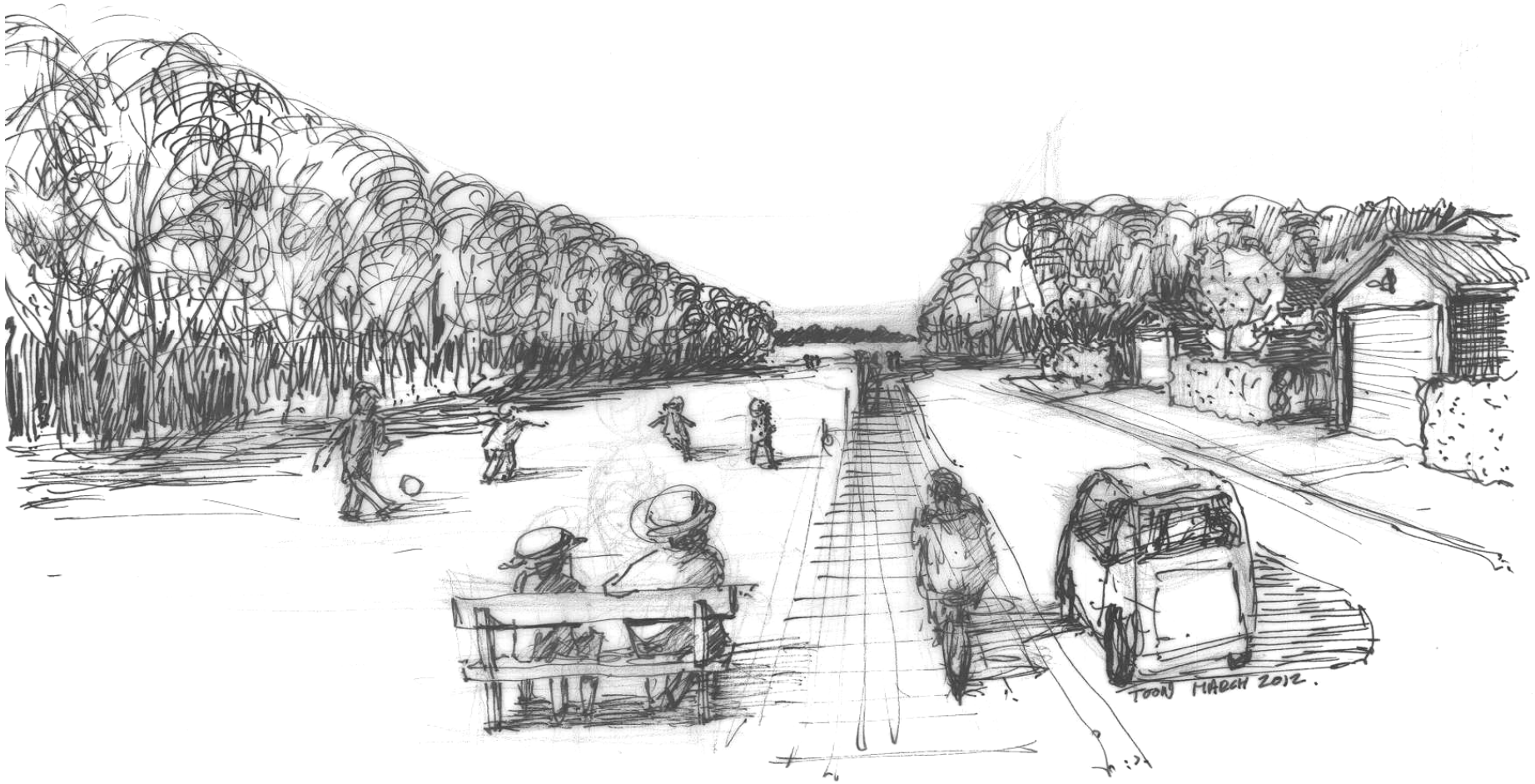
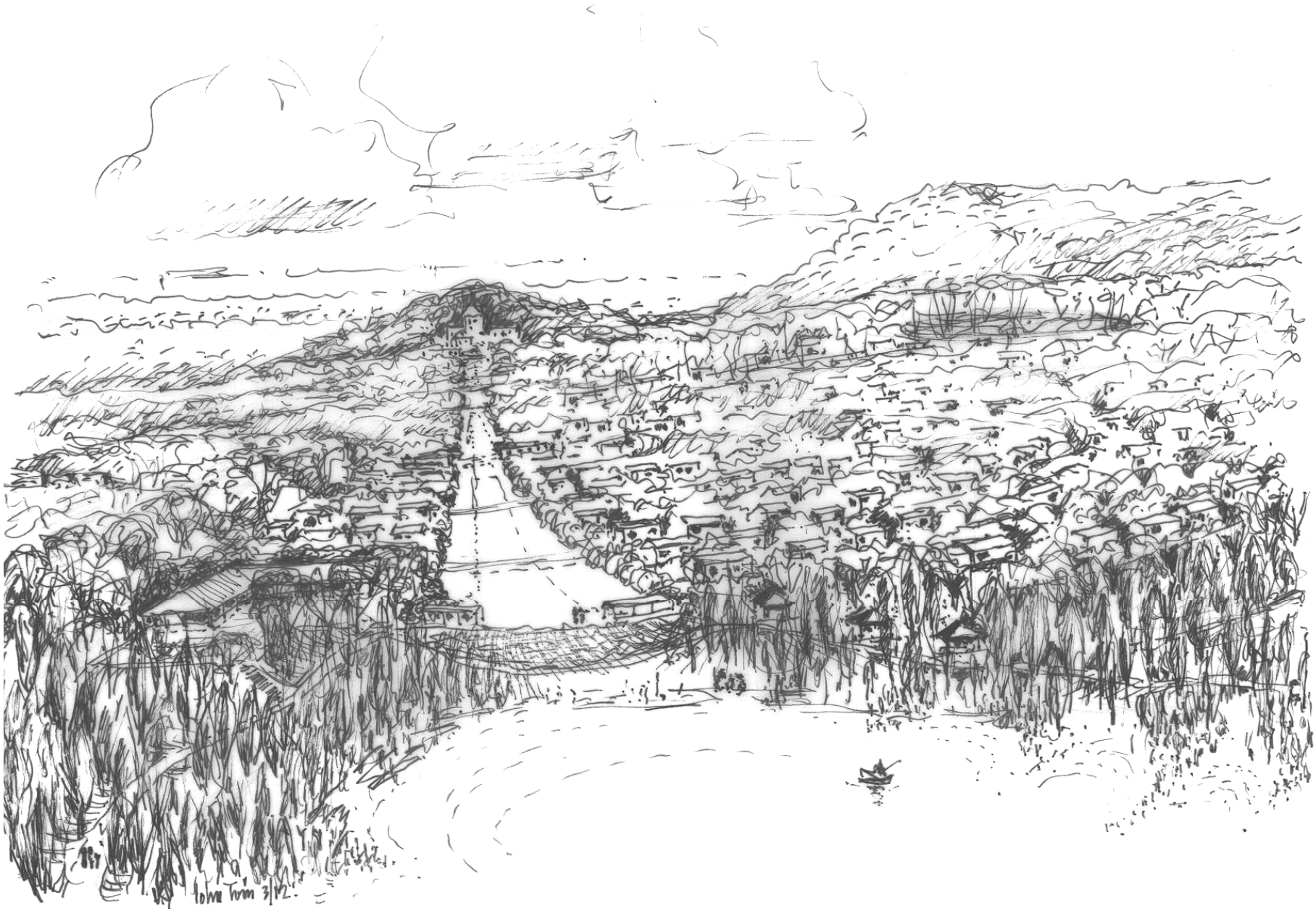
10. View along collector road looking west

