are uncertain but are considered to be localised and unlikely to have a substantial detrimental impact on the local population of the species.

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4.3.3 *Eastern bristlebird* (endangered)

The population of eastern bristlebirds on Bherwerre Peninsula is of critical importance for the conservation of the species as it is the largest remaining population of the species in Australia. The three largest populations are Jervis Bay (<700 individuals), Barren Grounds Nature Reserve (600 individuals) and Budderoo National Park (250 individuals) (Baker 1997). It is expected that all eastern bristlebirds on site, at minimum an estimated 50-70 individuals (>7% to 10% of population), based on Baker (2001) home range estimates, will be negatively impacted to some degree from the HE rezoning proposal, either through loss of habitat or indirect impacts.

The proposed rezoning of HE will directly remove 83ha of high quality habitat within the Investigation Areas (BES 2007) (MAP 4). It is estimated that there would be in the order of 15 to 20 territories (approximately 30 to 40 individuals) within this habitat (Baker 2001). A significant number of non-calling individuals will also be impacted. Recent research has shown that the eastern bristlebird population at Jervis Bay contains a subset of non-calling individuals that will not be sampled by current survey techniques (Bain 2006).

There is approximately 67ha of eastern bristlebird habitat within the Col Environmental Protection area and individuals within this habitat will be subject to indirect impacts from urban development. These indirect impacts include increases in introduced predators such as foxes (*Vulpes vulpes*), cats (*Felis catus*) and black rats (*Rattus rattus*), and increases in fire frequency. Both of these impacts are exacerbated through proximity to urban development (see discussion in section 4.2). Along with direct loss of habitat, these indirect impacts are key threats to the long-term survival of eastern bristlebirds (DECC 2007a). These indirect impacts will not be confined to the remaining habitat on the HE. Increases in fire frequency and prevalence of introduced species will further impact on eastern bristlebird habitat surrounding HE.

The proposed rezoning is not expected to impact significantly on the connectivity or movement of eastern bristlebirds along Bherwerre Peninsula. Sufficient habitat exists east of HE, within National Park, to maintain an effective corridor for the species.

Summary

- Significant impacts to a key population of the species are likely to occur due to the direct loss of habitat and loss of a significant portion of individuals in a key population.
- Substantial indirect impacts to protected habitat in and around HE are also likely.
- There will be only minimal impact to connectivity along Bherwerre Peninsula.

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4.3.4 Giant burrowing frog (vulnerable)

No individuals of the giant burrowing frog have been recorded within the HE area, although potential breeding habitat exists (MAP 5). It should be noted that the giant burrowing frog is extremely difficult to survey as little is known about its biology and it is generally only readily identified by call following heavy rainfall. There are nearby known breeding sites for this species in Vincentia and Booderee NP, and additional records from north of Wool Road. Surveys were undertaken when conditions had triggered calling at known breeding sites near Vincentia and as no individuals were heard calling on site it is considered unlikely that the area supports an important population of the species. However, suitable breeding habitat for this species exists along the Worrowing Waterway tributaries and poorly drained sedgeland areas. Suitable foraging and movement habitat occurs throughout the site in all vegetation communities in proximity to breeding sites. Giant burrowing frogs are known to travel several hundred metres from breeding sites. The presence of the giant burrowing frog on the site cannot be discounted.

Direct impacts from the rezoning proposal will result in the loss of potential breeding habitat within Investigation Areas 3 and 4 and foraging habitat within all Investigation Areas will be lost.

Little is known about the dispersal of the species, although it is likely to occur during rainfall events and be concentrated in the wetter parts of the environment. Dispersal would be expected along the Worrowing Waterway and its tributaries. It is expected that the Col Environmental Protection areas will maintain sufficient connectivity through the site and along Bherwerre Peninsula. However, indirect impacts from increases in introduced predators such as cats and foxes associated with urban development (see discussion in section 4.2) are likely to reduce the effectiveness of any corridor functionality through HE.

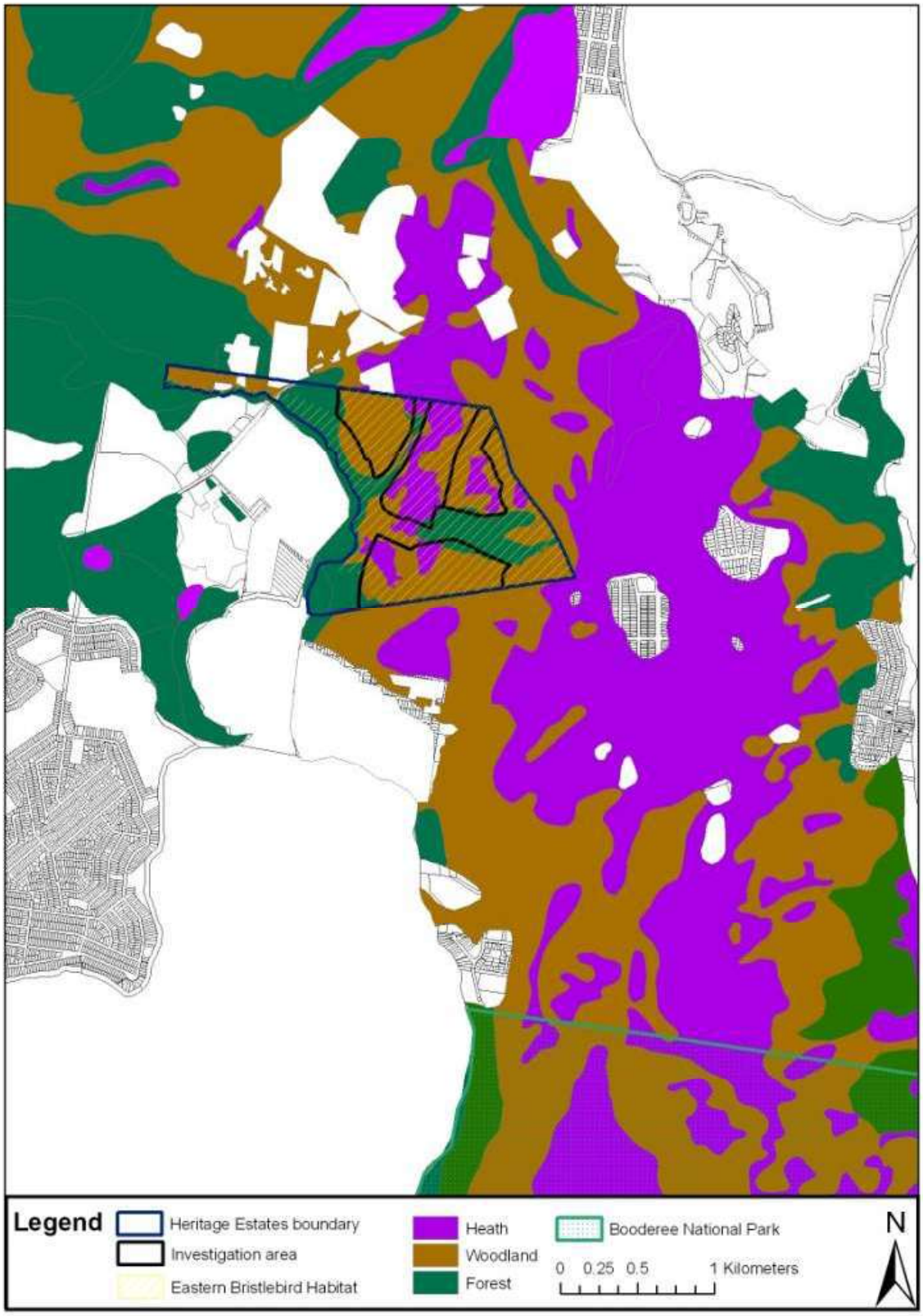
Summary

- Loss of some potential breeding habitat for the species on HE, although the importance of this habitat is unknown.
- Significant reduction in connectivity as a result of indirect impacts on corridor function, rather than direct loss of connecting habitat.

Table 5 gives a brief summary of impacts to these EPBC species.

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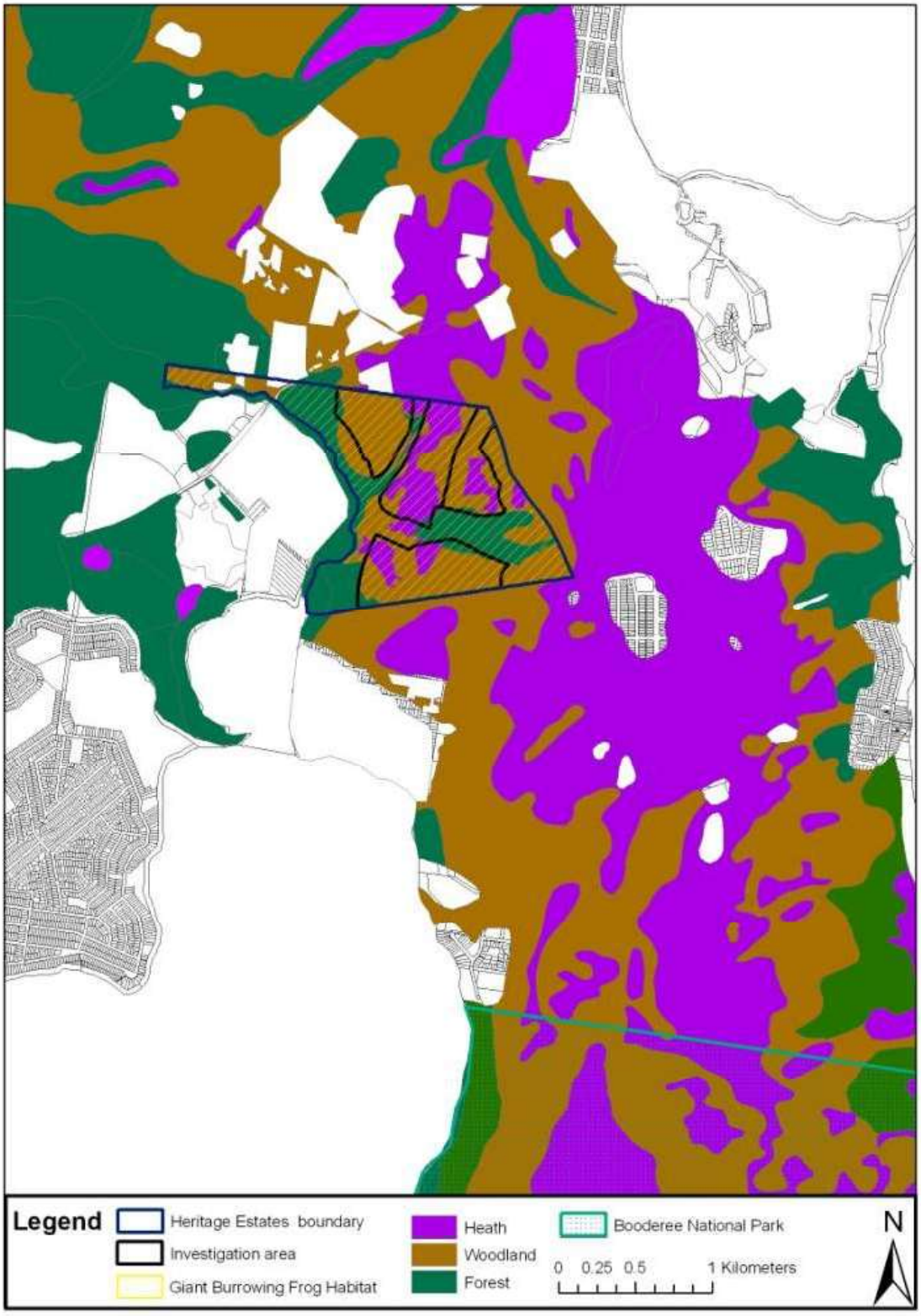
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MAP 4: Eastern bristlebird habitat and simplified vegetation mapping (BES 2007 & Mills 1993)

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MAP 5: Giant burrowing frog habitat and simplified vegetation mapping (BES 2007 & Mills 1993)

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4.4 Impacts to Booderee National Park

The HE area provides connectivity for many species along Bherwerre Peninsula. This connectivity links Booderee NP through the Bherwerre Peninsula isthmus to native vegetation north of St Georges Basin and the Wool Road and to the escarpment vegetation west of the Princes Hwy (KMA 1991). These corridors and linkages have been identified in the Jervis Bay Settlement Strategy (SCC 2003). At the same time as providing this connectivity, HE also provides habitat for many species in its own right. Connectivity is most effective when corridors support individuals and provide continuous habitat rather than 'bridges' between areas of habitat (Merriam 1991, Bennett 1990).

For all types of animals, movement is fundamental to their survival (Bennett 1992). Animals often rely upon corridors because they have an obligate relationship with natural vegetation and cannot move through inhospitable urban environments. In an urban landscape the optimum widths for corridors will be greater than in environments where adjacent activities produce fewer disturbances. Ultimately, corridor design should be considered in light of the particular species that the corridor is to benefit (Bennett 1991).

In assessing the suitability of wildlife corridors for species a number of factors need to be examined; the quality of the habitat; the quality or continuity of the connection; the length of connection and the width of connection (Forman 1995, Soulé and Gilpin 1991). The functionality of corridors for species will depend on their susceptibility to edge effects (width, condition), ability to traverse unfavourable environments (continuity) and the distance they have the capacity to move (length).

All species utilising HE will be impacted to different degrees from the rezoning proposal, although impacts to connectivity for species with similar habitat requirements or life histories are expected to be similar. As a result, impacts to species have been rationalised into groups to enable specific habitat and connectivity issues for surrogate species to be discussed in detail. However, where differences or exceptions for specific species are expected these will be highlighted and discussed.

It is noted again that impacts to the leafless tongue orchid, biconvex melaleuca, eastern bristlebird and giant burrowing frog, all species of concern for Booderee NP have been discussed in the previous section.

4.4.1 Heath or wet area species

Species included in this group are the swamp rat (*Rattus lutreolus*) and the eastern chestnut mouse (*Pseudomys gracilicaudatus*).

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The swamp rat is found throughout the Jervis Bay region in areas of suitable habitat. The eastern chestnut mouse was recently rediscovered in Booderee NP in 2005 (Booderee 2007) and the Jervis Bay location is the southern known limit of its distribution. There were several recent records of the species to the east of HE (Townley 2007).

Both of these species are reliant on wet or swampy areas incorporating some grasses, heaths or sedges, with the eastern chestnut mouse having a preference for the younger wet heath areas (Strahan 2002). There is only minimal connectivity of wet or swampy areas along Bherwerre Peninsula. HE forms an integral link between the wet areas south of Erowal Bay Road to those east of HE.

The identified Col Environmental Protection areas for HE incorporate much of the habitat along the drainage lines, although a large proportion of the swampy sedgeland or wet heath areas will be lost within the Investigation Areas (MAP 2). The result will be a reduction in available habitat and a loss of much of the connectivity for these species. The habitat requirements for the eastern chestnut mouse overlap with, but are narrower than for the swamp rat (Strahan 2002). In areas where the two species have been found, the eastern chestnut mouse is out competed by the swamp rat (Strahan 2002). The reduction and simplification of the mosaic of habitats in HE may result in a substantial loss of connectivity for the eastern chestnut mouse whilst retaining some connectivity for the swamp rat.

These species will also be subject to indirect impacts due to increases in introduced species. As a result of increased proximity to urban development, there will be an associated increase in introduced predators such as cats and introduced competitors such as the black rat (see discussion in section 4.2). The increased pressures from these introduced species will reduce the functionality of the habitat and consequently reduce the functionality of HE as a corridor for these species.

Summary

- Loss of some habitat although substantial areas of habitat will still remain on Bherwerre Peninsula.
- Significant loss of connectivity through habitat loss and indirectly through introduced predators and competitors.

4.4.2 Owls

Species included in this group are the powerful owl (*Ninox strenua*) and the barking owl (*Ninox connivens*).

The powerful owl individuals around the Bherwerre Peninsula are likely to be wide ranging as they are known to have large home ranges. The recent study by BES (2007) identified nesting powerful owls on site, a number of roost trees and their

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presence on site all year round. It is therefore considered that HE forms a core area of home range for at least one pair of powerful owls (MAP 6).

Based on home range size, the whole of Bherwerre Peninsula including Booderee NP is estimated to sustain a maximum of approximately 4 breeding pairs. Retention of important breeding areas for the species is vital for its survival in the region. Barking owls were not observed on site. However, they are known from areas just south of Vincentia and Booderee NP.

Both of these species have good dispersal ability and can travel significant distances during hunting activities. However, the barking owl tends to have a much more restricted home range than the powerful owl. Both species roost and hunt in forests and woodlands, much of which will be retained within the CoI Environmental Protection areas proposed on HE. Significant areas of potential foraging habitat are also present in other areas of Bherwere Peninsula.

Impacts to these species will result from their longer term proximity to urban development. In particular the known nesting tree for the powerful owl will be directly adjacent to Wanawong Boulevard. Raptors and owls are notoriously susceptible to high levels of human disturbance (Olsen 1998) and buffers for nesting trees in the United States are in the order of 1500m to 3000m (Richardson and Miller 1997). The BES (2007) study recommends minimum buffers of 100m for the nest tree and 50m for the roost trees.

Other impacts to these owl species will be in the form of impacts to prey species. Impacts to these species are mainly through indirect impacts from the proximity of urban development and are outlined in sections 4.4.1, 4.4.3 and 4.4.6.

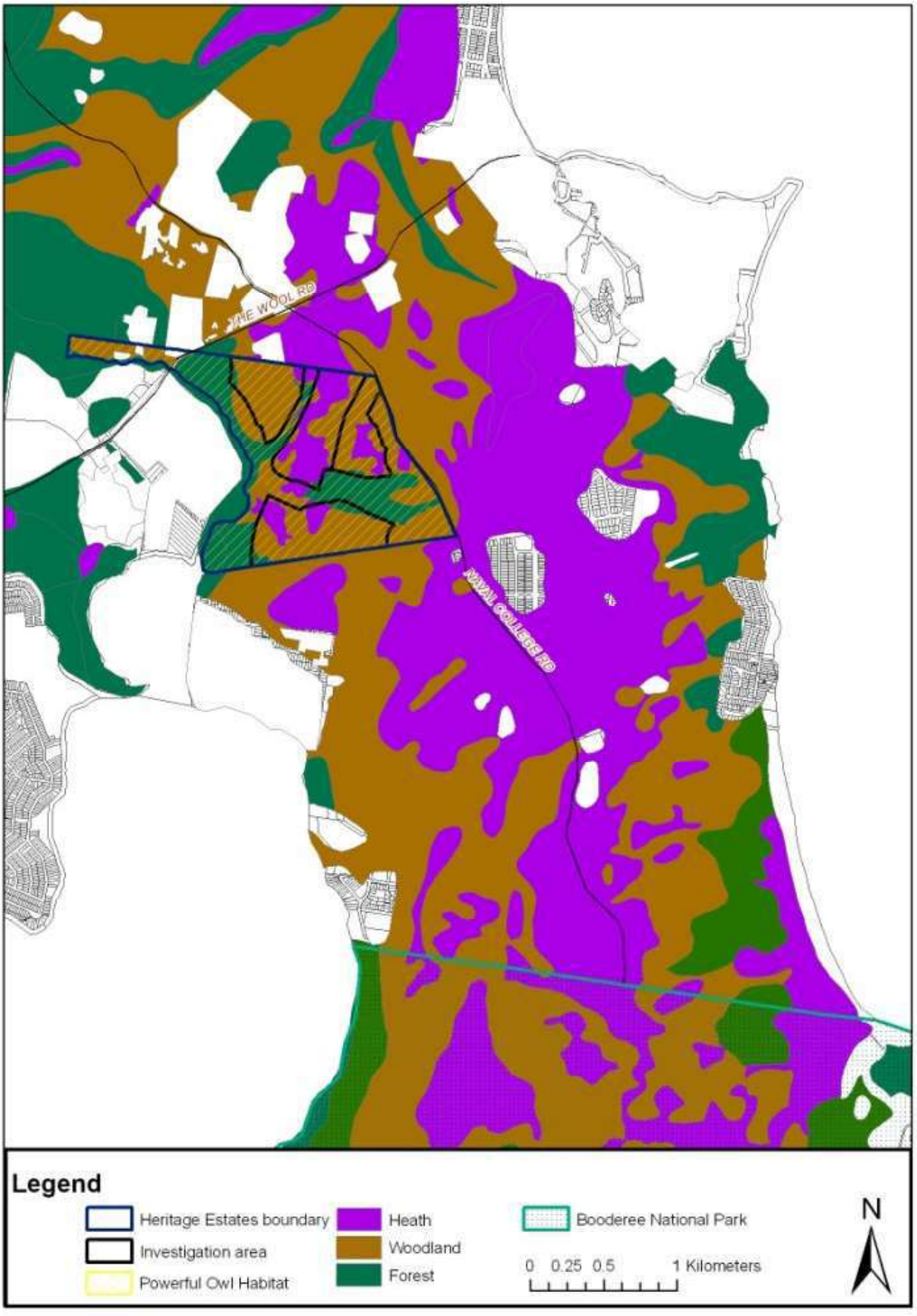
The HE rezoning proposal is unlikely to impact on connectivity for these owl species as they have good mobility and the majority of the important habitat will be retained. However, the rezoning will result in increased human disturbance to important resources such as known nesting areas, and so will result in indirect impacts to prey species within the HE. The outcomes of this are likely to be the loss of the area as breeding habitat for the species and reduced functionality as foraging habitat.

Summary

- Disturbance of known nesting and roosting sites for the powerful owl.
- Indirect impacts on prey items and reduced functionality of HE as foraging habitat.
- Unlikely to impact on connectivity to Booderee NP.

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MAP 6: Powerful owl habitat and simplified vegetation mapping (BES 2007 & Mills 1993)

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4.4.3 Gliders

Species included in this group are the yellow-bellied glider (*Petaurus australis*), the greater glider (*Petauroides volans*), the sugar glider (*Petaurus breviceps*) and the feathertail glider (*Acrobates pygmaeus*).

All gliders within this group are found in the forests around Jervis Bay and in Booderee NP, with the exception of the yellow-bellied glider, which disappeared from Booderee NP in the 1980's. Connectivity for these species along Bherwerre Peninsula from forests north of St Georges Basin to Booderee NP is restricted to the forests in HE. All species with the exception of the feathertail glider were surveyed on site in the recent study by BES (2007). HE supports at least 2 family groups of yellow-bellied gliders and presumably many greater glider and sugar glider individuals, both of which have much smaller home ranges.

Habitat for these species is restricted to the forest and woodland communities on site (MAP 7). The majority of habitat for the yellow-bellied glider, greater glider and feathertail glider and approximately two thirds of the habitat for the sugar glider is contained within the Col Environmental Protection areas.

Gliders, and in particular yellow-bellied gliders, are considered to be susceptible to increased urban development as they are particularly sensitive to habitat alteration and barriers to dispersal (NSW NPWS 2003; Incoll *et al* 2001). Consequently, it is rare to find many of individuals of this species in close proximity to urban development.

Connectivity for these gliders will not be greatly impacted by the direct loss of habitat from the proposed rezoning but rather from indirect impacts resulting from habitat proximity to urban development (see discussion in section 4.2). Increases in the prevalence of introduced predators such as foxes, cats and dogs will impact on the functionality of the Col Environmental Protection areas as viable habitat and corridors for these species.

Narrow corridors are impacted to a larger degree from edge effects, including exposure to predators. The proposed corridor for glider species through HE ranges between approximately 50m to 150m and currently provides no buffer to edge effects such as increases in introduced predators. It is acknowledged that there is a narrow pinch point in the corridor in the vicinity of the Wool Road, however, this short, narrow pinch point is considered to be less of a barrier to movement than a long narrow corridor adjacent to urban development, as would occur with the current proposal.

The functionality of any corridor depends in part on the functionality of the area as habitat, rather than being solely a 'bridge' across unfavourable areas. Other arboreal mammal species such as the common brushtail possum (*Trichosurus*

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vulpecula) are much more adaptable and are known to survive in urban situations. It is likely that this species will out-compete other arboreal mammal species in proximity to urban development, particularly for habitat resources such as tree hollows and potentially food resources. Brushtail possums commonly feed on both flowers, a significant yellow-bellied glider food source, and leaves, a significant greater glider food source (Strahan 2002).

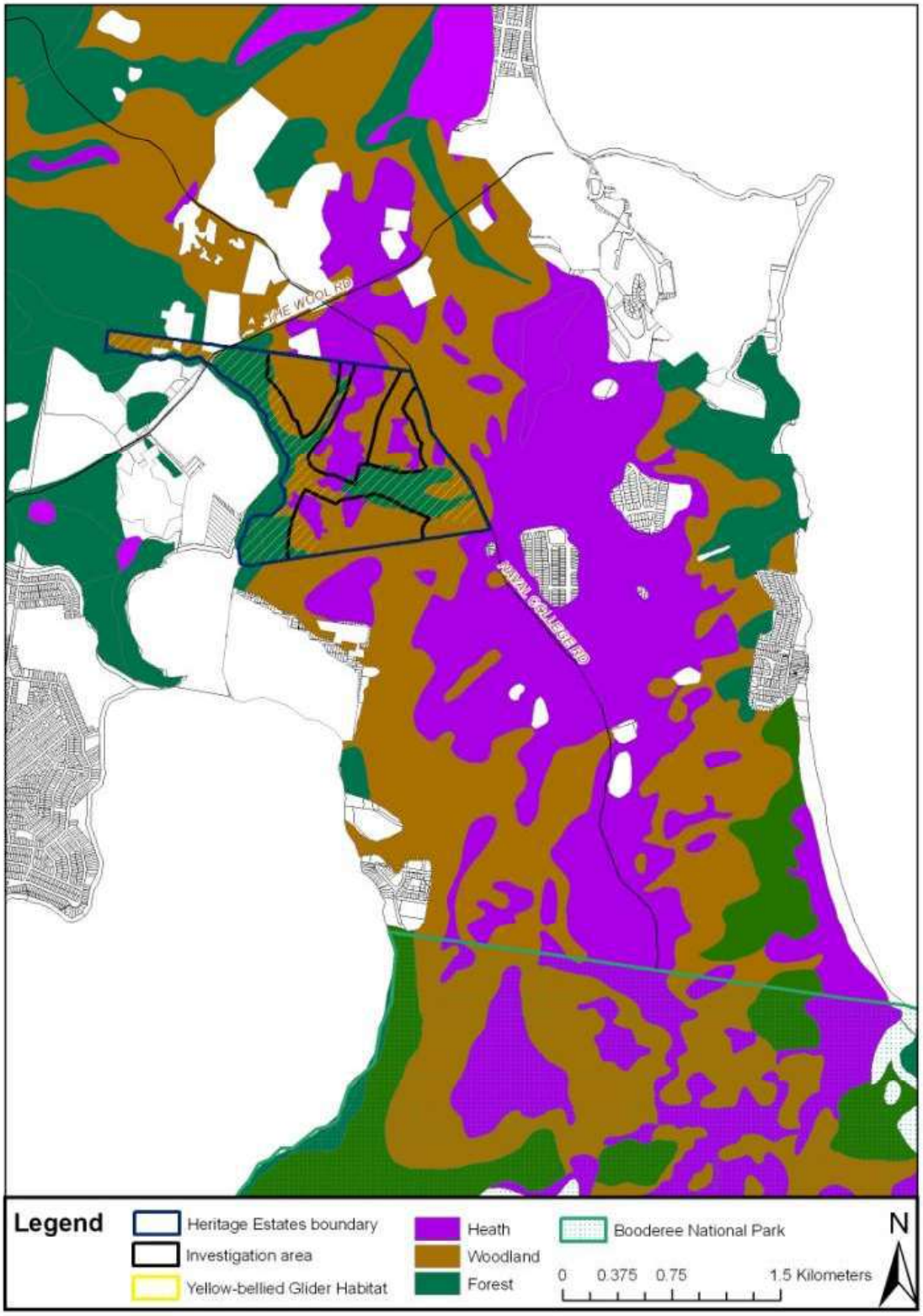
A recent study by Grarock (2006) examined the impact of potential future development in yellow-bellied glider populations in the St Georges Basin area. The study involved modelling the losses of yellow-bellied glider sites from development across the area and concluded that there would be a loss of known individuals south of HE (toward Booderee NP) if the development of HE was to proceed. Any future recolonisation of Booderee NP by yellow-bellied gliders would be unlikely following the current proposed rezoning and development of HE.

Summary

- Major decrease in functionality of the corridor from loss of habitat, increased susceptibility to predators, increased competition from other arboreal mammals and loss of buffering vegetation to the corridor.
- Reduction in available habitat for resident or migrating individuals.

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MAP 7: Yellow-bellied glider habitat and simplified vegetation mapping (BES 2007 & Mills 1993)

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4.4.4 Heath and woodland species

Species included in this group are the eastern pygmy possum (*Cercartetus nanus*) and beautiful firetail (*Stagonopleura bella*).

The heath and woodland on the site provides habitat and connectivity for many heath and woodland species including the eastern pygmy possum and beautiful firetail (MAP 8). The rezoning will result in the loss of 49% (87ha) of habitat for the eastern pygmy possum and 55% (83ha) for the beautiful firetail on site. However, approximately 1100ha of habitat will still remain on Bherwerre Peninsula.

The majority of eastern pygmy possum captures recorded during the BES (2007) study were from within Investigation Areas 1, 2 and 3 and not from within the Col Environmental Protection areas. The remaining areas identified as the Col Environmental Protection areas contain significant habitat, and some connectivity, for these species through HE. Connectivity, particularly for the eastern pygmy possum, is concentrated in the woodland habitat. To retain corridors of woodland vegetation along Bherwerre Peninsula, connectivity needs to be maintained through the woodland corridor in HE.

As these species are small in size and these areas of connectivity are already compromised by Navel College Road and Erowal Bay Road, any corridors need to be as wide and accommodating as possible. Identified Col Environmental Protection areas are sufficient for this connectivity across Navel College Road. However, development of Investigation Area 3 will result in a significant reduction to potential movement paths across Erowal Bay Road as it contains a large amount of suitable habitat for these species.

It should be noted that HE is not critical for the movement of these species along Bherwerre Peninsula, as both species are known from the areas of heath found to the east of HE. However, these areas to the east provide few nesting resources for the eastern pygmy possum, a species of which several individuals were recorded in HE. Foraging and nesting resources are found east of HE for the beautiful firetail. Indirect impacts such as increases in introduced predators resulting from urban development at HE may increase in these areas of habitat to the east.

Indirect impacts to these species from edge effects such as increases in introduced predators like foxes and cats, and weed encroachment from increased proximity to urban development, will affect the functionality as habitat and corridors of the Col Environmental Protection areas (see discussion in section 4.2).

Both of these species are cover-dependent and the loss of the majority of vegetation communities with thick understoreys will result in higher susceptibility to predation. Increases in fire frequency and increased weed encroachment from

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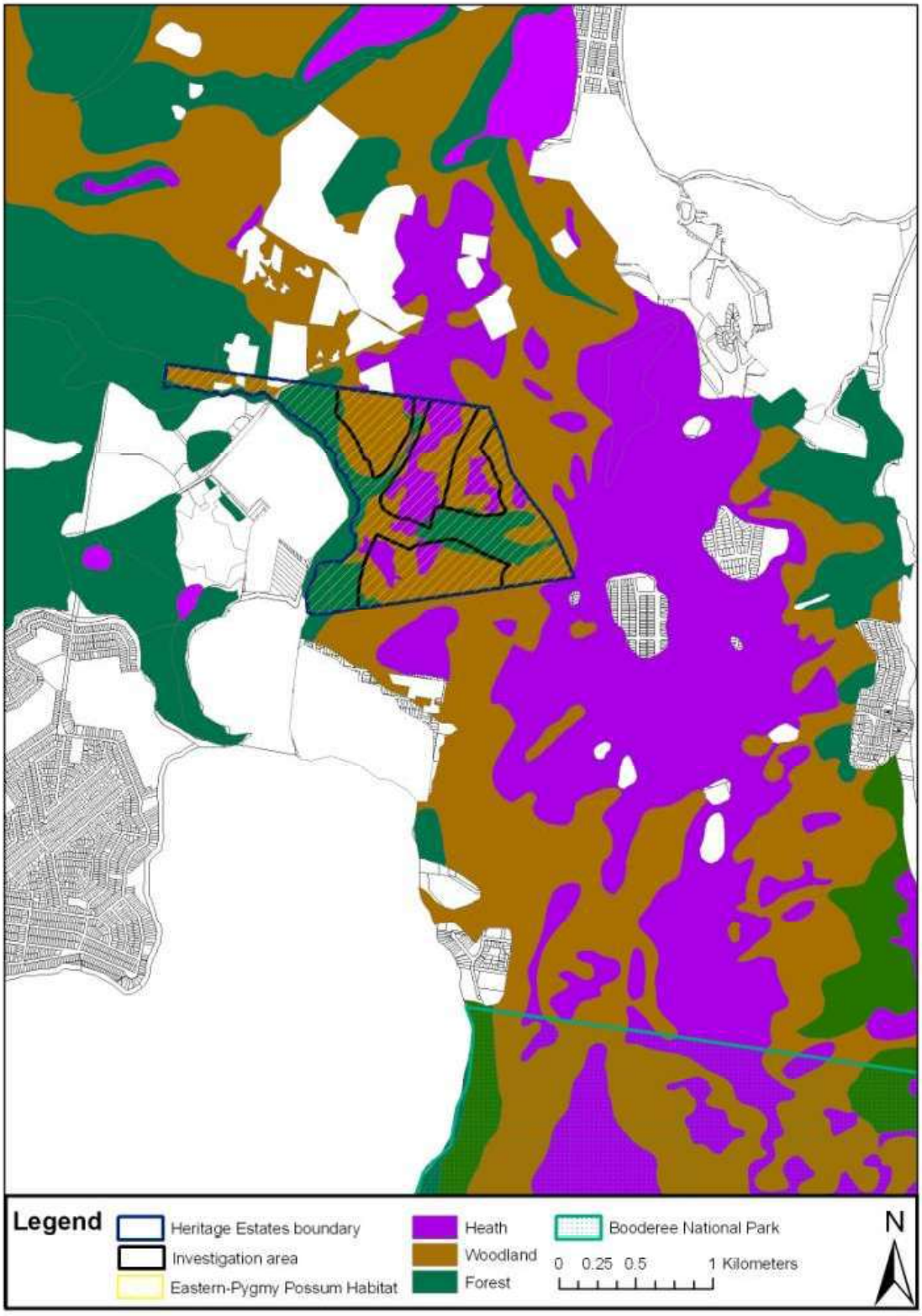
proximity to urban development may also increase the amount of open understorey habitat remaining in the CoI Environmental Protection areas, further reducing the functionality of these areas as corridors for these species. Any increase in weed encroachment is also likely to reduce the availability of food resources for these species by out competing native vegetation.

