West Culburra Mixed Use Concept Plan
Major Project 09-0088
Environmental Assessment

John Toon Pty Limited
March 2013

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Major Project 09_0088
West Culburra Mixed Use Concept Plan

DECLARATION

I, John Toon, Managing Director of John Toon Pty Ltd., hereby certify that the information contained in this Environmental Assessment for the West Culburra Mixed Use Concept Plan has been prepared with due professional care and is neither false nor misleading.

.....John Toon..... 26 Nov 2012.

John Toon.

West Culburra Mixed Use Concept Plan
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A project prepared under Part 3A of the Environmental Planning and Assessment Act 1979. The project comprises primarily residential development including some medium density development, sites for industrial, commercial, waterfront tourist-oriented and recreational facilities. The project is anticipated to be spread over a 10-year development period commencing in 2013.

John Toon Pty Limited
March 2013

Cover photo. The moongate to the site of the original Guesthouse which Harry Halloran built to accommodate potential purchasers circa 1920.

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The West Culburra Mixed Use Concept Plan

Executive Summary

The object of the Part 3A West Culburra Mixed Use Concept Plan is to accommodate primarily residential development that will enable Culburra to increase in permanent and tourist population.

Associated with the expected increase in population are proposals for additional industrial, commercial, tourist and recreational facilities. Collectively these developments are considered to have a significant potential to increase local employment.

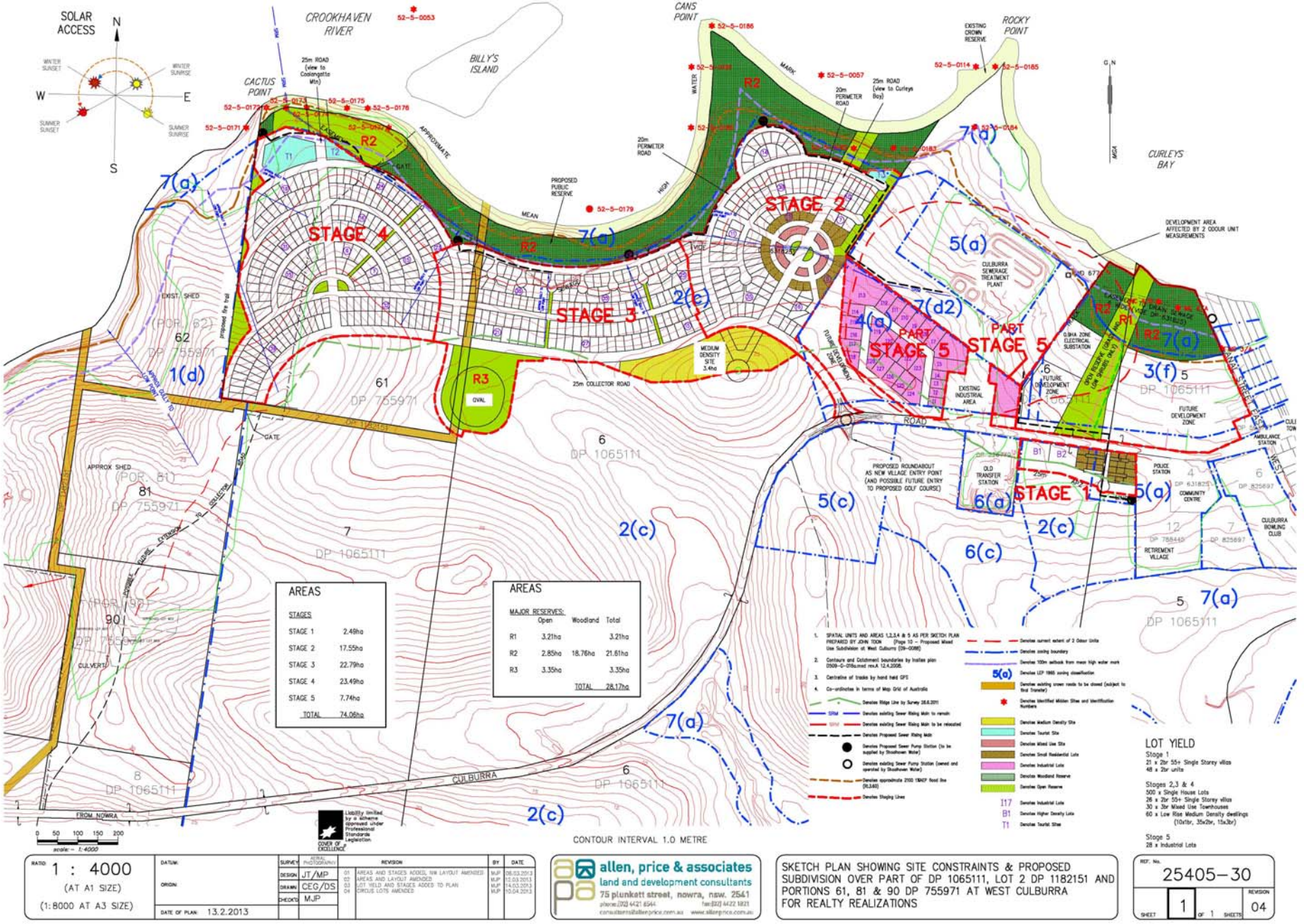
The West Culburra Mixed Use Concept Plan is a simple plan. The main structural elements are: (1) a new neighbourhood comprising some 600 dwellings; (2) a loop collector road off Culburra Road generally aligned along the catchment divide being the primary access to the new neighbourhood; (3) two cycle/walkways aligned east-west linking the new neighbourhood to the existing town centre; (4) a cluster of medium density developments within walking distance of the town centre; (5) a 3.75km long foreshore park; (6) a series of vistas designed to integrate the development with its estuarine setting; and (7) a leisure 'hub' located on the Crookhaven River waterfront.

The three land units that comprise the Part 3A proposal are: (1) a 2.49ha parcel of land south of Culburra Road allocated to residential uses; (2) a 63.83ha parcel of land located west of Culburra STP which is referred to Stages 2, 3 and 4 (the new neighbourhood); and (3) a 7.74 parcel of land located south of Culburra STP allocated to industrial uses referred to as Stage 5 (see Plan 1 and Illustration 1).

The project has an overall area of 102.23ha of which 74.06ha is for urban development. The foreshore protection zone accounts for 21.61ha and the two parklands have a combined area of 6.56ha. The foreshore protection zone is envisaged as a 3.75km long foreshore park which is intended to be a major asset for Culburra Beach.

The development proposal includes the following:

1. 47 small lot dwellings aimed at the 55+ age cohort;
2. 500 standard residential lots ranging in size from 500-900$m^{2;}$
3. 48 1, 2 and 3 bedroom apartments;
4. 60 medium density town houses;
5. 30 mixed-use dwellings;



Plan 1: The West Culburra Mixed Use Concept Plan

1. Birds-eye View of Culburra looking east

This illustration shows the new neighbourhood in the foreground, the strong avenue planting along Culburra Road in the mid-ground with the existing road pattern, the crescents, in the distance with Lake Wollumboola and the ocean defining the land form.

6. 28 industrial lots of various sizes;

7. Waterfront sites for tourist-oriented developments;

8. A 3.75km long foreshore park.

9. A recreation oval

10. A vista park

The proposed development is considered to be unexceptional. It is a Part 3A project because it is on land identified in SEPP 71. There are also SEPP 14 wetlands on adjacent areas of the foreshore. The proponent envisages the foreshore as having utility for recreation as well as being a conservation zone. The proponent recognises the design challenge that this dual use implies; the challenge is accepted.

The site is defined by the divide separating the catchment of Lake Wollumboola from that of the Crookhaven River. This flows from the findings of the Sensitive Urban Lands Review Panel that ' land within the catchment of Lake Wollumboola is considered unsuitable for urban development.' Certain minor elements of the plan, some of which are unavoidable, are in the catchment of Lake Wollumboola. The reasoning for these deviations is set out in the study.

The aboriginal cultural assessment revealed the existence of some important cultural sites (middens) along the foreshore. The proposal is to incorporate the conservation of these sites into the proposed foreshore park.

No items of European heritage significance were identified.

The proposal involves the clearance of some 60ha of native vegetation. The majority of the land to be cleared is xeric woodland. Certain small areas of mesic communities are proposed to be cleared to enable important vistas to Curleys Bay to be realised.

The ecology of the area has been intensively investigated to determine whether or not there are any endangered or threatened species affected by the proposed development. The most important ecology is the foreshore area which is dominated by estuarine and mesic communities. The transition to xeric communities that characterise the major part of the site occurs at about RL3.00 to RL5.00. Over much of the site this transition coincides with a steep bank and is readily observed; this transition is more gradual in the area adjacent to the town centre. The complexity of the foreshore ecology is a key factor in leading the proponent to propose that the foreshore park be micro-managed to achieve a high standard of conservation design.

Whilst most of the proposed development area contains native vegetation, the development area is confined almost entirely to xeric vegetation community

types and some cleared land. These woodland and foreshore ecosystems are widespread and abundant in the immediate vicinity, general locality and Shoalhaven region, and are extremely well represented in the extensive conservation reserves (National Parks and Nature Reserves) and State Forests of the locality and region.

The potential impacts of the proposed development have been considered with respect to threatened biota and their habitats (as listed in the *Threatened Species Conservation Act 1995*) and "*Matters of National Environmental Significance*" (listed in the *Environment Protection & Biodiversity Conservation Act 1999*). Whilst there will doubtless be some adverse impacts upon individuals of some such biota, the proposal is considered unlikely to adversely affect any such biota or their habitats to any significant extent.

The proponent expects to provide offsets for the areas to be cleared. The proponent also undertakes to form the foreshore parkland using the highest standards of urban design to achieve a conserved environment which will have high utility for the Culburra Beach community.

The estuarine setting of the site requires that a stringent surface water cycle management regime be established. The proponent proposes a regime that meets exacting standards. The staging of the project over a decade provides the opportunity for on-going monitoring of the performance of the regime and the opportunity for corrective action should that be necessary.

The new neighbourhood is expected to take 7-10 years to completion by which time it is anticipated that the adjoining land, known a Cactus Point, will be re-zoned to enable the project to be rounded out.

The small-lot 55+ developments are expected to be taken up quite quickly. Strong demand for these has been expressed by both the community and real estate agents.

The development of the apartments is expected to be spread over a 10 year period. The proponent is willing to hold this land until the demand warrants development. There has been some expression of interest, notably from seniors.

The rate of development of the commercial and industrial sites is unpredictable.

The lead consultant consulted with the local community initially at the outset of the project and recently when the draft final proposals were presented using a power point presentation. This presentation gives a quick overview of the project. The power point presentation is at Appendix A.

John Toon March 2013

Part 1 – Scope of the Project

1.1 Introduction

The proposal for this significant development at Culburra Beach is a project prepared under Part 3A of the Environmental Planning and Assessment Act (MP 09-0088).

The West Culburra Mixed Use Concept Plan comprises residential, commercial and industrial uses on land in the single ownership of Mr Warren Halloran. The land is located west of the existing settlement of Culburra Beach and almost entirely outside the catchment area of Lake Wollumboola.

The decision to go ahead with this project followed several years of negotiation with the Department of Planning culminating in a Planning Forum and site inspection held at Culburra under the auspices of the Department of Planning on 4 May 2010. The Director Generals requirements were issued on 27 May 2010; an amended version was issued on 8 July 2010.

The lead consultant responsible for the overall management, planning and design of the project is John Toon Pty Limited, town planning and urban design consultants.

Sub-consultants engaged on the project are:

Allen Price and Associates	- surveying, mapping, subdivisions, infrastructure and costing
Martens and Associates Pty Ltd	- geo-technical, ground water and contamination report, surface water management, coastal controls
SLR Consulting	- (1) odour study; (2) flora and fauna; and (3) computer generated graphics
GTA Consulting	- traffic and access, local road network
South-East Archaeology Pty Ltd	- Aboriginal Heritage
Ecological Australia	- Bushfire Risk
Stedinger Associates	- European Heritage
The Public Practice	- Social Impact Assessment
Peter Phillips Landscape Architecture	- Landscape Planning

Following the Planning Forums of 4 May 2010, the lead consultant held a community consultation evening on 27 October 2010. The community was advised by a letter-box drop flyer and some 150 persons attended. The community was informed of the areas being considered and the type of development that was possible. The area was initially divided into five land units. These were later restructured into five stages. The plan of the area and briefing notes were circulated to the community.

Particular issues raised by the community were: (1) the need for housing suitable for seniors; and (2) a resistance to high rise (14 storeys had been mentioned as a possibility by the proponents consultant); (3) the need for more holiday accommodation; (4) more jobs which the project was seen to support; and (5) more recreation opportunities, particularly for youth.

The 2010 briefing note to the community is included at Appendix B.

The consultant offered to show the community the various sites on the following day, the 28th October. About 30 people attended. Several people commented on the attractiveness of the open paddocks west of the defined Part 3A area, commenting that it would have been better to use that site rather than the actual site which is mostly woodland.

The consultant also offered private meetings on Saturday 29th October at which individuals or groups could present particular concerns. Six people availed themselves of this opportunity. The two major concerns expressed were: (1) the implied loss of woodland; and (2) the concern for jobs for aboriginal youth.

On 14 October 2012 the consultant presented the draft proposals to the community, using a power point presentation (Appendix A). A briefing note with the plan was placed on each chair (see Appendix C). About 140 people attended. The reporter for the local newspaper, when asked by an associate about the response of the community to the proposals, said that he thought about 75% of the audience were in favour of the project. The major objections were the scale of the project and the five-storey apartment buildings. There was strong support for the 55+ housing and the foreshore park, the cycle/walkways and the concept of an active waterfront. Others expressed concern for the loss of woodland and for the protection of the SEPP 14 wetlands.

The consultant advised the community of the procedures that would be followed with the submission of the Part 3A application.

The community was invited to respond by fax or email using a pro-forma sheet provided. Nine responses were received (see Appendix D).

1.2 The Structure of the EIS

The EIS is structured in six parts. Part One introduces the project and reports on community consultations.

Part Two introduces the project in detail, the site analysis, the contextual framework of the Culburra Beach community in its sub-regional and local setting. The specialist site specific studies are reported and the site constraints are mapped.

Reports on the context of the proposal and site-specific investigations to be read in conjunction with Part Two include: the Scoping Study of the Culburra/Orient Point Community (Appendix E); the Profile of the Culburra/Orient Point Community (Appendix F); the Profile of the Culburra/Orient Point Aboriginal Community (Appendix G); the Aboriginal Cultural Heritage Assessment (Appendix H); the European Cultural Heritage Assessment (Appendix I); the Geotechnical Assessment Report (Appendix J); the Site Contamination Report (Appendix K); the Groundwater Quality Assessment (Appendix L); the Odour Assessment Report (Appendix N); the Flood Risk Assessment Report (Appendix M); and the Ecological and Riparian Issues and Assessment Report (Appendix O).

Part Three introduces the proposal in detail.

Reports outlining the assessment of technical and design considerations to be read in conjunction with Part Three include: The Water Cycle Management Report (Appendix P); the Infrastructure Report (Appendix Q); the Transport and Access Report (Appendix R); the Bushfire Risk Report (Appendix S); The Landscape Report (Appendix T); the Visual Impact Assessment (Appendix U); and the Design Controls Report (Appendix V).

Part Four is an assessment of the proposal in relation to the policy and statutory frameworks.

Part Five deals with key issues and undertakings.

Part Six deals with costings.

1.3 Scope of the Project

The objective of this project is to accommodate primarily residential development that will enable Culburra Beach to increase in permanent and tourist population. Associated with the expected increase in population are proposals for additional industrial, retail, tourist and recreational facilities. Collectively these developments are considered to have a significant potential to increase local employment. The project has an overall area of 102.23ha.

The foreshore protection zones have an area of some 21.61ha leaving an area of 74.06ha available for urban development.

The development proposed includes the following:

1. 47 small – lot dwellings aimed at the 55+ age cohort;
2. 500 standard residential lots ranging from 500-900m^2;
3. 48 1, 2 and 3 bedroom apartments;
4. 60 medium density town houses;
5. 36 mixed-use dwellings;
6. 28 industrial lots of various sizes;
7. Waterfront sites for tourist-oriented developments;
8. A 3.75km long foreshore park.
9. A major recreation area.
10. A vista park.

The site was initially subdivided into 5 spatial units. These have been rationalised into 6 sites which collectively add up to a significant expansion of Culburra Beach township.

Plan 1 shows the proposal which comprises the following six separate sites. These are:

1. Vista Park (site R1) which is a view corridor located in the business zone. This area will be cleared of woodland and grassed to provide a view through to Curleys Bay. Vista Park has an area of 3.21 ha.
2. The area south of Culburra Road (stage 1) between the road and the catchment divide which is allocated to medium density development – part small lot single storey dwellings for the 55+ age cohort and part four storey units. The area is within easy walking distance of Culburra Beach town centre. This site has an area of 2.49ha.
3. The major estate (Stages 2, 3 and 4) which comprises the largest component of the Part 3A project. It has an area of 63.83ha. The majority of the major estate is allocated to single house lots ranging in size from 500m^2 to 900m^2. There is provision for some shop-top housing to accommodate a range of business uses; a site is allocated to medium density housing (town houses and villas); this is a potential site for a retirement village. At the western end a leisure hub is proposed on the waterfront. Potential uses are motels, hotels, cafes,

restaurants, gift shops and the like. The plans for this area include an active waterfront with a jetty and boat launching ramp as well as BBQ shelters and active play areas. The detailed plan for this area is indicative only. The proponent considers it desirable to negotiate an adjustment to the boundary of the 7(a) zone which here follows the line of a sewer rising main for a distance of some 500m. Since a large part of this area is a cleared paddock extending to the edge of the Crookhaven River the logic of this definition of the 7(a) Environmental Conservation Zone is considered questionable.

4. The industrial estate (stage 5) which comprises 28 separate allotments ranging in size from 800m^2 to 7360m^2. There is a minor encroachment in to the catchment to enable the surface water drainage to connect by gravity to the town drains in the existing industrial subdivision. There will be no adverse impact on the lake as a consequence of this action. This industrial zone has an area of 7.74ha.

5. The 3.75km (site R2) long Foreshore Park will be developed concurrently with the stages of the major residential estate. It has an area of 21.61ha.

6. The Oval (site R3), located adjacent to the new collector road, is intended as an active recreational area. It has an area of 3.35ha.