The collector road is aligned along the ridgeline; avenue planting is proposed to provide a continuous canopy over the road. This view is at the saddle (at RL 16) with the oval at left and residential development at right. The principal cycle/walkway is shown at left. From here the road curves along the ridge rising to the western boundary (at RL 28).



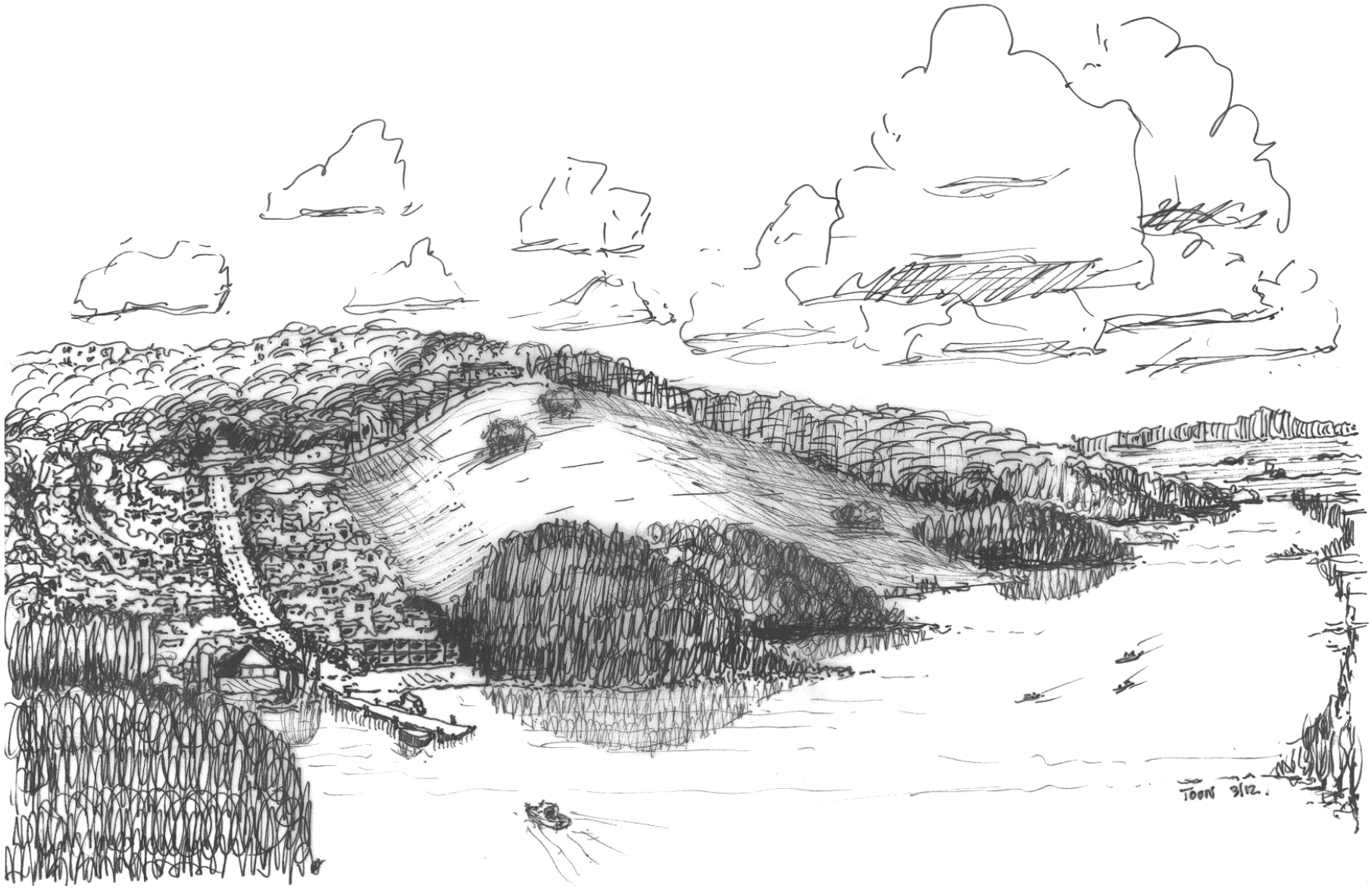
11. Vista Park looking north to Curleys Bay

This 50m wide vista is cut through the woodland to open up a view to Curleys Bay with Orient Point in the distance. A cycle/walkway through the park connects the Foreshore and Culburra Road cycle/walkways. The vista park will be grassed with minimum obstructions to the view.