Summary

- Some loss or modification of habitat, particularly nesting habitat for the eastern pygmy possum.
- Loss of connectivity through HE, particularly woodland vegetation. Other heathland corridors exist on Bherwerre Peninsula.

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MAP 8: Eastern pygmy possum habitat and simplified vegetation mapping (BES 2007 & Mills 1993)

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4.4.5 Heath and sedge species

The species included in this group is the ground parrot (*Pezoporus wallicus*).

The majority (74%) of habitat for the ground parrot in HE will be lost from development of the Investigation Areas (MAP 9). The area is likely to support a breeding population of the species, as the surveys by BES (2007) recorded ground parrot activity during the breeding season and the site is adjacent to other known individuals of the species.

There is a restricted amount of habitat for the ground parrot on Bherwerre Peninsula and all areas are considered important for the species and their movement in the region. The species is only known from just north of Wool Road, Bherwerre Peninsula and Booderee NP on the western side of Jervis Bay.

Ground parrots rarely fly long distances (DECC 2007) and consequently, long distance dispersal is unlikely. As a result, maintaining connectivity, through continuous habitat or through 'stepping stones' of viable habitat is critical for this species to endure.

Connectivity for the population on the western side of Jervis Bay requires the maintenance of these small stepping stones of habitat which includes habitat north of Wool Road behind Huskisson, habitat within HE and adjacent to it to the north, habitat east of HE to the south of Vincentia and west of Hyams Beach, habitat east of Erowal Bay, and habitat within Booderee NP.

Of these areas, only the habitat north of Wool Road and habitat in and around HE is not within reserved lands. These areas of habitat are critical to maintaining the northern extension of this population in the Bherwerre Peninsula region.

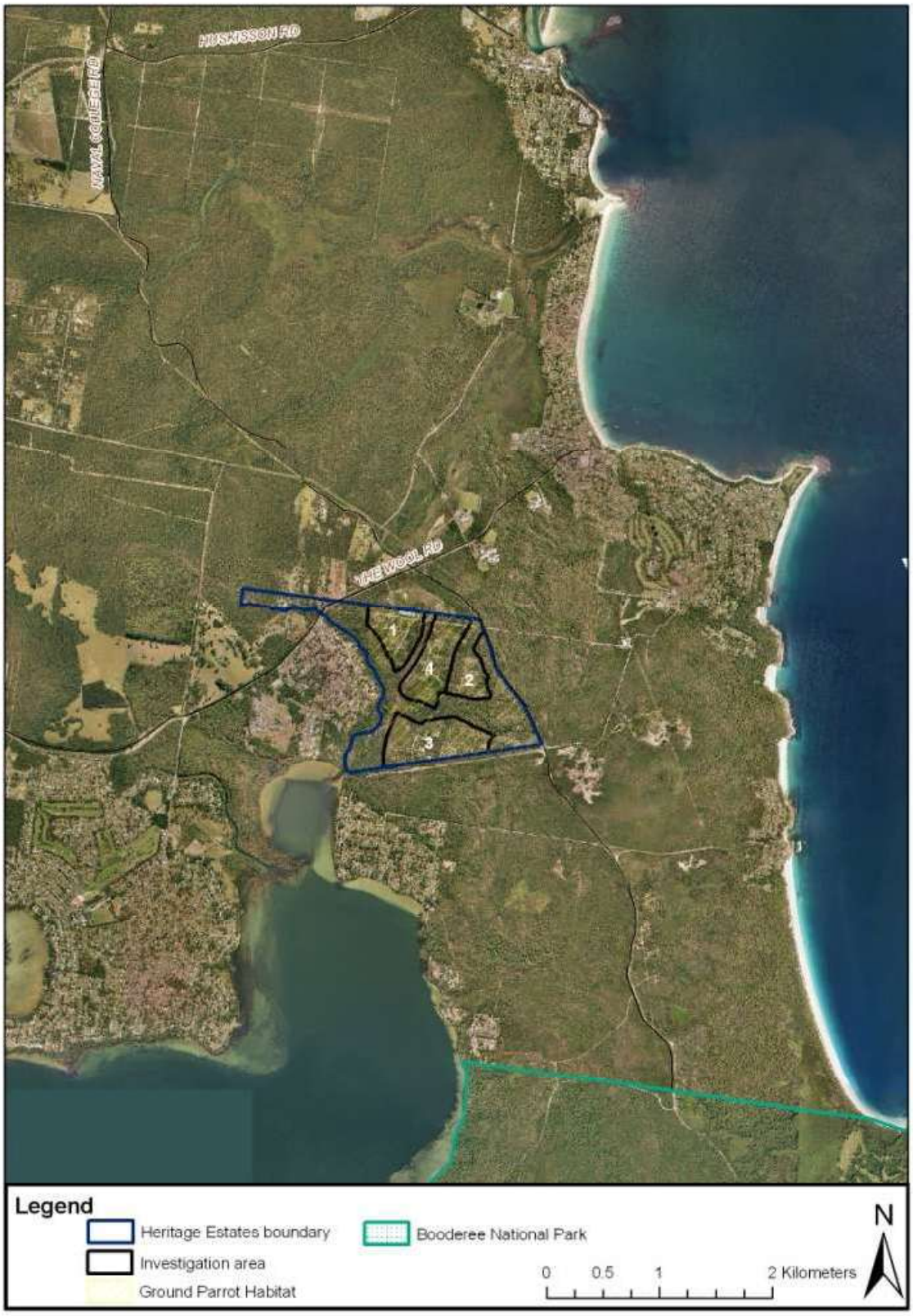
A small amount of habitat is identified for protection within the Col Environmental Protection areas (18ha). However this portion of habitat alone is not considered viable for the ground parrot due to its size and the likely indirect impacts from proximity to urban development. Indirect impacts on this habitat would include increased introduced predators such as the fox, cat and black rat (see discussion in section 4.2) and changes to the hydrological regime affecting the sedge dominated vegetation of the habitat.

Summary

- Significant loss of breeding habitat.
- Loss of habitat is likely to cause a disruption of connectivity to Booderee NP through the loss of one significant 'stepping stone' of habitat along Bherwerre Peninsula.

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MAP 9: Ground parrot habitat within Heritage Estates.

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4.4.6 Woodland and forest species

Species included in this group are the white-footed dunnart (*Smithopsis leucopus*) and spotted-tail quoll (*Dasyurus maculata*).

The woodland and forest components of HE are largely encompassed in the proposed environmental protection areas. Despite this, approximately half (88ha) of suitable habitat for the white-footed dunnart and the spotted-tail quoll would be lost on site within the Investigation Areas (MAP 2).

There are very few records of the spotted-tail quoll in the Jervis Bay region (KMA 1991) although it was only considered extinct from Booderee NP in the 1990's (Booderee 2007). Any potential recolonisation of Booderee NP would need to be from forests to the north and west of the St Georges Basin area and through HE, using corridors identified as 'disturbed habitat and vegetation' in SSC (2003). The spotted-tail quoll requires large areas of habitat, with home ranges between 750ha to 3000ha, and is susceptible to competition with introduced predators. The proximity to urban development is likely to increase the prevalence of introduced predators such as cats and foxes (see discussion in section 4.2). The narrow corridors proposed within the CoI Environmental Protection areas in HE are considered unsuitable for the movement of spotted-tail quolls.

The white-footed dunnart was trapped on HE within woodland and forest in Investigation Area 1. It is also known to occur in heath and woodland east of HE, north of Wool Road west of Huskisson and in Booderee NP. The HE rezoning proposal would result in the loss of a significant portion of habitat from Bherwerre Peninsula and also impact on connectivity.

The HE forms the only connectivity for this species between habitat north of Wool Road and Booderee NP. As with many of the species discussed here, the areas within the CoI Environmental Protection areas are suitable habitat for the white-footed dunnart. However, connectivity will be impacted indirectly by edge effects such as increases in introduced predators and increased weed encroachment (see discussion in section 4.2) that will result in the decreased functionality of the habitat as a corridor.

The white-footed dunnart is a small mammal that is at risk from predation by cats and foxes and prefers an open understorey in its habitat (Strahan 2002). Weed growth within the CoI Environmental areas resulting from proximity to urban development and associated edge effects may result in unsuitable habitat for the species within these proposed corridors.

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Summary

- Significant loss of habitat, particularly for the white-footed dunnart
- Significant disruption of connectivity to Booderee NP through loss of habitat and indirect impacts on remaining corridors from introduced predators and weed encroachment.

4.4.7 Summary

The rezoning of HE and subsequent development will result in significant impacts to a range of species that utilise Booderee NP. These impacts include the loss of habitat for these species on the HE site (i.e. in an area nearby to Booderee NP) and a substantial loss of connectivity to and from Booderee NP. This loss of habitat and connectivity are likely to reduce the functionality of Booderee NP as habitat for some of these species, and impact on the viability of populations of some of these species within the region. Species likely to be significantly affected include the eastern chestnut mouse, yellow-bellied glider, greater glider, ground parrot and white-footed dunnart.

As a result of impacts to these species, it is considered that significant impacts to Booderee NP will occur. More broadly, the needs of the species focused on in this report are broadly representative of a number of other species which may also be impacted on and contribute to impacts to Booderee NP.

Table 5 gives a brief summary of impacts to these species of significance for Booderee NP.

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5. Mitigation Measures

There are potentially significant impacts to 3 EPBC listed species and on connectivity for a number of species along Bherwerre Peninsula, to and from Booderee NP, as a result of the proposed HE rezoning. This section outlines potential mitigation measures that may be implemented to reduce the impact on these species and to Booderee NP.

Table 5 gives a brief summary of the mitigation measures that would be required to alleviate impacts to the EPBC species and to Booderee NP.

5.1 Local mitigation measures and outcomes

Local mitigation measures cannot adequately address the full impacts to all the species of concern (i.e. the EPBC listed species and the species connected to Booderee NP). In assessing the mitigation of impacts to the various EPBC species and connectivity to Booderee NP a number of measures were examined. These mitigation measures included modifying the identified Investigation Areas, enlarging the CoI Environmental Protection areas, implementing sensitive urban design and development controls on tree retention and domestic animals.

Some of these mitigation measures will work well for some species and others will work well for other species. However, on balance, none of the measures and no combination of measures will mitigate impacts to all species, nor will they address completely the impacts on connectivity to Booderee NP. This outcome concurs with the findings and recommendations from BES (2007), Lindenmayer (2007) and to a lesser extent Possingham (2007).

For example, the following actions would be required to adequately mitigate impacts to the EPBC listed species:

- the leafless tongue orchid would require a reduction of approximately 50% in the footprint of all Investigation Areas;
- the eastern bristlebird would require the retention of the heath and woodland areas on the site, principally Investigation Areas 2, 3, and 4; and
- the giant burrowing frog would require the widening of the east-west CoI Environmental Protection corridor and a reduction of development by approximately 50% within Investigation Area 4.

Concurrently, in order to mitigate impacts to Booderee NP for forest and woodland dwelling species such as the yellow-bellied glider, greater glider, feathertail glider, white-footed dunnart and eastern pygmy possum there would need to be a significant widening of corridors to provide a functional corridor for movement of these species.

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The widening of the two main corridors (north-south and east-west) would result in the reduction in the size of all Investigation Areas.

Further mitigation for the powerful owl would require the realignment of Wanawong Boulevard to avoid impacts to a known breeding site. All of these mitigation measures would also need to be accompanied by development controls on domestic animals, landscaping with local natives, strict waste control along with restricted public access to the bushland areas.

The combination of all on-site mitigation measures for all species of concern would result in the loss of all developable areas identified within the CoI Investigation Areas. Consequently, any further mitigation measures must look at the alleviation of impacts through off-site offset actions, discussed below.

5.2 Offsets

DEWHA released a draft policy on the use of offsets under the EPBC Act for public comment in August 2007. This analysis of the potential use of offsets has been based on the definitions and principles identified in the draft policy.

Direct offsets (e.g. purchase and conservation of habitat) for the HE rezoning are not considered to be available for a number of significant species. Impacts to some species such as the biconvex melaleuca could potentially be offset off-site by investing in the increased conservation of the population to the north of St Georges Basin, much of which is on private land. However, most of the other species on site will not substantially benefit from off-site offsets.

For example, the leafless tongue orchid will require the maintenance of existing populations to maintain the current level of genetic variation. The loss of a population can not be offset as the genetic information can not be replaced and translocation of individuals is not considered to be a legitimate offset tool.

Another example involves the eastern bristlebird that is restricted to the heath and woodland vegetation communities along Bherwerre Peninsula. The population is largely contained south of the Wool Road and significant areas of connected habitat outside of Bherwerre Peninsula do not exist.

Concurrently, the Bherwerre Peninsula population is the largest remaining population of this species and is therefore highly significant for the ongoing survival of this species. Approximately 7-10% of this population currently occupies the HE and the remaining population is predominately within reserved lands. As a result of these points, direct offsets are not considered available for this species and this population. While it may be possible to put in place indirect offsets for this species (e.g.

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contribution to research), these would not adequately compensate for the impacts to this species.

Similarly, offsets for the species requiring connectivity through HE for movement along Bherwerre Peninsula can not be provided. The intrinsic value and functionality of the identified habitat corridors through HE are due to their location in the environment. This functionality can not be replaced anywhere on Bherwerre Peninsula. Loss or indirect impacts to this corridor that disrupt its functionality can not be recreated or replaced.

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Table 5: Summary of impact and mitigation for all species

Species	Impact summary	Significance	Mitigation measures
EPBC Species			
Leafless Tongue Orchid (Cryptostylis hunteriana)	Loss of important populations	Major	50% reduction of all Investigation Areas to avoid locations. No public access.
Biconvex Melaleuca (Melaleuca biconvexa)	Localised impacts to individuals	Minor	None
Eastern Bristlebird (Dasyornis brachypterus)	Loss of up to 10% of largest remaining population	Major	Avoid development of habitat within Investigation Areas 2, 3 and 4
Giant Burrowing Frog (*Heleioporus australiacus*)[1]	Loss of potential breeding habitat	Moderate	Widen east-west corridor and 50% reduction of Investigation Area 4
Species of Concern for Booderee NP			
Heath or wet area species			
• swamp rat (*Rattus lutreolus*)	Limited loss of connectivity	Minor	Don't develop Investigation Areas 2 and 4 and reduce Investigation Area 3
• eastern chestnut mouse (*Pseudomys gracilicaudatus*)[1]	Impaired connectivity through loss of habitat and competition	Moderate	Don't develop Investigation Areas 2, 3 and 4
Owls			
• powerful owl (*Ninox strenua*)	Limited loss of connectivity. Loss of breeding and foraging resources.	Moderate	Widen buffer along Worrowing Waterway and buffer around the nest tree
• barking owl (*Ninox connivens*)	Limited loss of connectivity. Loss of foraging resources.	Minor	Reduce development in all Investigation Areas to expand Environmental Protection areas
Gliders			
• yellow-bellied glider (*Petaurus australis*)	Loss of some sites south of HE and unlikely to re-establish in Booderee NP	Major	Widen habitat corridors by a minimum of 200-300%
• greater glider (*Petauroides volans*)	Impaired connectivity through predation and competition	Major	
• sugar glider (*Petaurus breviceps*)	Some loss of habitat and connectivity, increase	Moderate	

[1] Not recorded in HE but recorded on nearby land and considered likely to occur due to suitability of habitat

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Species	Impact summary	Significance	Mitigation measures
• feathertail glider (*Acrobates pygmaeus*)[1]	in predation and competition Impaired connectivity through predation and competition	Moderate	
Heath and woodland species • eastern pigmy possum (*Cercartetus nanus*)	Loss of high quality foraging and nesting habitat also serving as habitat corridor	Moderate	Don't develop Investigation Areas 1, 2 and 3
• beautiful firetail (*Stagonopleura bella*)[1]	Loss of good quality habitat and some connectivity	Minor	Don't develop Investigation Areas 2 and 3
Heath and sedge species • ground parrot (*Pezoporus wallicus*)	Loss of important habitat and important 'stepping stone' connectivity for Jervis Bay population	Major	Don't develop Investigation Areas 2, 3 and 4
Woodland and forest species • White-footed dunnart (*Smithopsis leucopus*)	Loss of habitat and impair connectivity to Booderee NP	Major	No development in Investigation Areas 2 and 3 and reduced footprint of Investigation Area 4 by 50%
• spotted-tail quoll (*Dasyurus maculata*)	Impair connectivity to Booderee NP	Major	Don't develop Investigation Areas 1 and 3 and reduce size of 4 by 50%

[1] Not recorded in HE but recorded on nearby land and considered likely to occur due to suitability of habitat

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6. Assessment of uncertainty

The following assessment of uncertainty pertains to uncertainty surrounding the assessment of impacts to species. No assessment of uncertainty of mitigation measures is presented as no mitigation measures have been recommended.

The assessment of the impact of the HE rezoning proposal on those species within the CoI Investigation Areas contains very little uncertainty as the individuals occurring there will be lost. This pertains to species such as the eastern bristlebird and leafless tongue orchid.

Impacts to species such as the giant burrowing frog, swamp rat, eastern chestnut mouse, glider species, eastern pygmy possum, beautiful firetail, ground parrot and white-footed dunnart are partly based on the assumption that proximity of urban development will increase introduced predators and introduced competitors (see discussion in section 4.2). This assumption is widely established and accepted within literature (BCC 2007; WMC 2007; GCC 2005; Tait *et al* 2005; Meek 2003; Meek and Saunders 2000) and for those species outlined.

The full impacts of potential development on the functionality of the habitat corridors within HE is uncertain. However, this functionality would not be able to be re-established in the locality in the mid to long-term given significant disturbance in the location following any urban development. The severing of this habitat link along Bherwerre Peninsula will cause a cessation of movement of the primarily forest dependent species including gliders between Bherwerre Peninsula and the forests to the north of the St Georges Basin and escarpment forests west of the Princes Hwy. For some species such as heath and woodland dwellers, connectivity to Booderee NP will be reduced but not lost altogether.

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7. Conclusion

Based on a review of the available information for the HE development, 4 EPBC listed threatened species (including the giant burrowing frog which has not been confirmed onsite) and 13 other species that are or have been present within Booderee NP (Commonwealth land) were identified for detailed analysis.

Due to both direct (i.e. loss of habitat) and indirect (e.g. loss of connectivity, introduced species) impacts, it is likely that significant impacts will occur to 3 of the listed threatened species (including the giant burrowing frog) as well as to the Commonwealth land.

The key listed EPBC species of concern include the leafless tongue orchid and eastern bristlebird. The key species of concern with regards to impacts to Commonwealth land include heath or wet area species such as the eastern chestnut mouse; gliders such as the yellow-bellied glider, greater glider and feathertail glider; heath and woodland species, particularly the eastern pygmy possum; heath and sedge species such as the ground parrot; and woodland and forest species such as the white-footed dunnart and spotted-tail quoll.

A range of mitigation measures were considered in respect of the potential impacts to the threatened species and to Booderee NP, concerning the modification to the proposed development area. However, no mitigation measures were considered to be able to adequately reduce the level of impact to all affected species. This was due to:

- The varied nature of the habitat in HE
- The number of species and their various habitat requirements
- When mitigation measures for all species were combined, no developable areas identified in the CoI remained

Further, offsets are not considered to be a suitable option for this development to compensate for the residual impacts. For example:

- Offsets are not available to compensate for the loss of the leafless tongue orchid populations and the likely genetic variability contained within them
- Offsets would not be able to compensate for the loss of key habitat and individuals for the eastern bristlebird in its largest remaining population
- Offsets for the loss of connectivity to Booderee NP are not possible

The proposed rezoning of the CoI Investigation Areas for residential development is considered likely to have a significant impact on listed threatened species and on Commonwealth land.

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ATTACHMENT A. PUBLIC CONSULTATION ON DRAFT PER

Exhibition Details

The draft PER was initially exhibited from 10th June to 21st July 2008. The exhibition period was then effectively extended to 16th September 2008.

Notification of Exhibition

Newspaper advertisements were placed in:

- Shoalhaven Mail on 15.06.08, 29.06.08, and 13.07.08
- South Coast Register on 11.06.08, 25.06.08 ; and 30.07.08, and 13.08.08 (see Figure 22)
- Sydney Morning Herald on 14.06.08, 28.06.08 ; and 26.07.08, and 9.08.08 (see Figure 22)



Invitation to Comment on Report Titled: Draft Public Environment Report for the 'Heritage Estates', Worrowing Heights, NSW, Proposed Rezoning and Associated Public Works to Facilitate Residential Development

Shoalhaven City Council is seeking to rezone land known as the "Heritage Estates", Worrowing Heights (north of Erowal Bay), from rural to residential under Shoalhaven Local Environmental Plan 1985 in accordance with recommendations from a NSW Commission of Inquiry in 1999. The proposed rezoning would potentially enable construction of up to 730 dwellings and would require removal of native vegetation, road construction, maintenance of bushfire asset protection zones, and provision of services and infrastructure including sewer, water and electricity.

The proposal has been determined to be a "controlled action" under the Environment Protection and Biodiversity Conservation Act, 1999 (EPBC Act) on the basis that it is likely to have a significant impact on matters protected under Part 3 of the Act, namely listed threatened species and ecological communities (sections 18 and 18A) and Commonwealth land (sections 26 and 27A).

Under section 98 of the EPBC Act, Shoalhaven City Council is required to publish and make available the Draft PER. The Draft PER is available for viewing during normal business hours at the following locations:

- Department of Planning Information Centre, 23-33 Bridge Street, Sydney;
- Department of Planning, Heritage Branch, 3 Marist Place, Parramatta;
- Liverpool City Council, Ground Floor, Liverpool City Library, 170 George Street, Liverpool; and Administration Centre 1 Hoxton Park Road, Liverpool
- Nature Conservation Council of NSW, Level 2 301 Kent Street, Sydney;
- Shoalhaven City Council, Administrative Centre, 36 Bridge Road, Nowra, Administrative Centre, Deering Street, Ulladulla;
- Bay and Basin Leisure Centre, 167A The Wool Road, Vincentia
- Sanctuary Point Public Library, 46 Paradise Beach Rd, Sanctuary Point
- Department of the Environment, Water, Heritage & the Arts, John Gorton Building, King Edward Terrace, Parkes, ACT

The Draft PER is also available online at:
http://www3.shoalhaven.nsw.gov.au/applications/leodcps94/pex.asp

Persons are invited to make comments either via the above website or in writing to: The General Manager, Shoalhaven City Council, PO Box 42 Nowra, NSW, 2541.
Representations should include:

- Your name and address;
- The name of the proposed activity;
- Lodged in writing quoting File no. 1446-09.

Any submissions on the Draft PER already provided do not need to be resubmitted. The closing date for receipt of submissions is 16 September 2008, at 5 pm. The substance of submissions made to Council on this matter may be made available to the public or included in a Council report without notifying the correspondent. Enquiries should be directed to Eric Hollinger, Strategic Planning Group, on (02) 4429 3320.
council@shoalhaven.nsw.gov.au www.shoalhaven.nsw.gov.au

Figure 22 - newspaper advertisement after 13 July

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Hard copies of the draft PER were made available at:

- Department of Planning: Information Centre, 23-33 Bridge Street, Sydney; and Heritage Branch, 3 Marist Place, Parramatta;
- Liverpool City Council: Ground Floor, Liverpool City Library

  170 George Street, Liverpool; and Administration Centre 1 Hoxton Park Road, Liverpool
- Nature Conservation Council of NSW, Level 2 301 Kent Street, Sydney;
- Shoalhaven City Council: Administrative Centre, 36 Bridge Road, Nowra; and

  Administrative Centre, Deering Street, Ulladulla;
- Bay and Basin Leisure Centre, 167A The Wool Road, Vincentia
- Sanctuary Point Public Library, 46 Paradise Beach Rd, Sanctuary Point
- Department of the Environment, Water, Heritage & the Arts, John Gorton Building, King Edward Terrace, Parkes, ACT

The draft PER was available electronically on Council's website where submissions were also able to be emailed. CD's were provided free of charge on request.

Council wrote to the owners of land within the investigation areas on 6th June and 28th July 2008, with information on the exhibition. A hard copy of the draft PER and CD's were also provided to the Shoalhaven Landowners Association, based in Sydney.

Processing of Submissions

All submissions were registered and assigned a document number by Council's Records Unit. A copy of all submissions forwarded to DEWHA. A summary of submissions was also forwarded to DEWHA.

Submissions received up to 25th September 2008 were included in the database.

Overview of submissions

Approximately 382 written submissions (including form letters) were received. Of the total submissions received, approximately 71% were in support of the proposal and 29% were opposed. The majority of submissions in support of the proposal were from, or on behalf of owners of land in the investigation areas. Approximately 90 support letters were petition/form letters which did not include postal details.

One submission was for conditional support subject to their property also being included in the proposed rezoning, as their property is currently located in the area recommended for environmental protection by the CoI. A number of other submissions in support of the proposal were also from owners of land in the area recommended for environmental protection by the CoI.

Of the submissions opposed to the proposal approximately12% were on behalf of various societies, organisations, associations or agencies. The majority of the

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submissions opposing the proposal from individuals were from residents in the Jervis Bay and St Georges Basin area.

The most common arguments raised in submission supporting the proposal were:

- social justice – the rights of owners who have paid rates on their land for approximately 20 years;
- economic stimulus if the proposal proceeds;
- other development (i.e. Vincentia District Centre and Bayswood residential subdivision) in the area has been allowed to proceed; and
- the land's environmental attributes have been overstated.

The most common arguments raised in submissions opposing the proposal were:

- impacts on local biodiversity;
- impacts on regional biodiversity (i.e. contributing to the isolation of Bherwerre Peninsula);
- impacts on downstream waterbodies of St Georges Basin/Erowal Bay;
- impacts on attractiveness of area for tourism and related impacts on community; and
- community services and infrastructure (such as healthcare and aged-care services and roads) are currently inadequate and will not cope with additional demands created by the development.

The distribution of submissions according to postcode is shown in Figure A.1 - Breakdown of submissions by postcode. This analysis excludes those submissions that did not provide their suburb or postcode.

More detail on issues raised and responses to these is provided in Table A.1.

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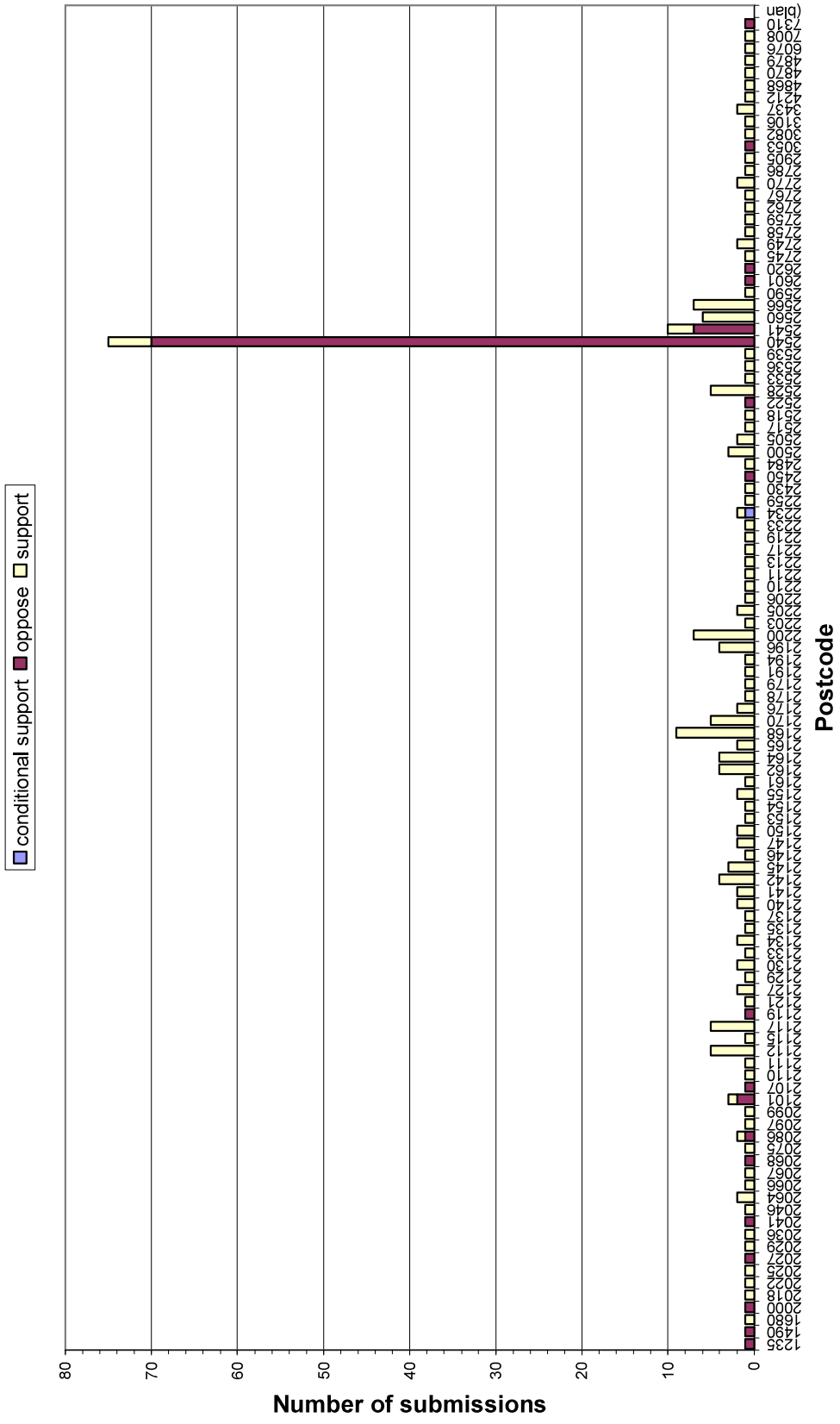


Figure A.1 - Breakdown of submissions by postcode

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Table A.1 - Issues raised in submissions on Draft PER and response

Issue	Response
Environmental constraints/ impacts relevant to the controlling provisions	
No photographic evidence of threatened species. The land's environmental attributes are overstated. Consultants are biased/subjective.	It is neither standard practice to include photographs of threatened species found on a site in a Threatened Biodiversity Assessment report, nor to make detailed maps of threatened species occurrences publicly available. Photographs were provided to Council by BES through their progress reports. Descriptions of the land's environmental attributes are based on the findings of consultants engaged by Council. Only reputable firms were invited to submit fee proposals and the experience and qualifications of the project team were taken into consideration as part of this process.
There were no Bristlebird sightings prior to the BES study. There were no Bristlebird sightings in only 8 hours of direct observation. The PER claims that the area represents 10% of the species on the [Bherwerre] Peninsula. This would be >40 birds – how would this be possible if no direct observations were made? Claims Baker (1996) reported lower Bristlebird densities east of Naval College Road.	Refer to pp. 14-15, 41 & 53 of the BES report published on DEWHA's website: http://www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=3448 BES directly observed numerous Bristlebirds both visually and aurally, during their targeted surveys for this species and while doing other surveys. ELA stated that based on BES findings, 7-10% of the Bherwerre population would be negatively impacted to some degree, either through loss of habitat or indirectly. Refer to p. 23 in Attachment 9 of the PER.
Eastern Bristlebird is present in the area as is the Yellow-bellied Glider.	See previous comments.
The site borders Booderee National Park.	While the land is adjacent to the Jervis Bay National Park (NSW) it is approximately 3.1 km from the Booderee National Park (BNP). The significance of Heritage Estates to BNP is attributed to geography: its position within the isthmus to Bherwerre Peninsula and not that it directly adjoins the Park. Refer to the PER for details.
Properties were initially clear of vegetation and there was no evidence of endangered species.	A series of aerial photographs provided in section 1.2.2 of the PER indicates that the subject land was largely undisturbed in 1981. A mosaic of disturbances is evident in the 1994 photograph, with some revegetation evident in the 2006 photograph. Attachment 4 includes a description of disturbances and findings from the preliminary land contamination assessment.
Likely to be other orchids on the site including: *Prasophyllum affine* (Jervis Bay Leek Orchid) *Rhizanthella slateri* (Eastern Underground Orchid) *Calochilus pulchellus* (Pretty Beard Orchid) *Corybas undulatus* (Tailed Helmet Orchid).	BES conducted targeted surveys for *R. slateri* and *P. affine*. Neither was detected but BES concluded that both species may occur in the locality. *C. pulchellus* was listed as endangered on the TSC Act after the BES study was completed.
The western side of Birriga Avenue is already partly developed, negating claim of corridor value.	The area in the vicinity of The Wool Road is an acknowledged 'pinch point' in the "disturbed habitat and vegetation" (JBREP, 1996) corridor, e.g. refer to section 4.4.3 of Attachment 9. Refer also to 1.4 above.
Land is being degraded: erosion caused by land clearing, fires, motor bikes & cars; illegal dumping.	Land degradation is acknowledged in the PER as an ongoing problem and one of the reasons why maintaining the status quo is detrimental to all stakeholders.