The 3.75km long foreshore 7(a) Environmental Conservation Zone is proposed to be a managed environmental park. It should be noted that trail bike riders and others have substantially degraded some areas of the 7(a) zone. The unmanaged interface between land and water is an attractive playground for some. In our opinion bringing urban development in close proximity will increase community surveillance of the foreshore area. This area contains important aboriginal middens as well as important ecologies. We propose to integrate managed public access in the form of a 3.75km long cycle/walkway together with conserved cultural items/conserved ecologies and surface water cycle management in the form of swales to create a conserved foreshore parkland that is expected to become a major attribute of Culburra.

The proponent is of the opinion that, in order to maximise the potential of the foreshore for leisure purposes, for the cycle/walkway, for conservation of ecologies and cultural artefacts and for the inclusion of bioremediation swales, the actual demarcation line of the foreshore zone be established by 'on the ground' survey with the representatives of the relevant agencies being involved in the overall design and the detailed design of each stage of the foreshore parkland.

The other major community facility proposed is the oval. This site is selected because it is near flat and eminently suited to recreation purposes. It has an area of 3.35ha. This facility is in the upper reaches of Downs Creek which

drains to Lake Wollumboola. The water cycle management proposed will ensure there will be no adverse impacts on the lake by locating the oval in this position.

1.4 Development Options

No alternative sites were considered. The area of the Part 3A project was endorsed by the Department of Planning following several years of negotiation.

One of the key issues is the density of development. This is because the form of Culburra Beach is very unusual in that development is arranged along relatively narrow peninsulas – Orient Point, Culburra Beach and Penguin Head – which are generally about 500m wide and 2km long. The commercial centre is located on a narrow neck of land about 700m wide between Curleys Bay and Lake Wollumboola; this location is at the entrance to the township and relatively remote from most residences. Being located on a narrow neck there is only limited scope for more dense development around the town centre. This project includes a limited amount of undeveloped land that is located within easy walking distance (400m) of the commercial centre. The commercial centre currently comprises a modern supermarket, shops and an array of services. One of the aims of this project is to maximise the density of residential development within walking distance of the commercial centre. Medium rise units and small-lot villas are proposed on the available site.

1.5 Justification

The population (at census) of Culburra Beach is slowly declining. Anecdotal evidence is that the summertime population has been increasing. This proposal aims to arrest the decline of the permanent population by the development of a new housing neighbourhood which will attract a permanent population to Culburra. By introducing a wider range of lot sizes and dwelling types the proposal will enable the existing population to move to dwellings more suited to their changing needs (upsize and downsize), thus freeing up existing housing for new households.

The economy of Culburra Beach is centred on leisure and retirement. A proportion of the workforce commute to Nowra for employment; Nowra is relied upon for higher order services by the local population. The identification of new leisure and recreation opportunities has been an important theme underlying the preparation of the concept plan. The foreshore parkland is considered to have the potential to become a major recreation asset which will provide employment opportunities for its on-going maintenance as well as attracting tourist-oriented developments at selected locations. These are also anticipated to generate new employment opportunities.

Provision is made for growth in employment in the industrial estate. This will be promoted with emphasis on small units for start-up industries. There is provision for the service sector to expand (retail and personal services). It is anticipated that the population growth will also lead to increased turnover and a consequent rise in employment in the existing businesses in the commercial centre.

Part 2 – Analysis of the Site and its Context

2.1 The Definition of the Development Area

The lands covered by this proposal comprise the following: Part Lot 5 and Part Lot 6 and Part Lot 7 DP1065111 and Portion 61 DP755971 (see Plan 2).

The five stages of development have a combined area of 74.06ha. The total site area including the foreshore park, the oval and vista park is 102.23ha.

A 100 foot (30m) foreshore crown reserve defines the northern boundary of lot 6 DP106511 and Portion 61 DP755971.

The topography (see Plan 2) shows the high ridge (RL35) located some 500m north of Culburra Road and the divide (RL10-25) some 500m further north. By definition all land north of the divide falls to the Crookhaven River. This is the site of the development area.

The key topographical determinants that define the site are:

1. The divide between the catchment of Lake Wollumboola and the catchment of the Crookhaven River and Curleys Bay; and

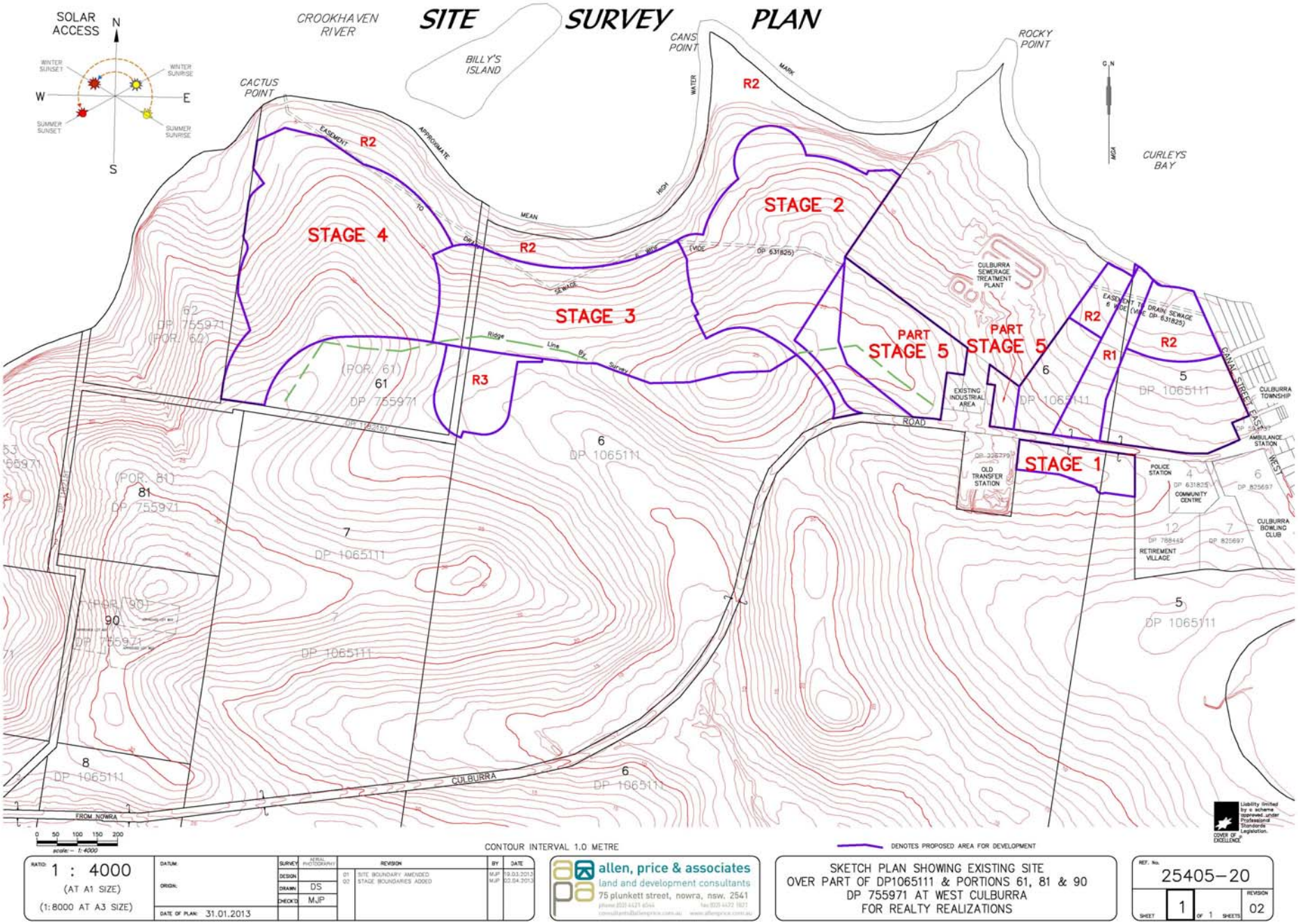
2. The 100m setback from the high water mark along the frontage to Curleys Bay and the Crookhaven River.

These features define the southern and northern bounds of the proposed development (see Plan 3).

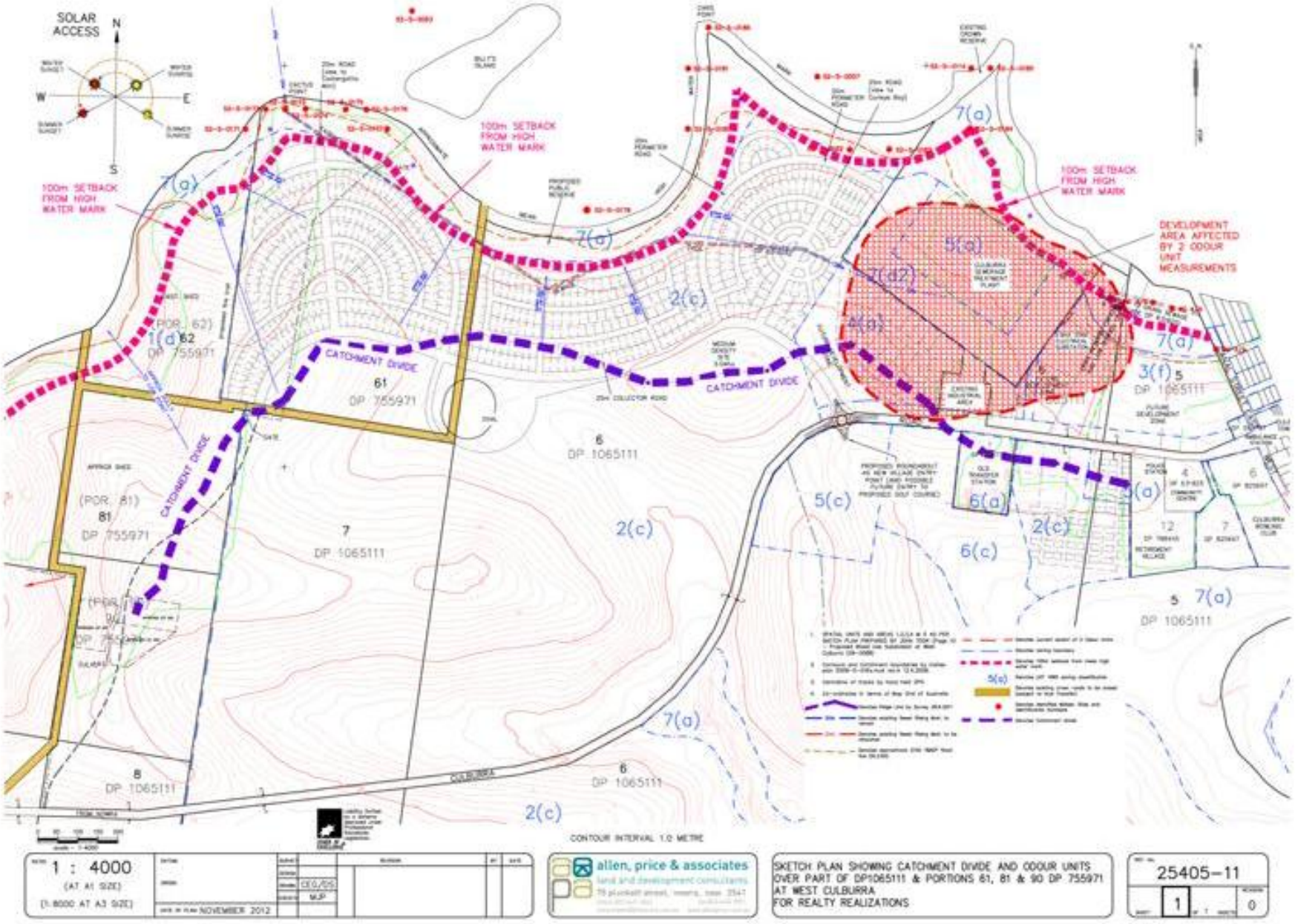
The eastern boundary is determined by the western edge of Culburra township. The western boundary is the western boundary of Portion 61 DP755971 which is the boundary of land zoned Residential 2(c) in Shoalhaven LEP1985. This is the limit of land that can be used for urban purposes at the present time (see Plan 2).

Within this the odour study established an area around the sewage treatment plant (STP) with an odour concentration greater than OU2 within which residential development is precluded although industrial and commercial uses are permissible (see Appendix M).

The area is some 2.5K long and some 0.3-0.6K deep. The >OU2 zone is a 600m diameter balloon around the STP. The area defined by these constraints is shown in Plan 3.



Plan 2 – Topography and development footprint of the site



Plan 3 – The determinants of the development area (see separate pdf file for clearer image)

2.2 The sub-regional context of the Development Area

The development areas are predominantly woodland. Cleared areas are located south of Culburra Road (part lot 5 DP106511 and part lot 6 DP106511) and at the western end of the site (Portion 61 DP755971). The site of the new neighbourhood is bounded on the north side by the Crookhaven River (western section) and by Curleys Bay (eastern section); the central section is a SEPP14 wetland located east of Billys Island; a narrow gulch, essentially a drainage channel, separates the wetland from the mainland although the SEPP14 boundary includes a narrow band of mangroves and saltwater marshes that are located in the inter-tidal zone of the mainland. (see Air Photo 1). The estuarine environment to the north is a dominant feature of the site.

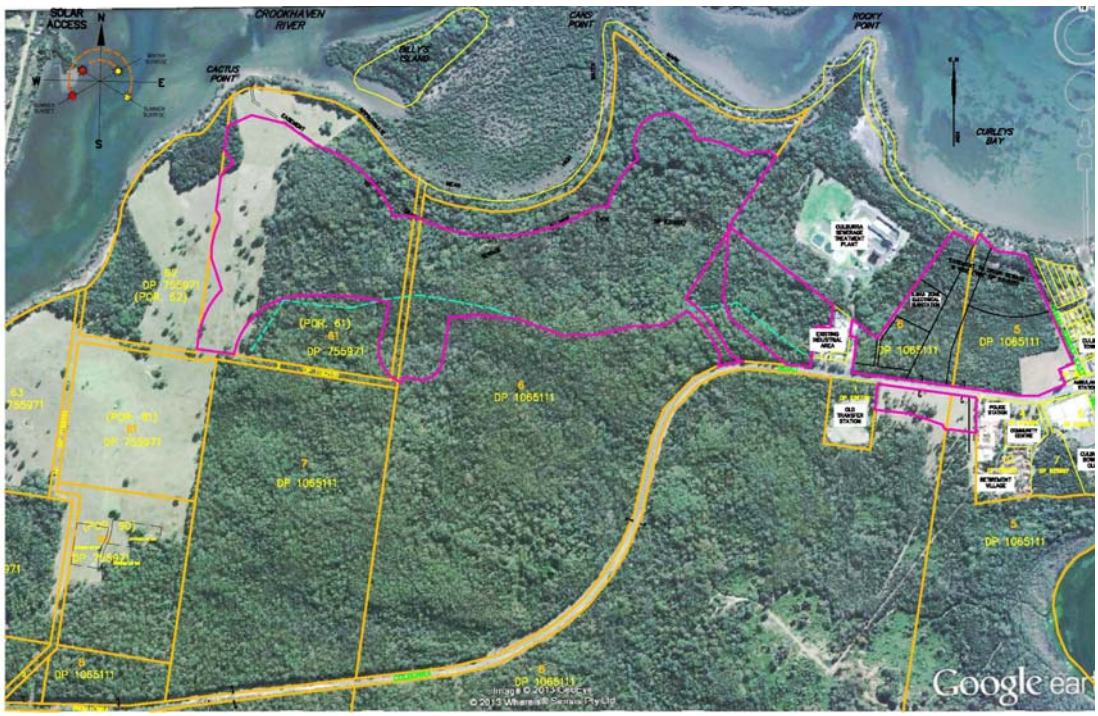
The second dominant feature is the high ridge (at RL38) to the south. To all appearances this ridge would be the ridgeline that separates the catchments of Lake Wollumboola and Crookhaven River. However that is not the case; the actual divide is the low ridge (at its lowest point RL16) on the major estate, declining to RL10 adjacent to the Police Station. It is this low ridge that defines the southern boundary of the site (see Plans 2 and 3).

The land falls to the north from the divide; slopes range from 4–8% across the site; generally areas to the east, adjacent to the existing urban development have slopes of circa 2% whilst areas to the west, and north of the catchment divide, have slopes in the 7–8 % range.

The sub-regional context is dominated by two distinct features.

One is the extensive flood plains between the Crookhaven and Shoalhaven Rivers that lie between Greenwell Point and Nowra. Land use is this flood plain is primarily small scale dairy farms with a scatter of minor settlements located on slightly elevated land. This is a pastoral landscape. Greenwell Point Road, linking Nowra to Greenwell Point is located on the divide between the Crookhaven and Shoalhaven catchments.

The second distinct feature is the range of low hills that stretch from Nowra Hill to the coast. Land use in this range of hills, which rise to an elevation of 80m, is almost entirely woodland. The ridgeline of the hills is the catchment divide between the Crookhaven River and Jervis Bay. At the eastern end these low hills contain a separate catchment defined by Forest Road on the south and a northern ridge which is within the woodland. This catchment, drained by Coonemia Creek, feeds Lake Wollumboola which is an intermittent open and closed coastal lake. It is the northern boundary of this catchment that forms the southern boundary of the Part 3A development site. The extensive areas of woodland are part State Forest, part National Park and part privately owned (see Air photo 2).



Air Photo 1: Air view of the development areas

Air Photo 2: Air view of the sub-regional context

Greenwell Point, located on slightly elevated land, was established in the mid-1800's as a coastal port. It is home to a small fishing fleet and is well-known for its oysters. In more recent times it has attracted a limited range of tourist functions. It has a population of about 1250 and has reached the limit of its potential urban area, being now edged by the floodplain.

Culburra Beach was developed primarily as a holiday resort from the 1920's onwards. It, together with Orient Point, has a population of just under 3000. It is well known for its fine beaches. It is located on slightly elevated land which merges into the dune system towards the north. Culburra Beach and Greenwell Point are the easternmost extent of the low hills. Greenwell Point is defined by the floodplain; Culburra Beach is defined by woodland. Culburra Beach is distinguished by being surrounded by three water bodies – the ocean to the east, Curleys Bay and the Crookhaven estuary to the north-west and Lake Wollumboola to the south. The distinctive design of the plan of Culburra Beach reflects the orientation to the three water bodies. The layout is a series of intersecting crescents oriented towards the three water bodies (see Plan 8). The economic base of Culburra Beach is fragile, comprised entirely of retail and services oriented to a holiday and ageing population.