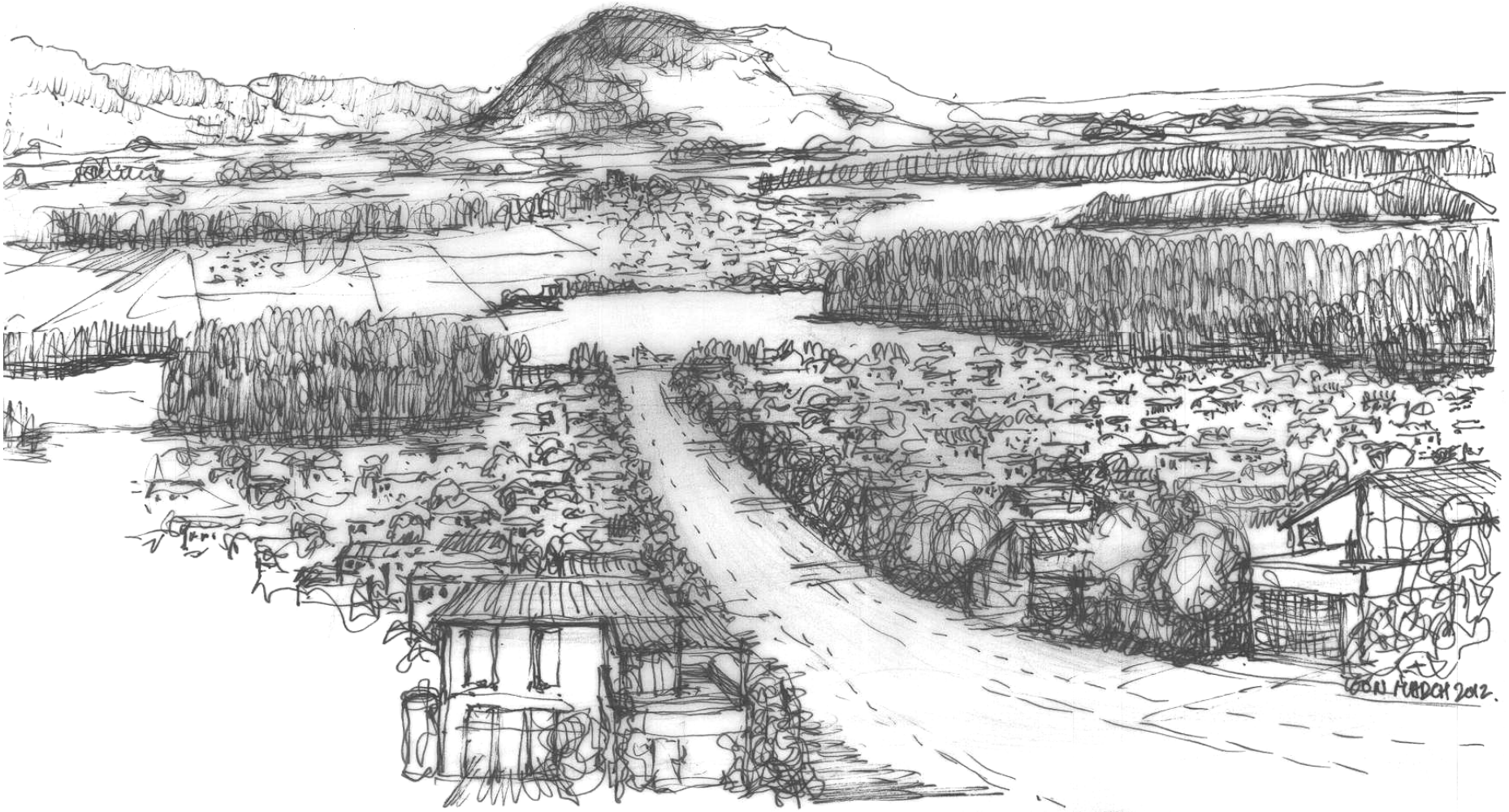
12. Vista Avenue East viewed from Curleys Bay