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Issue	Response
The land contains a high number of threatened and important plants and animals including plants and animals at their geographical limits. Area is of high conservation significance. Further habitat loss in corridor would isolate Booderee NP and impact on its biodiversity. Conclusions made by BES/ELA/independent reviewers on the ecological significance of the land & level of impact provide a sound basis to make an informed decision.	Numerous submissions restated findings and conclusions of BES, ELA and/or the two reviews attached to the Draft PER.
The development will increase cat & dog numbers in the corridor.	Potential impacts from introduced animals are acknowledged in the PER documentation.
The development will change bushfire regimes in the corridor.	Acknowledged as a threat in the PER documentation. Additional information has also been added to section 6 relating to bushfire regimes and climate change.
Flora and fauna study should have covered the whole Estate.	The BES study did cover the whole site. This was done to compare the distribution of any threatened species in the areas recommended for environmental protection, to their distribution in the investigation areas.
Leafless Tongue Orchids occur elsewhere in the region. The PER documentation does not make a rational judgement about the regional significance of this orchid.	BES described the 211 Leafless Tongue Orchids as a substantial population. ELA concluded that these constitute "at least two important populations". The presence of this orchid on other land in the area is detailed in the ELA report.
Threatened orchids could be relocated.	There appears to be consensus among experts in the field that translocation of the orchids is not a viable solution.
The site's value as a habitat corridor is diminished by its proximity to major roads.	It is acknowledged that the existing roads in proximity to the subject land, to some extent, impede wildlife movement and contribute to increased mortality of wildlife. New roads and increased traffic would be expected to further impede wildlife movement to some degree. However, the regional impact of this is uncertain.
Concerns about introduction of weeds and potential impacts on Jervis Bay NP.	The PER documentation states that introduced species including plants, indirectly impact on bushland adjoining urban areas.
Introduction of domestic pets associated with development of the land would compromise any mitigation measures.	See above.
No consideration of cumulative impacts (1 submission)	The PER documentation discusses cumulative direct and indirect impacts on biodiversity as required in section 5 of the PER Guidelines (Relevant Impacts).
Park management acknowledges that BNP itself is insufficient to protect region's biodiversity because of its relatively small size, isolation and biogeographical characteristics.	BNP's concerns are already acknowledged in the PER.
Conditions were less than ideal for some of BES's targeted surveys, e.g. bushfires, less than ideal conditions for Giant Burrowing Frogs.	Limitations of the survey findings are acknowledged in the BES report and PER documentation.
Consideration should be given to: Articles 8 & 14 of the Biodiversity Convention Recovery plan for Eastern bristlebird currently under preparation. Approved conservation advice for Leafless tongue orchid.	Information from NSW recovery plan/conservation strategies is provided in section 5.7.3 of the PER.
St Georges Basin is listed on Commonwealth Directory	Stated in section 5.4 of the PER.

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Issue	Response
of Important Wetlands in Australia.	
Government can sustain the wildlife corridor by acquiring the land and adding it to the Jervis bay reserve system.	Refer to options for conservation of the land discussed in section 2 of the PER.
Beecroft & Bherwerre Peninsula's are both connected by vulnerable isthmuses that must be protected to maximise their connectivity. This is more important given pressures from climate change, land clearing for urban development, and impacts of pests and diseases.	Additional information in relation to climate change has been added to section 6 of the PER.
Council not adequately resourced to undertake compliance effectively.	While Council has finite resources to undertake compliance, the relevance of this would depend on what conditions were associated with an approval.
Environmental impacts not directly related to the controlling provisions	
Lack of access to full information (Hydrological & Soil Assessment, Threatened Biodiversity Assessment, Bushfire Assessment, SCC water quality results) selective/partial reporting of studies (1 submission)	The draft PER included key findings of the geotechnical studies carried out by Coffey Geosciences, the Bushfire Assessment completed by BES, and the Threatened Biodiversity Survey & Assessment completed by BES. Data from Council's water quality monitoring program had/has not been reported at this stage as this was not stipulated in the PER Guidelines. As outlined in the Draft PER, further assessment of water quality impacts would be addressed at a later stage, if the proposal is approved under the EPBC Act. No request for such information had been received by Council prior to receiving this submission.
Would impact on the water table and water pollution in Erowal Bay/St Georges Basin. Impossible for standards recommended by the CoI [no net increase in average annual pollutants or change to hydrology] to be met if the land is developed – urban development completely changes the runoff and water quality regime. Numerous submissions referred to stormwater runoff problems in recent years from a nearby development site. The study by Geosciences Australia on St Georges Basin indicated it is very sensitive to any increases in pollution.	Numerous submissions opposed to the proposal expressed concerns about impacts on downstream water quality/hydrology (that is, impacts on Worrowing Waterway, Erowal Bay and/or St Georges Basin). These issues are not considered directly relevant to the controlling provisions under the *EPBC Act* Jervis Bay Territory extends to the eastern shoreline of St Georges Basin but does not include the waters of St Georges Basin. Potential impacts on St Georges Basin would have to be assessed in detail as part of the NSW rezoning process (Environmental Planning & Assessment Act, 1979). A comprehensive water quality monitoring program was undertaken to inform detailed stormwater modelling and design, but the modelling and design work has not been undertaken at this stage, pending the outcome of the *EPBC Act* approval process.
Area remains wet for up to 6 weeks after heavy rain.	Drainage considerations are briefly discussed in the PER. Further analysis is not considered necessary in relation to the controlling provisions under the *EPBC Act*. See above.
Not sufficient mention of staging the development in the PER as per the COI recommendations.	Recommendation 6 of the CoI (refers to staging) was inadvertently omitted in section 1.4.1 of the Draft PER. This has been rectified. Section 6.5.1 of the PER refers to staging of the development as a key strategy in minimising soil erosion. A reference to recommendation 6 of the CoI has been inserted in this section to emphasise this point.
Proposed development would contribute to global warming.	Additional information has been added to section 6 of the PER.
Concerns about creating a precedent for other "paper subdivisions" in NSW.	Such subdivisions in the Shoalhaven LGA are being considered on a case by case basis.

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Issue	Response
Social issues	
Belief that humans should come before the environment. Landowners have a right to have their land rezoned or be compensated. Request respect, tolerance and community fair mindedness.	Refer to section 3 of the PER.
Social impact study too narrow and methodology flawed. Information of social impacts not balanced by potential social/economic impacts to residents of the Bay and Basin area and Jervis Bay Territory (JBT) should the development proceed. Impact of development has not been assessed on broader community; impacts on tourism; the Wreck Bay community.	The social impact study was prepared specifically to show the impacts on the landowners if the proposal does not proceed. Additional information broadly outlining social and economic impacts, with particular regard to Commonwealth land, has now been provided in section 3 of the PER.
Requests that Council undertake an economic feasibility study. Believes this will show that the best option is compulsory acquisition for addition to the Jervis Bay NP.	A full economic feasibility study would be costly and would be difficult due to high levels of uncertainty in relation to many of the variables.
Will change the area's character irreversibly. Will create urban sprawl.	Further information provided in section 3 of the PER discusses potential impacts on the character of the area.
Threatened species didn't prevent the Vincentia District Centre and residential subdivision from being approved, less than 1 km from Heritage Estates [perceived hypocrisy and discrimination where a large developer is the proponent].	The Stockland Vincentia development was approved in relation to Sections 18 and 18A of the EPBC Act (threatened species and ecological communities) on 30th July 2007. DEWHA determined that the Heritage Estates also requires approval under Sections 26 and 27A of the Act (relates to impacts on Commonwealth land) as well as Sections 18 and 18A.
Decline in the area's biodiversity would result in negative impacts on community.	Refer to section 3 of the PER.
Existing infrastructure and services will not cope with the development: roads, schools, waterways, medical, water and sewerage, aged care facilities etc.	Preliminary information on adequacy of water, sewerage and electricity is provided in section 2 of the PER. Additional information on community services & infrastructure has also been provided in section 3 of the PER. Further assessment of these issues would be undertaken if/when the proposal is approved under the EPBC Act.
The area already has a high level of unemployment – would be exacerbated if the proposal proceeds.	Refer to section 3 of the PER.
Proposal would provide additional employment opportunities.	Refer to section 3 of the PER.
Impact of development has not been assessed on broader community; impacts on tourism; the Wreck Bay community.	Refer to section 3 of the PER.
Wreck Bay Aboriginal Community has a strong connection with the land. The Heritage Estates land is in the isthmus to Bherwerre Peninsula & has strategic importance & without it some species may not be able to survive.	Refer to section 3 of the PER.
Economic Issues	
Will impact on character of coast villages.	Additional information provided in section 3 of the PER.

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Issue	Response
BNP is a national treasure, a tourist attraction & source of employment for Wreck Bay people. Booderee NP and the Bay are principal attraction for visitors to the area. The region competes with many other areas of natural beauty and maintaining values of the area is a huge challenge as use and development pressure increase. The Park supports many commercial/ecotourism activities that rely on a high quality natural environment. Market highly competitive with discerning clientele.	Refer to section 3 of the PER.
Importance of tourism in Jervis Bay area & impacts of proposal on tourism. No specific economic data available on contribution of the Jervis Bay National Park to region's economy.	Refer to section 3 of the PER.
Would decrease property values in neighbouring areas.	Refer to section 3 of the PER.
There is a need to provide land for population growth.	Refer to information on land supply added to section 3 of the PER.
There is no shortage of residential land in the area.	See above.
The development would provide economic stimulus to the area's economy. The Vincentia District Centre won't be as viable without the development. Would provide students for adjacent school.	Refer to section 3 of the PER.
Owners should be compensated under the Just Terms Compensation Act.	
Unfair to pay rates on a property for 20 years, that can't be used.	Council is required to levy rates on the properties under the *Local Government Act, 1993.*
Owners shouldn't be compensated. Council shouldn't charge rates. Ratepayers should not have to subsidise.	See above.
Council should have charged nominal rates and resumed the properties. Concerned about Council's sale of land for unpaid rates.	In relation to land within the investigation areas, Council's policy is not to pursue ownership of the properties unless the owners volunteer their land in lieu of unpaid rates. In relation to land in the areas recommended for environmental protection, Council will also seek to include and purchase properties if rates are outstanding for 5 or more years. The reason for this is to take the properties out of private ownership to resolve the dilemma for both landowners and Council. 15 properties from the area recommended for environmental protection were purchased by Council through the sale of land for unpaid rates held on 12.11.2008. The properties will be held indefinitely by Council.
If the land is developed there would be a financial risk to broader rate paying community. Infrastructure costs will be astronomical to people who are already suffering financially. Broader rate paying community should not subsidise development of the Heritage Estates.	Additional information has been provided in section 3 of the PER. Refer also to section 6.2.4 in the Judith Stubbs report in Attachment 3 of the PER.
Landowners are willing to pay for infrastructure.	See above.

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Issue	Response
Bushfire asset protection zones (APZ): 140-180 lots could not be built on because of APZ's. This would mean the remaining 550-590 owners would have to pay higher costs.	The Planning for Bush Fire Protection guidelines have been amended since BES completed the bushfire assessment report. There is also some leeway as the investigation areas identified by the CoI include approximately 800 lots.
Considerable resources have been invested in BNP as an area of conservation & educational significance.	No specific information was provided to Council on this issue.
Concern about Council funding the social impact assessment completed by JSA – considers this a misuse of Council funds.	Money allocated by Council for the rezoning investigations is being repaid by the landowners through a special rate levy.
History & Other Issues	
Prominent signage was placed around the land when it was for sale and price was extremely low compared to other land in the vicinity.	Council's signage warning potential purchasers was erected in 1988, partway through the sale. Note median sale price reported by Judith Stubbs was $17K.
The vast majority of properties have been on-sold since the original sale.	While Council regularly receives zoning enquiries in relation to Heritage Estates properties on the market at any given time, overall this statement is not consistent the JSA study.
Proposal not consistent with the CoI	A number submissions opposed to the proposal expressed a belief that the CoI had recommended no development. The proposal is consistent with the CoI's recommendations and the JBSS. Refer to section 1.4.1 for further details.
Proposal should revisit the whole of the Heritage Estates area. Some owners of land in the area recommended for environmental protection don't understand how their property came to be excluded from the rezoning investigations. West Birriga Ave should be rezoned for development considering existing development already there. Riparian areas would provide adequate corridors.	A NSW Government moratorium on rezoning land in the Jervis Bay area at the time of the COI was only lifted when the Jervis Bay Settlement Strategy (JBSS) was endorsed by Department of Planning in 2003. In relation to Heritage Estates, the JBSS requires that any rezoning be consistent with the CoI's recommendations. Council has little choice other than to proceed in accordance with the CoI.
Acquisition of the land historically not supported by Government.	If the proposal is not approved due to the potential impacts on regional biodiversity, there is a strong argument for Government acquisition.
Have waited 20 years for land to be rezoned. Hoping to retire and build on the land.	Personal statement made by many landowners – no comment offered.
Study by JSA has no credibility, especially regarding the ignorance of the landowners when they bought their land: Council signs warned potential purchasers; solicitors would have warned people.	The report by Judith Stubbs & Associates indicates that many purchasers used solicitors who were acting in association with the real estate agent. The Council signs were erected in 1988, part way through the sale. Refer to Attachment 3 in the PER.
Council should give the owners their money back. Land should never have been sold in the first place.	Council cannot prevent the individual lots from being bought and sold. Council made two submissions to the State Government when the land was first being sold off, seeking State Government intervention to prevent the land from being sold. The submissions were ultimately unsuccessful.
Given the circumstances which the land was initially sold, owners should receive 'compensation' such as through biobanking.	Refer to section 2 of the PER
Landowners purchased land without dwelling entitlements despite Council's warnings that it does not have dwelling entitlements.	Council considers that the ongoing uncertainty is in no one's best interest and is committed to resolving this matter as soon as possible.

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Issue	Response
Ongoing uncertainty about the land is unnecessarily cruel to the landowners and resources could be better spent in exploring other solutions for all the landowners of the Heritage Estates.	
Media reports that Council has a moral obligation to the landowners? Moral obligation should be to residents and ratepayers of the Shoalhaven.	This reference related to a statement about the need to resolve current uncertainty and the situation where landowners are required to pay rates on land they cannot use and the land is being degraded to the community's detriment.

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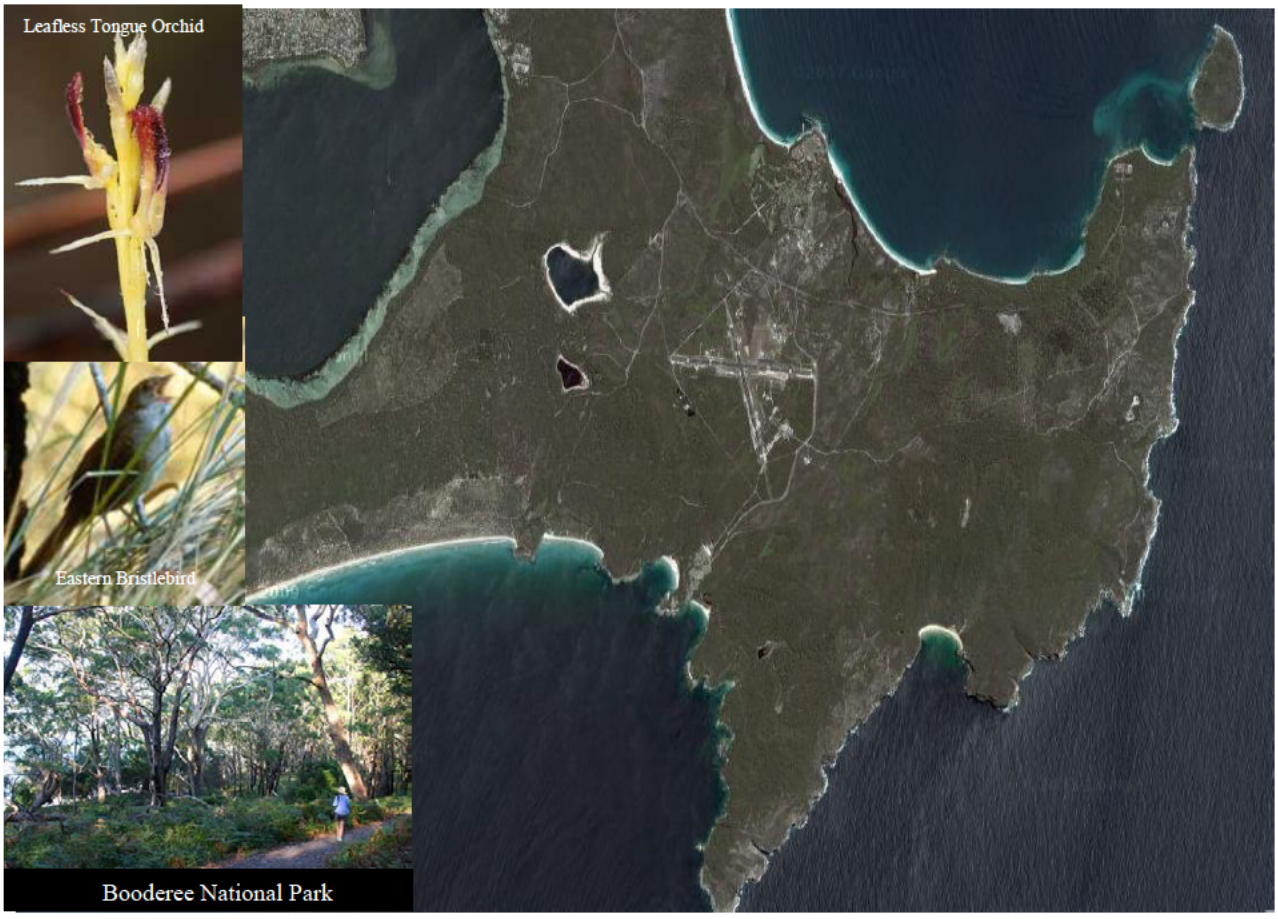
Australian Government

Department of the Environment, Water, Heritage and the Arts

RECOMMENDATION REPORT

HERITAGE ESTATES REZONING AND ASSOCIATED PUBLIC WORKS, WORROWING HEIGHTS, NSW

(EPBC 2007/3448)



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Recommendation

That the proposed Heritage Estates rezoning and associated public infrastructure works (EPBC 2007/3448) not be approved under the *Environment Protection and Biodiversity Conservation Act 1999* due to unacceptable impacts on listed threatened species and ecological communities (sections 18 and 18A) and Commonwealth land (sections 26 and 27A).

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Material on which the decision maker's findings will be based

i. Referral document; Shoalhaven City Council, May 2007.

ii. Public comments received on the referral (over 30)

iii. Threatened Biodiversity Survey and Assessment – Rezoning Investigations, Worrowing Heights (Heritage Estates), City of Shoalhaven; Bushfire and Environmental Services, February 2007.

iv. Report to the Honourable Dr Andrew Refshauge, Deputy Premier, Minister for Urban Affairs and Planning, Minister for Aboriginal Affairs and Minister for Housing, Heritage Estate, Jervis Bay; Kevin Cleland, Deputy Chairman, Commissioners of Inquiry for Environment and Planning, August 1999.

v. Impacts of the Heritage Estates Development Proposal; Professor David Lindenmayer, Australian National University, June 2007.

vi. Review regarding the effects of the Heritage Estates proposal, Worrowing Heights, Jervis Bay (EPBC referral 2007-3448) on the Eastern Bristlebird and other threatened flora and fauna; Professor Hugh Possingham, The Ecology Centre, University of Queensland, June 2007.

vii. Public comments received on the draft PER (over 380)

viii. Public Environment Report; Shoalhaven City Council, January 2009.

ix. Social and Economic Impact Assessment of Heritage Estates Development Proposal, Report by Robert Gillespie of Gillespie Economics, January 2009.

x. Environmental Impact Assessment of Heritage Estates Development Proposal, Report by Dr Daniel Ramp and Ms Erin Rogers of UNSW Global PTY LTD, January 2009.

xi. Booderee National Park Management Plan: Consisting of a description of Booderee National Park and a management plan 2002

xii. Conservation Advices for the Leafless Tongue-orchid and Melaleuca biconvex at: http://www.environment.gov.au/biodiversity/threatened/conservation-advices.html.

xiii. Register of the National Estate (place ID 1604) – Gurumbi Nature Reserve

xiv. Register of the National Estate (place ID 1587) – Jervis Bay and Surrounds.

xv. Commonwealth Heritage List (place ID 105394) – Jervis Bay Territory

Definitions

Investigation Areas – four investigation areas were identified for staged development in the 1999 Commission of Inquiry on Heritage Estates, plus the environmental protection zone (see map at Figure 1.)

Figures

Figure 1 – Proposed Heritage Estates subdivision and recommendations of the Commission of Inquiry
Figure 2 – Vegetation description of Heritage Estates site
Figure 3 – Corridor Linkages at Bherwerre Isthmus
Figure 4 – Regional Context of conservation and developed areas
Figure 5 – Jervis Bay Territory listed on Commonwealth Heritage List
Figure 6 – Jervis Bay and Surrounds listed on Register of National Estate
Figure 7 – Gurumbi Nature Reserve listed on Register of National Estate

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Background

Proposal to develop the Heritage Estates site

1. The Shoalhaven City Council proposes to rezone and undertake public infrastructure works to facilitate residential development on the 179.6 ha Heritage Estates site, Worrowing Heights, NSW. This includes the implementation of bushfire protection and hazard reduction measures. The majority of the site, which is located south of The Wool Road, has a width of between 1.2km and 1.75 kilometres.

2. The Shoalhaven City Council is seeking to implement a recommendation from the NSW Commission of Inquiry 1999 (CoI), which would allow the residential development of a maximum of 730 of the 1,232 registered lots of the Heritage Estates site (see map at Figure 1). Therefore a consequential impact of allowing the proposal to proceed would be the likely development of a maximum 730 lots for housing. The CoI also recommended that this maximum of 730 lots could be further reduced depending on the outcomes of site studies on acid sulphate soils and water run-off. In making decisions under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) the consequential impacts of proposals must be considered in accordance with the Federal Court judgement relating to the Nathan Dam proposal.

History of the Heritage Estates site

3. In 1964, when land use zoning was introduced into the Shoalhaven, the Heritage Estates site was zoned rural. In the late 1980s and early 1990s the site was sold in 1,232 urban sized lots. Such registered subdivisions are sometimes referred to as paper subdivisions, as they do not have dwelling entitlements.

4. The rural zoning provisions of the *Shoalhaven Local Environmental Plan (LEP)* 1985 do not permit the erection of dwellings on individual lots within the Heritage Estates site.

5. The Public Environment Report (PER) (2009) states that the purchasers of the Heritage Estates lots were subject to "aggressive marketing strategies", which led them to believe that there "would be no problem in the future with building on the land." The landowners, who purchased those rural-zoned lots, have since sought permission to build on them. However, the CoI (1999) states that:

> *"[t]he erection of dwelling houses on individual allotments less than 40 hectares is not permissible under the relevant provisions of Shoalhaven LEP. These facts were clearly spelt out by Council at the time the land was being marketed and purchased. The land was advertised as "no dwellings allowed". Landowners who bought Heritage Estates land following the necessary enquiry prudent before such commitment would have been in no doubt as to the development status of the land."*

6. According to the 2009 Public Environment Report (PER), "[in] 1992, Shoalhaven resolved to investigate rezoning of the subdivision to enable residential development. Several planning and environmental studies were prepared in the mid 1990's and Council unsuccessfully sought to prepare and exhibit draft Local Environmental Plans to rezone the land on a number of occasions. A State Government, Council and landowner taskforce was subsequently unable to reach agreement on a development scenario, culminating in a NSW Commission of Inquiry (CoI) in 1999."

Commission of Inquiry 1999

7. The CoI (1999) noted that "[t]he ecological and water quality values of the site, even though it is partly degraded, are the pre-eminent values. Intrinsic ecological values are largely due to the presence of a number of threatened species and the likelihood that more would use the site."

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8. Many of the state agencies, prior to and during the CoI (1999), expressed their concerns about the proposal. The NSW National Parks and Wildlife Service, the Department of Urban Affairs and Planning, the Department of Land and Water Conservation, and the Environment Protection Agency, among others, agreed that there was "no strategic planning benefits of rezoning and developing the Estate in the short term (Attachment 8, PER 2009)."

9. The NSW Minister for Urban Affairs and Planning directed the CoI (1999) to consider seven planning options for the site, which were outlined in the Patterson Britton Report (April 1998). The option it recommended would allow for the development of a maximum of 730 residential lots from the total of 1,232 lots. "Option 4 would provide reasonable surety [of setting aside wildlife corridors to protect biodiversity] and it is the maximum development option which should be implemented. Even so, further restrictions may need to be applied following additional investigation of water quality aspects (CoI 1999)."

10. The proposal referred by the Shoalhaven City Council is generally based on the outcome of the CoI (1999). Although there are some changes from the CoI recommendations, and other matters that require further consideration. The CoI recommended that Birriga Avenue not be developed as a through road between Jervis Bay Road and The Wool Road as it would impact on a proposed sedgeland habitat corridor. However, Shoalhaven City Council states that Birriga Avenue would be built as a through road to meet requirements for bushfire protection. Bushfire protection was not considered in the CoI, and Asset Protection Zones and Strategic Fire Advantage Zones would be required if the proposal was to proceed. The CoI also recommended that development proceed on a staged basis. It recommended that initial development only occur on stage one (135 lots) of the proposed four stage development, depending on the monitoring results concerning water run-off. This monitoring was recommended to ensure there would be "no net increase on key pollutants" draining into St Georges Basin.

Referral and public consultation

11. On 9 May 2007 Shoalhaven City Council submitted a referral for the proposal under the EPBC Act. The referral (EPBC 2007/3448) included a report entitled 'Threatened Biodiversity Survey and Assessment Rezoning Investigations' by Bushfire and Environmental Services (BES 2007). That report concluded that the site had high conservation values due to its function as a wildlife corridor, high species richness and diversity, and high number of listed threatened species that were found, and that it should not be rezoned for residential development.

12. The Department of the Environment, Water, Heritage and the Arts (the department) sought independent advice from scientific experts (Drs Lindenmayer, Possingham and Szabo) at the referral stage, to determine whether the proposal could be considered to be clearly unacceptable under section 74B of the EPBC Act, on the basis of the impacts identified by BES (2007).

13. Dr David Lindenmayer's report, dated 15 June 2007, agreed with the conclusions reached by BES (2007), principally that the proposal would be clearly unacceptable due to the disruption it would cause to the environmental values of Booderee National Park (BNP) and impacts on listed threatened species. He noted that the unacceptable nature of the proposal would be compounded by the high numbers of listed fauna and flora associated with the site; the possible 'extirpation' of the Eastern Bristlebird from the site; the increase in domestic animals and predation of listed species in neighbouring habitats such as BNP; and loss of habitat corridors and connectivity to BNP, among others. Lindenmayer further added that he could not see how the proposal could be modified to mitigate the negative ecological and environmental impacts.

14. The report by Drs Hugh Possingham and Judit Szabo, dated 15 June 2007, confirmed that the proposed activity would have a wide range of impacts on all relevant threatened species and that mitigation measures would be costly and could not be guaranteed.

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15. Shoalhaven City Council agreed to extend the public comment period on the referral to 8 June 2007. This was done to allow the public more time to consider supporting documentation, because the BES report (2007) was not initially available to the public on the department's website. There were over 30 public submissions received during the referral phase. Less than one quarter of the submissions supported the proposal and the rest opposed it.

16. On 22 June 2007, a delegate of the Minister decided that the proposal would be a controlled action under section 75 of the EPBC Act, for likely impacts on listed threatened species and ecological communities (sections 18 and 18A) and Commonwealth land (sections 26 and 27A). The delegate also decided that the proposal would be assessed by Public Environment Report (PER) under section 87 of the EPBC Act.

Assessment approach and public consultation

17. The decision to assess the proposal by PER was made to provide further analysis of the relevant impacts on listed threatened species and Commonwealth land, and to provide the public with further opportunity to comment on the proposal. In addition, the PER could consider the potential for significantly modifying the proposal, which was not addressed in the BES report (2007).

18. On 15 May 2008, the PER for the proposal was published for comment from 10 June 2008 to 21 July 2008. Owing to incorrect dates in the notice requesting public comments, another notice was published requesting public comments on the PER from 26 July 2008 to 12 September 2008. Over 380 submissions were received during the two public comment periods. Submissions were received from various parties including the Shoalhaven Landowners Association, individual scientists and non-government organisations.

19. Two thirds of the submissions received supported the proposal. They were mainly from Heritage Estates landowners. The principal issues raised in those submissions were:
    - It is now the landowners' right to develop the land after owning it for so long and paying rates;
    - Other developments in the area (e.g. Stocklands, Bayswood subdivision etc) have been allowed to proceed;
    - The land's environmental attributes have been overstated; and
    - The negative social and economic impacts of not rezoning on the local community, because an influx of residents would add to the ratepayer base and generate better services for everyone.

20. The principal issues raised in submissions opposing the proposal were:
    - The loss of threatened species and habitat corridors;
    - The available scientific information indicates unacceptable impacts and no potential for mitigation or offset;
    - The isolation of species and ecosystems that would occur in Booderee National Park and the Bherwerre Peninsula;
    - Potential impacts on tourism value of adjacent Booderee and/or Jervis Bay National Park;
    - The social and economic study was too narrow in scope; and
    - No consideration was given to climate change impacts.

Environmental Record

21. According to the PER (2009), the Shoalhaven City Council has a management plan which "outlines how Council plans to promote ecological sustainability and protect sensitive areas…Council has developed (and is developing) processes that allow the City's environment to be studied so that long term action plans may be implemented for the benefit of the environment and/or the benefit of the community." Discussions with the Shoalhaven City Council indicate that it has not been involved in any court cases and has received one PIN (penalty infringement notice), regarding damage to a seagrass bed (Hollinger pers comm. 2009).

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22. The PIN was issued by NSW Fisheries regarding damage to a seagrass bed during dredging works. The damage occurred in December 2002, with Council receiving a fine and an order to allow remediation, which was by natural regeneration.

Assessment

Controlling provisions

23. The proposed development site is adjacent to the NSW Jervis Bay National Park and about 3 kilometres north of Booderee National Park. Booderee National Park (BNP) is a Commonwealth Reserve that is nationally recognised for its environmental significance. The BNP is also considered an important population reservoir because of its protected status and diversity of species. "It lies between bioregions and consequently it is unusually rich in natural resources…Many species are at their northern or southern limit of distribution (Attachment 7 PER 2009)." In particular, it provides important habitat for Commonwealth and NSW listed threatened fauna and flora species, including the endangered Eastern Bristlebird and vulnerable Giant Burrowing Frog, and the NSW listed Ground Parrot and Yellow-bellied Glider.

24. The Heritage Estates site includes rainforest, swamp forest, sedgeland, open forest and heathland (see map at Figure 2). These various vegetation assemblages provide a mosaic of habitats for different fauna species. According to the department's environmental reporting tool, listed threatened species and migratory species potentially occur on the site. Surveys undertaken by BES (2007) and EcoLogical Australia Pty Ltd (ELA) (2008), and information provided by Drs. D. Lindemayer, H. Possingham and J. Szabo, indicate that the endangered Eastern Bristlebird (*Dasyornis brachypterus*), the vulnerable Leafless Tongue Orchid (*Cryptostylis hunteriana*) and the vulnerable *Melaleuca biconvexa* are known to occur on the site. Other potentially occurring EPBC listed species are the endangered Jervis Bay Leek Orchid (*Prasophyllum affine*) and the vulnerable Giant Burrowing Frog (*Heleioporus australiacus*).

25. The issues of concern addressed in this assessment are:
    - the fragmentation of habitat corridors for fauna and flora occurring on the Bherwerre Peninsular;
    - impacts on the viability of species' populations within the Booderee National Park on Commonwealth land;
    - impacts from clearing vegetation that provides habitat for EPBC listed threatened species and NSW listed threatened species; and
    - potential indirect impacts, such as the degradation of remaining habitat through edge effects, weed encroachment, fire and the introduction of pest animals.

<u>Commonwealth Land – Booderee National Park</u>

The importance of Heritage Estates site as a habitat corridor for Booderee National Park

26. The Heritage Estates proposal occurs within the Bherwerre isthmus – a narrow land corridor to the Bherwerre Peninsula and Booderee National Park. This land is an important habitat corridor for fauna and flora species on the Peninsula (see map at Figure 3) and contains habitat for listed EPBC species, as well as NSW listed species and species of regional significance.

27. Habitat corridors are defined as "areas of natural vegetation which connect two or more larger areas of vegetation in order to maintain the full range of plant and animal life found in the region (PER 2009)." Although the land surrounding and including the Heritage Estates had been identified as linking Bhewerre Peninsula, Gurumbi Nature Reserve to forest north of St Georges Basin to Yerriyong State Forest and the then proposed Parma Creek Nature Reserve, it was not formally recognised as a habitat corridor in the Jervis Bay Regional Environmental Plan. One of the reasons for this was that 67% of the land is in private ownership. Even though, it "correlates to the 'indicative habitat corridor' in the South Coast Regional Strategy (PER 2009)."

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28. The biogeography of the BNP on the Bherwerre Peninsula, which is approximately 3.5km at the narrowest point of the isthmus, makes it particularly vulnerable to species population isolation and extinction. Therefore the neck of the Bherwerre Peninsula forms an important corridor for species, providing habitat linkages between the BNP, NSW Jervis Bay National Park and other natural areas in the broader region, including the Beecroft Peninsula to the north and the Morton National Park to the west (see map at Figure 4). The map at Figure 4 also shows the urban development that is encroaching on those habitat corridors.

29. The Booderee National Park Management Plan (Commonwealth of Australia, 2002) states:

> "*Because of its secure protection and rich diversity of species, the Park is considered a population reservoir for the wider region. Other reservoirs in the area include Beecroft Peninsula to the north and Morton National Park to the west. It is important that these reservoirs are linked by a system of habitat corridors to ensure maintenance of species diversity and genetic viability. This is particularly important in the context of Booderee, which is on a peninsula, linked to other areas by a narrow tract of land. The vegetation on the narrow neck of the Bherwerre Peninsula is fragmented by the settlements of Hyams Beach and Erowal Bay/Wrights Beach. The retention of vegetation in the remaining parts of the 'neck' as habitat corridor is important for the long-term protection of the Park. Regional planning exercises for the protection of habitat corridors have involved liaison with the NSW National Parks and Wildlife Service, the NSW Department of Urban Affairs and Planning and the Shoalhaven City Council. The Director, Parks Australia, the Wreck Bay Aboriginal Community and the Park Board have expressed concerns about the possible fragmentation of this corridor and the subsequent impact it may have on the biodiversity of the Park.*"

30. The Director of National Parks (letter dated 29 July 2008) acknowledges that the "park itself is insufficient to protect the region's biodiversity particularly because of its relatively small size, isolation and bio-geographical characteristics." This is supported by the list of species that have become locally extinct from BNP in recent decades (Table 1 of Attachment 7 of the PER (2009)).

Impacts on Booderee National Park

31. As mentioned in paragraph 1, the width of the Heritage Estates site south of The Wool Road varies between 1.2 and 1.75 kilometres. The site supports a range of vegetation assemblages that provide a mosaic of habitats for different species (paragraph 24). The CoI stated that "[m]inimum effective [habitat corridor] widths of 250 metres to 500 metres were referred from the literature." That recommended width will vary depending on habitat requirements of relevant species, likely edge effects from urban development, management of Asset Protection Zones for bushfires and the expected impacts of climate change. However the corridors between urban areas recommended in the CoI generally range from 75 m for the central corridor to an average of 200 metres in the western corridor of Heritage Estates site. The CoI further states that "[i]t can be inferred from the evidence that a corridor width of 50 metres will have a very restricted effectiveness due to edge effects and that in general the wider the corridor the better. Nevertheless, even a narrow corridor is better than no corridor at all."