2.3 The West Culburra Mixed Use Concept Plan in Outline

The urban structure of the proposal reflects the pronounced linear form of the site. The principal structural elements are: (1) a collector road aligned along the dividing ridge being an extension of Culburra Road; (2) a cycle/walkway aligned adjacent to the collector road and Culburra Road; and (3) a cycle/walkway along the entire length of the waterfront threaded through the proposed foreshore parkland. The Culburra-Nowra bus service will be routed through the collector road; some 90% of all new dwellings will be within 400m walking distance of the bus service. The cycle/walkway aligned along the ridge will provide a direct route to the town centre; the foreshore cycle/walkway is designed as a leisure/recreational route.

These routes are aligned east-west. A series of vistas aligned generally on a north-south alignment is introduced as connecting ways between the east-west routes. These vistas are designed to integrate the development with its wider estuarine setting.

Planning for water and sewerage infrastructure to service the project is already incorporated in Shoalhaven City Council plans. Commencement of the works has been withheld pending approval of the development proposal. Electricity supply requires augmentation of the local network. A new substation is required. Negotiations with Endeavour Energy have been initiated regarding the location of the new sub-station. A location adjacent to the STP is the preferred option.

The project will involve the conservation of aboriginal middens and certain ecologies in the foreshore area; it is proposed to incorporate interpretive signs that will explain the significance of these sites. The advice of the Jerrinja Local Aboriginal Land Council will be sought on the content, design and location of the interpretive signs. Initial contact has been made with the council with respect to their active co-operation in this project.

The foreshore zone will require a high level of micro-design and micro-management. It will involve threading the foreshore cycle/walkway through cultural and ecological items/areas of significance and siting a range of embellishments such as BBQ shelters and fitness equipment. It will also involve integrating the detailed design of bioswales to produce a coherent and sustainable foreshore parkland.

The foreshore vegetation will be retained except where the main vista avenues require a small amount of clearance to ensure the purpose of the vista is achieved.

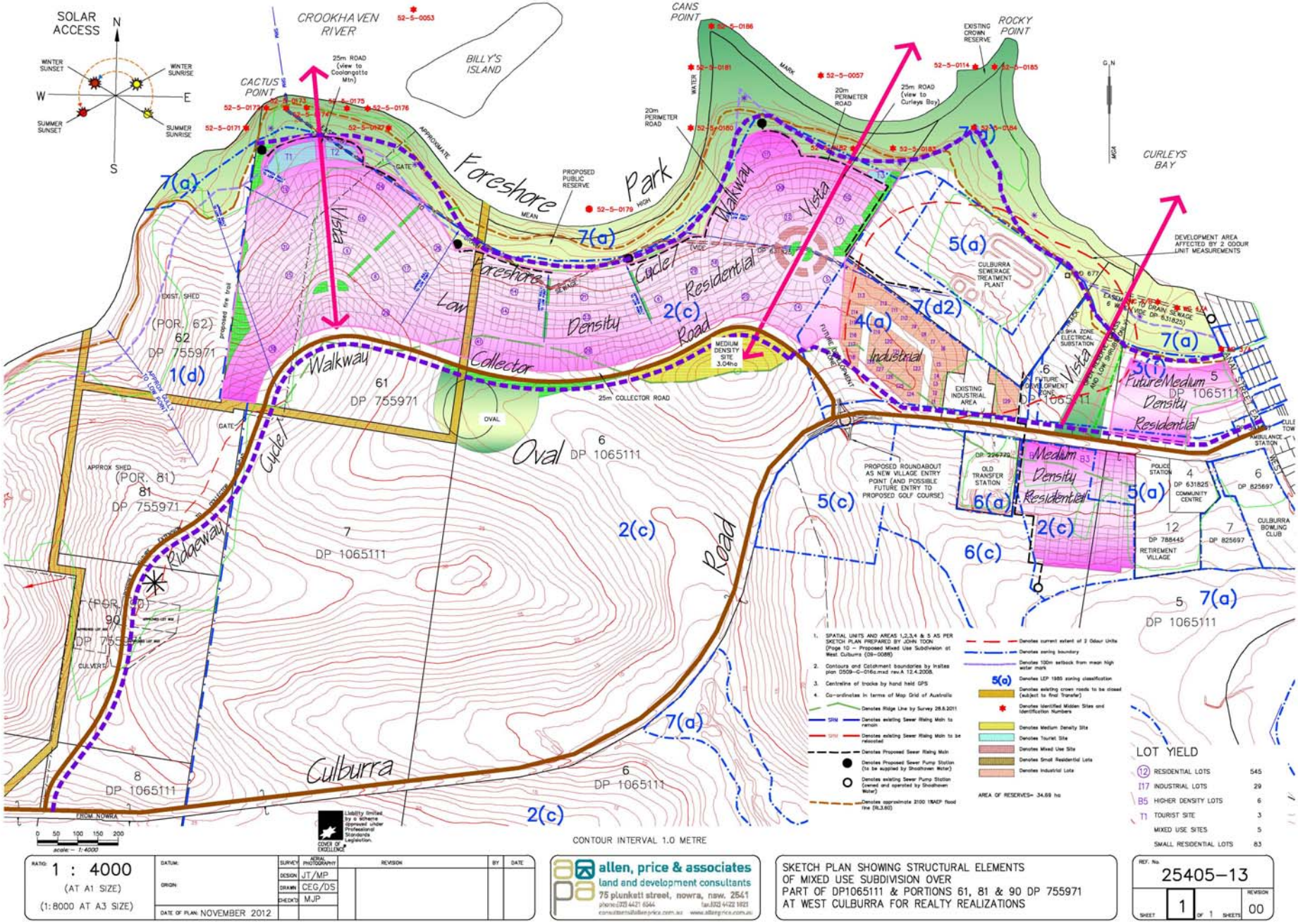
The principal structural elements are shown on Plan 4.

The following sections detail each stage of the proposed development.

2.3.1 The Medium Density Zone: Stage 1

The first component programmed for development is the area south of Culburra Road which has an area of 2.49ha. This area is within easy walking distance (400m) of Culburra Beach town centre. It is adjacent to the existing retirement village and senior citizens centre. It is considered to be very suitable for medium density development due to its proximity to the services and facilities available.

Part of the site is allocated to a 21 small lot (300m^2) single storey dwelling estate targeting the 55+ age cohort. The balance is allocated to two 4-storey apartment building sites. A strong demand for 55+ housing has been expressed by the local community and local real estate agents. The apartments are anticipated to be attractive to investors (for holiday or short-term letting), to retirees and to young households. The proposal is that the units fronting Culburra Road will be 4-storeys high. The reason for this is that we consider it essential to maximise the density of this location which is within easy walking distance of Culburra shops and commercial centre. The proponent is prepared to hold this land for as long as necessary. Four storeys is selected because the bulk of development with low site coverage is considered to be visually compatible with the context. It is the height recommended for units in coastal town centres in the Coastal Design Guidelines. The height is considered compatible with the avenue planting proposed for Culburra Road. Some 48 units are proposed for this site.



Plan 4 – The Principal Structural Elements

The small-lot 55+ housing will be the first stage of development. It is expected to be marketed in late 2013 subject to approvals being obtained. The first units are expected to become available for purchase in 2015. The unit development is anticipated to be spread over several years.

2.3.2 The New Neighbourhood: Stages 2, 3 and 4

The largest component by area is the new neighbourhood located west of the sewage treatment plant (STP). This component has an area of 63.83ha. The new neighbourhood requires the provision of new infrastructure (water reticulation and sewerage and drainage) prior to developing the first stage of the residential road network. It is envisaged that the roundabout and the first stage of the collector road will be the final elements to be completed prior to the opening of the estate. The proposed development comprises some 500 single dwelling lots ranging in size from 500m^2 to 900m^2. It is anticipated that this component of the project will be attractive to permanent residents and for second home buyers seeking a holiday home. It may also attract some retirees.

The foreshore protection zone, with an area of 21.61ha is proposed to be a continuous foreshore park which is conceptualised as a major recreation resource. It will comprise ecologies, some of which will be rehabilitated, and cultural artefacts (middens) in carefully designed conservation settings, enhanced by a continuous cycle/walkway along the entire length of the foreshore linking this new neighbourhood to the town centre. The walkway will feature BBQ shelters, exercise and play equipment at strategic intervals along its length. This cycle/walkway is conceptualised as a leisure facility. The foreshore park will be developed incrementally with each stage of the estate.

The centrepiece of the entrance to the new neighbourhood is a roundabout. This will have the dual purpose of creating a focal point marking the entrance to Culburra and the entrance to the new neighbourhood. The roundabout will be enhanced by quality landscaping and a feature tree in the centre. Avenue planting between the roundabout and Canal Street East will create a distinctive entrance to Culburra.

The primary access to this new neighbourhood is by the new collector road aligned along a ridge which forms a 3km loop road off Culburra Road; the Culburra-Nowra bus service is proposed to be re-routed through this collector road. The cycleway and walkway aligned along the ridge adjacent to the collector road are conceptualised as functional routes. They will provide direct access between Culburra shopping and commercial centre and the new neighbourhood. These will also be developed incrementally.

Marketing the new neighbourhood is expected to commence in 2014.

2.3.3 The Industrial Zone: Stage 5

The second component to be developed is the Industrial Zone. This zone has an area of about 12ha and is considered to be larger than necessary. A cluster of small industrial establishments is located at Strathstone Street; they occupy about 1.5ha of the zone. The area of the land to be developed for industrial uses has an area of 7.74ha.

Sites will be made available for small industrial units suitable for start-up enterprises at an early stage of the development.

The zone has been reduced in area at the western end to allow space for the intersection between the collector road and Culburra Road to be designed in a setting appropriate for the entrance to the new residential neighbourhood.

2.4 The Social Context of the Proposal

The Social Impact Assessment (SIA) was undertaken by The Public Practice. Colin Menzies is the lead consultant.

The Social Impact Assessment focuses on two considerations:

- The impacts of population growth on Culburra Beach township; and
- The impacts of the proposal on the Culburra Beach community and community values.

The study briefly describes the overall layout and concludes it is in accordance with the Heart Foundation Guidelines 'Healthy by Design'.

The study considers the South Coast Strategy (SCS) and the Settlement Planning Guidelines. The SCS considers the South Coast will have to accommodate an additional 60000 population in the region, requiring an estimated 45600 dwellings, 26,300 of which will be in Shoalhaven. The SCS estimates the housing demand to be made up of the following:

Young families with children	25%
Couples without children	37%
Group households	2%
Single person households	36%

The SCS notes the preponderance of single dwellings in the region and the need for smaller dwellings in multi-unit arrangements. It sets a target of 70% detached and 30% medium density development for housing.

The study notes the preference for neighbourhood planning which embodies a range of housing choice and the provision of shops and community facilities within walking distance.

The study then considers the existing community, describing it as an homogenous and stable community. Inter alia, it notes that 60% of the population had lived in the same dwelling at least 5 years, that there is a high proportion of retirees, a low workforce participation with a low percentage of managers and professionals, and that the population is dominantly of an anglo-celtic heritage, and that 75% are Christian.

The dwelling statistics indicate a large holiday population with 869 out of 2361 dwellings unoccupied at census. The winter population of c3600 is estimated to rise to 8000 in summer. The study observes that the number of dwellings and house prices are stable and affordable (with average prices around $350,000); except for houses and sites adjacent to the beach and ocean which are in the $1 million + range.

The demographic analysis indicates a population highly skewed to the 40+ age cohorts. The family formation age cohorts (20-40 years) have fallen steadily over the last 25 years with a corresponding fall in the pre-school age cohort (0-5 years). Compared with the rest of Shoalhaven the 55-70 age cohorts are over represented and the under 30 age cohorts are under represented.

The declining number of occupants per dwelling (from 2.52 in 1991 to 2.32 in 2006) is considered to be due to partners of couples dying, leading to a significant increase in single person households, to young adults leaving for better job opportunities elsewhere, and to older couples (retirees) replacing families (and often upgrading or rebuilding in the process).

The study notes the significant percentage of people with a chronic disability; the rate of disability in the 45+ age cohorts is relatively high compared with Shoalhaven.

From these analyses the Public Practice consultants identify the following issues in Culburra Beach;

- aged services and the demand for home services will increase;
- housing stress is evidence for some due to the lack of job opportunities;
- unemployment at 12% with only 41% in the workforce;
- low school attendance with only 75% of eligible children in high school; and

- high number of single person households (283 in 1991 to 377 in 2006).

The study then considers the potential impact of projected population growth. It uses a Public Practice model to project the probable rate of growth. It establishes a baseline model which is evaluated under various no-growth assumptions – principally a continuing decline in occupancy rates and a progressive increase in the number of unoccupied dwellings at census (winter-time).

Then using the Public Practice model it makes forecasts for the rate of new dwelling construction concluding that the population will rise to circa 5500 in 2039 (winter). It notes the take-up rate can be quickened or slowed depending on marketing strategies and that the ratio of built-upon to vacant lots may vary. The Public Practice projections estimate 67% of incoming residents will be retirees and 33% Gen X families. They expect the expansion area to reach its peak population around 2025.

The Public Practice then consider the likely socio-economic impacts of their projections. These are as follows:

- the additional population will strengthen the shopping centre, reinforcing the viability of the existing shops and generate a demand for new retail and other services;
- the new population will redress the population imbalance because the incoming population will be younger;
- the prices of lots may influence the age of the incoming population, with lower prices attracting a younger population;
- the project is likely to provide more jobs in construction, aged services, retail and entertainment;
- the number of potential volunteers will increase, potentially strengthening local community organisations;
- the increased population should increase the viability, and hence the frequency, of local bus services.
- the design of the new neighbourhood will lead to more people cycling and walking; and
- there will be an increased demand for aged care facilities.

The Public Practice undertook an analysis of the aboriginal population in Culburra Beach/Orient Point.

The indigenous population comprise some 6% of the Culburra Beach/Orient Point population. The Public Practice caution the reliability of data.

The demographic profile of the aboriginal population is the opposite of the overall Culburra Beach/Orient Point data referred to above.

Only 19% of the population are over 45 with 45% being in the 0-18 age group. Only 12% are in the 18-25 cohort indicating a significant out-migration of young adults, no doubt in search of education and jobs. There is high unemployment in the working age cohorts. Incomes are generally low, with only 5% of the employed earning more than average weekly earnings.

The employment data underlines the need to create more job opportunities for young people generally and for young aboriginals in particular.

The proponent aims to promote job opportunities for the aboriginal community when approval for the Part 3A project is granted. Discussions with the Local Aboriginal Land Council have been initiated as have discussions with individuals of the Jerringa People to this effect.

The Social Impact Assessment is at Appendix E. The profile of the Culburra/Orient Point Community is Appendix F. The profile of the Aboriginal Community is Appendix G.

2.5 Aboriginal Heritage Assessment

The aboriginal heritage assessment was undertaken by South-East Archaeology Pty Ltd. The lead consultant is Peter Kuskie

The principal aims of this assessment were to: (1) identify and record any Aboriginal heritage evidence or cultural values within the investigation area' (2) assess the potential impacts of the Proposal on this evidence; (3) assess the significance of this evidence; and (f) formulate recommendations for the conservation and management of this evidence, in consultation with the local Aboriginal community.

The investigation proceeded by recourse to the archaeological and environmental background of the locality, followed by consultation with the Aboriginal community and a field survey undertaken with the assistance of representatives of the registered Aboriginal parties, in accordance with the relevant DoPI and Office of Environment and Heritage (OEH) in the Department of Premier and Cabinet (formerly the Department of Environment, Climate Change and Water {DECCW}) requirements.

These requirements included an assessment that addresses the DEC (2005) draft *Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation.* However, to support any subsequent Aboriginal Heritage Impact Permit (AHIP) application where future approvals are sought under Part 4 of the EP&A Act, the assessment has also been conducted in accordance with the DECCW (2010) *Code of Practice for Archaeological*

Investigation of Aboriginal Objects in New South Wales, OEH (2011) *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* and DECCW (2010) *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy.

The field inspection was undertaken on 9 and 10 August 2011 with representatives of the two registered Aboriginal parties, the Jerrinja Local Aboriginal Land Council and Jerrinja Traditional Owners Corporation.