This view shows Curleys Bay in the foreground with access to the bay located at the end of the avenue. The foreshore cycle/walkway is shown meandering around the foreshore with BBQ shelters at right and a commercial use such as a café at left. The vista terminates in the 'outlook tower'.



13. Vista Avenue viewed from the Crookhaven River

This Vista avenue has an active waterfront to the Crookhaven River which here is 400m wide. The edge of the new neighbourhood is somewhat arbitrary; the bald slopes known as Cactus Point, are envisaged as a continuation of the new neighbourhood. The collector road with its distinctive canopy can be seen running from left; it will be extended to the high point at RL38 and thence to re-join Culburra Road on the far side of the high point. This is to be a later stage of development.



14. View from the Collector Road looking north along Visa Avenue West

This view demonstrates the outlook from the collector road. The view includes the Crookhaven River in the foreground, together with Greenwell Point, and Mount Coolangatta dominating the middle ground view with the Cambewarra Range in the distance.

3.4 Strategic Overview and Synthesis

Although there are essentially three separate sites in this Part 3A project, each with its distinctive zoning, site characteristics and constraints, a co-ordinated urban structure and urban design intention runs through the entire proposal.

All the key planning elements, that is the ecological value of the sites, the land use potential of the sites, the provision of infrastructure and the desired urban form have been woven together to produce a coherent urban development strategy for Culburra Beach.

The aims of this strategy are to revitalise Culburra Beach by reversing the process of population decline, by creating a diverse range of dwelling types and lot sizes, by capturing opportunities for economic activities and employment, by enhancing the range of recreational pursuits and by creating an active and accessible waterfront to Curleys Bay and the Crookhaven River.

3.4.1 Staging

The project will be developed on three fronts.

Work will commence initially with the construction of the 55+ housing south of Culburra Road (Stage 1) adjacent to the existing retirement village. We anticipate this residential development being carried out as a joint venture. The anticipated rate of sales is 15 dwellings per year.

Development of the 4-storey units on the south side of Culburra Road will be initiated simultaneously. This is also planned as a joint venture development. Commencement will depend on there being a sufficient number of pre-sales to satisfy bank lending criteria. Our initial sales estimate is 20 dwellings per year commencing in 2016.

Work on the new neighbourhood will commence at the same time. The first stage will include major water reticulation, sewerage infrastructure and the first stage of the Collector Road. Vista Avenue East, local residential roads and the roundabout connection will be developed as Stage 2 of the new neighbourhood. Sale of lots will commence when access to the land becomes available. Provisional estimates for sales are 50-70 lots per year. Sales are expected to commence in 2014. Consideration is being given to having a 'home exhibition' village located at the intersection of Vista Avenue East and the Collector Road.

Table 3. Estimated rate of sales by dwelling type (assuming Part 3A consent by end June 2013)

Dwelling	2013	2014	2015	2016	2017	2018
Stage 1						
55 + dwellings	11	10	-	20	20	20
Units	-	-	-	-	-	-
Stage 2						
Lots	-	30	40	50	60	60
55+ dwellings	-	-	5	5	5	5
Townhouses	-	-	-	10	10	10
Total Dwellings	11	40	45	86	95	95

Marketing of commercial sites and industrial sites in Stages 2 and 5 will run concurrently with the marketing of residential lots and dwellings. Sales of commercial and industrial sites are unpredictable.