32. According to the PER (2009), "ELA concluded that the proposed rezoning and subsequent development will result in significant impacts to a range of species that utilise BNP. These impacts include the loss of habitat for these species on the subject land (i.e. in an area nearby to BNP) and a substantial loss of connectivity to and from BNP." It also states that the loss of this habitat and connectivity is likely to "reduce the functionality of the BNP as habitat for some of these species, and impact on the viability of populations of some of these species within the region."

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33. Independent advice to the department supports the above ELA conclusion, "[d]ue to the geography of the area and isthmus being the only terrestrial access to Booderee National Park, any impact to this natural wildlife corridor are likely to have long-term impact on the environment of Booderee National Park (UNSW Global 2009)."

34. Information provided in the PER (2009) from Booderee National Park at Attachment 7, states that the subject:

> "*land is located on the northern end of the narrow isthmus of land of the Bherwerre Peninsula, which connects Booderee National Park to NSW Jervis Bay National Park and surrounds…The Estate borders the NSW Jervis Bay National Park on their southern boundary, and then extend as a contiguous area of native coastal bushland* [for] *a further 3km southwards to the border of the Jervis Bay Territory and Booderee National Park. The area has been identified by the Commonwealth Government as a vital link to maintaining biodiversity in Booderee and the region since rezoning discussions commenced in the late 1980's, and there has been numerous correspondence with NSW State agencies on the issue."*

35. Information provided in the PER (2009) from the NSW Department of Environment and Climate Change at Attachment 8, states that:

> "*Government Agencies consider that the sub-regional/regional corridors are essentially an issue of biodiversity management for the region…The critical link between the Bherwerre Peninsula and…other reserved lands and habitat corridors is a narrow area between the towns of Vincentia and Erowal Bay. Wildlife movement through this link is essential to the long-term survival of the biodiversity of the Bherwerre Peninsula*."

Climate change and the importance of habitat corridors

36. In June 2007, the Commonwealth Government co-sponsored the 'Protected Areas: Buffering nature against climate change Proceedings of a WWF and IUCN World Commission on Protected Areas symposium, 18-19 June 2007, Canberra', which was aimed at examining how to manage climate change with an emphasis on the current reserve system. Many papers were submitted during the proceedings, in particular one paper by Mansergh and Cheal (2007) examined eastern Australia's temperate forests and woodland ecosystems under climate change. Some of the messages raised by Mansergh and Cheal (2007) were that:

> "*[i]n the 21st century, eastern Australian temperate woodlands and forests face a warmer and drier climate which has potential to have profound effects on the distribution and abundance of species and ecological processes. Threatening processes such as fragmentation of habitat, exotic species and changed fire regimes, are likely to be exacerbated*."

37. Furthermore, Mansergh and Cheal (2007) state that "[t]he percentage of land area of reserves in NSW (c. 7%) is less than half than that of Victoria (>16%) with woodlands being under represented…" and that "[e]cological connectivity between reserves is poor…" They then conclude that "[b]iolinks have a major part to play in restoring resilience in the context of climate change (Mansergh and Cheal, 2007)."

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38. The Director of National Parks (letter dated 29 July 2008) mentions particular concern regarding the "effectiveness and resilience of the reserve system in the face of climate change, and [that] there is a growing emphasis by governments generally on improving connectivity and coordinating management programs to increase resilience to climate change impacts." "In addition, the region's parks form part of Australia's National Reserve System protecting representative samples of Australia's biodiversity."

Habitat loss on Heritage Estates site and corridor functionality for species

39. The PER (2009) quotes ELA (2008) as stating that "[t]he [Heritage Estates] area provides connectivity for many species along Bherwerre Peninsula…At the same time as providing this connectivity, [Heritage Estates] also provides habitat for many species in its own right." Of particular note is the NSW listed Yellow-bellied Glider, which has disappeared from Booderee National Park but is still found on the Heritage Estates site. "The functionality of any corridor depends in part on the functionality of the area as habitat, rather than being solely a 'bridge' across unfavourable areas." The proposed proximity of urban development to the remaining habitat would undermine its long term viability and decrease the functionality of the corridor. According to DECC (20 November 2007) while the Yellow-bellied Glider has become locally extinct in BNP "a population of the threatened arboreal possum, the Yellow-bellied Glider, has been recorded as occurring along the Worrowing Water way within the Heritage Estates site for a number of years." The Director of National Parks (letter dated 29 July 2008) also notes that the issue of "species becoming locally extinct and some are in decline" has been raised in previous correspondence.

40. Independent advice to the department supports this perspective, "[t]he entire development area contains primary habitat for a wide range of NSW threatened fauna, most of which occur in Booderee National Park. Development of the subject land will restrict the ability of locally extinct species to recolonise adjacent areas and increase the risk of extinction of species of concern in BNP (UNSW Global 2009)."

41. Information provided in the PER (2009) at Attachment 7, states that the studies undertaken by CSIRO scientist Judy Caughley in 1993, the CoI (1999), and BES (2007), all identified the high ecological significance and conservation values of the land and the need for it to be zoned for environmental protection. In particular, BES (2007) identified that the "landscape position of the study area, its connectivity to adjoining areas of habitat and function as a wildlife corridor increase its conservation significance. In considering the sum of the values and extent of ecological restraints it was concluded that none of the study area should be rezoned for residential development."

42. The importance that the Heritage Estates site plays in the protection of biodiversity corridors has increased as various developments within the Bherwerre Isthmus, such as the Stockland Vincentia development and the Baptist School and Church Centre, will have cumulative impacts on the viability of existing habitat corridors.

Impacts on habitat corridor functionality for listed threatened species

43. The preservation of linked habitat corridors on the Bherwerre isthmus is strategically important to maintain the diversity and genetic viability of species populations in the Jervis Bay region. The maintenance of effective habitat corridors is of particular concern for EPBC listed threatened species, including the Eastern Bristlebird, Giant Burrowing Frog and others.

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44. Some species could be directly affected through the loss of the habitat corridor alone, such as the Eastern Bristlebird. The report provided by Possingham and Szabo (2007) identified that the loss of the study area, which is an important habitat corridor for this species, would "negatively impact [on] the long-term viability of the Eastern Bristlebird in two ways. First, increased isolation reduces genetic exchange between populations and decreases population viability. Second, the Eastern Bristlebird exists as isolated populations, each of which is prone to local extinction through catastrophic events, such as fire or disease. Consequently, long-term persistence of the species depends on connectivity through continuous habitat that enables individuals to recolonise areas of local extinction and to colonise new areas."

45. In considering the need for habitat corridors in the Heritage Estates site, the CoI recommendation focused on "conservation of forest and habitat corridors for the protection of the *yellow-bellied glider*, *common bent-wing bat* and *glossy black cockatoo* (UNSW Global, 2009)." It did not consider the habitat provided by the sedge or heath for the Eastern Bristlebird, Leafless Tongue-orchid, or Giant Burrowing Frog. The UNSW Global (2009) report states that "[a]s stated in the 2007 BES report, which superseded the CoI recommendations, 'the entire site represents primary habitat for threatened species recorded on site'."

Criticism of ecological value of Heritage Estates site as a habitat corridor

46. Many submissions supporting the proposal claimed that the identified ecological values and presence of threatened species on the site have been overstated, but that was not substantiated with further empirical information on habitat utilisation. As outlined above, that claim was not supported by the various ecological assessments undertaken by the Council or the reports of experts in ecology.

Heritage impacts

47. The BNP is a component of the Jervis Bay Territory, which is on the Commonwealth Heritage List (place ID 105394) for indigenous and natural values (see map at Figure 5). The Wreck Bay Community also has an Aboriginal Land Grant on the Register of the National Estate (place ID 16487). The Wreck Bay Aboriginal Community Council has identified the Heritage Estates land as special to them, "because we know that without it, some species on our lands may not be able to survive (letter, 15 August 2008)." The Community "has a strong connection with the land, and…greatly value the natural and cultural heritage of this area." The Community informed the Shoalhaven City Council that they "fully agree with your consultants, BES, and your draft PER about the importance of the site in conserving endangered species and connecting protected areas such as Booderee National Park and NSW Jervis Bay National Park (letter, 15 August 2008)."

48. Jervis Bay and Surrounds (see map at Figure 6) is also listed on the Register of the National Estate (place ID 1587). The listing is described as extending:

> "*from Sussex Inlet in the south to Culburra in the north, extending westward to include Currambene State Forest. The waters of Jervis Bay are also included. Areas which are continuous with this area which are listed in the Register of the National Estate are: Beecroft Peninsula-Lake Wollumboola area, [Booderee National Park] and Gurumbi Nature Reserve… The vegetation communities around the bay provide significant wildlife corridors linking populations of the Beecroft and Bherwerre Peninsulas."*

49. In addition the Gurumbi Nature Reserve (see map at Figure 7), which is located south of Heritage Estates near Erowal Bay east of St George's Basin, is also listed on the Register of the National Estate (place ID 1604). That site provides four ecosystems of which one, the hanging swamps, is described as 'fragile'. The reserve is considered to be in valuable natural condition and represents the floristic diversity of the region.

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Legal protection

50. In a submission letter of 12 September 2008, the Environmental Defenders Office Pty Ltd (EDO) stated that article 8(e) of the Convention on Biological Diversity (Biodiversity Convention) (1993) provides that a "contracting party shall '*Promote environmentally sound and sustainable development in areas adjacent to protected areas with a view to further protecting those area. Booderee National Park and Jervis Bay National Park fall within the definition of 'protected area' under the [Biodiversity] Convention*'." Those areas are known to provide habitat to several threatened species and will, according to the PER, "*be adversely impacted upon by the action, through the loss of habitat and connectivity to other habitat, diminishing the level of protection provided to species within the National Parks* (EDO 2008)." The EDO argues that "the approval of the proposed action would be inconsistent with Article 8 (e) of the [Biodiversity] Convention."

Department's conclusion on impacts on Commonwealth land

51. The proposal will significantly reduce the viability of one of two key habitat corridors for fauna and flora occurring on the neck of the Bherwerre Peninsular, and therefore have unacceptable impacts on Booderee National Park. The main impacts are:
    - fragmentation of a key habitat corridor for fauna and flora;
    - reduced ability of fauna and flora to recover from catastrophic events such as fire;
    - increased risk of local extinctions of species; and
    - a significant increase in genetic isolation of important populations of species.

<u>EPBC listed threatened species</u>

Biconvex Paperbark (Melaleuca biconvexa)

52. The EPBC listed vulnerable Biconvex Paperbark (*Melaleuca biconvexa*) occurs in the coastal districts and adjacent tablelands from Jervis Bay north to the Port Macquarie district in NSW. The Biconvex Paperbark grows on creekbanks and floodplains in Eucalypt open-forest with *Eucalyptus saligna, Eucalyptus robusta, Acacia elata* and in Paperbark scrub with *Melaleuca styphelioides, Melaleuca linariifolia, Melaleuca decora, Melaleuca sieberi* and *Melaleuca nodosa*. It occurs on alluvium soils over shale.

53. Individuals of the species were identified on the Heritage Estates site, although "confined to areas identified as CoI Environmental Protection areas along Worrowing Waterway. It is likely that these individuals form an extension of the larger populations to the north of St Georges Basin. This population is significant as it is a disjunct population from the remaining distribution of this species, on the Central Coast of NSW, and is at the southern limit of its known distribution (ELA 2008)."

54. "No direct impacts are expected from the proposed rezoning, though indirect impacts are likely from changed fire regimes, alterations to the hydrological regime, rubbish dumping and unrestricted access…(ELA 2008)."

55. Overall, the proposed development is considered "unlikely to have a substantial detrimental impact on the local population of the species (ELA 2008)."

Giant Burrowing Frog (Heleioporus australiacus)

56. The EPBC listed vulnerable Giant Burrowing Frog (*Heleioporus australiacus*) is confined to the eastern slopes of the Great Dividing Range and coastal regions from near Mt Coridudgy and Kings Cross in Wollemi National Park, New South Wales, to Walhalla in the central highlands of eastern Victoria.

57. The Giant Burrowing Frog is a cryptic species owing to its burrowing habit and restricted periods of activity during certain climactic conditions. This characteristic has hampered the detection of the species during fauna surveys and assessments of relative abundance. It also makes rigorous assessment of changes in local abundance or population trends difficult.

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58. There are nearby breeding sites for this species in Vincentia and BNP, and additional records from north of The Wool Road. While surveys undertaken at the Heritage Estates site failed to detect any calling, "suitable breeding habitat [was identified] along Worrowing Waterway tributaries and poorly drained sedgeland areas…[t]he presence of the giant burrowing frog on the site cannot be discounted (ELA 2008)." "*Giant burrowing frogs* have been recorded travelling several hundred metres to breeding sites (Penman et al., 2006) (UNSW Global, 2009)."

59. The proposed rezoning would result in the "loss of some potential breeding habitat for the species…, although the importance of this habitat is unknown [and a] significant reduction in connectivity as a result of indirect impacts on corridor function, rather than direct loss of connecting habitat (ELA 2008)." However, "[d]irect impacts from the rezoning proposal will result in the loss of potential breeding habitat within two of the four Investigation Areas (UNSW Global, 2009)."

60. The proposal will result in impacts on potential breeding habitat and result in a reduction in connectivity between known breeding areas. However, the species was not detected during surveys and the extent of likely impacts from this proposal are unknown.

Jervis Bay Leek Orchid (Prasophyllum affine)

61. BES (2007) surveyed for the EPBC listed endangered Jervis Bay Leek Orchid (*Prasophyllum affine*) on the Heritage Estates site. The species was not detected although suitable habitat is present. BES (2007) did acknowledge that given the "close proximity of known records of these species, it is considered possible that they could occur in the study area." The Australian Orchid Council Inc. and The Australasian Orchid Society Inc. contend that this species is likely to occur within the Heritage Estates site as it is found on a nearby property owned by the Jervis Bay Baptist Church.

Leafless Tongue-orchid (Cryptostylis hunteriana)



62. The Leafless Tongue-orchid *(Cryptostylis hunteriana)* is listed as vulnerable. While the Leafless Tongue-orchid has a wide distribution extending from Victoria to Queensland, it has a small area of occupancy (estimated at about 38km^2). This species is primarily known to be found singularly or in small colonies (typically 20 individuals or less).

63. Conservation advice for the Leafless Tongue-orchid (2008) states that the largest known site in NSW contains two populations at Bulahdelah containing "104 and 359 plants". The conservation advice (2008) also states that "[i]t appears to be most common in the Shoalhaven area with 25 populations generally with less than 30 individuals (Clark *et al*., 2004)." The species is also poorly represented in conservation reserves.

64. ELA (2008) considers that "the individuals found on [Heritage Estates] …constitute at least two important populations of the species in the region…as they are likely to be necessary for maintaining genetic diversity in the Jervis Bay region." The BES (2007) survey "recorded 211 individuals across the study area, occurring in woodland and sedgeland. This is a substantial population and the study area contains important habitat for this species."

65. ELA (2008) identified that "[n]early all of the 211 individuals…will be lost on the [Heritage Estates] as a result of the rezoning proposal, with only 1 of 40 surveyed locations outside of the identified Investigation Areas [see definition] (BES, 2007)..." The one population that is outside the proposed areas of residential development is located directly adjacent to a proposed area of residential development, so it would still be at risk due to indirect impacts (see paragraph 71).

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66. "Two other known populations occur near Heritage Estates; one immediately north of Heritage Estates is comprised of 100 individuals, while the second occurs north of Wool Road and is comprised of 112 individuals. These three populations make up the total known records for this species on the peninsula (UNSW Global, 2009)."

67. These other locations are vulnerable to a range of negative impacts that are "likely to reduce the quality of orchid habitat in those areas and will put those individuals under increased threat of extinction. As a result, the populations within [Heritage Estates] have a greater conservation significance (ELA, 2008)."

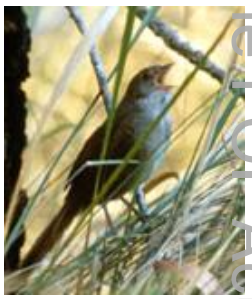
68. The Leafless Tongue-orchid is pollinated solely by the ichneumonid wasp and reproduction is largely restricted to seed disposal via wind, though the species does have the capacity for "vegetative reproduction and can form permanent colonies in a location (ELA 2008)." This means that the species is unlikely to be widely dispersed and to exchange minimal genetic information between populations in a region. "Genetic variability in the species is likely to be greatest across regional populations rather than within populations…Therefore all populations within an area are considered important to retain [and] maximise the level of genetic diversity within a region (ELA 2008)."

69. Conservation advice for the Leafless Tongue-orchid (2008) identifies the need to "investigate options for linking, enhancing or establishing additional populations"…and "constrain public access to known sites" among other measures. The EDO (2008), notes that subsection 139(2) of the Act "requires the Minister to have regard to any approved conservation advices for species." The actions within the conservation advice are all aimed at the recovery of the species.

70. ELA (2008) concludes that the likely "loss of these important populations would be a significant impact and would be likely to threaten the long-term survival of the species in the region."

71. The proposal will result in unacceptable impacts on the Leafless Tongue-orchid for the following reasons:
- it will result in the direct loss of two important populations necessary for maintaining genetic diversity in the Jervis Bay region;
- the increased indirect impacts from changes to hydrology, fire regimes, weed encroachment, traffic and collecting; and
- increased cumulative impacts on a species poorly represented in conservation reserves.

Eastern Bristlebird (Dasyornis brachypterus)



72. The EPBC listed endangered Eastern Bristlebird occurs in three geographically separate regions, the northern population is in far south-east Queensland, the central population occurs on coastal NSW between Budderoo Plateau and the Bherwerre Peninsula, and the southern population occurs from Nadgee (SE NSW) to Mallacoota in eastern Victoria. The range of the species has declined dramatically and it is close to local extinction in Queensland and Victoria.

73. The Eastern Bristlebird is sedentary and inhabits low dense vegetation in a wide range of habitats including sedgeland, heathland, swampland, shrubland, sclerophyll forest and woodland, and rainforest. It is a semiflightless species that is fire sensitive. Local extinctions of populations have been attributed to major fire events. Despite this fire sensitivity, if vegetation has not been burnt for long periods floristic and structural diversity may be altered to the disadvantage of the species. The importance of fire in maintaining suitable habitat is nonetheless uncertain. Advice provided to the department indicates that "[b]oth fire and habitat clearing have been implicated in the decline of the species. *Eastern bristlebirds* avoid fire by moving to unburnt areas, and return later when conditions are more suitable (Bain *et al.*, 2008). Because of this strategy, dispersal is crucial for the long-term persistence of this species (UNSW Global, 2009)."

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74. The total population of the species is estimated at less than 2000 birds, of which approximately 1500 to 1600 birds are found in the central population. The population on the "Bherwerre Peninsula is of critical importance for the conservation of the species as it is the largest remaining population in Australia (ELA, 2008). Of the central population, the three largest populations are Jervis Bay [National Park] (<700 individuals), Barren Grounds Nature Reserve (600 individuals) and Budderoo National Park (250 individuals) (PER 2009)."

75. "Booderee National Park and the adjoining Jervis Bay [National Park] contain the largest remaining population of the Eastern Bristlebird (approximately 50%), but this population is under pressure through development in the area. The site provides vital contiguous habitat for Bristlebird populations in Booderee, NSW Jervis Bay National Park, and populations to the west as far as Tomorong (Attachment 7 PER 2009)."

76. "Surveys during the breeding season identified at least five territories in the north, north-east, east, central, south-west and south-eastern section of the study area...Much of the investigation areas 1 and the eastern half of the investigation area 3 [see map at Figure 1] is currently secondary habitat due to the young age of the understorey vegetation, resulting from slashing and/or fire. If left undisturbed, these areas of secondary habitat will develop into primary habitat within a few years (BES 2007)." However, "[d]isturbances to Eastern Bristlebird habitat by frequent fires is a key management issue for the study area (BES 2007)."

77. Studies undertaken by ELA (2008) determined that an estimated 50-70 individuals, or 7 to 10% of the "[Jervis Bay] population (based on home range estimate work undertaken by Baker 2001), would be negatively impacted by the rezoning proposal, either directly through loss of habitat or indirect impacts."

78. The proposed rezoning "will directly remove 83ha of high quality habitat within the investigation areas (BES 2007)…[This habitat includes] 15 to 20 territories…(ELA 2008)", but there is potentially more as non-calling individuals make up part of the Jervis Bay populations and would not be picked up by standard survey techniques (ELA 2008).

79. The PER (2008) acknowledges that while approximately 67ha of Eastern Bristlebird habitat occurs within the CoI Environmental Protection Area, individuals within this habitat will be subject to indirect impacts if the proposal proceeds. Impacts from the proposal include predation from domestic pets and animals associated with urban development such as foxes and rats, as well as increased fire frequency. Recent research indicates that loss and fragmentation of habitat and predation by foxes, particularly after fire events, are the main threats to the species. In addition, the PER (2008) acknowledges that these impacts will not be confined to the subject site but will occur in adjacent areas of habitat including the National Park, affecting the "long-term survival of Eastern Bristlebirds (DECC, 2007) (PER 2008)."

80. Much of the habitat suitable for the species in the Bherwerre isthmus, outside of BNP, has been identified for development (e.g. the Heritage Estates, Stockland, Baptist Church). The development of the neighbouring Stockland residential area, which was considered likely to have a significant impact on the endangered Eastern Bristlebird, has added to the importance of the Heritage Estates site as habitat for this species.

81. The Action Plan for Australian Birds (Garnett and Crowely 2000) identified the need to retain known subpopulations and maintain or increase the population size in each region. While the EDO (2008) notes that under subsection 139(1) of the EPBC Act, the Minister must "not act inconsistently with a recovery plan", a recovery plan is not yet in place for this species.

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82. ELA (2008) summarised the impacts expected on the Eastern Bristlebird as "significant impacts to a key population of the species are likely to occur due to the direct loss of habitat and loss of a significant portion of individuals in a key population", "substantial indirect impacts to protected habitat in and around [Heritage Estates] are also likely", but that "[t]here will be only minimal impact to connectivity along Bherwerre Peninsula."

83. The Manager of BNP stated that "[t]he entire development site contains important habitat for this species…" Further that "[t]he site provides vital contiguous habitat for Bristlebird populations in Booderee, NSW Jervis Bay National Park, and populations to the west as far as Tomerong. Without effective habitat corridors, the largest remaining population of the species within Booderee and the adjoining Jervis Bay National Park will become fragmented and be under significant threat."

84. The proposal will result in unacceptable impacts on the Eastern Bristlebird through the:
- significant loss of habitat of a key population;
- loss of dispersal and escape routes for the largest remaining population;
- decrease in genetic viability of the largest remaining populations due to isolation;
- increase in fragmentation of habitat for the largest remaining population; and
- increased impacts from urban development including predation by introduced species and increased fire frequency.

Department's conclusion for listed threatened species

85. The proposed action will result in clearing of vegetation that provides important habitat for listed threatened species, resulting in direct impacts on important populations of the endangered Eastern Bristlebird and the vulnerable Leafless Tongue Orchid, and on potential breeding habitat for the vulnerable Giant Burrowing Frog. There is also potential for impacts on the Jervis Bay Leek Orchid. This species and others such as the *Melaleuca biconvexa* are also potentially at risk from indirect impacts such as changes to fire regimes, alterations to hydrology, rubbish dumping, weed encroachment, unrestricted access and introduction of domestic species, as well as the expected increased impact of predator species, such as foxes. The various listed threatened species occupy a range of habitats, however the proposal only addresses the habitat requirements of some. The proposal would therefore increase the fragmentation of habitat corridor values for fauna and flora occurring in the Bherwerre Peninsular and in the neck of the isthmus, resulting in significant reductions in connectivity and impacting on the viability of species' populations and ecosystems within the Booderee National Park. The loss of dispersal routes to maintain migration, reproduction, genetic exchange and escape routes during stochastic events such as wildfire means that the long-term viability of these species will be at risk.

<u>Mitigation measures</u>

86. The Shoalhaven City Council was required to address the issue of whether there was any potential to modify the proposal to mitigate or offset the impacts in the PER. The question of suitable and appropriate mitigation measures was briefly addressed in the PER and in the numerous studies undertaken to support the referral and PER.

87. BES (2007) concluded that "the site had high conservation values and should not be rezoned for residential development." The department also sought advice from two groups of independent experts; the Australian National University (Dr D. Lindenmayer) and the University of Queensland (Drs H. Possingham and J. Szabo) on the findings of the BES (2007) report, and both agreed with the findings.

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88. According to Dr Lindemayer (2007), "I cannot see how the Heritage Estates development proposal could be re-designed to mitigate the not inconsiderable negative ecological and environmental impacts that would be associated with it. In addition, further field survey and assessment work like that done in the report by Bushfire and Environmental Services would only increase the definitiveness of my conclusions about the unacceptability of the Heritage Estates development proposal."

89. ELA (2008) concluded that "no mitigation measures were considered to be able to adequately reduce the level of impact to all affected species." In addition, ELA contended that "offsets are not considered to be a suitable option for this development to compensate for the residual impacts"... [such as] "the loss of the leafless tongue orchid populations and the genetic variability contained within them". "[T]he loss of key habitat and individuals of the eastern bristlebird in its largest remaining population" and "[o]ffsets for the loss of connectivity to Booderee NP are not possible."

90. "The combination of all on-site mitigation measures for all species of concern would result in the loss of developable areas identified within the CoI Investigation Areas (ELA, 2008)". ELA also considered that any further mitigation would need to consider off-site offsets, but found that there were no offsets available to provide the same level of connectivity currently being provided and required by the affected species. "Direct offsets (e.g. purchase and conservation of habitat) for the [Heritage Estates] rezoning are not considered to be available for a number of significant species (ELA, 2008)."

91. The EDO (2008) states that, article 14(1)(a) of the Convention on Biodiversity requires parties to "introduce appropriate procedures requiring environmental impact assessment of its proposed projects that are likely to have significant adverse effects on biological diversity with a view to avoiding or minimising such effects." The EDO (2008) accepts the ELAs findings (2008) that "neither mitigation measures nor offsets could adequately 'avoid or minimise' the effects of the proposed action on listed threatened species", and is therefore inconsistent with article 14(1)(a).

92. The PER (2009) states that "ELA concluded that the impacts cannot be effectively mitigated or offset elsewhere", and offers no alternative solutions or measures. The department also sought outside expert advice to determine the adequacy of the conclusions reached in the PER regarding the potential to mitigate expected impacts, and to identify any gaps. The independent consultancy was undertaken by UNSW Global. UNSW Global (2009) concluded that "[i]mpact of development in the subject area *cannot be effectively mitigated or offset*."

Department's conclusion on mitigation measures

93. Based on the information provided, the department concludes that there are no suitable mitigation measures or offsets available to address the impacts of the proposal.

Alternatives

94. As mentioned in the PER (2009) "[to] 'do nothing' would simply perpetuate the existing situation which is clearly unacceptable for all stakeholders". The current landowners have been pursuing approval to build on the Heritage Estates land since they bought lots in the late 1980s and early 1990s. The Shoalhaven City Council has attempted to resolve this on several occasions and has charged rates to the landowners to help fund the studies undertaken to resolve the issue.

95. The proposal has also undergone several key state processes, including a Commission of Inquiry in 1999, which recommended that a maximum of 730 lots of the original 1232 lots may proceed on a staged basis. However that recommendation was qualified as further studies were required to address bushfire protection, the occurrence of acid sulphate soils and the impacts of water run-off, and it did not address the habitat requirements of all listed threatened species.

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Social and economic matters

Heritage Estates Landowners

96. A social and economic study was commissioned by Shoalhaven City Council, entitled *Judith Stubbs & Associates (2008) Heritage Estates: Social Impact Assessment*. This report was confined to examining the social and economic impacts of a refusal decision on the individual landowners of the Heritage Estates proposal.

97. The Stubbs report (Stubbs, 2008), identified the affected landowners as typically: from culturally and linguistically diverse backgrounds; who reside in the south western suburbs of Sydney; are older than the NSW average; are generally on lower than average incomes; and are relatively "disadvantaged in terms of income, education and employment status (PER 2009)."

98. The Stubbs report (2008) also described the landowners as a group of people "vulnerable to the aggressive marketing strategy of the vendor and their associates." Many of the public submissions received from the landowners reinforced this idea that they had every expectation that at some stage they would be able to develop their land. "Less than 15% sought independent advice, and said that they were generally unaware that this would be required (Stubbs, 2008)."

99. The Stubbs report (2008) states that the current market value of lots is $18,000 with current zoning, and potential development costs of roads and drainage are estimated at $65,000 per lot. "[I]f the land is not rezoned, the landowners in the Heritage Estates would be left with an asset of no value, a significant economic loss, and ongoing financial liability (Stubbs, 2008)." Conversely if the land were to be rezoned, and the landowners were not given financial assistance for development costs, there would "be limited utility to some of the least well-off owners, except that they will gain some small profit…if they sell their land (Stubbs, 2008)."

Tourism considerations

100. The PER (2009) compares the regional economic benefits gained from various activities (Table 2 Economic value of sectors of the economy in the Shoalhaven LGA). Tourism amounted to about $647 million (gross) in 2003, compared to building activity of new residential development which amounted to $154M for 2003. Tourism is expected to increase based on recent achievements such as winning 'gold' at the NSW Tourism Awards for Indigenous Tourism or the Keep Australia Beautiful Award for Cleanest Beach on the South Coast. "[I]t is expected that ensuing marketing and promotional activities – both national and international – may result in increased visitation and revenue for BNP and the Jervis Bay and St Georges Basin area (PER 2009)."

101. The PER (2009) contends that impacts on the visual character of the area is unlikely to significantly impact on tourism as the report undertaken by Hassell Planning Consultants (1994) described the area as having "a high visual absorption capacity [which] would result in minimal visual impacts if developed…[and] much of the housing would not be visible from surrounding roads and other public vantage points (PER 2009)." The PER (2009) does acknowledge that some of the criteria used in the 1994 Hassell assessment. For example, "those affected by vegetation, such as the visibility of foreground from surrounding roads, may be subject to change over time due to bushfires and vegetation management/clearing (PER 2009)."

102. The draft PER (2008) acknowledges correspondence between the Shoalhaven City Council and BNP concerning the environmental, social and economic impacts related to the subject land's proximity to BNP, including adverse impacts on tourism, employment and social/community values associated with the Park and its environs.

Indigenous Heritage

103. The final PER (2009) made mention of the Wreck Bay Aboriginal Community and impacts on Booderee National Park and tourism, but it only analyses the issues on a superficial level. See paragraph 47 for further information on indigenous heritage matters.

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Gap analysis of social and economic information in the PER

104. Many public submissions raised concerns regarding the Stubbs report (Stubbs, 2008). Most argued against the proposal and believed that the report was too narrow in scope. The department commissioned Gillespie Economics Pty Ltd (Gillespie, 2009) to review and provide a gap analysis of the social and economic information in the PER. The company was also asked to consider the social and economic impacts of approving the proposal on the local community and nearby National Parks.

105. Gillespie (2009) describes how a benefit cost analysis could be applied to determine whether a community would be better or worse off as a result of the proposal. This would include an analysis of the development benefits and costs as well as externalities such as impacts on tourism, environmental costs and the impacts of global warming.

106. Gillespie (2009) noted that the Stubbs report (2008) largely focused on the:

> "*socio-demographic characteristics of the landowners and the circumstances and expectations around their land purchase."* It states that *"the proposal has estimated net 'Development' benefits (ignoring any implementation costs) of in the order of $10.5M. The unquantified environmental externalities of the proposal would need to be valued by the community at greater than $10.5M to make the costs of the proposal outweigh the benefits ... [T]he most economically efficient approach for providing additional residential development in the region is to do so in an area that will have fewer environmental externalities* (Gillespie 2009)."

107. The consequences of allowing the proposal to proceed would require Shoalhaven City Council to resolve the issue of how to manage over 500 lots that cannot be developed under the current proposal. The PER (2009) identifies two possible scenarios in this instance, which are: to continue its policy of allowing landowners to transfer their land to Council in lieu of unpaid rates and/or acquire the land; or purchase through compulsory acquisition to be handed to another entity to manage the land. While both proposals are undesirable from a Council perspective, no solutions are presented in the PER (2009).

108. In addition, the economic loss to these landowners "was not explored in the draft PER and JSA report, although both respondents in the JSA study [Stubbs 2004] and [public] submissions referred to the need to compensate this group of stakeholders (Gillespie 2009)."

109. Issues such as who bears the brunt of the infrastructure costs have not been resolved and would remain with the approval of the proposed development. The PER (2009) states "it is likely that Council would be required to borrow money to construct the necessary infrastructure up front and subsequently recover money from the landowners…but [t]here is a potential risk that some of the development costs could be borne by the broader community (PER 2009)." "[I]mplementation issues remain unresolved including how environmental protection lands will be obtained (if at all), who will manage these lands, the financial viability of making landowners fund the development and whether or not Council will actually fund the development upfront (Gillespie, 2009)."

Departmental conclusion on social and economic matters

110. The PER primarily recommends approval of the proposal on social grounds relating to the economic impacts on landowners. The costs to other parties, such as other ratepayers and the environmental externalities have not been explored in any depth. On the basis of the information provided, the Shoalhaven City Council has not demonstrated that the social costs to landowners outweigh the economic, social and environmental costs of the proposal proceeding.

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Ecologically sustainable development

The principles of ESD, as defined in the Act, are:

(a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;

The department has considered long-term and short-term economic, environmental and social matters in recommending the refusal of the proposal for impacts on the environment of Commonwealth land and listed threatened species.

(b) 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;

The proposal poses serious and irreversible threats to Booderee National Park and listed threatened species which cannot be mitigated or offset.

(c) the principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;

If the proposal was to proceed, it would have a significant deleterious impact on the environment that will benefit the present generation of landowners at the expense of future generations. The department therefore recommends that the proposal is unacceptable.

(d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making;

The proposal would result in a net loss of significant habitat for Eastern Bristlebird and the Leafless Tongue Orchid, and the loss of habitat connectivity for many other species resulting in isolation of populations within the Booderee NP and Bherwerre Peninsula.

(e) improved valuation, pricing and incentive mechanisms should be promoted.

There are no mitigation or offset measures available to improve the impacts of the proposed activity.

Other legal considerations

111. Under section 139 of the EPBC Act, The Minister must have regard to the following:

(1) In deciding whether or not to approve for the purposes of a subsection of section 18 or section 18A the taking of an action, and what conditions to attach to such an approval, the Minister must not act inconsistently with:

(a) Australia's obligations under:

(i) the Biodiversity Convention; or

(ii) the Apia Convention; or

(iii) CITES; or

(b) a recovery plan or threat abatement plan.