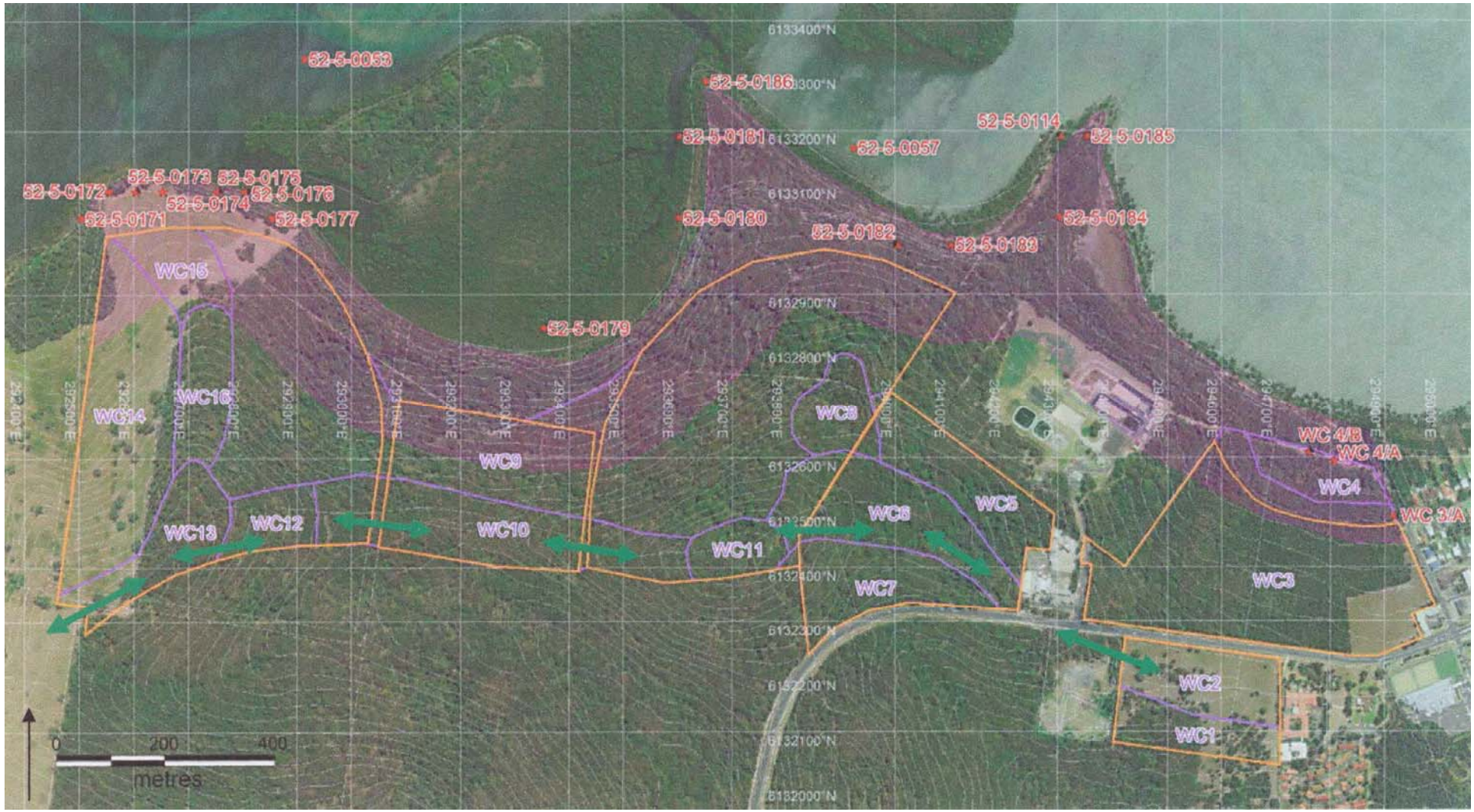
The survey involved sampling of a heritage study area (equivalent to the area of the development sites) that comprised the investigation area and 5.4 hectares of immediately adjacent land. This total area subject to heritage survey sampling, measuring 105.2 hectares, is referred to as the heritage study area. It was subdivided into 16 survey areas, all of which were inspected for Aboriginal heritage evidence.

The total survey coverage (ground physically inspected for heritage evidence) equated to approximately 5.3% of the heritage study area. As this coverage only refers to an area of several metres width directly inspected by each member of the survey team, the actual coverage for obtrusive site types (for example, scarred trees and rock shelters) was significantly greater than this. The total effective survey coverage *(visible* ground surface physically inspected with potential to host heritage evidence) equated to around 0.46% of the heritage study area.

No Aboriginal heritage sites are listed within the investigation area on any heritage registers or planning instruments. No Aboriginal heritage sites or cultural sites were identified directly within the investigation area during the present survey. However, three sites were identified immediately adjacent to the investigation area during the survey, within the slightly broader 'heritage study area'. These sites (West Culburra 3/A, 4/A and 4/B) are all open artefact occurrences. In addition, 18 previously recorded sites (17 middens and one artefact scatter, OEH #52-5-57, 52-5-114, 52-5-171 to 52-5-186) are located immediately adjacent to the investigation area, between it and the Crookhaven River. These sites are within the 7(a) Environmental Protection (Ecology) zone. (See Plan 5)

The registered Aboriginal stakeholders did not disclose any specific knowledge of any traditional or historical cultural values/places (for example, sites of traditional cultural significance or historically known places or resource use areas) within the investigation area, consistent with results from a previous study in 1983.

Two of the sites found during the survey and all of the adjacent previously recorded 18 sites are located within 100 metres of the Crookhaven River estuary. In fact, all 16 midden sites recorded by Hughes (1983) are reported as being within 30 metres of the shore, indicating that evidence of exploitation of estuarine resources in this area occurs very close to those resources. It is



Plan 5 - **Identification of significant Aboriginal Cultural Heritage Site**

not certain whether the potential artefact evidence is focused within a narrow zone (for example, within 30 metres of the estuary) or a broader zone (for example, up to 200 metres from the estuary). The midden evidence may be focused within a narrow zone fringing the estuary (for example, 30 metres, as presently identified), while artefact evidence representing broader activities and occupation, may extend over a wider zone. Further investigation may reveal information about the spatial distribution of evidence in this locality.

Much of the investigation area is outside of primary or secondary resource zones, and potable water sources are absent. Therefore, it is inferred that Aboriginal occupation of much of the investigation area would have generally been of a low intensity, and probably related to transitory movement through the landscape and hunting/gathering by small groups of people during the course of the normal daily round. It is noted that the prominent ridgeline that comprises part of the investigation area would have represented the only key avenue for land-based movement between the hinterland and Culburra Beach, Orient Point and Crookhaven Heads.

Part of the investigation area borders a primary resource zone, the Crookhaven River estuary. The numerous midden sites provide evidence of the procurement of shellfish resources from this environment and their consumption immediately adjacent to the source. However, the general absence of potable water is inferred to have been a potential constraint to more focused Aboriginal occupation (such as encampments, particularly those involving larger groups of people and/or longer durations).

Stone artefact evidence has been identified within the heritage study area, adjacent to the investigation area, confirming predictions of the site location model. The potential for further stone artefact evidence to occur is reassessed as follows:

- Within a zone potentially extending up to 200 metres from the shore of the Crookhaven River, there is a high potential for sub-surface deposits of artefacts to occur, including deposits that may be of research value. This includes the location of sites West Culburra 4/A and 4/B and elsewhere on the flat (survey area WC4) immediately adjacent to the investigation area, but also survey area WCI and 5 and minor portions of survey areas WC 3, 9 and 14 within the present investigation area; and

- In the remainder of the investigation area, the potential for artefact deposits of research value or significance is generally low, but a low-density distribution of artefacts consistent with 'background discard' is likely to be present. Repeated use of the ridgeline for transitory movement may have caused an accumulation of evidence through super impositioning, but this is unlikely to represent focused occupation.

Substantial shell midden evidence has previously been identified adjacent to the investigation area, within a 30 metre wide zone along the foreshore of the Crookhaven River estuary. Additional midden evidence may occur within this

zone, adjacent to the investigation area that was obscured by vegetation at the time of Hughes' (1983) study. However, the potential for midden evidence directly within the investigation area is revised downward to moderate to low for small isolated middens within say 200 metres of the estuary, and low elsewhere.

Other types of heritage evidence are not anticipated to occur within the investigation area (very low or negligible potential), albeit scarred or carved trees cannot totally be discounted where mature native trees remain and skeletal remains cannot totally be discounted in sandy sediments adjacent to the Crookhaven estuary. Other traditional or historical Aboriginal cultural values or associations have not been identified during the present or previous investigations.

Two of the open artefact sites within the study area (West Culburra 4/A and 4/B) have been assessed as being of low to potentially moderate significance within a local context. Site West Culburra 3/A has been assessed as being of low significance. The adjacent Culburra midden sites (OEH #52-5-171 to 52-5-186) have previously been assessed as being of 'considerable heritage and scientific value and of considerable importance' to the Jerrinja people, a conclusion endorsed here. These midden sites are of regional representative value. It is important to observe that all heritage evidence tends to have some contemporary significance to Aboriginal people, because it represents an important tangible link to their past and to the landscape.

The draft report was provided to the two registered Aboriginal stakeholders on 13 March 2012 for their review and comment, but none was provided.

The following recommendations are made on the basis of legal requirements under the NP&W Act and EP&A Act, the results of the investigation and consultation with the registered Aboriginal parties:

l) In consideration of the results of the assessment and subject to implementation of the recommendations below, there are no Aboriginal heritage constraints to approval of the Concept Plan under Part 3A of the EP&A Act;

2) Subsequent to detailed design being completed and in association with subsequent applications for development approval under Part 4 of the EP&A Act, further heritage investigation involving test excavations should be undertaken within survey area WC 15 and a sample of the portions of WC 3, 9 and 14 within the zone of high potential for sub-surface deposits of artefacts, to identify the nature, extent and significance of any heritage evidence present, and to enable the subsequent formulation of appropriate management strategies in consultation with the registered Aboriginal parties;

3) Should any subsequent development application involve proposed impacts outside of the heritage study area investigated during the current assessment, for example, in the foreshore zone between the investigation area and the Crookhaven River, further Aboriginal cultural

heritage investigation should be undertaken. As a minimum this would involve the archaeological survey of any proposed impact areas outside of the present heritage study area, in consultation with the registered Aboriginal parties, with the preparation of a supplementary heritage assessment report;

4) Subsequent to detailed design and the further heritage investigations required above being completed, and in association with any subsequent application for development approval under Part 4 of the EP&A Act, in order to establish a defence to prosecution under Section 86(2) of the NP&W Act with respect to the probable occurrence of stone artefacts within the impact area, and any subsequent impacts to those objects and identification of those impacts, a Section 90 AHIP should be obtained for the impact area prior to the proposed works being undertaken;

5) The Culburra midden sites (OEH #52-5-171 to 52-5-186) adjacent to the investigation area are of significance, potentially at a regional level, and warrant total conservation. Direct impacts to this suite of sites must be avoided and indirect impacts must be managed and minimised. As a condition of any development approval under Part 4 for the immediately adjacent land, a Conservation Management Plan specific to the protection of these midden sites should be formulated by a heritage practitioner with suitable qualifications and experience, in consultation with the registered Aboriginal parties;

6) As a condition of any further heritage investigation associated with an application for development approval under Part 4 for the investigation area, the oral account recorded in the late 1970s by Jerrinja Elder, Mr Jack Campbell, and lodged with AIATSIS, of the middens adjacent to the investigation area and their importance to the Jerrinja community, should be researched;

7) Archaeological investigations should only be undertaken by archaeologist's qualified and experienced in Aboriginal heritage, in consultation with the registered Aboriginal stakeholders, and occur prior to any development impacts occurring;

8) Where impacts will be avoided to the identified heritage evidence, appropriate protective measures should be implemented for those sites in close proximity to the construction works;

9) Other land users (for example, Shoalhaven City Council) should be made aware of the nature and location of the Aboriginal sites identified during the present investigation (West Culburra 3/A, 4/A and 4/13) to ensure that inadvertent impacts are avoided;

10) As a general principle, all relevant contractors and staff engaged on the Proposal should receive heritage awareness training prior to commencing work on-site;

11) Should any previously unrecorded Aboriginal sites or objects be

detected prior to or during the course of development which are not covered by a Section 90 AHIP, work in the immediate vicinity of those objects would need to promptly cease and the finds be reported to the OEH and advice sought as to the appropriate course of action. If skeletal remains are identified, the proponent is required to immediately stop work and notify the appropriate authorities, including the Police and the OEH. If impacts cannot be avoided, a Section 90 AHIP would be required prior to any impacts occurring;

12) Under the terms of the NP&W Act it is an offence to harm or desecrate an object that the person knows is an Aboriginal object, or to harm an Aboriginal object ('strict liability offence'). Therefore, no activities or work should be undertaken within the Aboriginal site areas as described in this report without a valid Section 90 AHIP; and

13) Single copies of this report should be forwarded to the registered Aboriginal parties and the OEH.

The Aboriginal Heritage Report is at Appendix H.

2.6 European Heritage

The assessment was undertaken by Stedinger Associates.

The lead investigator is Dr Helen Stedinger.

The study commences with a detailed review of the historical context of the settlement in the Shoalhaven area in general and Culburra Beach in particular, noting the significance of Henry Halloran in the design of Culburra Beach and the marketing of the town lots.

The study incorporates a detailed assessment of the Land Units that make up the study area. This is followed by a discussion of the archaeological potential of the study area.

The conclusion of this section is the Statement of European Heritage Significance which reads as follows:

> 'The survey area at West Culburra is not considered to have historic, social or scientific heritage significance. This area has not been the location of intensive use or occupation. While only limited disturbance has occurred through land clearance and the installation of a sewerage pipe, the area is not anticipated to contain significant European archaeological relics. European heritage and archaeological items, features, sites and/or artefact bearing deposits are not present which might provide substantial or significant information on the settlement and development of Culburra or Shoalhaven region. Rather, it is the natural landscape in the vicinity of the proposed development that holds aesthetic significance, in particular the coastal wetlands and Mangroves of the Crookhaven Estuary to the north, the Lake Wollumboola catchment area to the south and pastoral landscapes to the west.'

The impact of the proposed development on each land unit is considered and these are assessed as follows:

'**Positive Impacts**.

- The potential impact of the proposed mixed use subdivision on European heritage is limited given the absence of significant European heritage items or features within the survey area.
- The proposed development is not located in an area of known European archaeological potential. Works within the proposed development areas are unlikely to have any impact on a European archaeological resource.
- The proposed development itself is a continuation of that commenced by Henry Halloran in 1921. It is part of the historic coastal development of Culburra and is being carried out by the Halloran family.'

Neutral Impacts

- Land clearance and excavations for housing construction, site levelling, construction of the new Collector Road, for the installation of the services such as the easement for the sewer main and the spur rising main for water supply and a new reservoir if required, will cause ground disturbance to the subject area. These works, however, are unlikely to impact any European archaeological resource. The disturbance of unanticipated relics must be reported to the NSW Department of Planning (Heritage Branch).
- Two European heritage items in the immediate vicinity of the development. These structures are of a modest nature being sheds and a yard associated with the dairy or beef industry. One is a mass concrete storage 'cool store' built in c.1910 and the other is a typical yard and shed and dates to the c.1960s. The impact of the present proposal on these structures would be minor.
- It should be noted that, with the absence of historic buildings and heritage streetscapes in the immediate vicinity, it is not appropriate for this report to suggest specifications on colour, style, form or layout.

Negative Impacts

- The proposal will involve the clearing of 80 to 90 hectares of re-growth woodland. The clearance of vegetation may expose views to the new development from adjoining natural landscapes including the Crookhaven River and estuary and the Wollumboola catchment. Views from neighbouring historic settlements, including Greenwell Point, are likely to be too distant to be

negatively impacted.

Mitigating Measure

1. Screening would lessen the visual impact of the development on the natural heritage landscape. Retaining areas of natural vegetation or planting may be used to partly screen and soften the presence of the new development. In part, the natural character of the area may be restored by selecting species local to the area.'

The study concludes with the following recommendations:

1. 'The proposed development should not be refused due to European heritage or non-indigenous archaeological potential. No significant European heritage items or features were located within the survey area (Areas 1 to 5).
2. The subject survey area is not considered to have non-indigenous archaeological potential. It is not reasonably expected that any works in the proposed development area might reveal significant or substantial in situ *relics* that may contribute to our knowledge of Culburra and the development of the local coastal area.
3. Two European heritage items in the immediate vicinity of the development. One is a mass concrete storage 'cool room' built in c.1910 and the other is a cattle yard and shed and dates to the c.1960s. These structures will be minimally impacted by the proposed development. No further action is necessary with regard to these items.
4. Retaining areas of natural vegetation and/or planting vegetation screens should be incorporated into the proposed development to lessen the visual impact of new buildings on adjoining natural landscapes.
5. In accordance with Section 146 of the NSW Heritage Act 1977 the accidental discovery of relics, other than those discussed in this report, will be reported immediately to the NSW Department of Planning (Heritage Branch) (Heritage Act 1977, section 146).
6. Should any Aboriginal objects be discovered during the proposed works, or otherwise, then their accidental discovery should be reported to the Director General of the NSW Department of Environment, Climate Change and Water (DECCW) and the relevant permits should be obtained under section 91 of the National Parks and Wildlife Act 1974.
7. Copies of this report should be forwarded to Shoalhaven City Council and Nowra Public Library (local studies section).'

The West Culburra European Heritage Assessment is Appendix I.

2.7 Site Analysis of the development areas

The several specific sites identified as stages in the Plan, (see Plan 1) are considered below. Following the description of the site specific characteristics the set of technical site investigations are reviewed. The full details of the investigations are presented in the technical reports in the appendices.

The site analysis of these four areas follows.

2.7.1 The site south of Culburra Road (Stage 1)

This 2.49ha site is bounded on the north by Culburra Road, on the east by the retirement village (the village comprises a series of large buildings in the northern half of the site and a loose cluster of some 50 dwellings in the southern half of the 3.5ha site), on the south by open grassland and woodland (there is no defined southern boundary) and on the west by the former Council Waste Tip which is proposed, with adjoining lands, as a sports complex for Culburra Beach.

The site is part Lot 5 and part Lot 6 DP106511. It has a 285m frontage to Culburra Road and a depth of from 50-85m being the distance to the divide from Culburra Road. A further 25m of grassland south of the divide is included in the site area as an asset protection zone.

The site is characterised by a barely discernable shallow ridge located 50-85m south of Culburra Road. This ridge is the divide between the Crookhaven and Lake Wollumboola catchments. The ridge has a shallow fall from west to east, approximately 2.5m over a distance of 285m or about 1 in 115. North of the ridge the land has a shallow slope of 1 in 80 to Culburra Road; south of the ridge the land falls at a constant slope of 1 in 40 towards the floor of the Wattle Creek catchment. No identifiable creek exists south of the subject land; the central floor of the Wattle Creek catchment is located 525m (projecting the east boundary in a southerly direction) and 425m (projecting the west boundary in a southerly direction) south of Culburra Road. The central floor of Wattle Creek is a Swamp Paperbark Closed Forest. Two fire trails provide access across the Wattle Creek catchment to Long Bow Point south of the subject site.

The site is grassland. The frontage to Culburra Road is entirely grassland with the density of woodland increasing towards the south (see photo 1).

The site has good solar access. It has a 285m frontage to Culburra Road in which are located all town services. Culburra Road is virtually flat and is within easy walking distance (400m) of the shops and services available in Culburra Beach town centre.

Ground conditions are firm and the area is well drained.

Photo 1: The development area south of Culburra Road

2.7.2 The site west of Culburra STP (Stages 2, 3 and 4)

The site comprises part Lot 6 DP1065111, part Lot 7 DP 1065111 and Portion 61 DP755971. The development site has an area of 63.83ha. This is the site of the new neighbourhood.

This site is located to the west of Culburra STP and the industrial zone. The northern boundary is defined by the 7(a) zone that edges the estuarine waters of Curleys Bay (east) and Crookhaven River (west). The southern boundary is defined by the ridgeline that divides the Lake Wollumboola catchment from that of Crookhaven River and Curleys Bay. The ridgeline cuts through the industrial zone, crossing the boundary to this parcel of land some 140 m north of Culburra Road. The western boundary of Portion 61 is the western boundary of the development site.