(2) If:

(a) the Minister is considering whether to approve, for the purposes of a subsection of section 18 or section 18A, the taking of an action; and

(b) the action has or will have, or is likely to have, a significant impact on a particular listed threatened species or a particular listed threatened ecological community;

the Minister must, in deciding whether to so approve the taking of the action, have regard to any approved conservation advice for the species or community.

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112. Under article 8(d) of the Biodiversity Convention, Australia has obligations to "[p]romote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings." Under article 8(e) of the Biodiversity Convention, Australia has obligations to "[p]romote environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering protection of these areas." As the proposal is likely to facilitate the extinction of listed threatened species in Boodereee National Park, Australia's obligations under the Biodiversity Convention might not be met by the approval of the proposal. Refusal to approve the proposal would be more consistent with Australia's obligations under the Biodiversity Convention (see paragraphs 50 and 91).

113. There are conservation advices for the Leafless Tongue-orchid (*Cryptostylis hunteriana*) and Biconvex Paperbark (*Melaleuca biconvexa*). A draft recovery plan is also being prepared for the Eastern Bristlebird.

114. The conservation advice of the Leafless Tongue-orchid recommends minimisation of adverse impacts from land use at known sites, and the conservation advice of the Biconvex Paperbark recommends that construction and development activities in areas where Biconvex Paperbark occurs do not have a significant adverse impact on known populations. A decision to refuse approval of the proposal would be consistent with the conservation advices.

Conclusion

115. The magnitude of the impacts on the endangered Eastern Bristlebird and vulnerable Leafless Tongue-orchid are such that direct impacts will result in the immediate loss of key populations from the Heritage Estates site, with long-term ramifications for surrounding populations in the Booderee National Park and Bherwerre Peninsula. Indirect impacts are expected on the Biconvex Paperbark and Giant Burrowing Frog. The proposal may also impact on the potentially occurring Jervis Bay Leek Orchid, however the likely impacts cannot be quantified without further surveying. The Shoalhaven City Council acknowledges in the PER that there are no mitigation measures that could adequately reduce impacts on affected species. Approval of the proposal would not contribute to the fulfilment of Australia's obligations under articles 8(d) and 8(e) the Biodiversity Convention, and refusal to approve the proposal would be more consistent with those obligations. Based on the impacts for the Eastern Bristlebird and Leafless Tongue-orchid, the department concludes that the action is unacceptable for the controlling provision 'listed threatened species and ecological communities'.

116. The proposal will result in the increased fragmentation of habitat corridor values to the Bherwerre Peninsula. It would directly affect the fauna and flora values of the Commonwealth listed Booderee National Park, potentially adding to local extinctions of listed species, and impacting on its natural and heritage values. Based on the impacts described for Booderee National Park, the department concludes that the action is unacceptable for the controlling provision 'Commonwealth land'.

Additional references

Mansergh I and D. Cheal (2007) Protected area planning and management for eastern Australian temperate forests and woodland ecosystems under climate change – a landscape approach, In Taylor M. & Figgis P. (2007) (eds) Protected Areas: Buffering nature against climate change, Proceedings of a WWF and IUCN World Commission on Protected Areas symposium, 18-19 June 2007, Canberra, (WWF Australia Sydney)

Garnett, S. T., and G. M. Crowely (2000) The Action Plan for Australian Birds, Natural Heritage Trust. http://www.environment.gov.au/biodiversity/threatened/publications/action/birds2000/index.html.

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LEX 83485 Document 22

Report prepared on behalf of
UNSW Global Pty Limited

Assessment of Public Environment Report for Heritage Estates

for

Department of the Environment, Water, Heritage & the Arts

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LEX 83485 Document 22

Report brief

This report provides information on the impact of the proposal to rezone and develop residential lots on the Heritage Estates in Worrowing Heights, NSW. The brief was to assess (i) the information included in the Public Environment Report (PER) and the public comments (ii) to provide advice on whether a decision to rezone the land will have a significant impact on the Commonwealth listed threatened species and impact upon Commonwealth land and (iii) to assess that the proponent has addressed the issues raised in the public comments adequately.

Documents examined

- Draft Public Environment Report, Shoalhaven City Council, Worrowing Heights, NSW.
- Public and Professional comments made on the Public Environment Report.
- Final Public Environment Report, Shoalhaven City Council, Worrowing Heights, NSW.

Aim of the Public Environment Report

- A collation of information and commissioned reports regarding the suitability of a proposal to rezone and develop residential lots on the Heritage Estates.

Aim of this report

- A review of the Public Environment Report Documentation.
- An analysis of the nature and magnitude of the impacts of the proposed development and assessment of the potential for the development to impact on one or more threatened species, that therefore creates an irreversible impact on the values of Booderee National Park.
- A review of the public comments made on the Public Environment Report.
- An assessment that the proponent has addressed the issues raised in the public comments adequately through changes made to the PER.

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2. The proposal to rezone the land
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Attachments

1. Independent advice provided to DEWHA in 2007 from Prof. Hugh Possingham (UQ) and Prof. David Lindenmayer (ANU)
2. Guidelines for the content of a draft public environment report (PER)
3. Heritage Estates Social Impact Assessment (Judith Stubbs & Associates, 2008)
4. Geotechnical Information on the subject land (Coffey Geosciences, 2005)
5. Vegetation descriptions and plant species identified on the subject land (BES, 2007)
6. Fauna species recorded on the subject land (BES, 2007)
7. Information provided by BNP
8. Information provided by NSW Department of Environment and Climate Change (DECC)
9. Report prepared by Eco Logical Australia Pty Ltd (ELA, 2008)
10. Public Consultation on Draft PER (Attachment A)

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Background information on the Heritage Estates development proposal

Heritage Estates (HE) is located at Worrowing Heights, approximately 28 km south of Nowra immediately to the north of Erowal Bay in NSW. The site is located on the isthmus of the Bherwerre Peninsula and links Booderee National Park (located 2.8 km south) to other conservation areas in the region. The site is surrounded to the east and south by Jervis Bay National Park and to the west by Worrowing Waterway. Heritage Estates is located at an eastern extremity of an "Indicative Habitat Corridor" and is mapped as "Biodiversity Assets Outside Conservation Reserves" (DoP, 2008). This listing was recognised by Council in consultation with the NSW Department of Planning (DoP) and the NSW Department of Environment and Climate Change (DECC).

Heritage Estates comprises 1,232 registered lots held in approximately 1,100 ownerships totalling 180 ha on land zoned as rural. Headed by the Shoalhaven Land Owners Association, landholders have been trying to have the land rezoned since Heritage Estates was first sold in the late 1980s and early 1990s. A Commission of Inquiry (Col) in 1999 concluded that there was scope for a maximum of 730 lots to be zoned "residential" within four investigation areas, totalling 90 ha, subject to further investigation. The Col set aside environmental protection areas within the estate that were valued for their ecological significance and recommended that they be zoned "environmental protection" corridors. The proposal to rezone was referred to the Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA) in 2007 because of the presence of EPBC listed threatened species and concerns outlined in DECC correspondence with the Shoalhaven City Council. DEWHA determined that the proposal is likely to have a significant impact on the following:

1. Listed threatened species and communities (sections 18 and 18A); and
2. Commonwealth land (sections 26 and 27A).

The proposal was determined to be a 'controlled action' meaning further assessment and Ministerial approval was required. DEWHA determined that the project should be assessed by a Public Environment Report (PER).

A review of the Public Environment Report Documentation

Shoalhaven City Council proposes to rezone the subject land from rural to residential to enable the construction of up to 730 dwellings on 730 lots in four areas labelled "Investigation Areas", as recommended by the Col 1999 report. Rezoning on this basis would involve clearing of native vegetation, road construction, bushfire asset protection clearing and maintenance, and the provision of services and infrastructure.

A review of impacts on threatened species (Section 18 of the EPBC Act) and impacts on the biodiversity of Booderee National Park (Section 26 and 27A of the EPBC Act) were assessed by Eco Logical Pty Ltd. in 2008 on behalf of Shoalhaven City Council. Impacts on listed threatened species relate primarily to the *leafless tongue orchid* and *eastern bristlebird*. In order to assess impacts on the biodiversity of Booderee National Park, key 'surrogate' species

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with a range of habitat preferences were surveyed. These included: heath and wet area species such as the *eastern chestnut mouse*; the *yellow-bellied glider*, *greater glider* and *feathertail glider*; heath and woodland species such as the *eastern pygmy possum*; heath and sedge species such as the *ground parrot*; and woodland and forest species such as the *white-footed dunnart* and *spotted-tail quoll*.

Eco Logical concluded that the proposed rezoning of the Col Investigation Areas is likely to have a significant impact on listed threatened species and on Commonwealth land. The commissioned report also concluded that the impact of development cannot be effectively mitigated or offset elsewhere. Correspondence to Shoalhaven City Council from DECC in 2008 expressed additional concerns regarding the environmental, social and economic impacts related to the subject land's proximity to Boorderee National Park, including adverse impacts on tourist visitations, employment and social/community values associated with the National Park and its environs.

In light of social and economic considerations, Shoalhaven Council engaged Judith Stubs & Associates to research and document the potential social and related economic impacts on the landowners should the proposal not proceed. The report concluded that, generally speaking, there are likely to be significant adverse social and economic impacts for landowners if the rezoning does not proceed. The implications of the social impact study are being assessed currently by another consulting group and not available to us for review.

Analysis of the nature and magnitude of the impacts of development

There are two controlling provisions which must be considered prior to the Minister issuing a ruling. Both provisions and recommended mitigations measures are summarised below using information derived from reviewing the following documentation: (DECC, 1999; BES, 2007; Booderee, 2007; Lindenmayer, 2007; Possingham, 2007; Ecological, 2008). Our analysis and recommendations follow.

1. **Impact on one or more threatened species.** Impacts on listed threatened species relate primarily to the *leafless tongue orchid* and *eastern bristlebird*. Suitable breeding habitat was found for the *giant burrowing frog*, while the vulnerable *Biconvex Paperback* was also found on-site (DECC, 1999; BES, 2007; Ecological, 2008).
    a. If development occurs, the *eastern bristlebird* (*Dasyornis brachypterus*) is thought to be directly impacted in two ways: through the predicted loss of individuals (estimated as 7-10 % of the population of Bherwerre Peninsula) within the Heritage Estates and, through predicted loss of habitat (amounting to 83 ha of high quality habitat). Suggested mitigation measures recommended are:
        i. Improving habitat elsewhere
        ii. Translocation of individuals
        iii. Offsets

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iv. Increased retention of heath and woodland areas on the site.

b. The *leafless tongue orchid* (*Cryptostylis hunteriana*) is thought to be directly impacted by the predicted loss of all 211 individuals occurring on-site. Recommended mitigation measures include:

i. Translocation of individuals

ii. Direct offsets

iii. Reduction in proposed development areas by 50 %

iv. Widening of the (east-west) CoI Environmental Protection corridor.

c. The *giant burrowing frog* (*Heleioporus australiacus*) was not located on-site but potential important breeding habitat was found (approximately 90 ha of good quality breeding habitat in the proposed development areas). Recommended mitigation measures include:

i. Purchasing offsets

ii. Widening of the east-west CoI Environmental Protection corridor

iii. Reduction of development in Area 4 by 50 %.

d. The presence of *Biconvex Paperbark* (*Melaleuca biconvex*) was considered by the CoI when making recommendations for development. Thus, *Biconvex Paperbark* individuals indentified within Heritage Estates are confined to the protected areas identified by the CoI. Development is not considered to have a substantial detrimental impact on the species; however indirect impacts could be caused by increased fire frequency and a change in the hydrology of the area. Recommended mitigation measures for indirect impacts include:

i. Protection clearing and maintenance

ii. Regular monitoring.

2. An irreversible impact on the values of Booderee National Park.

a. Development of Heritage Estates is thought to impact on Booderee National Park directly through loss of connectivity through habitat loss and indirectly through the introduction of invasive and feral species. Recommended mitigation measures include:

i. Prohibiting land-holders from owning domestic animals

ii. Extensive weed and feral animal eradication programs

iii. Enhancement of CoI corridors to improve functionality

iv. Maintenance of areas considered to be of connective value

v. Widening of the two main corridors to provide functional movement for these species.

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Table 1. Summary of the nature and magnitude of the impacts of development.

Report	Main outcomes	Report comment	Assessment
Ecological 2008	Indirect impact of increased introduced species as a result of proximity to urban development.	Prohibit land-holders from owning domestic animals. Extensive weed and feral animal eradication programs. Sensitive urban design and tree retention.	Landholders would need to act in compliance and measures would need to be regularly monitored.
	Loss of *leafless tongue orchid* populations would threaten the long-term survival of the species in the region.	Translocation of individuals or direct offsets. Reduction in proposed development areas by 50 %.	Given the lack of basic ecological knowledge, translocation measures for the orchid would be extremely difficult and require further information. Most species onsite will not benefit from off-site offsets due to the loss of genetic variation.
	Localised indirect impacts on *Biconvex Paperbark*.	Not considered to have a substantial detrimental impact on the species.	Agree the impact will be minimal, indirect impacts a possibility.
	Significant impact on *eastern bristlebirds* due to direct loss of habitat and loss of a significant portion of individuals.	Translocation of individuals and offsets are possibilities as well as increased retention of heath and woodland areas on the site.	Offsets are unlikely because significant populations do not exist outside of the Bherwerre Peninsula.
	Loss of breeding habitat for the *giant burrowing frog*. Significant reduction in connectivity as a result of indirect impacts on corridor function.	Widening of the east-west Col corridor and a reduction of development in Area 4 by 50 %. Enlarging the Col Environmental Protection areas and purchasing offsets.	Little is known about the dispersal of the species. Recommended Col corridors are likely insufficient but further studies are recommended.
	Impact on Booderee National Park through loss of connectivity through habitat loss and indirectly through introduced predators and competitors.	The combination of all on-site mitigation measure for all species of concern would result in the loss of all developable areas in the HE. Concluded that the impact of development cannot be effectively mitigated or	Corridors recommended by the Col do not satisfy all habitat requirements for the variety of fauna present on the peninsula. Offsets for species requiring connectivity cannot be provided. Value of habitat

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		offset elsewhere.	corridors within HE are due to their location, functionality cannot be replaced or purchased elsewhere.
BES 2007	Disturbance such as clearing, construction of tracks and roads.	The junction where the Wool road crosses Worrowing Waterway should be enhanced to improve functionality as a corridor. Enhance riparian vegetation along the Worrowing Waterway. Manage and retain the vegetation within the Erowal Bay Road reserve.	Should development occur, the recommended mitigation would help maintain the land set aside by the CoI as functional corridors.
	Increased fire frequency.	Proximity to urban environment is likely to alter the fire regime of the surrounding bushland.	Increased fire frequency is expected. Bushland would need to be continually cleared and monitored.
	Critical area of connectivity for wildlife movement.	Maintenance of areas considered to be of connective value for the yellow-bellied glider. Maintenance of all potential nest sites for the glossy-black cockatoo.	Functional corridors for key elements of the biota will need to be of the vegetation type which is suitable habitat for each species of concern.
Booderee submission to SCC on HE 2007	Directly destroy habitat for an array of threatened, vulnerable and common species.	CoI corridors inadequate. They should be enlarged.	Previously addressed.
DECC 1999 Submission to CoI	Species reliant on timbered communities would be dependent on Heritage Estates for movement between Bherwerre Peninsula and other reserved lands.	Provision of habitat in both the south-eastern section and the Worrowing Waterway linkage.	Mitigation is likely sufficient to accommodate the habitat requirements of species requiring timbered communities.
	Critical area of connectivity for wildlife movement.	Culverts under the road at the intersection of Wool Road/Birriga Avenue would aid the movement of some species.	Will not successfully mitigate the impacts of development of all species present.

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Lindenmayer in 2007	Large disruptions to biodiversity of Booderee National Park	Cannot be redesigned to mitigate.	Agree the impact of development cannot be effectively mitigated for all species.
	Domestic pets and feral species are an issue.		Previously addressed.
Possingham 2007	Wide range of impacts to all threatened species.		Previously addressed.
	Loss of eastern bristlebird habitat and individuals.	Loss of habitat could be mitigated by improving habitat elsewhere.	Measures would need to be accompanied by regular monitoring of numbers and genetic diversity.
	Loss of movement and connectivity.		Previously addressed.

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Assessment of impacts, mitigation options and solutions

We make the following comments on stated impacts:

1. Threatened species

The Public Environment Report acknowledges that rezoning and subsequent development will impact severely on listed threatened species and states that these events cannot be mitigated by direct action or with the purchasing of offsets.

- The *eastern bristlebird* is a cryptic, ground-dwelling, insectivorous and semi-flightless passerine that is fire-sensitive (Baker, 2000). Both fire and habitat clearing have been implicated in the decline of the species. *Eastern bristlebirds* avoid fire by moving to unburnt areas, and return later when conditions are more suitable (Bain *et al.*, 2008). Because of this strategy, dispersal is crucial for the long-term persistence of this species. The population of *eastern bristlebirds* on the Bherwerre Peninsula is of critical importance for the persistence of the species as it is the largest remaining population in Australia (Ecological, 2008). The *eastern bristlebird* is distributed throughout the Bherwerre Peninsula with an estimated total of 700 individuals (Bain *et al.*, 2008). We agree with Ecological's assessment that an estimate of 50-70 individuals within Heritage Estates, or 7-10 % of the population of Bherwerre Peninsula, will be impacted by the proposal. The proposed rezoning will directly remove 83 ha of high quality habitat, while the 67 ha of *eastern bristlebird* habitat that lies within the Col Environmental Projection area, will be subject to indirect effects from urban development. In addition the *eastern bristlebird* requires heath or similarly structured understory to disperse, thus the Col protection forest corridors are likely insufficient.
- The *leafless tongue orchid* (*Cryptostylis hunteriana*) has historically been known from a number of localities on the NSW south coast and little is known about the ecology of the species (Bell, 2001). It does not appear to favour specific habitats rather it is known to frequent many communities, with a seeming preference for woodland habitats dominated by Scribbly Gum (*Eucalyptus sclerophylla*) (Bell, 2001). As the *leafless tongue orchid* occurs in coastal areas it is threatened by development and road works that cause habitat loss and fragmentation. Two other known populations occur near Heritage Estates; one immediately north of Heritage Estates is comprised of 100 individuals while the second occurs north of Wool Road and is comprised of 112 individuals. These three populations make up the total known records for this species on the peninsula. If rezoning and subsequent development occurs nearly all of the *leafless tongue* orchid individuals will be lost within Heritage Estates, with only 1 of 40 surveyed locations recording presence within the Col Environmental Protection areas (BES, 2007). We agree with reports that development would negatively impact on the vulnerable *leafless tongue orchids* by directly removing virtually all of the 211 individuals and eliminating roughly half of the genetic diversity on the peninsula.

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- Detection probability for the *giant burrowing frog* (*Heleioporus australiacus*) in surveys is low (even when it is known to be present in an area) because it rarely calls and trapping rarely succeeds (Penman *et al.*, 2006). To adequately survey for this species, surveys should be conducted after significant rainfall and in still conditions. Due to its cryptic nature, the presence of this threatened species on-site remains a possibility. Surveys were conducted under the proper conditions (Ecological, 2008). *Giant burrowing frogs* have been detected in nearby Vincentia, Booderee National Park and north of Heritage Estates. Suitable breeding habitat for this species does occur along the Worrowing Waterway tributaries. *Giant burrowing frogs* have been recorded travelling several hundred metres to breeding sites (Penman *et al.*, 2006). Direct impacts from the rezoning proposal will result in the loss of potential breeding habitat within two of the four Investigation Areas. Therefore, we agree that the development will has the potential to impact negatively on giant burrowing frogs, restricting their movement and destroying suitable habitat. Because little is known about its biology further research is necessary to understand the dispersal ability of the species and how the loss of potential breeding habitat would impact them.

- *Biconvex Paperbark* (*Melaleuca biconvex*) is found only in NSW, with scattered and dispersed populations found in the Jervis Bay area and the Gosford-Wyong area (Wrigley & Fagg, 1993). The species requires damp low-lying areas generally on the edge of waterways and is threatened by alterations to the drainage hydrology of low-lying areas and increased fire frequency (Wrigley & Fagg, 1993). *Biconvex Paperbark* individuals indentified within Heritage Estates are confined to the protected areas identified by the Col. The population is significant as it is a disjunct population from the remaining distribution of this species which occur further west just north of the St. Georges Basin (Ecological, 2008). The rezoning and subsequent development of Heritage Estates has the potential to alter the natural runoff and groundwater discharge regimes along the Worrowing Waterway. Due to the proximity of urban development the fire regime may also change. We agree that there are unlikely to be direct impacts arising from the proposed rezoning of the subject land. However, indirect impacts such as changed fire regimes and alterations to the hydrological regime have the potential to impact on the species.

2. Biodiversity of Booderee National Park

The Public Environment Report acknowledges that rezoning and subsequent development will impact severely on the environment in Commonwealth land by impeding movement and dispersal of the fauna of Booderee National Park.

- *Booderee National Park* supports significant populations of a wide range of mammal taxa (Baker *et al.*, 2002). The landscape exhibits considerable patchiness and heterogeneity in vegetation types, ranging from sedgeland to temperate rainforest that are markedly different in floristics and structure (Braithwaite *et al.*, 1995). The varieties of mammals require a diverse range of conserved dispersal corridors to maintain populations. The retention and creation of corridors for maintaining populations and

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conserving biodiversity is an important conservation strategy (Haddad *et al.*, 2003). *Habitat connectivity* plays an considerable role in promoting viability of species populations by increasing effective population size, maintaining gene flow, and facilitating regular migration, dispersal, and recolonisation (Hargrove *et al.*, 2005). Habitat corridors have been shown to direct movement of different types of species, where greater movement between connected patches is beneficial for many species (Haddad *et al.*, 2003). The NSW Government Agency submission to the CoI stated that the vegetation communities are not evenly represented across the isthmus connecting Booderee National Park to the north. Habitat links on the eastern side of the isthmus are dominated by heath and sedgeland while the western side (including the subject land) includes woodland and forest links.

- Species of concern that will be negatively impacted by the development of Heritage Estates include: the *eastern chestnut mouse*, *yellow-bellied glider*, *greater glider*, *ground parrot* and potentially the *white-footed dunnart* and *spotted-tail quoll*. These species represent key surrogate species with a range of habitat preferences. Furthermore, while species found in Heritage Estates are generally a subset of those found in Booderee National Park, species such as the *yellow-bellied glider* are not found on the eastern side of the isthmus.
- We concur that the proposed rezoning and subsequent development will result in *loss of habitat* for these species and a substantial loss of connectivity to and from Booderee National Park. Development represents an impediment to their major movement corridors, as well as fragmenting what are essentially single populations.
- Restriction of the movement of fauna along the Bherwerre Peninsula isthmus will impact on Booderee National Park. Due to the geography of the area and the isthmus being the only terrestrial access to Booderee National Park, any impact to this natural wildlife corridor are likely to have long-term impact on the environment of Booderee National Park. The entire development area contains primary habitat for a wide range of NSW threatened fauna, most of which occur in Booderee National Park. Development of the subject land will restrict the ability of locally extinct species to recolonise adjacent areas, and increase the risk of extinction of species of concern in BNP.

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Summary of assessment of impacts, mitigation options and solutions

It is unlikely that local mitigation measures will be able to adequately address the full impacts to all EPBC listed threatened species and species requiring connectivity to Booderee National Park. The combination of *all on-site mitigation measures* for all species of concern would result in the *loss of all developable areas* identified within the CoI Investigation Areas. We conclude that the impact of development cannot be effectively mitigated or offset elsewhere.

We make the following additional comments:

- Land that is not developed
  - There are several issues that require resolving in relation to the zoning and management of properties that are within the area recommended for environmental protection by the CoI. The CoI recommended that current owners be responsible for compensation to those whose land is unsuitable for development. How Council will manage these issues remains unclear and speculative in the PER documentation.
- Connectivity
  - The CoI focused on conservation of forest and habitat corridors for the protection of the *yellow-bellied glider*, *common bent-wing bat* and *glossy black cockatoo*. Recent information obtained from Council's recent investigations is more *comprehensive* than was available at the time of the CoI. As stated in the 2007 BES report, which superseded the CoI recommendations, "the entire site represents primary habitat for threatened species recorded on site."
- Fire
  - In order to comply with NSW bushfire planning requirements, Birriga Avenue would need to be constructed as a through road to provide alternate bushfire emergency access for the proposed development. This requirement would *contradict recommendation 11* of the CoI which states that Birriga Avenue not be constructed as a through-road between Jervis Bay Road and the Wool Road. This counter recommendation has been recognised by Council in the final PER.
  - The 2006 BES assessment indicated that *bushfire protection measures*, including asset protection zones and perimeter roads, would severely compromise in the order of 140-180 of the recommended 730 lots. It is therefore uncertain whether dwellings on all 730 lots could be achieved. Any reduction in development yield would likely increase development cost per lot, reducing the economic viability of developing the land.

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- Feasibility
  - If rezoning occurs, owners of sites that can be developed will be faced with substantial costs associated with: compensation to owners who cannot build, infrastructure costs, and monetary contributions to Council. According to the Heritage Estates Social Impact Assessment (Judith Stubbs & Associates, 2008), most owners do not have the sufficient income to finance development without Council support. This factor should be considered as part of the decision making process. In addition, Council recognises that there some development costs will be required to be borne by the broader community and that Council may need to borrow money to pay for the required infrastructure.
- Roads
  - Although it was recognised in the PER that the construction of additional roads would likely impede movement of fauna, detailed information was not provided in the PER about the possible effects of roads on the viability of fauna in the region. Roads affect microclimate, wind flow, run-off and water flow, create noise pollution and facilitate the dispersal of both plants and animals, including weeds, feral animals and native species (Forman *et al.*, 2003; Coffin, 2007). For wildlife, roads have numerous impacts on populations, forming barriers to movement, fragmenting populations and isolating them from resources and mates. They can also alter the structure of populations adjacent to roads where road effects lead to avoidance (Ramp & Ben-Ami, 2006; Ramp *et al.*, 2006). Roads also cause fatalities of animals as a result of collisions with vehicles (Ramp *et al.*, 2005). We do not feel that the possible effects of both increased traffic and increased road construction have been properly addressed in the PER literature due to the absence of proposed mitigation solutions.
- Climate change
  - It is expected that due to rapid climate change there will be an increase in *fire frequency and intensity* over the coming decades (Pitman 2007). Booderee National Park is located on the isthmus of the Bherwerre Peninsula and thus is effectively cut off from the mainland, with the exception of narrow vegetation corridors which maintain connectivity to the region. There is the potential, if development occurs, that narrowing of these corridors will restrict escape routes of native fauna from an approaching bushfire. It was recognised in the PER that development of the subject land would alter fire regimes in the natural areas within the subject land as well as on adjacent land outside of the study area. The "relevant impact" section of the PER outlines how bushfire risk will be minimised but this does not include information on past fire history and the spread of bushfires in the Jervis Bay region. According to Lindenmayer et al. (2008), the Jervis Bay Territory is an area noted for its prolonged and well documented history of past fire, including a major wildfire that burnt approximately half of Booderee

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National Park in late 2003. Further corridor reduction may have a negative effect on native species during bushfires, predominantly for larger species (*kangaroos*, *wallabies*) and less mobile species (the *eastern bristlebird*) (Bain *et al.*, 2008). Additionally, the marked variation in responses among mammal groups to vegetation type and wildfire suggests that all of the vegetation communities found in Heritage Estates would need to be preserved to ensure sufficient escape routes. For detailed information on how species may be affected by bushfire see (Lindenmayer *et al.*, 2008).

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A review of the public comments made on the Public Environment Report

- In total there were 382 submissions made on the Public Environment Report.
- Of the 111 against development:
    a. 17 were professional submissions:
        i. 2 were received from academics
        ii. 9 from individuals representing associations or societies
        iii. 1 from the Environmental Defenders Office
        iv. 4 from non-government agencies
        v. 1 from NSW Department of Environment and Climate Change
    b. 94 were received from individuals.
        i. The majority of these were from local residents who opposed the development for reasons listed in Table 2.
- There were 271 submissions from individuals in favour of development.
    a. The majority of these were the Heritage Estates landholders, with a strong representation from individuals included in the Shoalhaven Land Owners Association, which represents Heritage Estates landholders.

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Table 2

Key concerns/arguments raised by individuals and professionals in the public submissions against rezoning Heritage Estates.

Issue Raised	Number[1]
Impacts on local and regional biodiversity: loss of species, impact on Booderee National Park, loss of tourism due to development.	110
The landowners were warned before purchase that their properties were zoned rural. Belief the case falls under the Caveat Emptor clause.	64
Community services and infrastructure are inadequate. Concerns over accommodating the extra people in the area due to the high levels of unemployment.	44
A recent Bush Fire Hazard study likely reduces the developable lots by a further 150. Concern if development is still economically viable given the likely reduction in developed land.	37
Impacts on downstream waterbodies of St Georges Basin/ Erowal Bay.	29
The inadequacy of the social impact study. The study only included the landholders within the proposed development and not the larger community.	16
Studies undergone since COI in 1999 such as Eco Logical 2008 and BES 2007. Would the COI reach a different conclusion now given their findings?	14
Domestic cats and dogs would not be banned from the development. Their presence may negate the usefulness of the proposed corridors.	11
Climate Change was not addressed in the PER	10
At the time of the COI, the Stockland development had not been approved. What would the impact of further development (Heritage Estates) now have on the area?	8
Staged development or development efforts to minimise impact not addressed sufficiently in the PER, such as mandatory composting toilets and energy efficient housing.	6
Lack of full access to relevant supporting information and partial reportage of outcomes of previous studies.	2

[1]More than one issue was raised in each public comment letter

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Table 3

Key concerns/arguments raised by individuals in the public submissions in favour of rezoning Heritage Estates

Issue raised	Number[1]
Social Justice: Owed under the Just Terms Compensation Act, as owners who have paid rates on their land for over twenty years.	186
Believe humans should come before the environment.	126
Economic stimulus of development.	122
Affordability issues. They do not have the income to buy elsewhere, which were largely the reasons for purchasing land initially and have lost money since land purchase due to taxes.	106
If Heritage Estates is not developed belief local council would need to increase taxes in the area.	69
Other development has been allowed to proceed. The land was "pristine" question why it was allowed to be developed and not the Heritage Estates land. Angry over belief developers come before single landholders in decision making.	32
Land's environmental attributes have been overstated.	12
Heritage Estates land is currently degraded and has been cleared periodically since purchase. Worry land is becoming dumping ground and being degraded by recreation bikers and ATV users.	10
Rudd government promise of opening up land for housing to increase affordability. Need to provide land for population growth.	3
The impact and occurrence of bushfires if the lots were ALL developed would be reduced.	2
If threatened flora/fauna exist you can re-plant them (ie. orchids) or move the fauna.	1

[1]More than one issue was raised in each public comment letter

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Assessment that the proponent has addressed the issues raised in the public comments adequately

Attachment A of the final PER reviewed the public comments on the draft PER. It addresses the issues raised by the public during the public consultation period of the draft PER. The Council's record of the number of submissions received as well as the breakdown of those in favour and opposed to development were in line with our findings. Table A.1 summarised the issues raised in submissions to the draft PER as well as Council's response. The summaries of issues raised are consistent with our summary (Tables 2 and 3). The final PER is thorough in its inclusion of responses to all issues raised by the public in response to the draft PER. In particular the inclusion of sections 3A Supplementary Social and Economic Issues and sections 6A Climate Change, address the public's concern over the draft PER's omission of a summary on the impact of development on the regional community and the importance of considering climate change as a general issue requiring consideration.

The final PER does not include additional amendments or modifications to the development proposal for the minimisation of unacceptable impacts on listed threatened species or on the values of Booderee National Park. The report acknowledges that the proposed rezoning and subsequent development will result in significant impacts to a range of species that utilise Booderee National Park and inhabit Heritage Estates, including the loss of habitat for these species and a substantial loss of connectivity.

Proposed alternatives if rezoning is not permitted

The report states that three alternatives to rezoning the land are possible:

1. Joint Government acquisition
    a. If the land is not rezoned because of its role in maintaining regional biodiversity, there is an argument for joint Federal and State Government acquisition and inclusion of the land in the National Park system.
2. Biobanking
    a. Under such a scheme the land would be assessed for its biodiversity values and credits issued and sold to developers seeking to develop land elsewhere with similar biodiversity values. The strength of biobanking is that it aims to enhance threatened species conservation, while weaknesses include management and compliance issues and an overall lack of resources for implementation and long-term monitoring (Burgin, 2008). The number of separate owners may make negotiating and operating a biobanking scheme problematic. If ownership of the land was centralised, biobanking may be a feasible option for conserving land while providing a remuneration fund for landowners. Long-term responsibility for managing the land would need to be determined. *Biobanking is not considered a viable* means of allowing development of the subject land given the ownership of the land and the site specific issues (Ecological, 2008).

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3. The "do nothing" approach

    a. According to the current owners of Heritage Estates, the current situation has resulted in illegal clearing, recreational 4WD and trail bike use and illegal dumping. Clearing, slashing or mowing in the Heritage Estates currently requires consent. This is due to the regulations governing the zoning of the land under the Shoalhaven Local Environmental Plan (1985) and other State and Commonwealth legislation. If the stated claims of land degradation and illegal activity are legitimate, the "do nothing" approach may result in continued degradation of the land.

Summary

- Sustainable land-use practises and *pro-active protection* of remnant fragments are essential to the preservation of biodiversity in expanding regions (Margules & Pressey, 2000).
- The impact of development in the subject area *cannot be effectively mitigated or offset*.
- Corridors recommended by the CoI do not satisfy *all habitat requirements* for the variety of fauna present on the peninsula.
- The value of habitat corridors within Heritage Estates are due to their location, *functionality cannot be replaced* or purchased elsewhere.
- As a majority, local residents feel development would *negatively impact upon them,* with many raising concerns with issues not comprehensively addressed in the draft PER.
- Heritage Estates landholders are angry the Stockland development was approved and believe they are owed under the *Just Terms Compensation Act*.
- Rezoning of the land may turn out to be *economically unfeasible*. Owners of sites that can be developed if rezoning occurs could face substantial costs associated with development.

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LEX 83485 Document 23

Assessment

of

Public Environment Report

for the

Heritage Estates

Final Report

PREPARED FOR THE

DEPARTMENT OF ENVIRONMENT, WATER, HERITAGE AND THE ARTS

BY



GILLESPIE ECONOMICS

January 2009

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1.0 Introduction

The Heritage Estates is a "premature" or "paper" subdivision located 30km south of Nowra near Erowal Bay. The Estate was created in 1915 and 1,232 lots are registered but do not have dwelling entitlements. The land is zoned Rural 1(a) and Rural 1(b) under the provisions of the Shoalhaven Local Environment Plan (LEP) 1985. Erection of dwelling houses on individual allotments less than 40 hectares is not permissible under the LEP.

Over the last ten years there has been a concerted effort by the landowners to have their land rezoned for residential development and Shoalhaven City Council has on several occasions unsuccessfully sought to prepare and exhibit draft LEPs to enable the majority of the Estate to be developed for residential purposes.

A number of strategic planning and environmental management studies and reports have been prepared about the suitability, need, timing and infrastructure provisions for the Estate including:

- a Local Environmental Study and supplementary flora and fauna report prepared in 1994;
- a strategic flora and fauna study prepared in 1995; and
- Patterson Britton Report dated April 1998.

A Government/Landowner Taskforce in mid 1998 was unable to reach agreement on a development scenario, culminating in a NSW Commission of Inquiry (COI) in 1999.

The COI found that on balance there are no environmental or feasibility issues which require that no residential development occur on the site. A staged development to accord generally with Option 4 of the Patterson Britton report was considered to provide an appropriate level of residential development while protecting the important ecological and downstream water environment values of the Heritage Estate land. This development scenario is for a maximum of 730 dwellings on 730 lots.

In 2005, Shoalhaven Council commissioned several studies including a Threatened Biodiversity Study to support the proposed rezoning recommended by the COI. This identified four threatened species and five migratory species listed in the Environment Protection and Biodiversity Conservation (EPBC) Act 1999 and there were concerns from Booderee National Park (BNP) about the threat to biodiversity in Jervis Bay Territory. Consequently, it was determined that Ministerial approval would be required under the EPBC Act and that a Public Environment Report (PER) would need to be prepared.

Public submissions to the draft PER have now been received and a final PER has been prepared. This report reviews the:

- social and economic analysis undertaken in the draft PER;
- potential social and economic impacts (providing a gap analysis) associated with the proposal going ahead on the surrounding community as well as the National Park. The gap analysis aims to identify all potential social and economic impacts, pointing out those impacts that have not been adequately addressed in the draft document. It includes advice on the nature and likely magnitude of these impacts, and discusses the social and economic impacts of all potential decision including a refusal decision;
- public comments made on the draft PER and assesses whether the proponent has:
  - addressed the issue raised in the public comments adequately through changes made in the PER document;
  - made amendments that minimise the potential for unacceptable social and economic impacts on the surrounding community and National Park.

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2.0 Social and Economic Analysis Undertaken in the Draft PER

The focus of the social and economic issues section of the draft PER was on the social (and related economic) impacts on the landowners of the Heritage Estate should the proposed rezoning not proceed. While the draft PER acknowledges that there are likely to be a range of other social and economic impacts in the location, both positive and negative, it was considered beyond the scope of the study undertaken by JSA to address these broader issues (draft PER page 26).

The JSA (2008) report found the following characteristics of the Heritage Estate landowners:

- older age profile of Heritage Estate owners than Shoalhaven and NSW;
- more likely to be living as a couple with children at home;
- generally lower than average incomes;
- very high proportion from culturally and linguistically diverse backgrounds;
- many reside in the south western suburbs of Sydney;
- many relatively disadvantaged in terms of income, education and employment status;
- relatively high proportion own a home outright or are paying off a home;
- most originally purchased Heritage Estate blocks between1987 and 1990 with the intention of building a home to live in immediately or in the future;
- in todays dollars the median price paid was $24,526;
- most people appeared not to be well off at the time of purchase, and the majority borrowed to by the land;
- a small minority are still paying their Heritage Estate land off;
- while generally aware that the rural land use zoning precluded development, the vast majority of purchasers believed that there would be no problem in the future with building on the land;
- less than 15% sought independent advice;
- current use of the land is severely constrained but owners continue to pay rates of around $465 pa, many for almost 20 years;
- very few have attempted to sell their land with most continuing to hope they will be able to build on it;
- hopes were raised by recent approval of a large Stocklands retail, commercial and residential development to the north of Heritage Estates;
- far more would now build a home to live in rather than a holiday home, if allowed to build.

The following impacts were identified if the land is not rezoned:

- economic/financial loss including lost opportunity if they had chosen to buy an alternative property, diminished retirement options and lost opportunity to own a holiday home or own a home to live in; and
- emotional and psychological impacts.

With regard to economic/financial loss the JSA report identifies:

- historic expenditure on the properties by landholders;
- foregone capital gains associated with investing in the Heritage Estate instead of elsewhere;
- how financially better-off landholders would have been if the land was rezoned one or two years after purchase;
- how landholders would fair financially if the land is rezoned today, with and without costs to date treated as sunk costs and with and without payment of infrastructure costs.

However, if rezoning does proceed JSA also highlights that without financial assistance, it is likely that a significant proportion of the Heritage Estate owners would struggle to afford the development costs.

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3.0 Social and Economic Issues Arising in Submissions

Numerous submissions were received for and against the proposed residential development.

Arguments for the development included:

- that it would add to the inadequate supply of affordable housing outside our overcrowded towns and cities reducing the social breakdown of families;
- it would enable owners to finally build a home on their property;
- it would address social justice issues;
- high environmental claims for the area are false;
- at time of purchase had every reason to believe rezoning would occur within a few years;
- it would bring additional rates revenue to the Council and would enable further development of urgently needed infrastructure;
- the Bayswater Town Centre would be likely to provide a wider variety of goods for local residents;
- if the project doesn't go ahead Council will be obliged to either increase the rates to reduce the amount of money spent on road maintenance and other services;
- it would benefit the landowners but also improve the existing life style of local residents;
- if the proposal doesn't proceed compensation should be provided under Just Terms Compensation Act;
- there has been a cost to owners in the form of lost investment opportunity;
- it would enable owners to get on with their lives knowing that at least some limited justice had been done;
- have paid rates and charges while receiving no real community services and it is time that the contributions and patience were recognised;
- view that all properties in the Heritage Estate should be included;
- something must be done for those whose property is not within the proposed rezoning area;
- owners are willing to pay for provision of services;
- it would bring investment to the region;
- provide more children for local schools enabling needs of students to be better met;
- enable debt of local school to be paid of quicker;
- bring a halt to illegal use of tracks by trail bikes etc and illegal dumping.

Arguments against the development included:

- loss of unique flora and fauna from clearing and increased weed invasion and feral predators, and dogs and cats, altered fire regime;
- loss of protection for the waterway of St Georges Basin;
- loss of important wildlife corridors connecting to Booderee NP;
- offsets are not a viable alternative;
- stubbs report has not taken local residents into consideration - more people in area would stretch further the inadequate facilities currently available - medical, hospital, transport and increase traffic volumes on Jervis Bay Rd;
- estate owners not hapless victims - they knew they could not build;
- the estate should be purchased by State and Federal Government and gazetted as a NP;
- the only argument Council has in support of development is the social and economic effect for the landowners - this argument is not good enough;
- Heritage Estate landowners were aware they could not build when they purchased their properties at lower prices than residentially zoned land;
- if Heritage Estate landowners were misled they need to take matter up with those that misled them;
- potential degrading and destroying of tourism potential of Booderee NP;
- Council should not have charged rates;

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- concern that cost of power and water etc will end up being borne by all residents in the region, not just those who own Heritage Estate land;
- many Heritage Estate owners are relatively disadvantaged in terms of income, education and employment but the area already has one of highest unemployment levels in Australia, therefore it is ludicrous to encourage even more unskilled and unqualified people to an area where employment is so scarce;
- Judith Stubbs statement that caveat emptor might not be applicable to these people lacks substance as it applies to the rest of the population;
- if Heritage Estate owners are already financially disadvantaged surely it is irresponsible to place even further financial strain on these people - via payments for infrastructure including roads, water, sewage, electricity etc;
- additional costs don't make it viable to the landowner as similar blocks in the area sell for $100,000 - but infrastructure costs will be $63,000 per lot and compensation to others $36,000 per lot;
- impact on social structure of area not assessed - infrastructure impacts - health, schools;
- release would impact value of existing properly zoned land;
- concern re discrimination against some owners who can't develop under the proposals;
- narrow Terms of Reference of Stubbs report focussing only on Heritage Estate landowners who have a vested interest.

4.0 Socio-Economic Evaluation Framework

There are multiple aspects of economic and social impacts that are potentially relevant in the consideration of the proposed subdivision. However, these are often confused and misrepresented in socio-economic evaluations. Fundamentally, economic analysis is concerned with whether the community as a whole is better-off or worse-off in aggregate as a result of a proposal. The approach used by economist to consider this question is benefit cost analysis (BCA). BCA is concerned with identification and estimation of the incremental costs and benefits of a proposal, including onsite and offsite environmental impacts. Only where a proposal has net benefits to the community is it considered desirable from an economic perspective.

There are a number of standard steps to BCA. These include:

- identification of the base case or "without" policy scenario;
- identification of the alternatives or "with" policy scenarios;
- identification of incremental costs and benefits of alternatives relative to the base case;
- physical quantification of incremental costs and benefits;
- valuation of incremental costs and benefits of alternatives;
- consolidation of value estimates to a present value;
- application of decision criteria;
- consideration of risk and uncertainty;
- consideration of non-quantified costs and benefits;
- consideration of equity issues.

This framework helps to place many of the individual issues raised in submissions and in the draft PER in a more comprehensive framework.

Additional economic issues to the overall economic desirability (economic efficiency) of a proposal include the financial feasibility of the proposal to individual stakeholders, potential mechanisms to achieve the residential development and regional economic impacts.

Another evaluation framework is Social Impact Assessment (SIA). Social impacts overlap to some extent with economic costs and benefits considered in BCA as well as aspects of financial feasibility, implementation mechanisms and regional economic impacts, and essentially focus on the impacts on some or all individuals and groups in society and the distribution of these impacts. While there are accepted procedural stages for undertaking SIAs e.g. scoping, profiling, prediction, evaluation, mitigation and monitoring, it is rare to find a

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social impact assessment that conforms to these stages (Fenton 2004). The majority of social impact assessments focus on the preliminary stages of scoping and profiling (baseline assessments) as it is these stages for which information is often available and which can be readily obtained using existing methods and techniques. The prediction and evaluation of social impacts is more difficult to address and the field of social impact assessment lacks rigorous methodological techniques and methods to address issues in these stages. For the most part the prediction and evaluation of social impacts is based on the 'expert judgement' of the SIA practitioner who will generally draw on information obtained from the community involvement process and primary and secondary data sources (Fenton 2004).

An important distinction between social impact assessment and economic impact assessment is that the latter attempts to reduce all impacts to monetary terms while the former often uses more qualitative methods.

4.1 Application of a Benefit Cost Analysis Framework

No BCA framework was used in the draft PER or the JSA report to consider socio-economic issues in a broader framework. What follows in an indicative application of a BCA framework to illustrate the likely costs and benefits of the proposal and identify which costs and benefits were not assessed in the draft PER.

Specification of the base case or without policy scenario

Identification of the "base case" or "without" policy scenario option is required in order to facilitate the identification and measurement of the incremental economic benefits and costs of the proposal.

The base case is what would happen in the absence of the proposal to release the land for residential development and is considered to involve:

- continuation of the land in a rural zoning with no housing development;
- continuation of the land providing unmanaged conservation values, wildlife corridor values and water quality protection for St Georges Basin;
- potential decline in conservation values as well as water quality of St Georges Basin associated with illegal off-road vehicle use and dumping on bush tracks etc

The draft PER identified that "a "do nothing" approach would simply perpetuate the existing situation which is clearly unacceptable, particularly for Council and the landowners." However, in an economic framework, adopting an alternative is only desirable if the benefits to the community of doing so exceed the costs to the community – where the community comprises all consumers and producers, including Government.

Specification of policy alternatives

There are two broad types of policy alternatives for the site that are identified in the draft PER, although the focus of the draft PER is on the former:

- rezoning and development for residential purposes - the current proposal is based on a protracted rezoning investigation process that commenced in 1992. It involves the rezoning of up to 730 lots for residential development, including clearing of native vegetation, road construction, bushfire asset protection clearing and maintenance, and provision of services and infrastructure including sewer, water and electricity.
- management of land for conservation – two potential mechanisms for achieving this are identified, Government acquisition and biodiversity banking.

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Identification of the categories of potential incremental economic benefits and costs of the proposal

Incremental economic costs and benefits are impacts on consumers and producers (including government) that would occur "with" the proposal compared to "without" the proposal (the base case). Costs and benefits may relate to use or non-use values held by consumers and producers.

Based on the information provided in the draft PER and other documentation, Table 1 outlines the key economic costs and benefits of the rezoning proposal.

Table 1 - Identification of Potential Incremental Costs and Benefits of Rezoning

	Costs	Bearer of Cost	Benefits	Receiver of Benefit
Development	1. Opportunity cost of lots used for environment protection, etc – difference between private value of land in current zoning compared to say open space zoning	Landowners who don't get rezoned	2. Appreciation in property value for rezoned land – value of land in residential zoning less value in current zoning	Landowners who get rezoned
	3. Physical infrastructure – roads, sewage, electricity, water, stormwater, electricity, telecommunications	Landowners who get rezoned or ratepayers	4. Surplus from housing construction – house value less costs of construction	Builders
	5. Social infrastructure - education, health, community infrastructure	In the short run local residents may experience shortage but ultimately NSW tax payers		
	6. Implementation costs	Landowners who get rezoned or ratepayers		
Externalities	7. Tourism impacts – Booderee NP	Visitors to Booderee NP	8. Cessation of illegal use of tracks and waste dumping	Broader community via non-use values
	9. Direct flora and fauna impacts from clearing	Broad community via non-use values		
	10. Wildlife corridor impacts – including on JBNP and Booderee NP	Broad community via non-use values		
	11. Fringe impacts on JBNP	Broad community via use and non use values		
	12. Loss of water quality protection for St Georges Basin	Users of St Georges Basin and broad community via non-use values		
	13. Global warming impacts of clearing	Broad community		

*Shading indicates costs and benefits addressed in the PER in an economic context.

The main economic benefit of the development relates to the appreciation in property value that occurs as a result of rezoning from rural to residential. This benefit accrues to the owners of lots in the Heritage Estate that will be rezoned. The JSA report tended to focus on issues related to this category of economic benefit largely focusing on socio-demographic characteristics of the landholders and the circumstances and expectations around their land purchase. It also provided information on historical expenditure, foregone capital gains and how much they would be better-off if the land had been rezoned one or two years after

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purchase. However, from an economic evaluation perspective this information is largely irrelevant. No decision now will change historical expenditure or foregone capital gains. Current decisions can only change whether landholders receive an appreciation in land value relative to the value in the current zoning. The relevant economic information therefore is how big this potential appreciation will be.

Another benefit is the surplus that accrues to builders of houses on the rezoned land. This is equivalent to the price charged for building less costs of building. No consideration was given to this benefit in the draft PER.

Not all land owners will have their land rezoned. For those whose land becomes part of the environment protection or drainage requirements of the subdivision a loss in land value will be experienced. This economic loss was not explored in the draft PER and JSA report, although both respondents in the JSA study and submissions referred to the need to compensate this group of stakeholders. Whether or not landholders are compensated, this reduction in land value is an economic cost to society that will be borne by in the order of 480 landholders.

There are some physical infrastructure costs associated with rezoning and development of the subject lands. Many of these physical infrastructure costs e.g. roads, sewage, water, stormwater, are normally borne by the developer or in this case the property owners whose land is rezoned. The COI identified that landholders benefitting from the rezoning should be liable for these costs, and a number of supporters of the proposal have agreed to this in their submissions. However, a number of submissions opposing the proposal were concerned that ratepayers may end up footing the bill.

Many social infrastructure costs are borne by government agencies (i.e.funded by tax payers) with infrastructure planned and provided on the basis of demographic changes to an area. Hence, while in theory increasing the population of a region should not have adverse impacts in relation to access to community infrastructure, there may be lags with service provision, in which case existing residents and visitors can experience shortages. Equally, however, additions to populations can result in thresholds being reached whereby additional types of social infrastructure are provided in an area that would otherwise not have eventuated. Some submissions raised the issue of the impact on social infrastructure, however this was not addressed in the draft PER.

Because the subdivision already exists with disparate ownership, release of the land for urban development is not as easy as simply rezoning it. Rezoning the land does not result in provision of roads, stormwater and other physical infrastructure that would normally be provided by the developer as part of the subdivision process. Consequently, there would be additional management costs involved in coordinating provision of physical infrastructure. These will not be insignificant if, as recommended by the COI, this infrastructure should be paid for by landowners, since it will involve management of payments from landowners, some of whom will not be able to afford it. This also begins to touch on the issue of financial viability which is addressed below in Section 4.2. The size and magnitude of these implementation costs have not been considered in the draft PER.

While there will be one external benefit of the proposal i.e. cessation of illegal use of tracks and waste dumping, there are potentially a number of more significant negative externalities associated with the direct and indirect loss of vegetation and associated habitat, including impacts on Booderee NP associated with impacts on the existing wildlife corridor and JBNP from fringe effects from the residential development. Any loss of habitat would also have greenhouse gas consequences. Loss of water quality protection for St Georges Basin is also a potential external impact although whether this would eventuate depends on the availability of water sensitive urban design (WSUD) to ameliorate impacts. Similarly, tourism impacts associated with visitation to Booderee NP would only eventuate if current and prospective visitors were adversely affected by the loss of habitat. Some of these impacts have been considered in the draft PER but not in an economic context.

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Identification of the physical consequences of the proposal

Before costs and benefits can be valued, often they need to be physically quantified. For example, to value the increase in property value it is first necessary to know how many lots will be rezoned. As identified in the proposal, up to 730 lots are proposed to be rezoned. The balance, 482, is assumed to be rezoned from rural to some other zoning such as open space.

To value impacts on tourism it is necessary to first estimate the visitor profile over time under the base case and the visitor profile over time under the proposal. This was not considered in the draft PER.

To value any water quality impacts on St Georges Basin it is necessary to identify the water quality in the Basin "with" and "without" the proposal and what uses or environmental attributes of the Basin would be impacted and in what way. It seems to be implicitly assumed in the draft PER that WSUD will avoid any water quality impacts.

To value terrestrial ecological effects it is necessary to identify the area and significance of flora and fauna communities that would be affected. Consideration of the physical consequences for flora and fauna is a significant component of the draft PER.

Valuation of the incremental economic costs and benefits of the proposal

Where costs and benefits relate to changes in market prices or costs they can be estimated from market data. For instance, the cost of using existing lots for environment protection or infrastructure is the market value of the land in its current zoning, estimated by JSA (2008) at around $18,000/lot[1]. The cost of physical and social infrastructure is simply the market cost of providing these services. JSA (2008) identify potential development costs (road and drainage works) and section 94 contributions at in the order of $65,000/lot. No estimate was made in the draft PER of the likely social infrastructure costs. However, some indication of average social infrastructure costs can be gained from a study by Keys Young Consultants (1993). They estimated the average recurrent and capital costs per additional resident to Rouse Hill for the Government provision of schools, public hospitals, police services, community development and support services and community facilities, at $897.8 per resident ($10,500 in 1993 present value terms over 25 years) and $1,385 per resident (1993 values), respectively. Aggregated and indexed to 2008 gives a cost of $18,000 present value per additional person. If there is some spare capacity in existing social infrastructure then the incremental cost of social infrastructure will be less than this. For the purpose of the analysis the average occupancy rate for the Shoalhaven (C) – Part B SLA was used i.e. 2.4.

Similarly, the appreciation in land value for property that is rezoned residential is simply the difference between the value of lots in their current zoning and the value of lots with a residential zoning. JSA (2008) identifies residential zoned land values at between $100,000/lot and $130,000/lot. So appreciation in land value will be between $82,000 and $112,000/lot[2].

For the housing development component of the proposal it is assumed in this report that house value is $300,000 and that the cost of construction is $275,000.

The global warming impacts of clearing can be calculated from an estimation of the release of carbon stored in vegetation and other construction activities and an estimate of the social marginal damage cost of carbon. The final PER estimates 9,000 to 18,000 tonnes of CO_2 from vegetation removal and 7,000 to 17,000 tonnes of CO_2 from road construction. Assuming a social damage cost of carbon of in the order of $14/t CO_2 (Tol 2005) the proposal would have global warming impacts of up to $500,000.

[1] This may overstate economic costs if expectations of rezoning have been built into the current land price.
[2] This may understate benefits if expectations of rezoning have been built into the current land price.

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Other impacts such as those on fauna and fauna largely fall outside the market and hence require the use of non-market valuation (NMV) methods such as contingent valuation (CV) or choice modelling (CM). These NMV methods elicit the community value for different conservation outcomes in a dollar value that is directly comparable to market costs and benefits. This aspect was not addressed in the draft PER and resources and available information do not permit estimation of these impacts in this report.

Table 2 identifies the valuation methods that would be appropriate for each of the identified costs and benefits of the rezoning proposal.

Table 2 - Identification of Potential Valuation Methods

	Costs	Valuation Method	Benefits	Valuation Method
Development	1. Opportunity cost of lots used for environment protection, etc	Market Data (adjusted for expectations)	2. Appreciation in property value for rezoned land - residential zoned land value less rural zoned land value	Market Data (adjusted for expectations)
	3. Physical infrastructure – roads, sewage, electricity, water, stormwater, electricity, telecommunications	Market Data	4. Surplus from housing construction – house value less costs of construction	Market Data
	5. Social infrastructure - education, health, community infrastructure	Market Data		
	6. Implementation costs	Market Data		
Externalities	7. Tourism impacts – Booderee NP	Travel Cost Method, Choice Modelling or Contingent Valuation	8. Cessation of illegal use of tracks and waste dumping	Choice Modelling or Contingent Valuation
	9. Direct flora and fauna impacts	Modelling or Contingent Valuation		
	10. Wildlife corridor impacts – including on Booderee NP and JBNP	Choice Modelling or Contingent Valuation		
	11. Fringe impacts on JBNP	Travel Cost Method, Choice Modelling or Contingent Valuation		
	12. Loss of water quality protection for St Georges Basin	Travel Cost Method, Choice Modelling or Contingent Valuation		
	13. Global warming impacts of clearing	Market Data		

*Shading indicates costs and benefits addressed in the PER in an economic context.

The resources required to undertake non-market valuation studies are not insignificant. A choice modelling study can cost in the order of $130,000 and take 3 to 4 months to complete.

Where these resources are not available it is possible to utilise benefit transfer. Benefit transfer involves transferring values in some way from existing valuation studies to a target study of interest. However, this requires the existence of NMV studies that utilise similar metrics to describe ecological impacts as those used in the draft PER.

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According to the draft PER the main direct impact to listed threatened species and ecological communities would be:

- that 211 Leafless Tongue Orchids (vulnerable) found within the subject land would be directly lost; and
- impact on 7%-10% of the Eastern Bristlebird population (endangered) of Bherwerre Peninsula.

It was also concluded that the proposal would have significant impacts to a range of species that utilise the BNP. These impacts include the loss of habitat for these species on the subject land (i.e. in an area nearby to BNP) and a substantial loss of connectivity to and from the BNP. This loss of habitat and connectivity are likely to reduce the functionality of BNP as habitat for some species, and impact on the viability of populations of some of these species within the region.

It is difficult to apply benefit transfer to these impacts. However, some indication of the types of results that may be possible can be ascertained from the studies reported in Table 3.

Table 3 – Examples of Results of NMV Studies

Item Valued	Unit Value	Unit of Value	Present Value[3] (Millions)	Reference
Per 10,000ha of native vegetation conserved	$3.80	Per household, once-off payment	$5	Lockwood and Carberry 1998
Extra native plant and animal species conserved in region	$1.69	Per household, once-off payment	$2	Lockwood and Carberry 1998
Per 1% reduction in area of a unique ecosystem	$3.68	Per household, once-off payment	$5	Rolfe, Blamey and Bennett 1997
Per endangered species preserved	$11.39	Per household, once-off payment	$14	Rolfe, Blamey and Bennett 1997
Per 1% increase in population size of non-threatened species	$1.69	Per household, once-off payment	$2	Rolfe, Blamey and Bennett 1997
Per 1,000 has of healthy river red gums	$1.45	Per household per year for 20 years	$11	URS 2007
Per 100 breeding pairs of threatened parrots	$4.39	Per household per year for 20 years	$35	URS 2007
Per 100 breeding pairs of threatened owls species	$0.18	Per household per year for 20 years	$1	URS 2007
Per 100 individuals of threatened long-footed Potoroos	$1.50	Per household per year for 20 years	$12	URS 2007
Per 1,000 ha of significant rainforest protected	$11.16	Per household per year for 20 years	$88	URS 2007
Per 1,000 ha of old growth forest protected	$0.65	Per household per year for 20 years	$5	URS 2007

Discounting

Incremental costs and benefits of the proposal would normally occur in different time frames. To facilitate comparison of these streams of costs and benefits over time they are converted to a present value using discounting. The discount rate may reflect the social opportunity cost of capital (SOC) or the social marginal time preference rate (SMTPR). The NSW Treasury recommended approach is 7% with sensitivity testing at 4% and 10%. The lower figure is indicative of SMTPR and the higher figure indicative of SOC.

[3] Values were aggregated to 50% of NSW households and a private discount rate of 15% was used to conservatively equate annual values to present values.

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While any rezoning and development of the Heritage Estates would be staged, the timing is uncertain. Consequently, for the purpose of this indicative analysis, rezoning, infrastructure provision and housing development are assumed to occur evenly over a 5 year period.

On this basis, the "Development" costs and benefits of the proposal, ignoring Implementation costs, would have present values (@7% discount rate) as reported in Table 4.

Table 4 – Estimation of Development Costs and Benefits of the Proposal

	Costs	Estimation of Present Value	Benefits	Estimation of Present Value
Development	1. Opportunity cost of lots used for environment protection, etc	$8M	2. Appreciation in property value for rezoned land - residential zoned land value less rural zoned land value	$69M
	3. Physical infrastructure – roads, sewage, electricity, water, stormwater, electricity, telecommunications	$39M	4. Surplus from housing construction – house value less costs of construction	$15M
	5. Social infrastructure - education, health, community infrastructure	$26M		
	6. Implementation costs			
Externalities	7. Tourism impacts – Booderee NP		8. Cessation of illegal use of tracks and waste dumping	
	9. Direct flora and fauna impacts			
	10. Wildlife corridor impacts – including on Booderee NP and JBNP			
	11. Fringe impacts on JBNP			
	12. Loss of water quality protection for St Georges Basin			
	13. Global warming impacts of clearing	$0.5M		

Application of the decision criteria

There are four main decision criteria for comparing the present value of benefits to the present value of costs. These include:

- Net present value (NPV) which is the discounted benefits less discounted costs. If the NPV is greater than zero then the project would result in net benefits to society. Where there are a number of alternatives the alternative with the highest NPV is most desirable in terms of economic efficiency.
- Benefit cost ratio (BCR) which is discounted benefits divided by discounted costs. If the BCR is greater than one then the benefits of the project exceed the costs.
- Internal rate of return (IRR) which is the discount rate that equates the present value of benefits to the present value of the costs. If the IRR is greater than the chosen benchmark discount rate, then the Project is considered to be desirable on economic efficiency grounds.
- Net present value per dollar invested (NPV/I) which is NPV divided by the PV of the initial capital investment. This indicates relative returns per dollar of capital invested.

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NPV is the most reliable method. On the basis of the assumptions made above, the present value of "Development" costs would be in the order of $73.5M and the present value of "Development" benefits would be in the order of $84M, resulting in net development benefits to society of $10.5M.

Sensitivity testing

There is likely to be considerable uncertainty around the physical prediction of impacts as well as the valuation of these impacts and therefore any framework should include consideration of risk and uncertainty.

Risks occur where a probability distribution is known e.g. of an event or variable, and can be accommodated in BCA by multiplying benefits and costs by a probability. The result is an expected net present value (ENPV).

However, where there is a lack of information on probabilities of different impacts, costs and benefits, it is relevant to undertake some form of sensitivity testing, for example:

- using different discount rates;
- making percentage changes to key physical or valuation assumptions; and
- examining best and worst case scenarios.

The range of net "Development" benefits using 20% higher and 20% lower cost and benefit assumptions and 4% and 10% discount rates is -$86M to $109M. The result is therefore quite sensitive to the assumptions that are made about costs and prices.

Consideration of unquantified costs and benefits

In any analysis, there will invariably be costs and benefits that cannot be quantified due to lack of physical data or valuation data. One means of dealing with these is via threshold value analysis where consideration is given to how large these unquantified costs or benefits would need to be to change the result e.g. critical thresholds. These critical thresholds can then be considered in light of the available economic valuation literature and judgement made about the likelihood of these thresholds being exceeded.

The estimated net development benefit (ignoring any implementation costs) estimated above of $10.5M, is essentially a threshold value against which unquantified environmental externalities can be compared (ignoring the unquantified positive externality of the cessation of illegal use of tracks and waste dumping).

That is, unquantified environmental externalities of the proposal would need to be valued by the community at greater than $10.5M to make the costs of the proposal outweigh the benefits and hence for it to be considered economically inefficient.

Consideration of equity issues

BCA is concerned with net benefits only, rather than distribution issues. That is, the costs and benefits in Table 1 are aggregated to see if the benefits exceed the costs. However, Governments and stakeholders are also interested in distributional implications of projects e.g. the identity of the groups which may be expected both to gain and to lose as a result of a decision, and the nature and size of those gains or losses. This consideration of distribution of costs and benefits also may help guide equitable funding arrangements.

From Table 1 it is evident that the costs and benefits of the proposal accrue to a variety of stakeholders. The main potential beneficiary is landowners whose land is rezoned. This group may also bear some of the costs such as physical infrastructure costs, compensation costs for landowners whose land is not rezoned and implementation costs. Although, ultimately the magnitude of these costs and whether or not landowners will bear them has not been definitively determined.

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This is a source of concern raised in some submissions since a number of ratepayers consider that they should not have to pay for infrastructure costs.

Externality costs are largely borne by the broad community across NSW, including those residing within the region.

Conclusion

Only some information relevant to a BCA of the proposal has been presented in the draft PER and then not in a BCA framework. An indicative BCA based on information contained in the PER and in the literature suggests that the net "Development" benefits of the proposal (ignoring any implementation costs) may be in the order of $10.5M. These need to be weighed up against the externality costs of the proposal. That is, unquantified environmental externalities of the proposal would need to be valued by the community at greater than $10.5M to make the costs of the proposal outweigh the benefits and hence for it to be considered economically inefficient.

While it is recognised that there are historical reasons for pursuing rezoning of the subject land it should be noted that the most economically efficient approach for providing additional residential development in the region is to do so in an area that will have fewer potential environmental externalities. In this way, the net benefits of rezoning and housing development would be realised without the environmental externality costs. However, such an approach would result in the costs and benefits of the rezoning being borne by different stakeholders in the community and would not address the concerns of the heritage estate landowners.

4.2 Application of a Financial Analysis Framework

Financial analysis is concerned with costs and benefits to an individual stakeholder. Because there are a number of stakeholders associated with the proposal, financial analysis can be undertaken from a variety of perspectives.

Landholders Whose Land Gets Rezoned

If landholders whose land is rezoned are not required to pay for physical infrastructure then they obtain an appreciation in land value, at no cost. From the information presented above this is estimated at approximately $82,000 to $112,000 per lot. Where landholders do not sell the property the increased wealth is in terms of an increased asset value. Where the landholder sells the property this increase in wealth (less sales costs) is converted to cash.

If landholders whose land is rezoned are required to pay for physical infrastructure (and perhaps implementation costs and compensation to other landholders) then they are financially better off provided that the appreciation in property price (from current market value, adjusting for expectations, to new market value) exceeds the payment required.

If physical infrastructure costs are in the order of $65,000 per lot these landholders would be between $17,000 and $47,000 better-off. Including compensation costs of $12,000/lot, landholders would still be between $5,000 and $35,000 better-off. Any implementation costs borne by the landholders would reduce this financial benefit further.

However, even if there is a net financial benefit to landholders, there is an asymmetry in the mode of the cost and the benefit to them. The infrastructure and compensation costs are real financial costs payable in cash whereas the benefit is in terms of asset appreciation. This raises issues of cash flow and ability of landholders to pay the financial cost, regardless of the appreciation in asset value.

While the draft PER touches on this issue, it is considered to be a substantial issue that requires more detailed consideration.

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Landholders Whose Land Does Not Get Rezoned

A number of property owners will not get their land rezoned or their land will be required for non residential aspects of the subdivision design. Where land zoning remains unchanged these people are no worse off with the proposal than without it (except when property market expectations are included). Where their land is required for non residential aspects of the subdivision design they essentially lose the asset value of their rural land e.g. $18,000/lot.

This group of landholders and their particular circumstance has not been addressed in the draft PER.

Council/Ratepayers

If Council bears the cost of physical infrastructure then this will ultimately be passed on to ratepayers. Ratepayers therefore bear a cost but receive no financial benefit. However, if infrastructure costs are recouped from Heritage Estate landowners then there will be no costs to Council/Ratepayers.

Some submissions refer to additional rate revenue as a benefit of the proposal, however, rate revenue is not a financial windfall to Council that allows provision of additional infrastructure. It is essentially a fee for service, it reflects the cost to Council of providing planning, environmental management and other services to the additional people that will reside on the subject land.

4.3 Consideration of Implementation Issues

Because the subdivision has occurred without the provision of basic infrastructure that normally accompanies a subdivision, even if approval is given for the rezoning and residential development, it is problematic to actually achieve this because of a range of coordination and funding issues. This is particularly the case where infrastructure etc is to be funded by the landholders whose property is rezoned. Funding will need to be obtained from owners of rezoned properties either as a lumps sum or an annuity – protests and non-payment will need to be dealt with. Some lots may need to be acquired to facilitate the subdivision design e.g. stormwater, open space, bushfire protection etc.

This issue warrants more attention in the PER because if implementation issues cannot be resolved, then there is little point rezoning the land.

4.4 Consideration of Regional Impacts

Regional economic impact assessment is concerned with the stimulus that an activity provides to regional economic activity – often measured in terms of changes in business turnover (output), value-added, income and employment.