The site is some 1.4k long extending from the western boundary of the Industrial Zone and the STP to the western boundary of Portion 61 DP755971. The development site has a 2.2k long frontage to the 7(a) Environmental Protection 'A' (Ecology) Zone. This zone extends along the foreshore between the STP and the western boundary of Portion 61 and defines the northern boundary of the development site. The depth of the site

ranges from 580m on the line of Vista Avenue East to 515m at Vista Avenue West; the central section at its narrowest is 240m deep.

A 30m wide Crown Reserve extends along the 2.2km frontage to the Crookhaven River and Curleys Bay.

Photo 2: **View from Greenwell Point across the Crookhaven River towards the western end of the site of the new neighbourhood. Most of the site is screened from view by Billys Island.**

The principal characteristics of the ridgeline that defines the site are: (1) a noticeable rise to RL26 (this is the small hillock referred to elsewhere in the text) from RL21 at the boundary of the Industrial Zone over a distance of some 160m; (2) a low saddle some 500m west of the small hillock at RL16, approximately mid-way between the east and west boundaries of the site; and (3) a gentle rise over a distance of some 500m to RL26 at a point some 200m from the western boundary of the development site at which point the ridge turns sharply to the SW crossing the boundary at the SW corner of Portion 61; and (4) continuing to rise to a noticeable hilltop at RL38 which is some 500m SSW of the western boundary of the site; the ridgeline at the boundary of the site is at RL28. The slopes along the length of the ridgeline are in the range of 1 in 35 to 1 in 40.

The site slopes down from the divide to the north. The eastern section of the site slopes down to Curleys Bay, the central section slopes down to the gulch between Billys Island and the mainland and the western section slopes down

to Crookhaven River. These slopes are consistently in the range of 1 in 15 to 1 in 17.5 with some noticeably steeper slopes at about 1 in 12 towards the western part of the site. There are no formed drainage lines across the entire site (see Photo 2).

The site is mostly covered with dry woodland. The dominant woodland types are Blackbutt and Scribbly Gum Open Forest. The Blackbutt and Scribbly Gum Open Forest characterises almost all of the woodland north of Culburra Road. The transition from moist coastal vegetation to dry forest occurs in the 7(a) zone and is quite apparent; the transition generally coincides with, or is below the 5.0m contour line.

Some 12.52ha at the western end of the site is cleared for grazing; this area forms part of the adjoining paddocks.

The development site has excellent solar access and, at some points, attractive views over the river toward the distant hills. The area to the east has an outlook over Curleys Bay; that to the west has an outlook over the Crookhaven River.

The site is traversed by a 6m wide sewer easement serving Greenwell Point. The sewer line crosses the Crookhaven virtually at the western end of the site; the alignment is generally close to the northern boundary cutting inland to enter the STP site at a point about 400m in from Curleys Bay.

The site is criss-crossed by tracks; the main one follows the line of the sewer easement.

2.7.3 The Industrial Zone (Stage 5)

The site is part lot 6 DP1065111. It has an area of 7.74ha.

It is located between the STP and Culburra Road.. It has a 500m frontage to Culburra Road and a rear boundary to the STP of 550m. It has an eastern boundary (to the business zone) of 100m and a cranked western boundary (to the 2(c) Residential zone) of about 460m, with a depth of some 400m from Culburra Road.

Strathstone Street, off Culburra Road, provides access to the STP; Reg Moodie Close, off Strathstone Street, functions as an industrial service road parallel to Culburra Road. There is a cluster of five separate industrial properties at the eastern end occupying an area of about 1.5 ha and accessed by these two roads.

The catchment divide traverses the site crossing Culburra Road from south-east to north-west at the mid-point of the zone at RL18. The divide then traverses in a north-west direction for 300m before turning westwards at RL20 to the small hillock at a depth of about 200m from Culburra Road at RL26. The section south of the divide forms the headwaters of Wattle creek;

gradients south of the divide are about 1in 25. Gradients north of the divide, extending into the STP are about 1 in 30.

The site is all xeric woodland. This area is traversed by several tracks used for service access to the sewer easements and access to Curleys Bay. The vegetation here is relatively open with few significant trees (see Photo 3).

Photo 3: View towards industrial zone from Culburra Road.

That part of the zone area being generally located south of the divide is left undeveloped. The first stage of the collector road and the cycle-walkway are aligned through this part of the site.

2.7.4 Vista Park (R1)

Vista Park has an area of 3.21ha and is located between Culburra Road and Curleys Bay.

It has 120m splayed frontage to Culburra Road narrowing to a 50m frontage to Curleys Bay. It is about 440m long and is intended to provide a 'snapshot' view of Curleys Bay when approaching Culburra Beach from the west.

The site of the park and adjacent lands have a very slight fall of 1 in 40 to the north.

The land to be cleared for Vista Park is all woodland. Dry forest, mainly Blackbutt Open Forest and Black She-oak closed forest, dominates the

southern section of the site transitioning in the 7(a) zone, to Bangalay/Woollybutt Forest, Swamp Oak closed forest and Mangrove forest in the northern section adjacent to Curleys Bay.

2.7.5 The Foreshore Park (R2)

The Foreshore Park has an area of 21.61ha. It comprises three distinct sections: (1) the area east of the STP which is low lying and very flat; being readily accessible from Canal Street East it is vulnerable to desecration with soil heaps and dumped domestic objects being common throughout the area; (2) the area west of the STP through to the cleared park of Portion 61; this area, generally between RL7 and HWM, is characterised by relatively steep banks that mark the transition between the mesic and xeric plant communities; and (3) the cleared area to the west which is characterised by a consistent gradient of 1 in 20 to the low bank at the waters edge. Scattered clumps of Swamp Oak characterise the waters edge.

The topography along the foreshore park is very uneven. Although the height variation is only a few metres from high water mark (RL0) to the southern boundary of the zone (generally RL5-7) the slopes vary significantly. The foreshore zone east of the STP has a very shallow slope over a depth of 180m. The central section west of the STP is much more varied with quite steep banks with slopes of 1 in 7 or steeper occurring randomly. The western, cleared, section has a more consistent gradient of about 1 in 20 down to a low bank of the river edge.

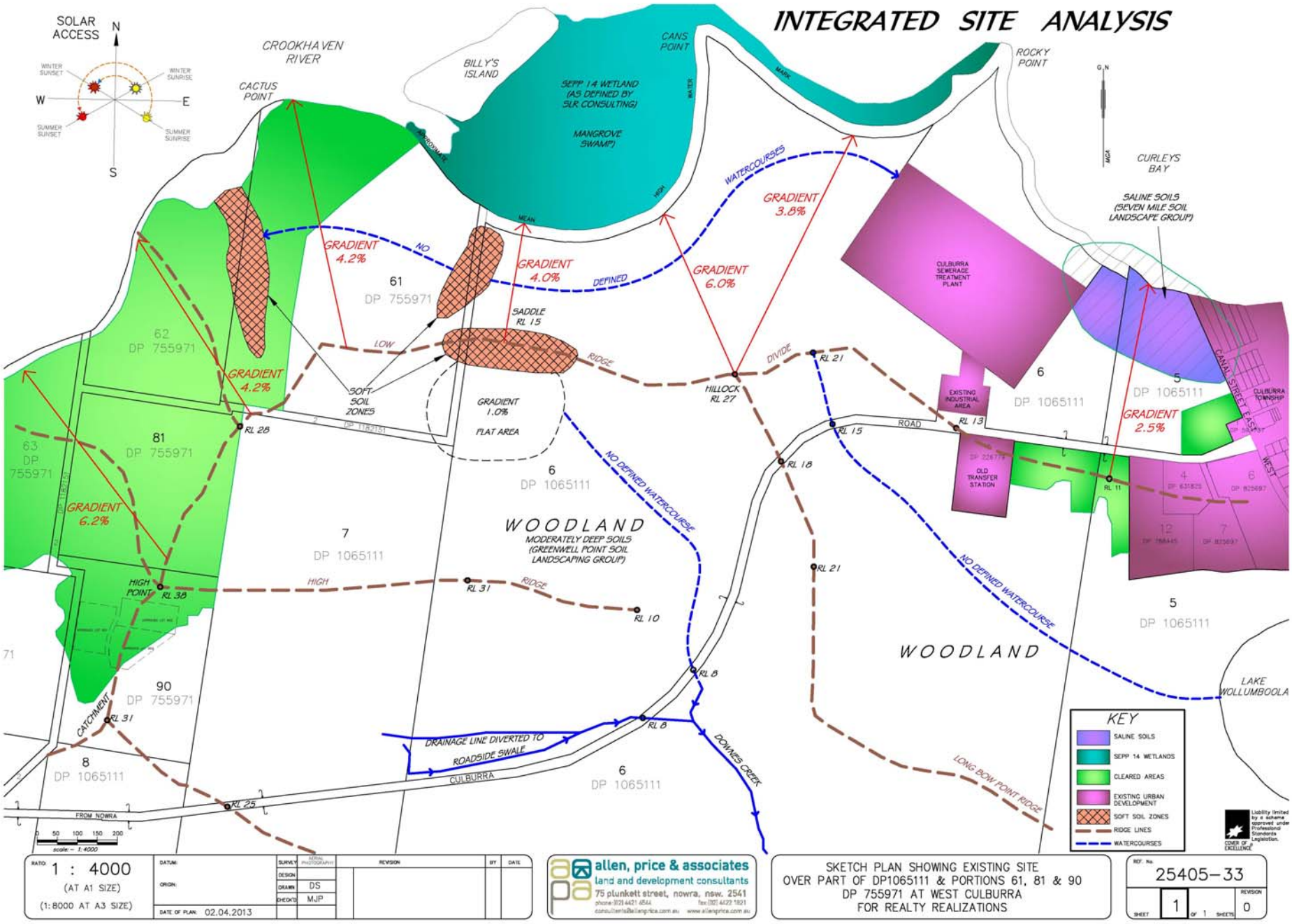
The several plant communities tend to occur at different levels with the dry communities dominant at the upper levels of the zone and the wet communities dominant at the lower levels.

2.7.6 The Oval (R3)

The oval has an area of 3.35ha. This area has very shallow gradients of 1 in 100 which render it eminently suitable for recreation purposes. Although all woodland, the density of trees here is very low, possibly reflecting the low level of groundwater identified in the groundwater assessment.

The oval is located in the upper arm of Downs Creek. There is no defined watercourse in this arm for a further 1000m downstream from the site of the oval; here it joins a drainage gutter formed alongside Culburra Road adjacent to the culvert.

These are the descriptions of the distinctive characteristics of each of the specific sites. The following is a summary of the technical reports that describe particular aspects of the areas to be developed.



Plan 6 – Key Elements of Site Analysis of Development Area

2.8 Analysis of the Physical Characteristics of the Development Areas

2.81 Geo-technical Analysis of the site

The Geotechnical Assessment was prepared by Martens Associates. The lead consultant is Andrew Norris.

The purpose of the assessment is to outline the suitability of the study areas for urban development.

The study included the following site investigations:

1. A general walkover to assess existing site conditions and to document site geomorphology.

2. Excavation of 25 boreholes.

3. Testing at 25 locations to determine soil strength properties, complementing borehole data.

4. Soil samples were collected from locations across the site to test for salinity, acid sulphate soils and other properties.

The physiographic site is described as follows: 'the majority of the site is elevated >5m AHD above the Crookhaven River estuary. Immediate foreshore areas are moderately steep and transitional between the study area and the estuary. Relief across the site is approximately 20m with slopes ranging from 2.5 – 5.0%'.

The hydrology is described as follows: 'site drainage ranges from good to poor, with poor draining areas characteristically associated with lower points of elevation in the landscape'. There are no watercourses draining the site.

The site is located on Wandrawandian siltstone. Immediate foreshore areas of the site, adjacent to the Crookhaven River estuary, consist of sedimentary units of gravel, sands, silts and clays overlaying siltstone.

Soils in the study area are described as 'predominately belonging to the Greenwell Point Soil Landscape Group and are typically shallow to moderately deep (<50cm to 100cm) loams.

Whilst not observed during field investigations, soil mapping suggests that the eastern periphery of the study area may contain the Seven Miles Soil Landscape Group; this group is genetically estuarine and comprises deep (>150cm) siliceous sands, and peats and humus podsoils.

The geotechnical investigation indicated that the soil mantle ranges in depth from 1.3-1.5m below ground level; with the underlying siltstone encountered

below 1.5m. Rock strength ranged from extremely to slightly weathered to depths of 5.5m. Significant rock outcropping was not observed on the site.

Soil strength estimates indicate soils below 0.3m are likely to have allowable bearing capacities ranging between 50-200 kPa, being suitable bearing capacity for standard shallow foundations for residential dwellings. Areas of the site identified as containing soft soils are likely to have lower bearing capacities which will require further investigation at the detailed design stage.

Initial investigations reveal that the rock weathering front occurs between 1.0-1.5m below ground level across the study area. Allowable bearing capacities of weathered rock between 300-600 kPa are likely to be encountered below 1.5m depth.

Localised soft soils were identified in several limited locations.

The potential for soil creep was investigated. The study recommended further investigation be undertaken to confirm the existence and possible extent of slope instability, particularly in areas of poor drainage and proposed development areas in proximity to the foreshore zone. Development over the balance of the site should be undertaken with good hillside construction practice and sound engineering principles.

The analysis indicates that the soils are generally non-saline. Soils in one borehole at the eastern end of the study area adjacent to Canal Street East were moderately to very saline throughout the soil profile. It is recommended that at the detailed design stage of any development in the eastern-most part of the study area detailed soil salinity tests should be undertaken.

An assessment of the presence of Acid Sulphate Soil (ASS) was undertaken as part of the study. The ASS Risk Map indicates potential ASS areas on the line of the Crookhaven River/Curleys Bay foreshore. It is concluded that, due to the characteristic local morphology, areas likely to exhibit ASS prevalence exist along the foreshore zone. It is noted that this area is protected by its zoning and a significant set-back.

A potential risk assessment of the proposed work was undertaken. The conclusion of the assessment is that soils are neither AASS or RASS but are inherently acidic derived from in-situ weathering of the underlying siltstone. However should development be considered within the 100m foreshore zone adjacent to Crookhaven River/Curleys Bay then ASS assessment should be required in this area.

The study concludes with a series of geotechnical constraints to be taken into account in the detailed planning stages. The study concludes that the site is generally geotechnically suitable for development; however it is recommended that further investigation be undertaken into the distribution and capacity of the areas characterised by soft soils; it is also recommended that detailed

salinity assessment is completed at the eastern end of the study area.

The study demonstrates that no specific geotechnical constraint exists with respect to foundations. However where soft soils occur these may require foundation treatment prior to construction.

Standard practice in relation to erosion control during and following clearing and construction; and to excavation, re-use of materials, filling and pavement preparation is proposed.

The report includes all the technical analyses and lab reports on soils and soil profiles.

The Geotechnical Assessment Report is Appendix J.

2.8.2 The Site Contamination Assessment

The Contamination Report is prepared by Martens and Associates Pty Limited. The lead consultant is Andrew Norris.

A preliminary (Stage 1) land contamination assessment has been undertaken.

The comprehensive site history indicates that the site has been cleared in the past, may have been used for grazing and is now, except for the cleared paddock to the west, substantially regrowth woodland. Some bulky waste items and a few small stockpiles of soil were identified but are not considered to be representative of widespread contamination.

Subject to the appropriate management of the identified stockpiles, dumped vehicles and any other such areas, the site is considered suitable for residential purposes.

The Contamination Report is Appendix K.

2.8.3 Groundwater Assessment

The Groundwater Assessment was undertaken by Martens and Associates Pty Ltd. The lead consultant is Andrew Norris.

The groundwater assessment repeats the characteristics of the site reported in the geo-technical assessment (see Appendix H)

The groundwater assessment is based on a site walkover, the completion of 26 boreholes, eight of which were used as groundwater monitoring bores (GMBs), monitoring of groundwater levels in the GMBs and rising/falling head tests in seven of the eight GMBs. Three samples of groundwater were collected for laboratory testing.

The aquifer layers are broadly classified as residual clay and siltstone. The residential clay extends from near natural surface to depths in the order of

1.3m BGL and is characterised by low hydraulic conductivity (K). The majority of boreholes within this stratum were drilled dry, even though the preceding month had above average rainfall.

Water bearing zones in the aquifer were observed in weathered siltstone from 3.2 to 4.2m BGL (BH1) to 6.4 to 7.0m BGL (BH2). Site testing for hydraulic conductivity (K) indicates the aquifers are of low permeability.

The results of testing the quality of the groundwater samples indicate the groundwater is acidic and has low nutrient levels; the samples range from fresh (west) to saline (east) to brackish (adjacent to waterways).

The potential impacts of reducing the areas of woodland and increasing the built-upon area are considered and assessed using the CLASS soil moisture model; the results indicate a minor increase in groundwater recharge which is not considered significant.

The assessment concludes as follows:

- The site contains two low permeability aquifers, being an unconfined shallow clay aquifer and a deeper confined aquifer in rock.
- The shallow clay aquifer was observed in 1 of the site's 8 GMBs within approximately 1m of the land surface in a low lying area of the site. Consequently, it is anticipated that shallow ephemeral aquifers shall exist in local drainage depressions.
- The deeper confined aquifer was observed in 3 of the site's 8 GMBs. This aquifer is confined by siltstone which typically occurs at a depth of approximately 1.3 mBGL. The water bearing zones for this aquifer are thought to comprise extremely weathered siltstone or clay seams. Water bearing zones were considered to be from 3.2 to 4.2mBGL (BH1), 6.5 to 7 mBGL (BHw) and 3.3 to 6.5 mBGL (BH6).
- Groundwater was not observed within 4 of the site's 8 GMBs.
- Shallow aquifer(s) beneath the site are likely to be ephemeral (ie non-permanent) in some areas, non-existent in others and permanent in low lying areas and areas with low grades.
- If shallow excavations (road pavements, service trenches and shallow footings) are proposed it is likely that works may intersect the shallow unconfined aquifer. This is to be assessed and managed through future construction works.
- The aquifers beneath the site are of low value to stakeholders (ecological and anthropogenic) given their low yield, limited distribution and ephemeral nature.

- Groundwater recharge will not be significantly altered due to the proposed development. Consequently, no mitigation is required to address changes to groundwater recharge which may impact downslope vegetation.

- In principle, groundwater is not expected to constrain site development. However, from a geotechnical perspective it is recommended that the findings in this report are considered for site engineering purposes.

The Groundwater Assessment Report is Appendix L. It is repeated as Section 3.0 of the Water Cycle Management Report.

2.8.4 Flood Assessment

The Flood Assessment Report was prepared by Allen Price & Associates. The lead consultant is Caroline Griffiths.

Following a brief description of the site and the proposed development, the author present the following data from Shoalhaven City Council Flood Certificate.

- 1% AEP level (existing): RL3.2m AHD
- 1% AEP level (2050): RL3.4m AHD
- 1% AEP level (2100): RL3.6m AHD
- Flood Planning Level (existing): RL3.7m AHD
- Flood Planning Level (2050): RL3.9m AHD
- Flood Planning Level (2100): RL4.1m AHD
- Hydraulic Category: Flood Storage – provisional
- Hazard Category: High – provisional

and

- The 5% AEP flood level and velocity is 2.3m AHD and 0.5m/s respectively;
- The 2% AEP flood level and velocity is 2.8m AHD and 0.5m/s respectively;
- The 1% AEP flood level and velocity is 3.2m AHD and 0.5m/s respectively;
- The PMF and velocity is 4.9m AHD and 0.5m/s respective;
- For the 1% AEP flood event, the site has been given a provisional Hydraulic Categorisation of High Hazard Flood Storage;
- Based on the above figures, site topography and an assessment of the impact of flooding of the proposed development the author concludes:
    - the 5% flood will inundate proposed reserves only. No dwelling will be inundated during this event;
    - the 5% flood will not inundate the road along the waterfront, however some infrastructure such as water quality basins, cycle ways and other embellishments of the reserves will be inundated once every 20 years

on average;

- the 2% flood will inundate proposed reserves only. No dwelling will be inundated during this event;
- the 2% flood will not inundate the road along the waterfront, however some infrastructure such as water quality basins, cycle ways and other embellishments of the reserves will be inundated once every 50 years on average;
- the 1% flood will inundate proposed reserves only. No dwelling will be inundated during this event;
- the 1% flood will not inundate the road along the waterfront, however some infrastructure such as water quality basins, cycle ways and other embellishments of the reserves will be inundated once every 100 years on average;
- The PMF will inundate the proposed reserves, some of the roads along the waterfront to a maximum depth of 200mm and some of the future development site with a velocity of 0.5m/s, the flood hazard (in accordance with Figures L1 and L2 of the Floodplain Development Manual is generally "low" unless water depth exceeds 800mm, where it is "medium" hazard (ie in the proposed reserves).
- Ingress and egress is "safe" for pedestrians and vehicles until flood water reach 800mm depth, however this would only occur in the proposed reserve areas and in all cases alternate ingress and egress is available flood free;
- The PMF will inundate a portion of the future development zone near Canal Street East only, however as this will be subject to further Development Approval this is not relevant for this application.

The report concludes, based on the above information, the 1% flood will only inundate proposed reserves; infrastructure such as water quality control basins, the proposed foreshore cycle/walkway and other embellishments may be inundated once every 50 years on average. No roads will be inundated in the 1% event. No dwelling will be inundated in this event.

The NSW Government Policy on Sea Level Rise is considered. The benchmarks adopted in Guideline 'Adapting to Sea Level Rise' identifies areas affected by flooding for further investigation. The subject site is caught by this clause and captured by the controls. The conclusion of this review is that the projected 2050 1% AEP plus 500mm equates to a figure of RL3.9AHD. The northern perimeter road is generally higher than RL5.0AHD.

The policy framework is then reviewed, specifically with reference to Shoalhaven LEP 1985 – Clause 21 – Development of Flood Liable Land and Shoalhaven DCP106 – Flood plain management. The proposal is tested against and satisfies the seven performance criteria.

The assessment concludes as follows:

- The site is flood prone only in the areas proposed as reserves;
- The 1% AEP flood level assuming a 2050 planning benchmark for sea level rise is RL3.4m AHD;
- In the 1% AEP event, the site is defined as High Hazard Flood Storage (noted on the flood certificate);
- The proposed development is proposed to be constructed with all lots created as a result of the development being above the level of RL3.9m AHD, which is equivalent to 500mm above the 1% AEP flood level assuming a 2050 planning benchmark for sea level rise;
- The proposed development is proposed to be constructed with all infrastructure above the level of RL3.4m AHD, which is equivalent to the 1% AEP flood level assuming a 2050 planning benchmark for sea level rise;
- The proposed development will have a negligible effect, if any, on flood behaviour;
- Egress from the proposed development in a PMF flood event assuming a 2100 planning benchmark for sea level rise is safe for pedestrians;
- Egress from the proposed development in a PMF flood event assuming a 2100 planning benchmark for sea level rise is safe for vehicular access;
- There will be no increase in demand for emergency services as all allotments will be above flood waters in a 1% AEP flood level assuming a 2050 planning benchmark for sea level rise and safe access is available for the all flood events up to and including the PMF assuming a 2100 planning benchmark for sea level rise.
- Flooding is not an impediment to the proposed development progressing.

The Flood Assessment Report is Appendix M.

2.8.5 Odour Impact Assessment

The Odour Impact Assessment was prepared by SLR Consulting Australia Pty Ltd. The lead consultant is Martin Doyle.

SLR Consulting understand that the proposed subdivision may encroach on the established buffer zone around the neighbouring Culburra Sewage Treatment Plant (the Project Site) and that an odour assessment is required to determine whether the proposed subdivision will introduce incompatible land uses and investigate the application of the 400m buffer distance as specified in Councils Development Control Plan (DCP 67).

An Odour Monitoring Program was conducted by SLR in conjunction with Odour Research Laboratories Australia (ORLA), and the resultant site specific

odour emission rates were used to quantify emissions from the existing sources at Culburra STP.

The advanced atmospheric dispersion model CALPUFF was selected to carry out the dispersion modelling calculations. The NSW OEH odour assessment criterion applicable to high density urban areas was used to assess the performance of the STP. This was based on the proposed number of dwellings in the surrounding area and the resultant population density of greater than 2,000 persons.

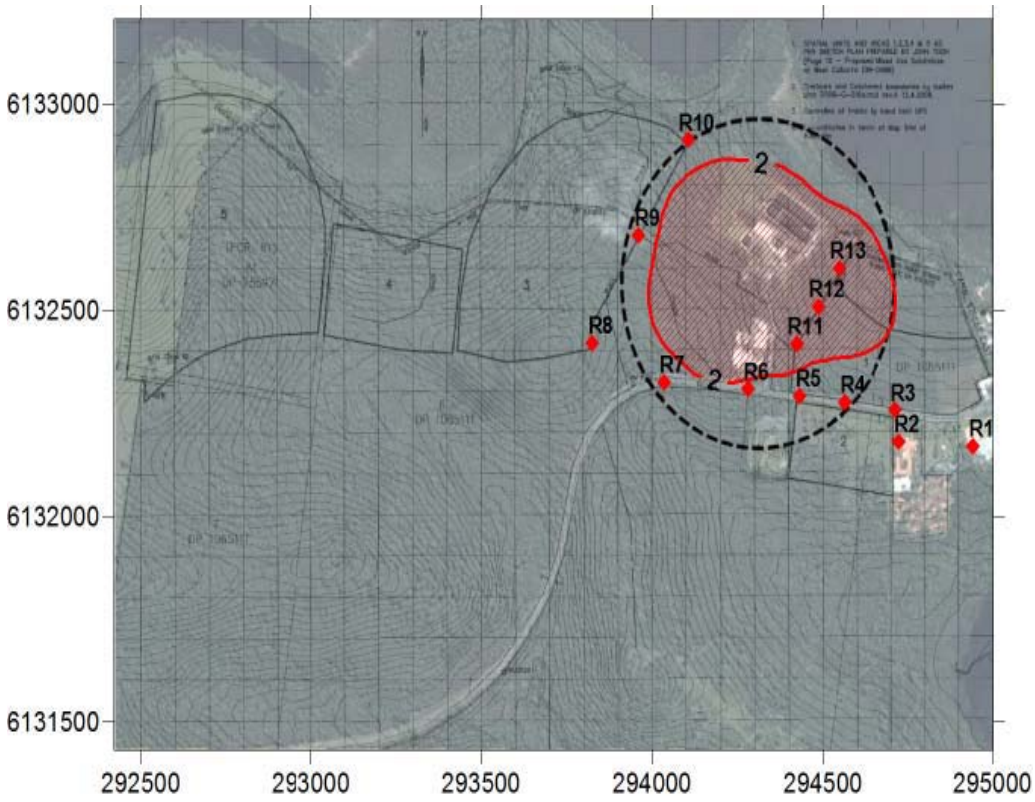
The results of the dispersion modelling for the Culburra STP suggest that no exceedance of the odour criterion of 2 odour units (2 OU) would occur beyond the 400m buffer zone. The potential for exceedance of the odour criterion was predicted for an area to the southeast of the proposed site, to a distance of approximately 400m, with the potential for introduction of incompatible land uses in the northwest corner of the Business zone.

The results by measuring station are shown in Table 1 and demonstrated spatially in Figure 1.

Table 1. Predicted 99th Percentile 1 Second Average Odour Concentration

Receptor ID	Location	Predicted Odour Concentration (OU) – Existing Operations
R1	Bowling club	0.4
R2	Existing Retirement Village	0.8
R3	Area2 Boundary N1	0.9
R4	Area2 Boundary N2	1.1
R5	Area 2 Boundary N3	1.5
R6	Proposed Sports Complex	1.8
R7	Proposed High School	1.5
R8	Area3 Boundary E1	1.1
R9	Area3 Boundary E2	1.1
R10	Area3 Boundary E3	1.0
R11	Area1 Boundary W1	**3.0**
R12	Area1 Boundary W2	**5.6**
R13	Area1 Boundary W3	**3.5**

Results greater than 2OU are highlighted in **bold red text**



2004 Meteorology, Emission Rates adopted from **Section 4.1**; Adopted Criterion – 2OU

Figure 1. 99th Percentile 1-second Average Odour Concentration - Culburra STP

Current NSW OEH guidance does not differentiate between commercial and residential properties in terms of the potential for odour impacts. It is however expected that the tolerance for offensive odour is higher in commercial areas than in residential areas where people may be subjected to the odour for a longer period of time.

The density of occupation in the industrial zone is expected to be much lower than the residential threshold. Tolerances are also expected to be higher in industrial workplaces. This, coupled with the absence of complaints from the existing industrial establishments, suggests that the expansion of the industrial zone in this location is acceptable although the 2 OU measure is exceeded.

The Odour Assessment Report is Appendix N.

2.9 The Ecological and Riparian Issues and Assessment

The Ecological Assessment for the Project was undertaken by SLR Consulting Pty Ltd. The leading investigator is Mr F. Dominic Fanning.

The SLR investigation and *Report* details the vegetation present on the 'West Culburra Project' site, and adjoining land to the south, as consisting of a mosaic of mostly xeric (dry) vegetation communities, with smaller areas of cleared grassland at the western and eastern ends of the Project site. The

Report also maps the vegetation present along the Crookhaven River foreshore and in the Crookhaven River estuary, and notes that mesic terrestrial vegetation is confined to a narrow band along the Crookhaven River foreshore (see Figure A).

The SLR Ecology *Report* states that the native vegetation on the Project site is generally in good to very good condition, although there are areas of disturbance and some areas of dense weed infestation, particularly along the Crookhaven River foreshore and immediately adjacent slopes. It is also noted in the SLR Ecology *Report* that much of the vegetation within the Project site had previously been cleared or significantly thinned for agricultural purposes, and that much of the vegetation present is therefore relatively recent regrowth. This circumstance explains the modest densities of hollow-bearing trees on the site, and the absence of hollow-bearing trees in various parts of the Project site.

With respect to habitat features for native wildlife, the SLR Ecology *Report* notes that there are no ponds, dams, wetlands, caves, rock piles or cliffs present on the Project site. The only 'special' habitat feature or resource for native fauna present on the Project site are the hollow-bearing trees, and these are patchy and at relatively low densities overall.

Despite ecological investigations on the Project site and in its immediate vicinity over nearly two decades, no threatened plant species have been recorded from the Project site, or any other portions of land nearby (*eg* Long Bow Point). Similarly, there are no "*endangered ecological communities*" (EECs) within the proposed development footprint on the land at Culburra, although the narrow band of mesic vegetation along the Crookhaven River has the floristic characteristics of some EECs.

A number of threatened fauna species have been recorded both on the Project site itself and in the near vicinity. Species which have been recorded on the Project site include the Powerful Owl, Glossy Black Cockatoo, Varied Sitella (once), Scarlet Robin (once), Grey-headed Flying Fox and several microchiropteran bats. Many of these species rely on tree-hollows for shelter or nesting, with the Powerful Owl and Glossy Black Cockatoo requiring large tree-hollows of particular types. The Square-tailed Kite and Little Eagle have been recorded soaring over the site. The Green & Golden Bell Frog has not been recorded on the Project site, and there is no suitable habitat for this species on the site itself.

The SLR Ecology *Report* acknowledges that all of the vegetation within the Project development footprint will ultimately be removed for the Culburra West Project, including all hollow-bearing trees. However, the loss of approximately 73 hectares of native xeric forest and woodland, and 92 hollow-bearing trees is not regarded as of ecological significance because:

- these resources constitute only a very minor fraction of those present in the locality and in the Jervis Bay region;

- there are very substantial tracts of such vegetation types and resources in the extensive conservation reserves, State Forests and private forested lands in the locality and in the Jervis Bay region;

- the threatened species recorded are highly mobile and/or are widely distributed in the locality and region; and

- there are no threatened species which would be reliant solely on habitats and/or resources within the Project site for their survival in the locality or region.

In addition, the SLR Ecology *Report*:

- notes that the overwhelming majority of the mesic forest communities (some of which could theoretically be EECs) are located within the Crookhaven River Foreshore Park, and are to be protected and rehabilitated as part of the Project;

- indicates that the estuarine and riverine habitats and ecosystems present along the Crookhaven River will be protected both by the 100m+ buffer between those ecosystems and the development (the Crookhaven River Foreshore Park) and by the comprehensive stormwater quality and volume management regime proposed;

- documents a *Hollow-bearing Tree Protocol*, which is designed to salvage and re-use all tree-hollows removed from the development footprint, to ensure there is no net loss of tree-hollows in the vicinity or locality;

- proposes a detailed *Vegetation Management Plan* for the Crookhaven River Foreshore Park which will rehabilitate the vegetation present (by weed removal and the use of vegetative material and tree-hollows removed from the Project site) and provide opportunities for public access and education; and

- proposes a mechanism for determining an appropriate area of offsets, using the biobanking methodology, to compensate for the removal of native vegetation from the development footprint.

The Ecological and Riparian assessment is at Appendix O.

Figure A. Vegetation Mapping of the Development Area

Part 3 – The Proposal, Subdivision Design, Layout and Desired Future Character

3.1 Planning Framework for the Project

The land has a total area of 102.23ha. It is comprised of the following: (1) a vista corridor cutting through the 3(f) business local and 7(a) environmental conservation zones located between the sewerage treatment plant (STP) and Canal Street East; (2) an area of cleared land south of Culburra Road and north of the divide zoned part 2(c) and part 5(a) special uses allocated to medium density housing; (3) an area located south of the STP and north of Culburra Road zoned 4(a) industry general and allocated to an industrial subdivision; this area encroaches on the lake catchment to a minor degree to enable the road serving the existing industrial subdivision to be extended into the new area in the form of a loop road; the sewer and drainage services in the existing road will likewise be extended into the new area; there will be no adverse impact on and no drainage into the lake catchment; and (4) an area of 63.83ha located west of the STP and north of Culburra Road which is allocated to a new residential district; this area is defined on the south by the divide and on the north by the 100m setback from the foreshore; the area is zoned 2(c) residential general; the foreshore zone is zoned 7(a) environmental conservation. The areas indicated by Stage or purpose, are detailed in Table 1.

Table 2. Development Areas and existing condition of land

Stages	Land Use	Woodland ha	Cleared ha	Area ha
Stage 1	residential	0	2.49	2.49
Stage 2	residential/mixed use	17.55	0	17.55
Stage 3	residential	22.79	0	22.79
Stage 4	residential/leisure	10.97	12.52	23.49
Stage 5	industrial	7.74	0	7.74
R1	recreation/vista park	3.21	0	3.21
R2	foreshore park	18.76	2.85	21.61
R3	recreation/oval	3.35	0	3.35
Totals		84.37	17.86	102.23

3.2 Urban Design Objectives for Culburra Beach

The desired future character of Culburra Beach and West Culburra flows from the analysis contained in Part 2 of this report and the recommended design methodology advocated in the Coastal Design Guidelines.

The area for the part 3A project will be quite distinct from the existing development. The key interfaces will be the section along Culburra Road between the proposed roundabout and the existing town centre. The major element, the new neighbourhood which might be assumed to have the greatest impact will not, in fact, be visible to the current population. The new neighbourhood is located some 1km north of Culburra Road and separated from it by the high ridge at RL30+.

Nevertheless the proposal has been shaped to yield benefits to the whole of Culburra. These are reflected in the desired urban form. The intended urban form is depicted in a series of sketches that are included at the end of this section.

3.3.1 Making the town centre more accessible

The primary objective has been to make the town centre more accessible for a greater number of people by: (1) adopting medium density building forms along the main road leading to Culburra Beach town centre; and (2) by integrating the new neighbourhood with the town centre by a set of direct routes for different modes of travel. The reinforcement of the town centre by concentrating building bulk, and population, around the town centre is considered a major opportunity in urban design, urban efficiency and urban structure terms. The medium rise buildings are intended to have a 'seaside' appearance. Avenue tree planning will enhance the sense of arrival and the sense of place. The alignment of the two cycle/walkways and the collector road aims to minimise the distance between the new neighbourhood and the existing town centre for pedestrian, cyclists, cars and buses.

3.3.2 Creating an active waterfront

The second objective has been to create an active waterfront extending from Canal Street East to the western end of the project area; and beyond subject to later planning approval. A 3.75km long cycle/walkway is proposed along the length of the waterfrontage which will be integrated with interpretations of cultural artefacts (the aboriginal middens) and areas of ecological interest, boat launching ramps and jetties. The western end of the waterfront is proposed as a 'leisure hub' focussing on the excellent access to the Crookhaven River. Sites are identified for waterfront activities such as cafés, restaurants and motels. The aim is to make the Crookhaven River and Curleys Bay a more accessible marine environment, whilst not adversely affecting the estuarine ecology or the oyster industry.