Any development whether of the Heritage Estates or other potential residential areas or indeed conservation will stimulate regional economic activity through purchases of intermediate goods as well as spending of employees.

While regional impacts have been raised in a number of submissions, consideration of regional economic activity is not considered a relevant criterion for judging whether or not a proposal is desirable or not from a socio-economic perspective.

4.5 Social Impact Assessment Framework

As indicated in Section 4.0, the scope of SIA and methods that can be used are considerably more flexible than those of economic analysis.

The draft PER and JSA report relies on community involvement via survey and case study analysis of affected landholders, delving into the socio-demographic characteristics of the people involved and the circumstances around their purchase. Specifically the focus is around

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Item 2 in Table 1, with consideration not limited to the "with" and "without" rezoning, forward looking comparison required by economic analysis. Other issues such as life time expenditure associated with the land, economic loss as a result of the decision to purchase land, economic loss considering alternative investment decisions, relative economic position had rezoning occurred within two years of purchase etc, have also been reported. Financial dimensions associated with meeting development costs are also explored.

However, the social dimension of the other costs and benefits identified in Table 1 has not been examined.

While there can be little doubt that some landholders may have been influenced in their decision to purchase the land by real estate agents and others seeking to maximise their own return on the land, equally the purchasers would also have been seeking to maximise the return from their investment by purchasing it at a much lower price than other residentially zoned land (reflecting its rural zoning) and attempting to influence government to rezone it so that its value increases. In economics this is referred to as rent seeking behaviour – which is when an individual, organisation or firm seeks to make money by influencing the economic and/or legal environment.

4.6 Amendments to the draft PER

There have been a number of amendments to the draft PER following public exhibition and the receipt of submissions.

In response to public submissions a new section on the impacts of the proposal on climate change has been included. Information provided in the final PER on physical carbon impacts has been used in Section 4.1 of this report to place a dollar value on climate change impacts of the proposal and include in the economic framework. This indicates that the impacts are relatively minor.

The final PER has also included an additional section on socio-economic impacts in response to various social and economic issues raised in submissions. This additional analysis:

- identifies the communities potentially affected by the proposal;
- briefly discusses the impact of the proposal on the bushland character of the area;
- analyses the impacts of the proposal on the visual landscape of the area;
- considers the implications of the proposal for road traffic access and traffic flow;
- identifies the implications of the proposal for demographics, community services and infrastructure, including in Jervis Bay Territory;
- briefly discussions the regional economic benefits of the proposal in terms of the stimulus it would provide to the construction sector and other sectors of the economy (although the analysis incorrectly attributes all expenditure on dwelling construction and infrastructure to the regional economy);
- touches on implementation issues identifying that "it is likely that Council would be required to borrow money to construct the necessary infrastructure up front and subsequently recover money from the landowners" recognising that there is a risk that Council would not recover all money it expends;
- identifies that undevelopable/environmental protection land may be either left in private ownership and obtained gradually if rates are unpaid or compulsorily acquired and transferred to an entity that would be responsible for management (although this has not been resolved);
- considers that there would be no impact of the proposal on tourism and/or revenue associated with BNP;
- identifies that the Wreck Bay Aboriginal Community strongly oppose the development of the Heritage Estates land;
- did not identify any impacts on Department of Defence Activities.

Many of the public submissions focused either on support for, or opposition to, the proposal and therefore did not raise additional issues that required addressing. However, the

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evaluation framework in Section 4.0 of this report identified a number of gaps in the draft PER analysis that largely remain in the final report (e.g. economic and social impacts to landowners whose land remains unzoned, implementation costs, surplus from housing construction, community value for lost ecological values, economic value of greenhouse effects, economic value of social infrastructure costs), including that it has not addressed the fundamental economic issue of whether the benefits of the proposal to the community are likely to outweigh the costs.

Furthermore, implementation issues remain unresolved including how environmental protection lands will be obtained (if at all), who will manage these lands, the financial viability of making landowners fund the development and whether or not Council will actually fund the development upfront.

5.0 Conclusion

In accordance with the Council brief, the socio-economic analysis undertaken by JSA and reported in the draft and final PER has a very narrow focus on "social and economic hardship impacts". While its historical perspective can inform consideration of social impacts and provide context to the current predicament of landholders, economic evaluation is forwarding looking only. Historical expenditure on the subject land by landholders and what could have been if they had invested elsewhere is largely irrelevant in economic evaluation. The choice for decision-makers is between continuation of the current zoning or adopting some alternative such as partial rezoning for residential uses or conservation of the subject land. Both these options will have a range of costs and benefits to different stakeholders in the community as well as financial and implementation issues, that have not been considered in a comprehensive manner in either the draft or final PER.

Attempts to undertake indicative analyses in this report, show that the proposal has estimated net "Development" benefits (ignoring any implementation costs) of in the order of $10.5M. The unquantified environmental externalities of the proposal would need to be valued by the community at greater than $10.5M to make the costs of the proposal outweigh the benefits and hence for it to be considered economically inefficient.

While it is recognised that there are historical reasons for pursuing rezoning of the subject land, it should be noted that the most economically efficient approach for providing additional residential development in the region is to do so in an area that will have fewer potential environmental externalities. In this way, the net benefits of rezoning and housing development would be realised without the environmental externalities. However, such an approach would result in the costs and benefits of the rezoning being borne by different stakeholders in the community and would not address the concerns of the heritage estate landowners.

The costs and benefits of the proposed rezoning and development would accrue to a variety of stakeholders. The main potential beneficiary is landowners whose land is rezoned. This group may also bear some of the costs such as physical infrastructure costs, compensation costs for landowners whose land is not rezoned and implementation costs.

While the indicative analysis indicates that landholders whose land is rezoned would still be financially better-off, even if they were required to pay for infrastructure costs and land acquisition costs, there is an asymmetry in the mode of the cost and the benefit to these landholders. The infrastructure costs and any compensation costs are real financial costs payable in cash, whereas the benefit to them of the proposal is in terms of asset appreciation. This raises issues of cash flow and ability of landholders to pay the financial cost, regardless of the appreciation in asset value.

Notwithstanding this, there are also unresolved implementation issues around coordination and payment of infrastructure development and acquisition and management of environmental protection lands.

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6.0 References

Judith Stubbs and Associates (2008) *Heritage Estates Social Impact Assessment*, prepared for Shoalhaven City Council.

Rolfe, J., Blamey, R. and Bennett, J. (1997) *Remnant Vegetation and Broadscale Tree Clearing in the Desert Uplands Region of Queensland*, Choice Modelling Research Report No. 3, University of NSW.

Shoalhaven City Council (2008) *Draft Public Environment Report (PER) "Heritage Estates" Worrowing Heights, NSW Proposed Rezoning and Associated Public Works to Facilitate Residential Development*.

Tol, R. (2005), *The marginal damage costs of carbon dioxide emissions: an assessment of the uncertainties*. Energy Policy 33 (2005) p. 2064-2074.

URS (2007) *Non-Use Values of Victorian Public Lands: Case Studies of River Red Gum and East Gippsland Forests*. Prepared for the Victorian Environmental Assessment Council.

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Appendix 1 – Costs and Benefits of Conservation

The option of conserving the subject land for its biodiversity and other values has a different set of costs and benefits.

Under a conservation zoning, all land in the Heritage Estates would experience a de-valuation, essentially to a zero market value. This opportunity cost of the land is estimated at $22M.

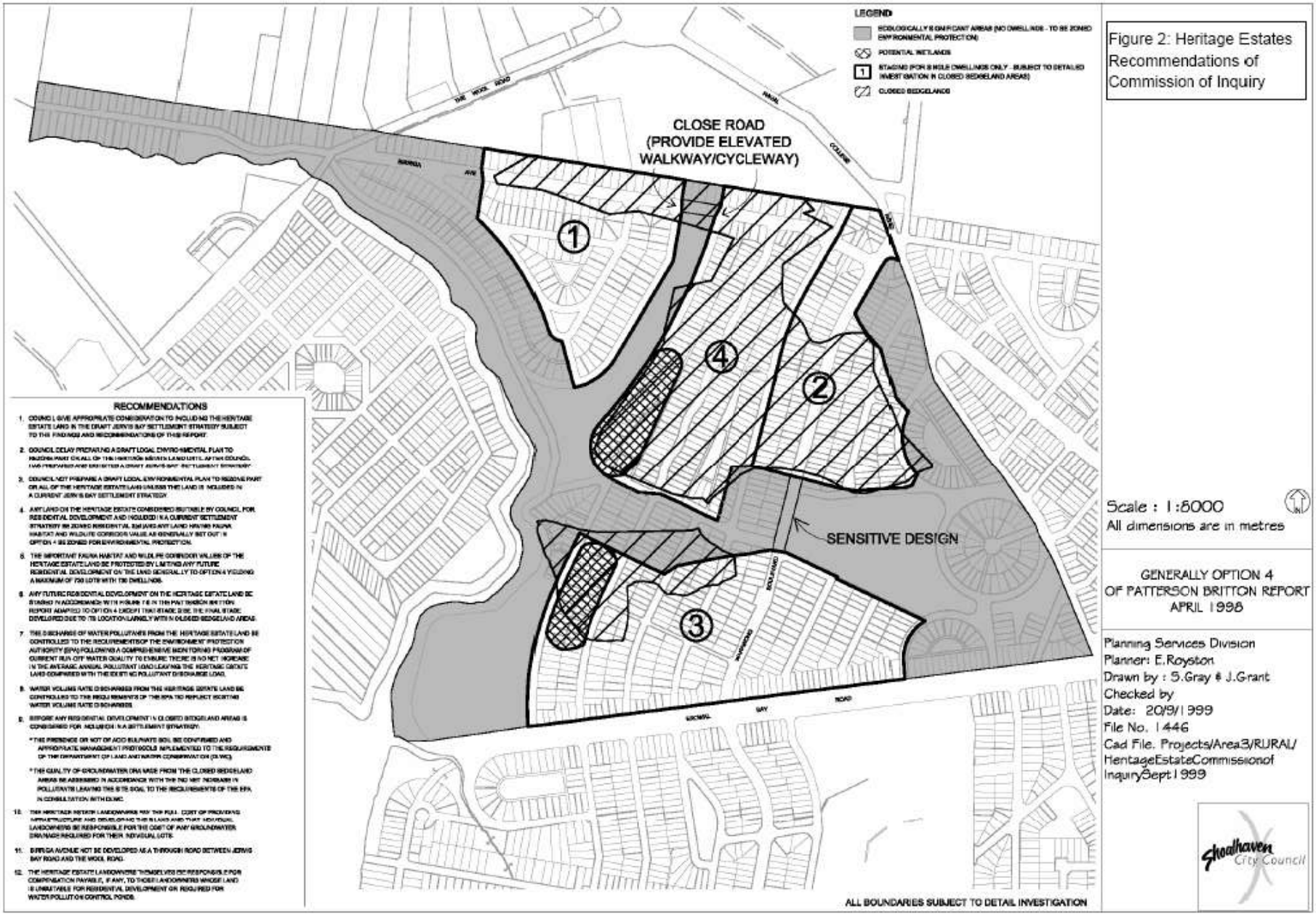
In addition it is envisaged that there would be some capital costs of establishing the conservation area as well as ongoing management costs.

Benefits would largely be of a non-market nature, including formal conservation benefits. In considering the magnitude of these benefits it is important to realise that any conservation, tourism or other benefits of this option need to be consider relative to the base case which includes informal conservation of these lands in the current rural zoning, albeit declining over time.

Costs	**Estimation of Present Value**	**Benefits**	**Estimation of Present Value**
1. Opportunity cost of lots used for conservation, etc	$22M	2. Cessation of illegal use of tracks and waste dumping	
3. Any capital costs of establishment		4. Tourism benefits – Booderee NP	
5. Management costs		6. Direct flora and fauna benefits	
		7. Wildlife corridor benefits – including on Booderee NP	
		8. Gain in water quality protection for St Georges Basin	
		9. Global warming benefits of any revegetation	

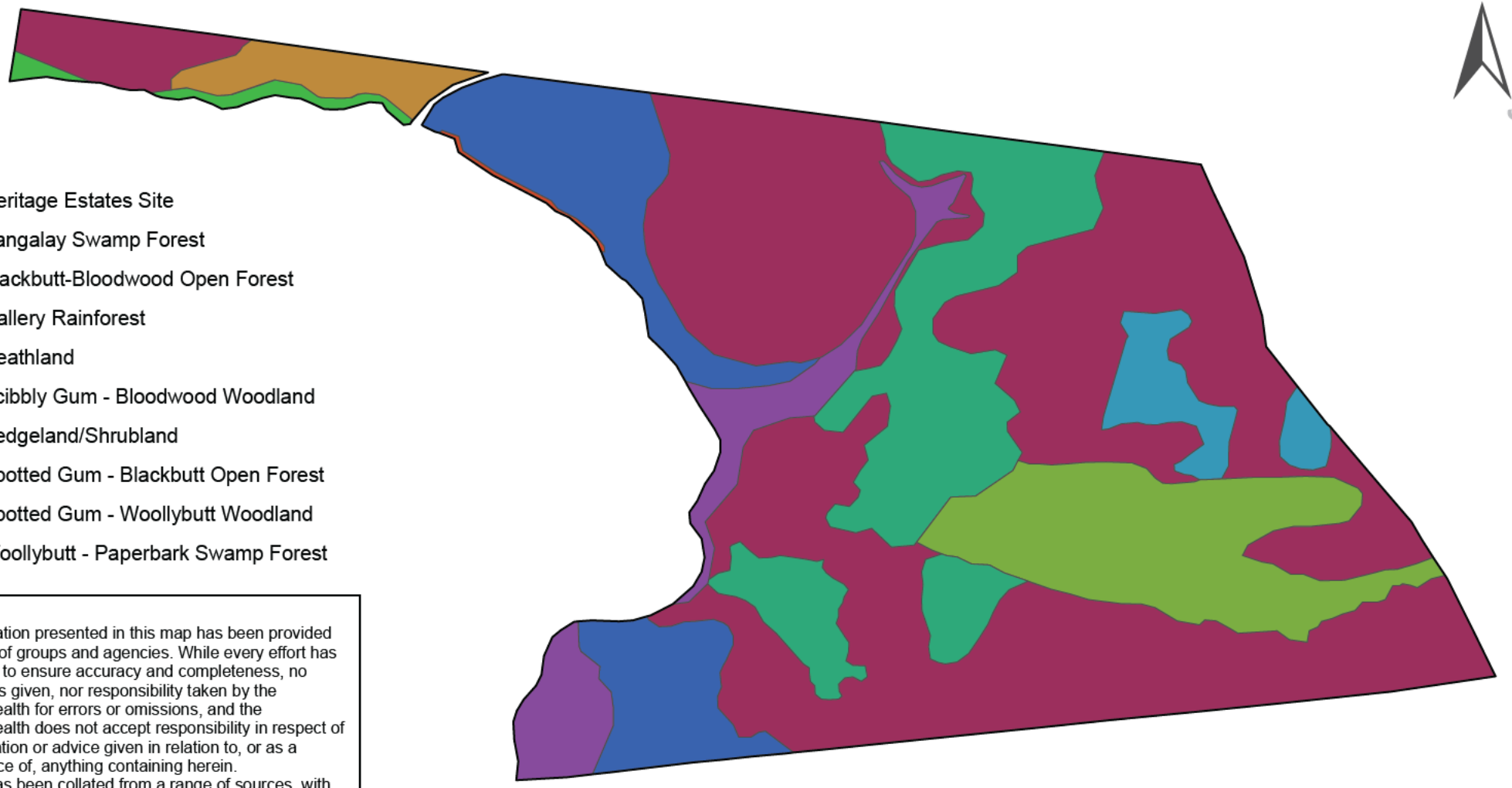
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Figure 1 - Proposed Heritage Estates subdivision and recommendations of the Commission of Inquiry (taken from the BES report (February 2007)



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Figure 2 - Vegetation description of Heritage Estates site



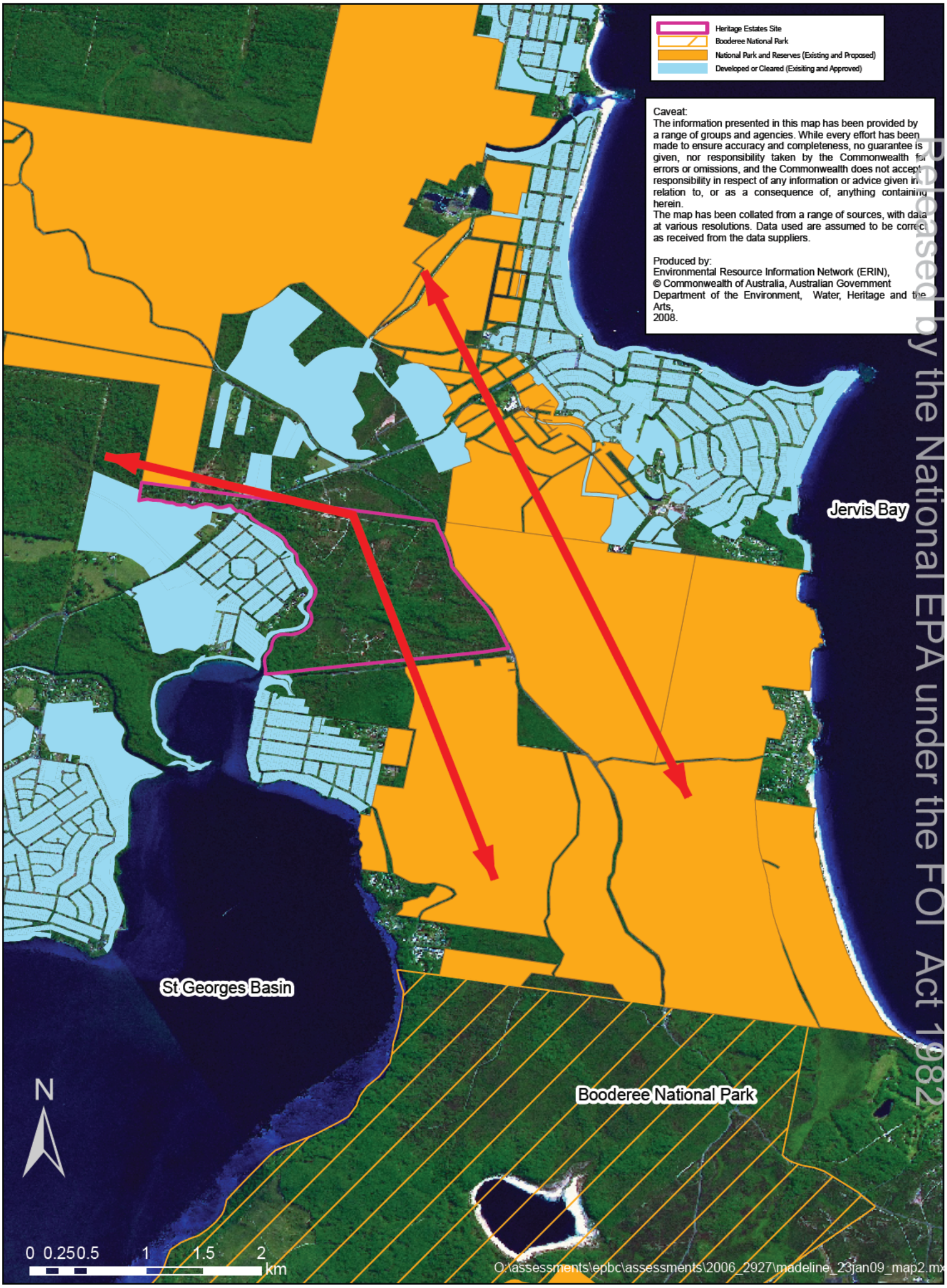
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Vegetation provided by BES - February 2007

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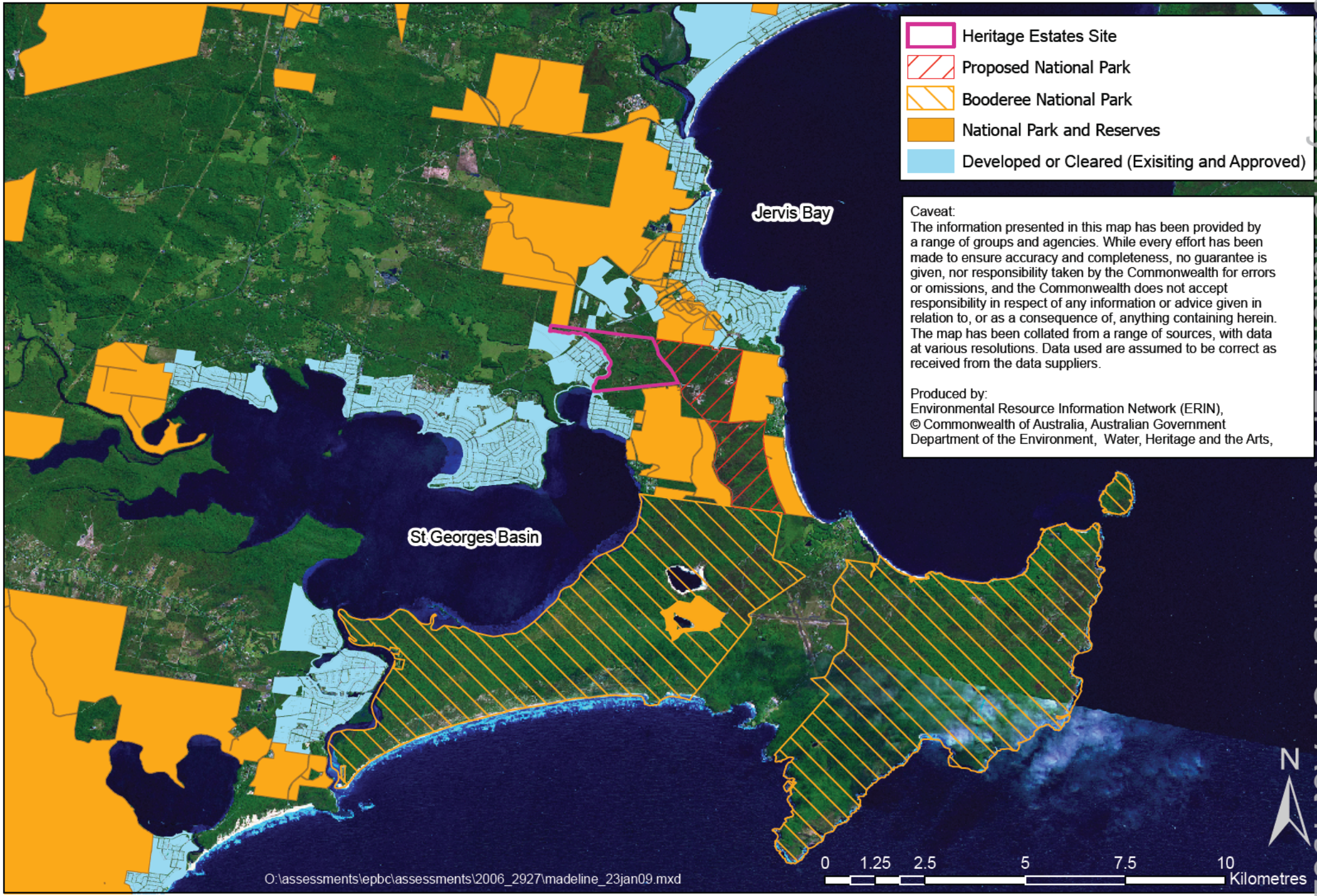
Figure 3 - Corridor Linkages at Bherwerre Isthmus



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Figure 4 - Regional Context of conservation and developed areas

LEX 83485, Document 27



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LEX 83485

Document 28

Figure 5 - Jervis Bay Territory listed on Commonwealth Heritage List



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- Towns and Places
- Roads
- Rivers
- Waterbodies
- Heritage Estates Site
- Commonwealth Heritage Listing
- State Borders

Australian Government
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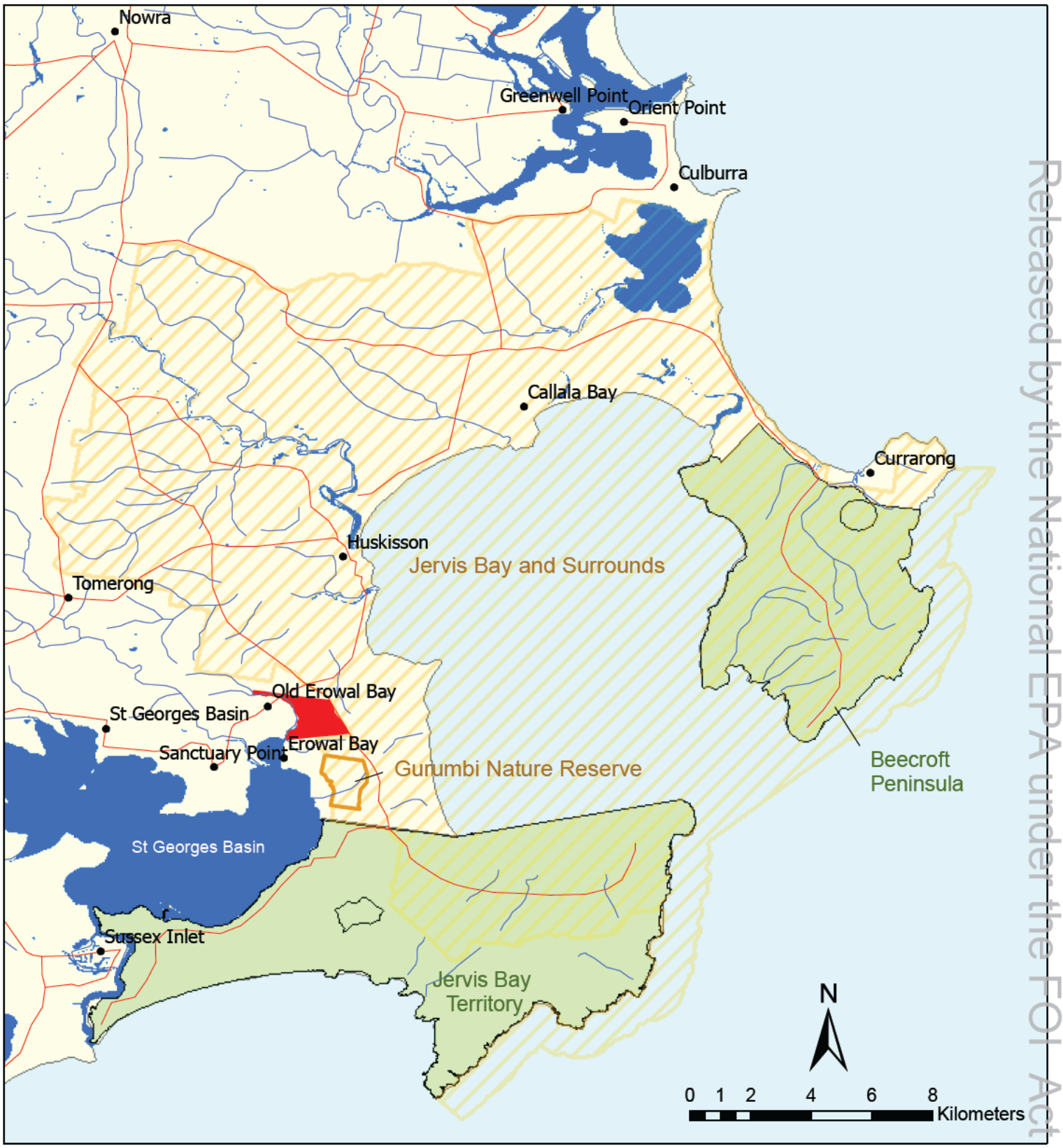
Source:
Towns:
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Roads:
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Rivers:
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Geographic Coordinate System, GDA94 Datum.

Figure 6 - Jervis Bay and Surrounds listed on Register of National Estate



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- Towns
- Roads
- Rivers
- Waterbodies
- Heritage Estates Site
- Register of the National Estate
- Commonwealth Heritage Listing
- State Borders

Australian Government
Department of the Environment, Water, Heritage and the Arts

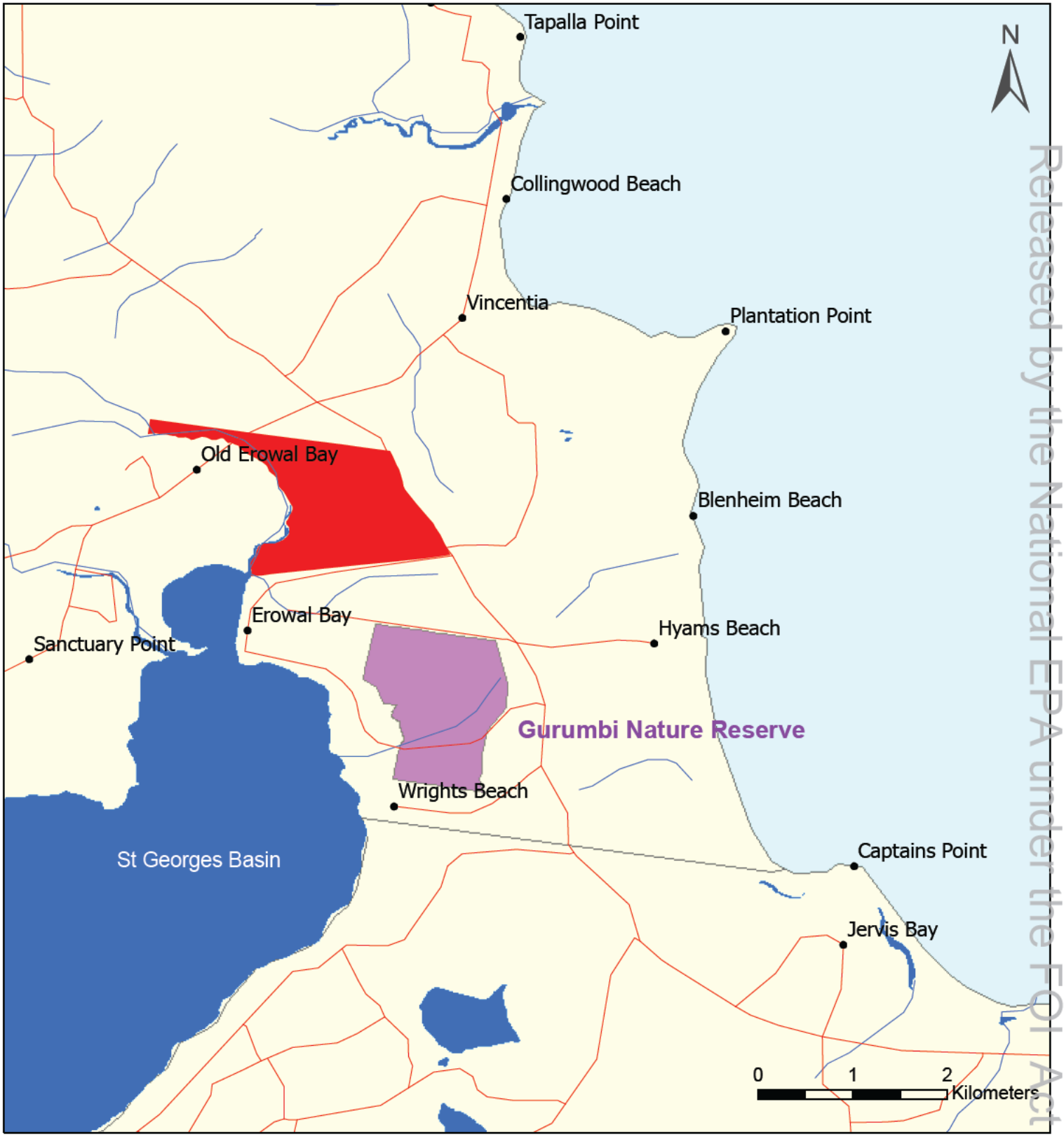
Source:
Localities:
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Register of National Estate:
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Geographic Coordinate System, GDA94 Datum.

Figure 7 - Gurumbi Nature Reserve listed on Register of National Estate



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- Towns and Places
- Roads
- Rivers
- Waterbodies
- Heritage Estates Site
- Register of the National Estate
- State Borders

Australian Government
Department of the Environment, Water, Heritage and the Arts

Source:
Towns:
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Register of National Estate:
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Geographic Coordinate System, GDA94 Datum.

DEPARTMENT OF THE ENVIRONMENT, WATER, HERITAGE AND THE ARTS

Minister for the Environment, Heritage and the Arts (Decision)

Brief No: B09/645
Division/Agency: AWD/DEWHA
Public Affairs Consulted: Yes
DEWHA File: 2007/03059

HERITAGE ESTATES REZONING AND PUBLIC INFRASTRUCTURE WORKS, FACILITATING DEVELOPMENT OF 730 LOTS, WORROWING HEIGHTS, NSW (2007/3448) – DECISION

Background:

On 19 March 2009, as recommended in the proposed decision brief at Attachment A, you wrote to the Shoalhaven City Council (the proponent) seeking comments on your proposed decision. The outcome of your consultation is summarised in the following table. The proponent's comments are at Attachment B.

Designated Proponent	Comment
Shoalhaven City Council	Disagrees on social and economic grounds.

Issues/ Sensitivities:

- The matters for consideration and factors to be taken into account for your decision remain as set out in the proposed decision brief (Attachment A).
- The proponent has provided comments on your proposed decision at Attachment B. However, those comments do not raise any substantial new information that you had not previously considered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Your proposed decision and the department's recommendation report were published on the Shoalhaven City Council's website on 23 February 2009.
- Media reports outlining your proposed decision were published on 24 February 2009.
- A number of landowners have called the department to comment on your proposed decision. Their submissions make the same social and economic arguments as those already provided during the two public comments periods under the EPBC Act. A summary of their comments are included at Attachment C. This also includes comments from people who support your proposed decision.
- The proponent has made the following comments on your proposed decision:
  - Stronger consideration should be given to the proposal on social and economic grounds;
  - The proposed decision will potentially have significant adverse impacts on landowners, many of whom are from disadvantaged socio-economic backgrounds. Public submissions to the Shoalhaven City Council about your proposed decision are attached to the proponent's letter of comment (Attachment B);
  - If you will not reconsider your proposed decision, the proponent urges that a joint government solution for long-term management of the land is pursued. Council suggests that acquisition of the land for conservation purposes would alleviate financial impacts on landowners and ensure preservation of biodiversity values at the site.
- The department recommends that you do not entertain the possibility that the Commonwealth might purchase the land as a result of your decision, as it is not government policy to acquire land purchased in the hope that it may be zoned for development. Although the environmental significance of the site has been established through the EPBC assessment process, this process does not determine whether or not land is suitable for Commonwealth acquisition.
- There is likely to be significant public interest in your decision. A media release and media handling note will be forwarded to your office shortly.

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Recommendations:

That you:

1. Note the proposed decision brief and recommendation report at Attachment A.	1. Noted / Please discuss
2. Consider the proponent's response to the invitation for comment on your proposed decision at Attachment B.	2. Considered / Please discuss
3. Note the summary of public comments received by the department on your proposed decision at Attachment C.	3. Noted / Please discuss
4. Refuse to approve the proposal for each controlling provision summarised in the table below.	4. Refuse the proposal / Please discuss
5. If you agree to 4, indicate that you accept the reasoning in this departmental briefing package as the reasons for your decision.	5. Accepted / Please discuss
6. Sign the notice of your decision at Attachment D.	6. Signed / Not signed
7. Sign the letter at Attachment E advising the proponent of your decision.	7. Signed / Not signed

Summary of recommendations on each controlling provision:

Controlling Provisions for the action	Recommendation	
	Approve	Refuse to Approve
Commonwealth land (ss 26 & 27A)		X
Listed threatened species and communities (ss 18, 18A)		X

Ms Vicki Middleton
Environment Assessment Branch
s. 22(1)(a)(ii)
/ 03 / 2009

Secondary Contact
s. 22(1)(a)(ii)

MINISTER
/ 03 / 2009

Consultation: Heritage Division, Parks Australia Division

Attachments:

A	Proposed decision brief, recommendation report and supporting documentation.
B	Proponent's comments on the proposed decision, including public submissions received by the proponent about your proposed decision.
C	Summary of public comments received by the department about your proposed decision.
D	Notice of decision.
E	Letter to the proponent advising of your decision.

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DEPARTMENT OF THE ENVIRONMENT, WATER, HERITAGE AND THE ARTS

Minister for the Environment, Heritage and the Arts (Decision)

Brief No: B09/268
Division/Agency: AWD/DEWHA
Public Affairs Consulted: Yes
DEWHA File: 2007/10740

HERITAGE ESTATES REZONING AND PUBLIC INFRASTRUCTURE WORKS, FACILITATING DEVELOPMENT OF 730 LOTS, WORROWING HEIGHTS, NSW (2007/3448) – PROPOSED DECISION

Timing: Your proposed decision is required by 9 February 2009, to allow 10 business days for the Shoalhaven City Council to comment on the proposed decision and recommendation report under section 131AA. The statutory timeframe for your final decision is 9 March 2009.

Purpose:

- To advise you of the department's recommendation report;
- To seek comments from the person proposing to take the action, under section 131AA of the EPBC Act, if you decide to accept the department's recommendation on refusal; and
- To seek your approval to release the recommendation report, proposed decision and other relevant documents for public comment under section 131A of the Act.

Background: Shoalhaven City Council referred the proposal to rezone and construct infrastructure on the Heritage Estates site to facilitate the development of a maximum of 730 lots. The site is located on the Bherwerre isthmus, which forms a habitat corridor for species and ecosystems of Booderee National Park (Commonwealth Land) on the Bherwerre Peninsular to the south. The Heritage Estates also provides habitat for listed threatened species, including the endangered Eastern Bristlebird and vulnerable Leafless Tongue-orchid, among others. Attachment A contains background information about the assessment of the proposal.

The proposal is locally contentious. During the referral stage, the department received 25 submissions opposing the proposal, and 7 supporting it. During the assessment phase, the Shoalhaven City Council received 124 submissions opposing the proposal, and 265 supporting it. Attachment B provides copies of the public comments, and a summary of comments from scientists and government agencies during both public comment periods.

Issues/ Sensitivities:

- The Heritage Estates consists of 1232 lots of land, which were sold to approximately 1100 individuals in the late 1980s and early 1990s. However, the land is zoned rural and cannot be developed for urban housing. The current proposal to facilitate development of 730 lots generally aligns with the outcomes of a NSW Commission of Inquiry (1999), which recommended that a maximum of 730 lots may be developed, contingent on further studies.
- The Director of Parks Australia advises that the proposed development has the potential to "impact on the viability of this protected areas estate, particularly Booderee National Park" and add to local extinctions of species within the Park. That advice is reflected in the department's recommendation report at Attachment C. The NSW Department of Environment and Climate Change has made similar comments.
- Development of the Heritage Estates would result in direct impacts on key populations of the Eastern Bristlebird and Leafless Tongue-orchid at the site. In addition, it would have long-term impacts on remaining populations of those species within the Booderee National Park and Bherwerre Peninsula, which rely on adequate habitat connectivity to maintain gene flow and population viability. The development would also have indirect impacts on other listed species through increased predation, fire frequency, and weed encroachment.

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- Shoalhaven City Council consultants have advised that the impacts of the proposal on Commonwealth land and listed threatened species cannot be mitigated or offset.
- If you decide to accept the department's recommendation to refuse the proposal, you are required to seek comment from the Shoalhaven City Council on your proposed decision under section 131AA of the EPBC Act, for 10 business days.
- As the proposal has attracted local and regional interest you may also wish to release your proposed decision, the department's recommendation report and the department's consultants' reports, for public comment over the same period. This option is available to you, but is not mandatory, under Section 131A of the EPBC Act. The recommendation report would be uploaded on the department's website and an email address created for public comments.
- There are pros and cons with making your proposed decision public:
  - Pros – the department considers that going out to the public provides transparency and allows all stakeholders another opportunity to comment. As the Shoalhaven City Council is likely to make your proposed decision available to the Shoalhaven Landowners Association, it would be courteous to provide other stakeholders, such as local residents of the area, with the information at the same time. This would provide a balanced presentation of your proposed decision, removing any cause for complaint regarding the process or access to relevant information. The public has also not had access to the department's consultants' reports at Attachment D.
  - Cons – there have already been extensive periods of public consultation and any further comments are unlikely to provide substantial new information. Many of the 1100 landowners would be expected to make comment on the proposed decision, which would create a significant administrative workload.
- The Shoalhaven Landowners Association actively promotes the interests of Heritage Estates landowners. It would be expected to lobby through various MPs, as well as garner media interest about the proposed decision.
- Although the Attorney-General's Department is responsible for the management of Territory land, that Department does not need to be informed of your proposed decision because it is not required to make an administrative decision with respect to urban development outside Territory land.
- A media release and media handling note are currently being prepared by the department.

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Recommendations:

1. Consider the department's recommendation report at Attachment C.	1. Noted/ Please discuss
2. Consider the PER and consultants' reports (Attachment D), and public comments (Attachment B).	2. Noted/ Please discuss
3. Agree to the proposed decision at Attachment E.	3. Agreed/ Not agreed
4. Agree to release the proposed decision (Attachment E) and recommendation report (Attachment C), plus the PER and independent consultants' reports (Attachment D) for 10 days public comment.	4. Agreed/ Not agreed
5. Sign the letter at Attachment F seeking the Shoalhaven City Council's comments on the recommendation report.	5. Signed/ Not signed

Summary of recommendations on each controlling provision:

Controlling Provisions for the action	Recommendation	
	Approve	Refuse to Approve
Listed threatened species and communities (ss 18, 18A)		X
Commonwealth land (ss 26, 27A)		X

Public submissions on assessment documents

Number 421 For 272 Against 149 Not specified 0

Ms Vicki Middleton
Environment Assessment Branch
s. 22(1)(a)(ii)
/ 02 / 2009

Secondary Contact
s. 22(1)(a)(ii)

MINISTER
/ 02 / 2009

Consultation: Heritage Division / Parks Australia Division

Attachments:

A Background information
B Public comments
C Recommendation report
D PER and independent consultants' reports
E Proposed decision
F Letter seeking comment from the Shoalhaven City Council on the recommendation report

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Attachment A

Background information on assessment process

- On 9 May 2007 the Shoalhaven City Council referred a proposal to rezone and undertake public infrastructure works at the Heritage Estates, to facilitate residential development of the 179.6 ha site at Worrowing Heights, NSW. The proposal includes the implementation of bushfire protection and hazard reduction measures. The Heritage Estates site, located south of The Wool Road near Vincentia, has an average width of between 1.2km and 1.75 kilometres. The referred proposal was made available for public comment and 32 submissions were received.

- The referral (EPBC 2007/3448) included a report entitled 'Threatened Biodiversity Survey and Assessment Rezoning Investigations' by Bushfire and Environmental Services (BES 2007). That report concluded that the site had high conservation values owing to its function as a wildlife corridor, high species richness and diversity, and high number of listed threatened species that were found, and that it should not be rezoned for residential development.

- The department sought independent advice from scientific experts (see paragraphs 12 - 14 of the recommendation report at Attachment C) at the referral stage to determine whether the proposal could be considered to be clearly unacceptable under section 74B of the Act, on the basis of the impacts identified by the BES report (2007).

- On 22 June 2007, a delegate for the Minister, Ms Vicki Middleton, decided that the proposal was a controlled action, and that it would be assessed by a public environment report (PER). On 10 June 2008 the Shoalhaven City Council publicly displayed this documentation for 30 business days until 21 July 2008. Owing to incorrect dates in the notice requesting public comments, a second notice was published from 26 July 2008 to 12 September 2008. During this time 389 public submissions were received.

- On 19 January 2009, the department received independent advice on the environmental impacts of the proposal from UNSW Global Pty Ltd and independent advice on the social and economic impacts of the proposal from Gillespie Economics Pty Ltd (Attachment D). On January the Shoalhaven City Council provided a summary of the public submissions in the finalised PER (Attachment D) to the department. The PER has been available to the public since 5 January 2009 for a 40 business day period.

- The receipt of the final PER triggered the department's statutory timeframe to prepare the recommendation report as required under section 95C of the EPBC Act.

- On 3 February 2009 a delegate for the Secretary, Ms Vicki Middleton, accepted the recommendation report (Attachment C).

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Shoalhaven City Council

City Administrative Centre
Bridge Road, Nowra NSW Australia 2541
Phone: (02) 4429 3111 • Fax: (02) 4422 1816 • DX 5323 Nowra
Address all correspondence to
The General Manager, PO Box 42, Nowra NSW Australia 2541

COUNCIL REFERENCE: 1446-09 (D09/27937)
CONTACT PERSON: s. 22(1)(a)(ii)
YOUR REF: B09/628

3 March 2009

The Hon Peter Garrett MP
Minister for the Environment, Heritage & the Arts
Parliament House
CANBERRA ACT 2600

Dear Minister

Recommendation Report and Proposed Decision
Heritage Estates Rezoning and Associated Public Works
(EPBC 2007/3448)

I refer to your letter provided to Council on 23 February 2009, regarding the Heritage Estates (EPBC 2007/3448)

This matter was reported to Council on 24 February and a copy of the report is attached for your information. Council resolved to:

a) *Make a submission requesting that stronger consideration be given to the proposal on social and economic grounds and urging a joint Government solution in the event that the Minister remains unwilling to approve the rezoning proposal.*

b) *The Mayor urgently seek a deputation with the Minister for the Environment, Heritage and the Arts, Hon. Peter Garrett MP.*

I am writing in respect of part a). In relation to part b) Mayor Paul Green will be seeking an urgent meeting with you.

As you would be aware, the Heritage Estates land under consideration for residential development is owned by approximately 700 individual landowners. Many of these landowners are from relatively disadvantaged socio-economic backgrounds. As detailed in the PER, a decision to not approve the Heritage Estates proposal will potentially have significant adverse impacts on these people.

Council specifically engaged Judith Stubbs & Associates (JSA) to examine the potential social and financial impacts on the landowners if the matter does not proceed. It is highly likely that if this proposal is refused that the affected landowners will be socially and economically disadvantaged. Thus, I urge you to review the information from the JSA study which is in the PER and request that stronger consideration be given to the proposal on social and economic grounds

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The Recommendation Report prepared by DEWHA concludes that the proposal would have unacceptable impacts on the biodiversity of Booderee National Park, yet the report makes no mention of what should happen to the land in the event that it is refused

If the proposal is not ultimately approved, Council strongly believes joint Government acquisition would be an appropriate solution to allow the land to be managed for conservation purposes whilst alleviating the financial impacts on the landowners. If the Commonwealth does not take immediate proactive action to resolve the land ownership matter, I believe the continued preservation of the biodiversity values could be jeopardised.

Council has received a number of submissions on this matter since your 'draft' decision became public. Copies of these submissions are also attached and I request that they be reviewed prior to your final decision.

Please do not hesitate to contact Mayor Green or myself if you would like to discuss this pressing matter.

Yours faithfully

s. 22(1)(a)(ii)

Acting General Manager

cc: s. 22(1)(a)(ii)
Department of Environment, Water, Heritage and the Arts

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ADDENDUM REPORT OF GENERAL MANAGER

ORDINARY MEETING

TUESDAY, 24 FEBRUARY 2009

STRATEGIC PLANNING AND INFRASTRUCTURE

1. Heritage Estates - Draft Environment Protection & Biodiversity Conservation Act Decision - EPBC 2007/3448 **File 1446-09**

This report is submitted as an addendum to the meeting given that the advice was received after the close of the business paper and the need to provide an urgent response.

Purpose of Report:
The purpose of this report is to inform Council of the proposed refusal by the Hon. Peter Garrett AM MP, Federal Environment Minister proposed refusal of the Heritage Estates rezoning proposal under the *Environment Protection and Biodiversity Conservation Act, 1999* (*EPBC Act*) (EPBC ref: 2007/3448). Under the Act, Council has the opportunity to provide comments on the proposed decision in 10 working days (from 23 February 2009) and the Minister will make his final decision by 9 March 2009

RECOMMENDED that Council make a submission requesting that stronger consideration be given to the proposal on social and economic grounds and urging a joint Government solution in the event that the Minister remains unwilling to approve the rezoning proposal.

Options:

Staff are not aware of any additional technical or scientific information that has not already been submitted, which may convince the Minister to reconsider his proposed decision.

However, Council may wish to prepare a submission again requesting stronger consideration of the proposal on social and economic grounds and urging a joint Government solution in the event that the Minister remains unwilling to approve the proposal

A decision of refusal by the Minister will effectively stop any further progress to rezone part of the estate for residential purposes

Details/Issue:

The letter advising of the Minister's proposed decision (Attachment "A") was received by Council on 23 February 2009 Council also received a copy of the Recommendation Report (copy provided in the Councillors Information Folder) prepared by the Department of the Environment, Water, Heritage and the Arts (DEWHA) and supporting documents

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The decision to refuse is based on the following factors (relevant controlling provisions):

Commonwealth Listed species and communities (Section 18 & 18A of Act) – essentially the impact on Commonwealth listed species found in and around the subject land.

Commonwealth Land (Sections 26 & 27A of Act) – essentially the impact on Booderee National Park and the habitat linkages to the Park

Page 3 of the DEWHA Recommendation Report lists the range of information sources considered by the Minister in making the decision. It should be noted that the Public Environment Report (PER) prepared by Council as the proponent, was only one of 15 information sources/factors utilised

The 21 page Recommendation Report concludes that the proposal should be refused on the following grounds:

115. *The magnitude of the impacts on the endangered Eastern Bristlebird and vulnerable Leafless Tongue-orchid are such that direct impacts will result in the immediate loss of key populations from the Heritage Estate site, with long-term ramifications for surrounding populations in the Booderee National Park and Bherwerre Peninsula. Indirect impacts are expected on the Biconvex Paperbark and Giant Burrowing Frog. The proposal may also impact on the potentially occurring Jervis Bay Leek Orchid, however the likely impacts cannot be quantified without further surveying. The Shoalhaven City Council acknowledges in the PER that there are no mitigation measures that could adequately reduce impacts on affected species. Approval of the proposal would not contribute to the fulfilment of Australia's obligations under articles 8(d) and 8(e) [of] the Biodiversity Convention, and refusal to approve the proposal would be more consistent with those obligations Based in the impacts for the Eastern Bristlebird and Leafless Tongue-orchid, the department concludes that the action is unacceptable for the controlling provision 'listed threatened species and ecological communities.'*

116. *The proposal will result in the increased fragmentation of habitat corridor values to the Bherwerre Peninsula. It would directly affect the fauna and flora values of the Commonwealth listed Booderee National Park, potentially adding to local extinctions of listed species, and impacting on its natural and heritage values. Based on the impacts described for Booderee National Park, the department concludes that the action is unacceptable for the controlling provision 'Commonwealth land.'*

Economic, Social & Environmental (ESD) Considerations:

The PER did include detail on the possible social and related economic impacts on the owners of land within the investigation areas should the proposal not proceed

This issue attracted a great deal of public comment during exhibition of the Draft PER. Additional information on the broader range of social and economic considerations, both positive and negative, was provided in the Final PER to address the various issues raised. (See section 3A of the PER)

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DEWHA also commissioned Gillespie Economics to review social and economic issues and in relation to these issues, DEWHA's recommendation report concludes:

> 110. *The PER primarily recommends approval of the proposal on social grounds relating to the economic impacts on landowners. The costs to other parties, such as other ratepayers and the environmental externalities have not been explored in any depth. On the basis of the information provided, the Shoalhaven City Council has not demonstrated that the social costs to the landowners outweigh the economic, social and environmental costs of the proposal proceeding*

In respect of ESD considerations relevant to the *EPBC Act*, DEWHA has recommended refusal of the proposal. See Page 20 of the Recommendation Report for further detail in this regard

The PER states that the 'status quo' is clearly unacceptable to all stakeholders, including Council, the landowners, and the broader community and refers to either joint Government acquisition should the proposal not be approved However, DEWHA has not made any recommendations in respect of acquisition or management of the land should the proposal not be approved.

Other Relevant Information

DEWHA has indicated that at this stage the Shoalhaven Landowners Association (SLA) has not been advised of the Ministers proposed decision. Council has been advised as the proponents in accordance with the legislation and been given the opportunity to comment.

It is understood however, that members of the SLA met with the Minster recently at a Community Cabinet Meeting in McArthur and were able to present their case. The Minister also visited the site during the weekending Friday 20 February 2009.

Financial Considerations:

A number of financial issues would need to be resolved should the land ultimately be rezoned and developed. These issues are discussed in section 3A of the PER.

Similarly if the estate remains undeveloped issues such as payment of rates, compensation etc will be raised.

Conclusions:

Council now have 10 working days from 23 February 2009 to comment on the Minister's proposed decision, the Recommendation Report and/or accompanying information.

As previously noted, the PER included a substantial amount of information on the potential impacts on the landowners should the proposal not proceed.

In discussions with DEWHA staff it was indicated that Council would need to present substantially new information as the basis for any request for reconsideration of the proposed decision. Council does not hold any additional environmental information that is likely to convince the Minister to reconsider the matter

The reasons for the proposed refusal included potential impacts on biodiversity of Booderee National Park Despite the apparent importance of the Heritage Estates land

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to Booderee National Park, neither the Minister's proposed decision nor the Recommendation Report provides any recommendation for future ownership and management of the land. Should the matter be refused this issue will need to be pursued as a matter of urgency with both State and Federal Governments, as allowing the land to remain in private ownership and unmanaged is likely to result in degradation of the area and will not be an acceptable outcome for landowners.

s. 22(1)(a)(ii)

DIRECTOR, STRATEGIC PLANNING & INFRASTRUCTURE

s. 22(1)(a)(ii)

GENERAL MANAGER

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D09/30540

The Honorable Minister for the Environment
Mr Peter Garratt

1 March 2009

s. 22(1)(a)(ii)

s. 22(1)(a)(ii) and purchased the land with dreams of one day building our retirement home there.

We have continued paying Council rates and in recent times have been paying an additional Heritage Rezoning Rate to council. Prior to purchase, our inquiries with the Shoalhaven Council's planning department indicated that the land would one day be re-zoned.

The many years of Environmental impact studies, meetings and false promises, have been disappointing to say the least. Over the years we have seen schools, a swimming complex, a bicycle path and recently a new sub-division come into the area. We are now hearing that a shopping complex may also be built near by.

We often wonder if any of these developments have been put through the same scrutiny as our little piece of land. I find it difficult to think that our land, as beautiful as it is, has any more importance than some of the land already developed in the same area.

If there is something special about our block that needs to be preserved and included as National Park for future generations to enjoy, then I would be more than willing to swap it for a block in the new estate or be compensated for the many years of financial and emotional loss.

Ironically we have holidayed in the area for the past 20 years; we now have s. 22(1)(a)(ii) s. 22(1)(a)(ii) and have had to pay for our holidays as well as paying rates on a block of land that we have not been able to even pitch a tent on. How is this fair?

We acknowledge that you have to make a decision in the best interest of all concerned, which will be difficult.

We look forward to hearing some favourable information as this long saga comes to a close.

Yours Sincerely

s. 22(1)(a)(ii)

s. 22(1)(a)(ii)

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s. 22(1)(a)(ii)

D09/30686

From: s. 22(1)(a)(ii) @bigpond com]
Sent: Tuesday, 3 March 2009 9:13 am
To: Planning Services
Subject: Decision on re-zoning and SLA

Att: s. 22(1)(a)(ii)
Shoalhaven Council - Planning Department

CC : s. 22(1)(a)(ii)

Advice has been received that there is still time to submit further comment on this matter

Feedback from members has raised questions about whether there has been an attempt to justify tne rejection of the request made by both Council and SLA members for the rezoning of properties

I have been advised that comments include the following:

One of our owners has advised me that when she referred to the decision to approve the Stocklands' development and the different attitude that has been taken with regard to the proposal for the "Heritage Estates" the response included the comment that the angle of the road bounding the Stocklands area was the cut-off point for estimation of proximity to the Booderee National Park. If this was in fact the basis of such a momentous decision it clearly indicates an attempt to justify the exclusion of our proposed development based on a pay-off deal. I might just as easily ask whether or not a line has been drawn at the angle of Macgibbon Parade, Old Erowal Bay and the Wool Road or the angle of the road leading down to Hyams Beach from the Jervis Bay Road etc. etc.

I was also advised that another owner had been told: "The decision was not going to be made known until 9th March but the media got hold of it and Mr Garrett was forced to announce his decision early." This is not the first time that our association has been confronted with this sort of behaviour. We are not donkeys! Who is telling what to whom? We do not feel it is appropriate for people who are not "Heritage Estate" property owners - people who have benefitted from our rate contributions for more than 20 years - to be given a hearing and presumably a tour around on our private property in connection with such a decision.

I trust s. 22(1)(a)(ii) will provide me with advice on whether or not a proposed urgent meeting will take place between Council and Mr Garrett prior to his OFFICIAL decision being made on the DUE DATE . I thank you in anticipation.

s. 22(1)(a)(ii)
President- SLA

3/03/2009

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s. 22(1)(a)(ii)

From: s. 22(1)(a)(ii) @bigpond com]
Sent: Tuesday, 3 March 2009 8:23 am
To: Planning Services
Subject: EPBC 2007/3448 Heritage Estates Rezoning and Associated Public Works

I applaud the Minister for Environment, Heritage and the Arts, the Hon. Peter Garrett in his standing to oppose the Shoalhaven City Council on the proposed Hertiage Estates rezoning and its associated public works. It is indeed refreshing to see that common sense has prevailed. The long term preservation of Jervis Bay, the Basin and surrounds are of vital importance in the pursuit to maintain no less than the delicate balance between human habitat and the local flora and fauna that currently exists This should never be allowed to give way to those with commercial interests.

s. 22(1)(a)(ii)

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s. 22(1)(a)(ii)

D09/30690

From: s. 22(1)(a)(ii) @shoalhaven net au]
Sent: Monday, 2 March 2009 10:18 pm
To: Planning Services
Subject: Heritage Estates

I fully support the preservation of the piece of bush known as Heritage Estates for the benefit of the creatures that live there, the people who appreciate and enjoy the environment and the scenery.
There are known to be endangered plants there and it forms a corridor for the movement of animals.

s. 22(1)(a)(ii)

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D09/30706

s. 22(1)(a)(ii)

From: s. 22(1)(a)(ii) @bigpond com]
Sent: Monday, 2 March 2009 6:53 PM
To: Council's Generic Mailbox
Subject: rezoning Worrowing Heights

Shoalhaven City Council
s. 22(1)(a)(ii)
council@shoalhaven.nsw.gov.au

Dear s. 22(1)(a)(ii),

Re Lot 161 DP 8770 Umina Grove and Lot 185 DP 870 Ooranye Gdn Worrowing Heights

s. 22(1)(a)(ii)
years ago; at the time the selling agent advised that this land would be zone residential within 1-2 yrs s. 22(1)(a)(ii)

s. 22(1)(a)(ii) I have spent a lot of time and money in the doing the right thing by keeping my land cleared and fenced to prevent vandalism, littering and fire bugs. And for the past 20 years we have paid land rates to the council.

It would be fair to say that 20yrs is long enough. Every land owner in Werrowing Heights estate deserves a fair and righteous decision

Recently I have been in touch with local government and Peter Garrett's office who has inturn advised me to write to Shoalhaven Council.

s. 22(1)(a)(ii)

I am asking you to make representation on my behalf to Peter Garrett and urge him to take into account my civil and human rights prior to his decision.

I am looking forward to a speedy and positive outcome.

Thanking you in advance.

s. 22(1)(a)(ii)

03/03/2009

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s. 22(1)(a)(ii)

009/29693

From: s. 22(1)(a)(ii) @bigpond.com]
Sent: Monday, 2 March 2009 10:01 pm
To: Planning Services
Subject: Heritage Estates Decision

Re: EPBC 2007/3448 Heritage Estates Rezoning and Associated Public Works.

Thank you ... someone is at last putting first things first ... to consider the environment. The listed threatened species and communities (Section 18 & 18A) and the Commonwealth land (Section 27 and 27A).

It's possible that at last something positive can be done about this wonderful property which will give protection for the wildlife and bushland as well as the lake of St Georges Basin.

Thank you Peter Garrett. Please continue to do the right thing. You have our hearfelt support.

s. 22(1)(a)(ii)

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s. 22(1)(a)(ii)

D09/29687

From: s. 22(1)(a)(ii)@bigpond com]
Sent: Monday, 2 March 2009 11:28 pm
To: Planning Services
Subject: WORROWING HEIGHTS RE-ZONING

DEAR MR GARRETT, 2/3/09

I AM THE OWNER OF s. 22(1)(a)(ii) AND I WISH TO MAKE AN OBJECTION ON THE VIEW OF THE STATE GOVERNMENT WHO ARE NOT LISTENING TO THE OWNERS OF OVER A THOUSAND PEOPLE WHO HAVE PAID RATES FOR OVER TWENTY YEARS AS I HAVE BOUGHT THIS PROPERTY HAS HAVE OTHER PEOPLE TO EVENTUALLY USE THIS LAND AS A FUTURE RETIREMENT PLACE TO LIVE
WE HAVE SEEN THAT IT IS OK TO CLEAN & CUT BUSHES IN THIS AREA TO BUILD A SHOPPING CENTRE & SCHOOLS.IF YOU DON'T ALLOW THE RE-ZONING TO HAPPEN WHO IS GOING TO GO TO USE THE SHOPS & GO TO THIS SCHOOL IF YOU DON'T ALLOW US TO BUILD OUR FUTURE HOMES WITHIN THIS AREA

YOURS TRULY
s. 22(1)(a)(ii)

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s. 22(1)(a)(ii) D09/28912

From: s. 22(1)(a)(ii)@bigpond.com au]
Sent: Monday, 2 March 2009 11:03 am
To: Planning Services
Subject: REZONE of Worrowing Heights Estates

s. 22(1)(a)(ii)

Email: s. 22(1)(a)(ii)@bigpond.com

Date: 2nd March, 2009.

Attention: Mr Peter Garret AM MP
Minister for Environment, Heritage and the Arts
C/O planning@shoalhaven.nsw.gov.au

RE: THE IMPENDING REZONE DECISION OF THE WORROWING HEIGHTS ESTATES

Hello Peter,

My name is s. 22(1)(a)(ii) and I am a landowner in the estate. I have been paying land rates for 20 years. Collectively We have contributed millions of dollars to the Shoalhaven community. This is money that has benefited the community and in return we have received nothing.

I would like to stress the importance of considering the social and economic outcome of a rezone of the estate. The people who own the land were planning for their future. Planning to move into the area and bring their families and businesses and contribute in a positive way to the community.
We have been patient for over 20 years.

Please note that Stocklands have just established an estate adjacent to the Worrowing Heights Estate. There was no opposition to that development. Nobody chained themselves to a tractor or a tree.

The development of a shopping center is scheduled to begin this year. To encourage and sustain quality retail outlets Stocklands needs people.

Please let March 9, the day when a decision regarding a rezone is handed down to the landowners of Worrowing Heights, be a day of celebration. Not a day of mourning.

Thankyou.

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s. 22(1)(a)(ii)

D09/29003

From: s. 22(1)(a)(ii) @bigpond com au]
Sent: Monday, 2 March 2009 12:20 pm
To: Planning Services
Subject: REZONE of Worrowing Heights Estates

s. 22(1)(a)(ii)

Date: 2nd March, 2009.

Attention: Mr Peter Garrett AM MP
Minister for Environment, Heritage and the Arts
C/O planning@shoalhaven.nsw.gov.au

RE: THE IMPENDING REZONE DECISION OF THE WORROWING HEIGHTS ESTATES

Hello Peter,

My name is s. 22(1)(a)(ii) are landowners in the above estate. s. 22(1)(a)(ii) s. 22(1)(a)(ii)

s. 22(1)(a)(ii) have been paying land rates for 20 years. For twenty years they have been waiting for a rezone of their land so that they could fulfill their dream of living in the Shoalhaven area. They made sacrifices and worked hard at a young age to afford this land, planning for their future as we all hope our children will. They have battled for 20 years and have received nothing in return.

As you deliberate on the decision of weather or not to rezone the land, I ask you to please consider all the owners of land in the Worrowing Heights Estates who, like s. 22(1)(a)(ii) have battled for the past 20 years to hold on to a dream. Like them, people who are eager to join a community and add to the social and economic wealth of the Shoalhaven area.

It is unfortunate that those with money, like Stocklands, are able to move into the Shoalhaven area - with no opposition - and go ahead and build their housing estates and their shopping centers just down the road from the Worrowing Heights Estates while the ordinary people without great wealth are denied their right to build a home on land they have paid for. Without doubt, the passionate people of the Worrowing Heights Estates should be considered as an important asset for the area.

Please do what is right and rezone the Worrowing Heights Estates - these are the people who support you.

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D09/30808

ATT: s. 22(1)(a)(ii)
SHOALHAVEN COUNCIL
PLANNING DEPT.

FAX: 44 221 816

MESSAGE FM. s. 22(1)(a)(ii)

PH/FAX - s. 22(1)(a)(ii)

s. 22(1)(a)(ii)

PLEASE INCLUDE WITH YOUR MATERIAL FOR PETER GARRETT THE ACCOMPANYING EMAILS - THANKS

s. 22(1)(a)(ii)

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s. 22(1)(a)(ii)

From: s. 22(1)(a)(ii) @bigpond.com>
To: s. 22(1)(a)(ii) @bigpond.com>
Sent: Friday, 27 February 2009 10:09 AM
Subject: Fw: Shoalhaven Landowners Association

----- Original Message -----
From: s. 22(1)(a)(ii)
To: peter.garrett.mp@aph.gov.au
Sent: Friday, February 27, 2009 10:05 AM
Subject: Shoalhaven Landowners Association

s. 22(1)(a)(ii)

Hello my name is s. 22(1)(a)(ii) in the Heritage Estates
It has been a dream of ours to be able to build a home on my block of land for over 20 years s. 22(1)(a)(ii)
s. 22(1)(a)(ii) believe that my family
and I would be of great value to the Shoalhaven community. After 20 years of loyalty in paying rates even when times were tuff and fighting for this dream to come true were we are now so close to an answer I am afraid its not going to go our way I erg you to consider my situation and hundreds of others like me to please make a decision in our favour we will be most grateful and it will be remembered and honoured for generations to come I thank you for your time in reading this letter s. 22(1)(a)(ii)
s. 22(1)(a)(ii)

s. 22(1)(a)(ii)

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s. 22(1)(a)(ii)

From: 's. 22(1)(a)(ii) @bigpond.com>
To: s. 22(1)(a)(ii) @bigpond.com.au>
Sent: Friday, 27 February 2009 1:46 PM
Subject: Worrowing Heights

s. 22(1)(a)(ii)

Rang Peter Garret's office today at 1.40pm, spoke to receptionist s. 22(1)(a)(ii) advised me that my letter is still in this system and is in the process of being responded to. Left my details to have someone call me back about the matter as I have concerns that if the wrong decision is made what economic impact it may have. s. 22(1)(a)(ii) told me that there will be a task force to address the Heritage Estates matter due to the influx of mail and phone calls and if I minded that my details be given to them so that they can contact me about what stage we are up to.

s. 22(1)(a)(ii)

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s. 22(1)(a)(ii)

From: s. 22(1)(a)(ii) @bigpond com au>
To: s. 22(1)(a)(ii) @bigpond.com>
Sent: Monday, 2 March 2009 12:15 PM
Subject: s. 22(1)(a)(ii) REZONE of Worrowing Heights Estates

s. 22(1)(a)(ii)

Date: 2nd March, 2009.

Attention: Mr Peter Garrett AM MP
Minister for Environment, Heritage and the Arts
C/O planning@shoalhaven.nsw.gov.au

RE: THE IMPENDING REZONE DECISION OF THE WORROWING HEIGHTS ESTATES

Hello Peter,

My name is s. 22(1)(a)(ii) are landowners in the above estate. s. 22(1)(a)(ii) s. 22(1)(a)(ii)

s. 22(1)(a)(ii) have been paying land rates for 20 years. For twenty years they have been waiting for a rezone of their land so that they could fulfill their dream of living in the Shoalhaven area. They made sacrifices and worked hard at a young age to afford this land, planning for their future as we all hope our children will. They have battled for 20 years and have received nothing in return.

As you deliberate on the decision of weather or not to rezone the land, I ask you to please consider all the owners of land in the Worrowing Heights Estates who, like s. 22(1)(a)(ii) have battled for the past 20 years to hold on to a dream. Like them, people who are eager to join a community and add to the social and economic wealth of the Shoalhaven area.

It is unfortunate that those with money, like Stocklands, are able to move into the Shoalhaven area - with no opposition - and go ahead and build their housing estates and their shopping centers just down the road from the Worrowing Heights Estates while the ordinary people without great wealth are denied their right to build a home on land they have paid for. Without doubt,
the passionate people of the Worrowing Heights Estates should be considered as an important asset for the area.

Please do what is right and rezone the Worrowing Heights Estates - these are the people who support you.

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