3.3.3 Creating memorable places

The third objective is to create a set of memorable places that will enhance the quality of life for both residents and visitors. One is the new road, the collector road, which is aligned generally along the ridge between the Crookhaven and Lake Wollumboola catchments. It is designed to provide

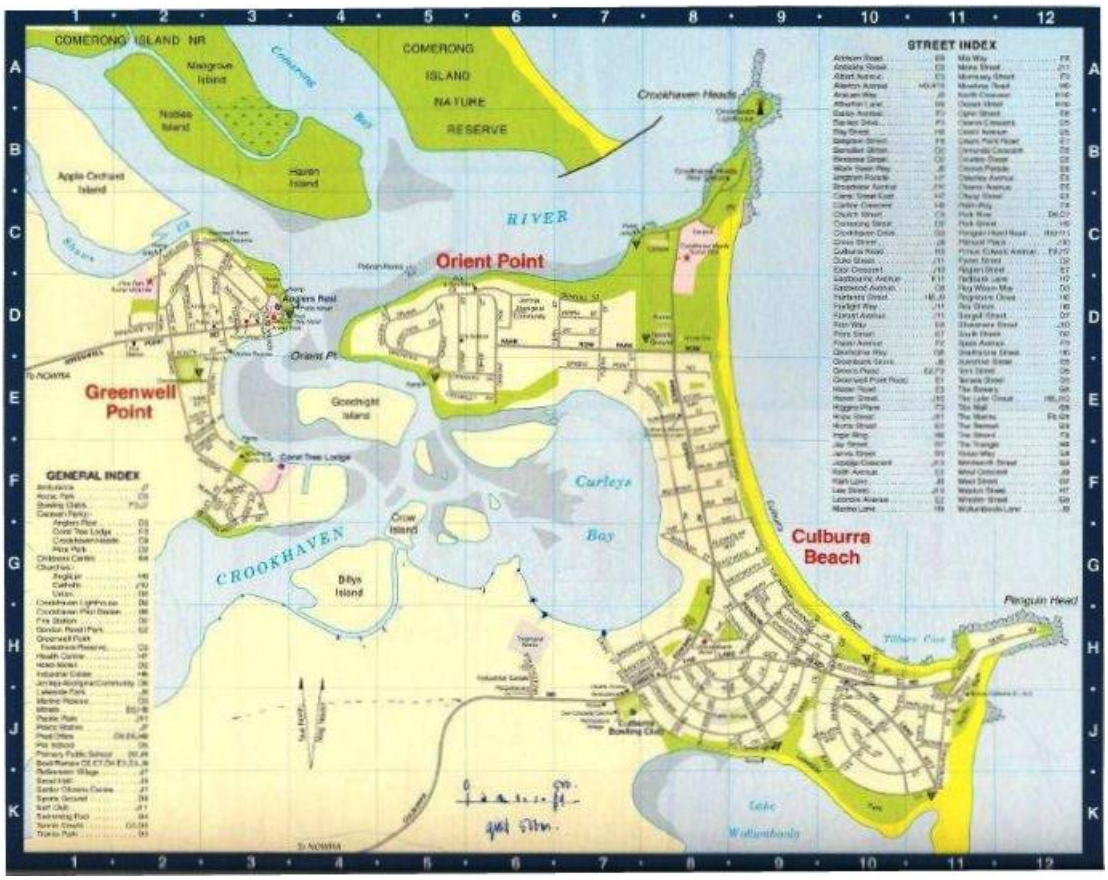
memorable views over the Crookhaven and the Shoalhaven flood plains towards Greenwell Point, to Mount Coolangatta and to Cambewarra Mountain. This road will function as a collector road for the new neighbourhood. It is shaped to have a series of focal points along its length. Aligned with the collector road will be a second cycle/walkway, 3.0 km long, which will provide direct access to Culburra Beach town centre and its associated facilities. This cycle/walkway will run from Canal Street East along Culburra Road, then adjacent to the Collector Road and generally along the ridge to a proposed Cambewarra Mountain lookout which is planned to be located at the high point on Cactus Point, where a local centre is to be proposed (not part of this project). The cycleway/walkway will link with the existing cycle/walkway located on Prince Edward Avenue. The second is the 'leisure hub' located on the Crookhaven River. The location is attractive, is well oriented and has excellent outlook. The aim is to create here a sense of place. The foreshore walkway will be linked to the 'leisure hub' which is intended as a focal point of the foreshore park.

3.3.4 Create a street layout that re-inforces the original plan for Culburra

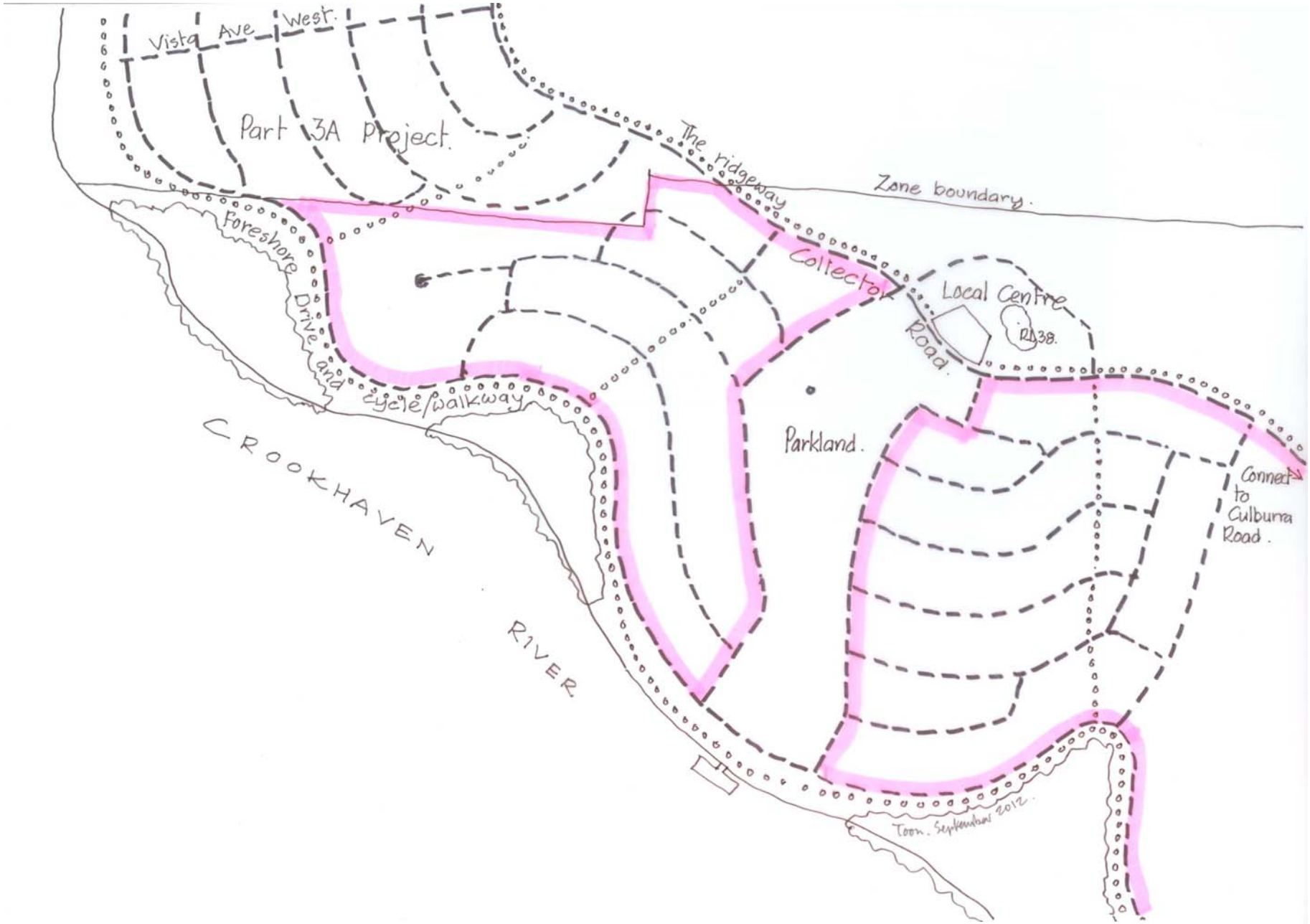
The fourth objective has been to design a street layout that reflects the street layout of Culburra Beach (see Plan 7). The original layout is modified in two distinctive ways. The first is that the major structuring roads have been designed as vista avenues providing views towards and over the water of the Crookhaven estuary. Such roads do not exist in the original pattern of crescents. The only example of a vista avenue in existing Culburra Beach is The Mall, which has less slope, and therefore less elevation, than the proposed avenues. The first vista avenue is aligned to capture the long water view over Curleys Bay towards Orient Point. The second vista avenue is aligned with Mount Coolangatta with near-distance views over the Crookhaven River to Greenwell Point. The land side of these vista avenues is in both cases local highpoints that will be given emphasis by architectural forms. A third vista is created close to the town centre by opening a cut through the existing vegetation in the 3(f) business zone. This vista provides views from Culburra Road to Curleys Bay and, in the distance, Orient Point. The purpose of this vista is to emphasise the proximity of the Curleys Bay waterfront to the town centre and to provide a legible visual link between the town centre and the proposed foreshore cycle/walkway.

The second component is the crescents which will have a more pronounced curve than the existing crescents. They are also better fitted to the topography than the crescents in Culburra Beach. Where the orientation of the slope is inconsistent with the pattern of curved streets then the street pattern is modified. Such variations as are necessary will mainly occur at the western end of the project site where it extends towards Cactus Point. The subdivision is designed to flow into the adjoining sites along with the completion of the Collector loop road.

The overall conceptual design of the West Culburra Mixed Use Concept Plan is based on the continuation of the loop collector road to an intersection with Culburra Road. The road generally follows the ridgeline which is the divide between the Crookhaven and Lake Wollumboola catchments. The land between the collector road and the Crookhaven River west of the Part 3A site is substantially cleared. A continuation of a similar pattern of residential development is envisaged on the adjacent land known as Cactus Point. A small local centre is proposed to be located at the high point (at RL 38.00) from which an open parkland axis will be struck aligned with the vista over the Berry floodplain to Cambewarra Mountain. The foreshore and ridgeline cycle/walkways will be extended through the extension area. A concept plan of the longer term proposal for Cactus Point is shown at Plan 8.



Plan 7. **Plan of Culburra Beach. The Plan shows the intersecting crescents oriented to the three water bodies - the Pacific Ocean, Lake Wollumboola and Curleys Bay.**



Plan 8 – Indicative Plan of Cactus Point

3.3 Desired Urban Form

There are seven main elements that combine to form the desired future character of Culburra Beach. These are outlined below. The illustrations are designed to give an impression of the desired future character.

3.3.1 Reinforcing the setting of Culburra Beach

Culburra Beach has a distinctive balance between the local vegetation – coastal brush along the dunes, mangrove fringed waterways around the estuary and woodlands on the gentle slopes that characterise the locality – and an unassertive form of urban development. It is a relaxed holiday town.

The proposal introduces new forms of urban development with the object of making Culburra Beach more identifiable as an urban place as well as retaining the holiday town atmosphere. The proposal aims to maintain the key elements of the landscape setting whilst introducing new elements – principally the vistas – that are designed to draw out the characteristics of the aquatic setting that gives Culburra Beach its distinctive identity. This is best demonstrated in the birds-eye views (see illustration 1 and 6).

3.3.2 Reinforcing Culburra Beach Town Centre

The project area includes lands within close proximity of the existing town centre. These lands are proposed for medium density development in the form of units and villas within easy walking distance of the town centre. The housing types will be suitable for the 55+ age group, for retirees, for young couples and for short-term visitors. Space will be allocated to tourist/recreation facilities to be provided by the private sector.

The two sites allocated to apartments on Culburra Road have a total area of about 0.7ha. Each site is approximately 3500m^2 and generously proportioned. Site coverage is anticipated to be about 35% with a site area per unit of 140m^2. This is a modest form of medium density development. The medium density apartments will be aligned along Culburra Road to create a strong built form edge to this approach road. It will announce arrival at Culburra Beach. This lead-in will be reinforced by avenue planting over the 900m length of straight road from the proposed roundabout to Canal Street East. Apartment buildings will be aligned along this arrival avenue; they will be designed to have a 'seaside' character with white stucco finishes, rounded balconies and the like and primary colour highlights (see illustration 5).

The single storey 55+ housing will be provided in two locations. One will be south of Culburra Road adjacent to the exiting retirement village. The other will be adjacent to The Circus in the new neighbourhood.

The town centre will also be strengthened by increasing the number of cycle/walkways that will radiate out from Culburra Beach town centre to places of interest and likely destinations such as the beach and surf club.

3.3.3 Forming a new collector road

The new collector road will eventually form a loop off Culburra Road. It is conceptualised as a wide boulevard carefully fitted to the land form.

The key determinant of this loop road is the location of the intersection with Culburra Road. This is in the form of a roundabout which is designed to mark the entrance to Culburra Beach (see illustration 8).

It is considered essential that the alignment provide a legible link between the new neighbourhood and Culburra Beach town centre. It is also considered essential from an estate development point of view that the entrance to the new neighbourhood be both visually and functionally separate from the adjoining industrial development.

The new road, springing off Culburra Road adjacent to the industrial zone, is shaped to sweep around the small hillock at about RL21.0; it then declines towards the saddle (at RL16) on an alignment that provides views into the oval (which is at a slightly lower level than the saddle). The road alignment then ascends westwards before skirting the north side of the relatively broad ridge to expose the dramatic views over the Crookhaven towards Mount Coolangatta, then following the ridge in a south-westerly direction to the high point exposing views towards the Cambewarra Range (see illustration 10).

The hillock and the western ridge have been identified as locations where an architectural statement will be required. These statements will terminate the landward side of the vista avenues. The intersection of these avenues with the collector road will be opened up with open grassland to emphasise the views down the vista avenues to the Crookhaven and/or Curleys Bay.

The new collector road is carefully aligned to provide a sequence of vistas along its length. It uses the landforms to create a memorable roadway.

3.3.4 Accessing the waterfront

The project offers the opportunity of creating a continuous cycle/walkway along the foreshore which can be designed to provide viewing locations demonstrating the variations in plant communities, the aboriginal middens and other features highlighted through interpretive signs combined with design elements introduced as part of the project such as waterfront cafés, jetties, boating facilities and avenues providing vistas to inland focal points. This waterfront accessway is conceptualised as a leisure walk, as a contribution to healthy living (with fitness apparatus items being located along its length) and as an attractive means of accessing the town centre for residents in the new

neighbourhood. It is intended that the accessway and the foreshore will be dedicated to Council (see illustration 9).

3.3.5 The ridgeway cycle/walkways

Inland and parallel to the foreshore cycle/walkway, a 'ridgeway' cycle/walkway is proposed aligned alongside the collector road and Culburra Road leading to the town centre. This is a relatively direct route which has mostly easy gradients along its 2.7k length It is anticipated that this cycle/walkway will be extended at least 500m into the adjoining lands to the west (Cactus Point) where the high point is envisaged as a local centre (see illustration 10 and Plan 3)

The aim is to make the ridgeway and the foreshore cycle/walkways attractive to all users with a long-term aim of linking them to an expanded network of cycle/walkways giving access to key recreation resources such as the beach, the existing sports facilities and the surf club.

3.3.6 The Vistas

The purpose of these vistas is to create a greater awareness of Culburra Beach being surrounded by water. As indicated in the earlier analysis the presence of water around Culburra Beach is generally not obvious.

The objective of the vistas is to bring the water bodies into the town.

Vista Park is located in the 3(f) Business zone. It provides a view corridor from Culburra Road to Curleys Bay as the town is entered; it is oriented slightly to the north-east to Orient Point and Crookhaven Heads.

Vista Park is in the form of an open grassed swathe with as few visual interruptions as possible thus emphasising the views to Curleys Bay.

The fall from Culburra Road (at RL11) to the edge of Curleys Bay is 11m over a distance of some 440m. The gradient at 1 in 40 is very flat. The distance across Curleys Bay is about 1500m. The view corridor needs to be at least 50m wide to compensate for the lack of elevation. This will involve some clearing of both the dry forest (Hard Leaved Scribbly Gum Woodland) and the moist forest (mainly Swamp Oak-Eucalypt Open Forest) plus a thin fringe of Grey Mangrove Forest around the lake edge. The vegetation loss in the 7(a) zone is not considered significant, amounting to slightly less than 1 ha of woodland. Both sides of the vista will be retained woodland, reinforcing the woodland setting of Culburra Beach (see illustration 11).

The benefit of this vista is that it provides a visual prompt of the proximity of water and the presence of an active waterfront from the main entrance point into Culburra Beach. The retained woodland edge will likewise provide a visual prompt of the woodland setting, emphasising the perspective through the view corridor.

Vista Avenue East is in the form of a 25m wide avenue providing views over Curleys Bay. The avenue is aligned slightly to the north-east from the small hillock (RL28) west of the STP to Curleys Bay, a distance of about 680m. The overall fall is about 1 in 25. The intersection of the vista avenue with the collector road (RL21.0) is about 500m from the edge of Curleys Bay. This intersection will be opened up with a flared set-back to emphasise the avenue by increasing its visibility from the collector road. The first 200m along Vista Avenue East from this intersection is relatively flat; then there is a fall from RL17 to the top of the bank at RL5 over a distance of 250m, a fall of about 1 in 20. The threshold to the more significant decline towards Curleys Bay is identified by an urban space in the form of a circus; the intention of this is to give emphasis to this vantage point through the enclosure of the threshold with a distinctive built form. The type of development proposed is three-storey mixed use town houses around a circus of about 35m radius (see illustration 2).

The benefit of this vista avenue is that it draws views of Curleys Bay into the subdivision thus emphasising the proximity of water. The vista will draw people to the waterfront which will be activated by the foreshore cycle/walkway and some commercial premises (see illustration 12).

Vista Avenue West is in the form of a 25m wide avenue oriented slightly northwest. The avenue is aligned from a point on the ridgeline at RL28 to the Crookhaven River, a distance of 670m with a significant and consistent slope of 1 in 24. The axis of the avenue is aligned with Mount Coolangatta which is prominent in this view. The landside terminal element will be an architectural element located on or near the ridgeline.

The intersection of Vista Avenue West with the collector road will be opened up with a flared set-back to emphasise the avenue by increasing its visibility from the collector road. The avenue will provide views down to the waterfront along its entire length; the vista will terminate in an active waterfront including a motel, a restaurant and a boat jetty on the Crookhaven River. The vista will embrace the wide stretch of the Crookhaven River and the residential waterfront of Greenwell Point on the opposite side of the river (see illustration 14).

The benefit of this avenue is that it will provide a visual prompt of the proximity of water and the presence of an active waterfront. This vista is considered to be visually powerful and will draw people to this section of waterfront which is intended to be the most active section with motel accommodation, at least one restaurant and boat activity associated with the jetty and a possible boat launching ramp.

These vistas are intended to give strong legibility to this new neighbourhood of Culburra Beach and to forge strong visual links with the district and its topographical setting.

3.3.7 The local road pattern

The distinctive curvilinear street pattern of Culburra Beach is replicated in a modified form in the new neighbourhood.

The curvilinear form is also adopted for several other reasons. One, it fits the contours very neatly; two, the lots are mostly oriented towards the north, thus enabling dwellings to take maximum advantage of the excellent solar conditions on these north facing slopes; three, the arrangement maximises the potential for view capture by multiple rows of dwellings; and four, the arrangement facilitates the introduction of a form of contour planning that enables drainage swales to be introduced in each crescent, thus arresting the rate and quantum of run-off.

The layout also provides high quality local access to the waterfront and to the collector road for both pedestrians and vehicles. The crescents lead to the vista avenues which are the primary links to both the waterfront and the collector road. The crescents return either directly or indirectly to the collector road which provides access to Culburra Beach town centre. The two east-west cycle/walkways connecting to Culburra Beach town centre are located along the waterfront and adjacent to the collector road. The collector road is the primary vehicle access to the new neighbourhood and to the sub-region; it is also the proposed bus route.

3.3.8 The landscape setting

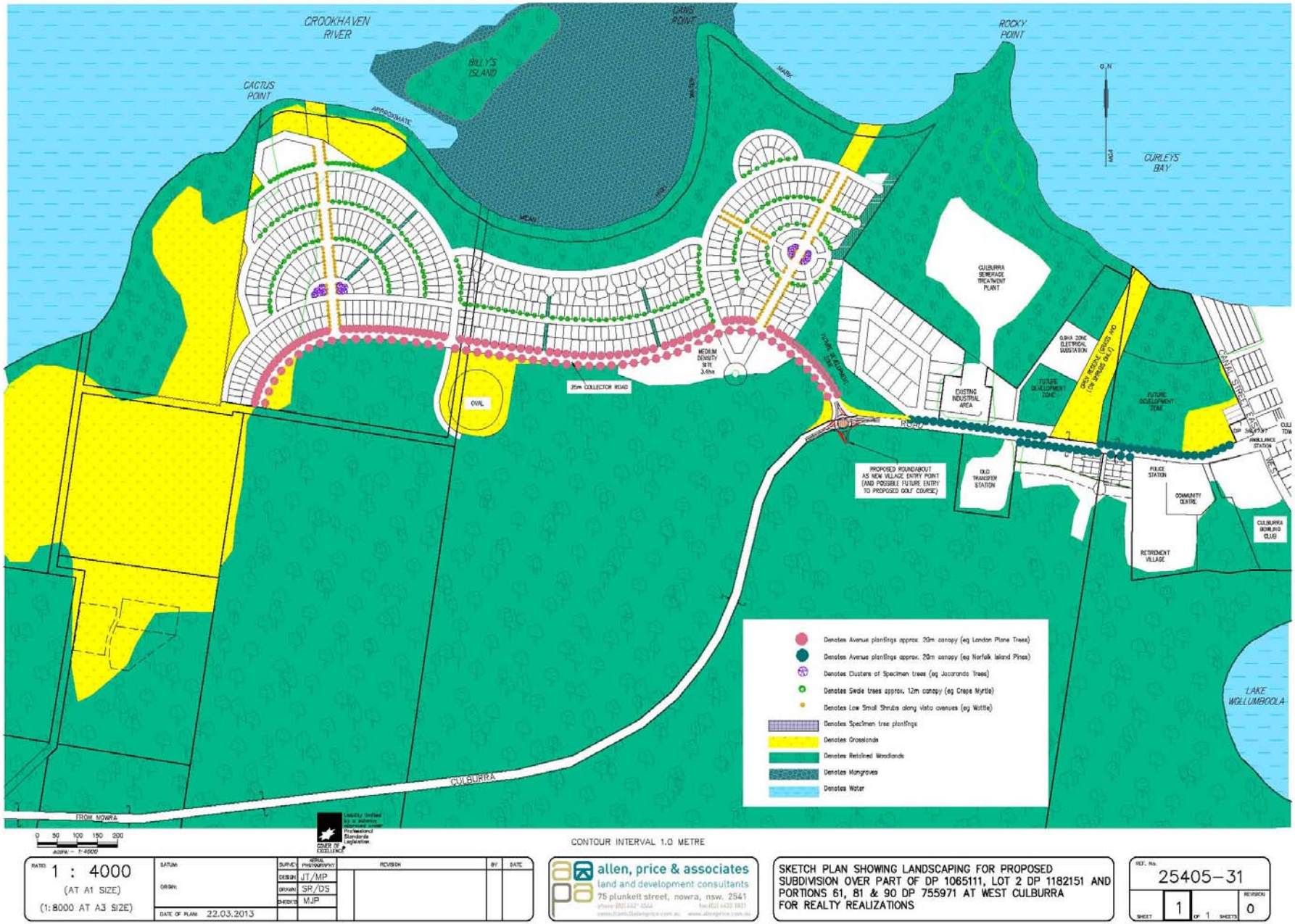
The landscape setting of Culburra Beach is dominated by shoreline vegetation along the beach, around the Crookhaven Headlands, the Crookhaven estuary and islands and around the foreshores of Lake Wollumboola. Planting within the existing township is partly retained trees and partly introduced exotic species. There is no coherent planting and, within the town, relatively low tree cover. Formal street planting is confined to a short section of West Crescent (Norfolk Island Pines).

Although Culburra Beach is set in woodland there is no defined edge.

The proposal aims to amend this lack of landscape coherence by introducing strong avenue planting in key streets as outlined below. This avenue planting will be contrasted with the retained foreshore and inland woodland.

The retained vegetation, in some cases rehabilitated where the native vegetation has been vandalised, will be supplemented by appropriate native species and grassland where public access is proposed, as, for example, along the foreshore cycle/walkway.

The new urban development will be set against a backdrop of existing vegetation. Significant areas of vegetation along Wattle Creek and on both sides of Culburra Road will be retained as visual screens to the development.



Plan 9 – The Landscape Plan

The proposed avenue planting is outlined below.

Culburra Road (roundabout to Canal Street East)

The aim here is to create a distinctive avenue using species associated with seaside towns such as Norfolk Island Pines. These will screen the adjoining residential flat buildings and provide a clear lead-in to the town centre. Where business uses are proposed they will be serviced by a service road with nose-in parking in the same manner as the existing shops.

The Collector Road

This road is located on or near the ridge. The aim here is to maintain a continuous canopy over the road, and over the ridge, so that the vegetated skyline is maintained. The tree type could be an exotic (eg London Plane or similar) or a native species typical of the locality (but they need to have a well shaped mantle and not to have disruptive roots). The road reservation is proposed to be 25m wide with a 2.5m wide cycle/walkway on the south side where there will be fewer crossings.

Vista Park

The object of this vista is to open up views of Curleys Bay from Culburra Road. The view corridor is proposed to be a minimum 50m wide. The northern section will be a swathe cut through the existing vegetation right to the edge of Curleys Bay, a distance of some 440m.

The Vista Avenues

The object of these two vistas is to open up views to the Crookhaven and Curleys Bay and to visually draw the water into the subdivision emphasising the sense of this being a waterside place.

The avenues are 25m wide. In order to maximise the view corridor tree planting is proposed at the street boundary. The tree type should be unobtrusive in form (a pyramidal mantle is preferred) and limited in height. The trees could be ornamental, flowering and with colourful (eg autumn) foliage. They certainly should be decorative. They should preferably not be too dense so that they allow unobstructed views to the water from dwellings adjacent to the street. The rear garden of adjoining houses should be screened by hedges up to about 1.8m in height.

The object of this specification is to minimise the impact of avenue planting on the view corridor.

The Landscape Plan

The Landscape Plan demonstrates the main features of the plan (see Plan 10).

It shows that the area covered by the Part 3A proposal is surrounded by large tracts of woodland. This reinforces the conclusion of the Visual Impact Analysis that the project is largely screened from view from public places by existing woodland; the only public place from which it will be seen is the southern tip of Greenwell Point.

The plan also shows how the proposed landscaping reinforces the distinctive form of the street layout, emphasised by the key structural elements by the use of avenue planting which is to have distinctive form and colour; the form of the residential streets is also emphasised by adopting distinctive tree types.

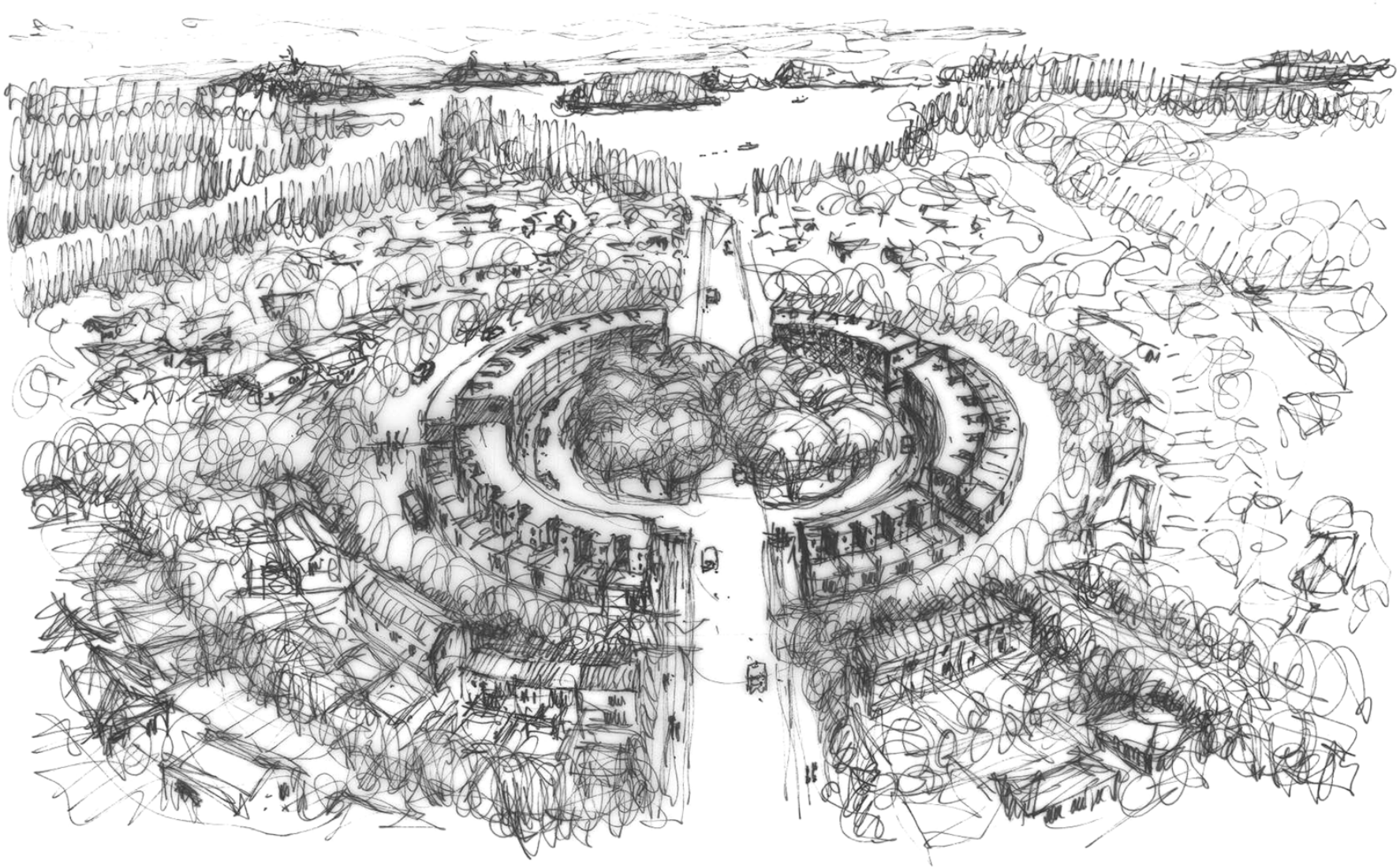
The principal urban places are distinguished by specimen trees which are intended to become associated with the particular place, emphasising the sense of place and creating memorable images.

The centre piece of the entire plan will be the foreshore park which will be accessed from the vista avenues, the foreshore drives and the 3.75km long cycle/walkway. The land/water interface is always attractive; here the conservation of significant ecologies and important cultural items in a land/water interface comprising retained woodland and coastal eco-systems is designed to create an important landscape feature for the use of Culburra Beach residents.

The Visual Impact Analysis contains several computer generated images of the principal elements of the landscape plan.

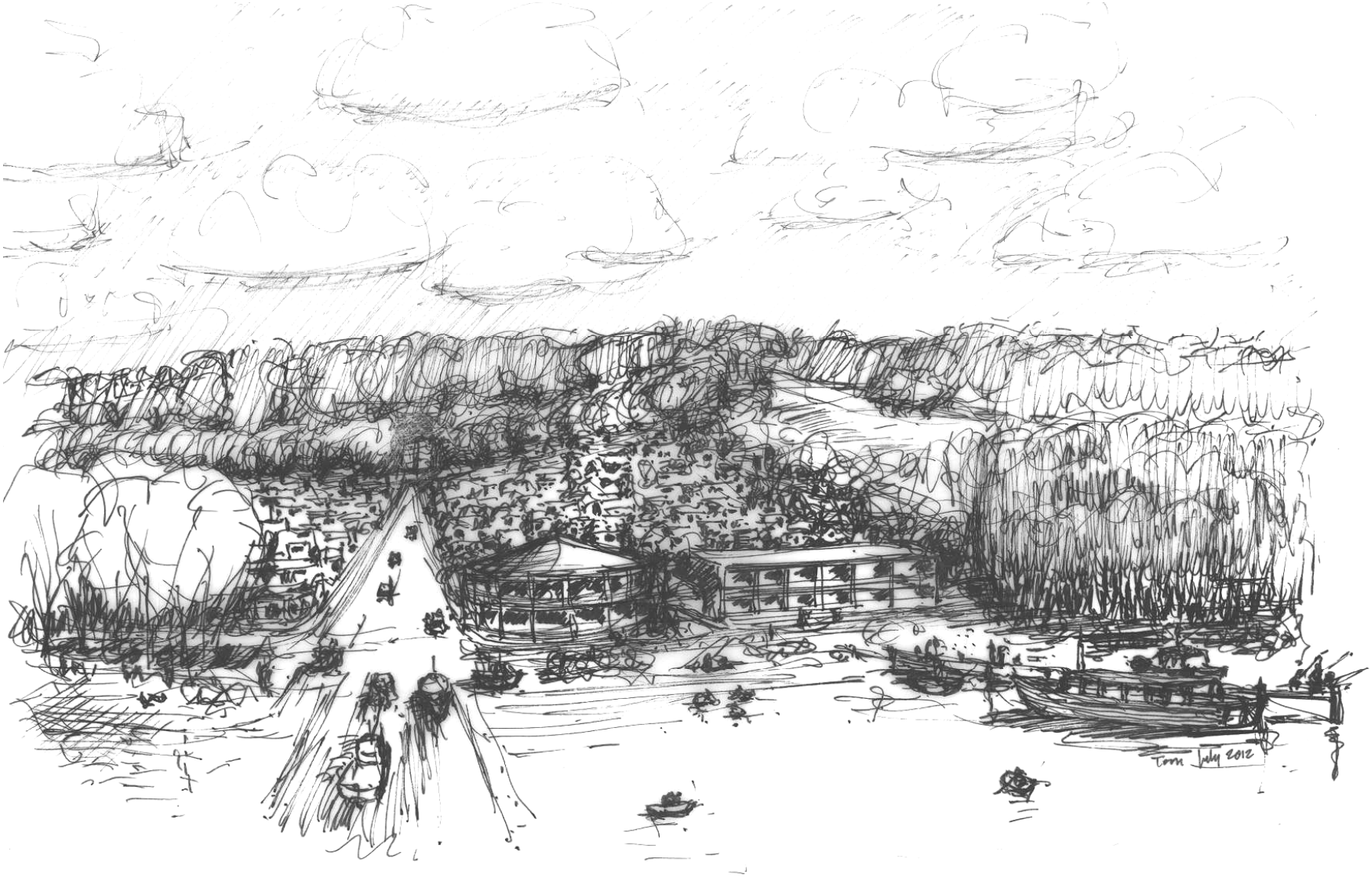
1. Birds-eye View of Culburra looking east

This illustration shows the new neighbourhood in the foreground, the strong avenue planting along Culburra Road in the mid-ground with the existing road pattern, the crescents, in the distance with Lake Wollumboola and the ocean defining the land form.



2. The Circus looking north to Curleys Bay

The Circus located astride Vista Avenue East is the centrepiece of the first stage of the new neighbourhood. It is proposed as a mixed use zone with two-storey residences over a business ground floor providing convenience shopping for the new neighbourhood and boutique business places. The centre of the circus is to be planted with a grove of distinctive trees.



3. The Crookhaven River Waterfront

This location is considered ideal for new leisure and recreation oriented businesses. The jetty and boat ramp will provide an access to the Crookhaven estuary for a range of tourist-oriented activities that will increase the range of leisure opportunities available in Culburra Beach.

4. The 55+ Housing

This will be offered as a range of single-storey house and land packages on 300m2 (minimum) lots. This view shows the Brighton Parade extension with the foreshore cycle/walkway leading to Culburra Beach shopping centre, with the retained foreshore vegetation at left.