3.4.2 Design Quality Controls

The intention is that Really Realizations Pty Ltd will undertake the development of the land, install roads and infrastructure and act as overall project managers.

The intention is to sell lots for individual dwellings, for industry and for commercial uses. The multi-dwelling projects, such as the small-lot 55+ housing, villas, town-houses and units are proposed to be joint ventures where Really Realizations Pty Ltd will have an input into the individual project design. In the latter cases Really Realizations Pty Ltd will develop site specific urban design guidelines in consultation with Council which joint venture partners will be required to satisfy.

The single lot housing development will be built to the relevant Shoalhaven Development Control Plan. The exception to this will be the larger single dwelling lots with frontage to the collector road. Here a greater average set-back will be required together with a requirement that enables vehicles to exit these sites in a forward direction (see Appendix V – Design Controls).

3.5 Technical Assessment of the Proposal

They key technical considerations are water cycle management, infrastructure provision, traffic, bushfire control and visual impact.

3.5.1 Water Cycle Management Report

This report documents the results of a conceptual water quality assessment, specifies a treatment train to achieve nominated water quality objectives, assesses the requirements for on-site detention and storm water quality control measures including controlled discharge into the adjoining mangrove environment, assesses the potential impacts on sensitive receiving environments including the identified SEPP 14 wetlands, seagrass beds and oyster leases, outlines a water quality monitoring plan, formulates a sediment and erosion control plan to address both construction and operation phases, and provides a statement of commitments relating to stormwater management.

Having established the site characteristic the report provides an assessment of groundwater conditions which are characterised as being in two low permeability aquifers being: (1) an unconfined layer of clay which is relatively dry and (2) an underlaying layer of siltstone which is confined with groundwater head levels ranging from 0.62 to 1.41m below ground level.

The groundwater is acidic and ranges from fresh (upper levels) to brackish at lower levels to saline adjacent to Canal Street East.

The report concludes that, in principle, groundwater is not expected to constrain site development.

With regards to water quality objectives the authors adopt Shoalhaven Council's draft 'Sustainable Stormwater Management DCP (2012)' which establishes the following pollutant retention (ie treated versus untreated) objectives:

- 90% of gross pollutants
- 85% of total suspended solids (TSS)
- 65% of total phosphorus (TP)
- 45% of total nitrogen (TN)
- 90% of total hydrocarbons

The treatment train is designed to achieve these objectives.

The Model for Urban Stormwater Improvement Conceptualisation (MUSIC) was used to evaluate pre-development (the existing conditions), the post-development (1) without and (2) with water quality structures.

The details of the modelling are included in the appendices of the report. The project area is divided into four catchments – the Crookhaven River catchment (western outlets), the SEPP 14 wetland catchment, the Curleys Bay (eastern outlets) catchment and the Lake Wollumboola catchment (the oval). These outlets were assessed separately to test for specific impacts on items such as seagrasses (Crookhaven), oyster leases (Crookhaven and

Curleys Bay) and the SEPP 14 wetlands (wetland outlets). The oval wetland is designed as a closed system with detained water being used to irrigate the oval with no impact downstream.

Essentially the recommended treatment train for the major estate consists of: (1) rainwater tanks storing water for domestic purposes; (2) stormwater units to remove gross pollutants, suspended solids and nutrients from stormwater run-off, vegetated bio-retention swales in residential streets, vegetated bio-retention basins and foreshore wetlands adjacent to the Billys Island outlets.

Special provisions are made for the oval and the Vista park.

The effectiveness of the treatment trains is reported as follows:

Table 4: **MUSIC results – NORBE assessment – Crookhaven River**

Parameter	Pre-Development	Post-Development	Achieved Reduction (%)	Complies (Y/N)
TSS (kg/year)	13500.0	10600.0	21%	Y
TP (kg/year)	32.5	30.6	6%	Y
TN (kg/year)	251.0	230.0	8%	Y
Gross Pollutants	898.0	898.0	0%	Y

Table 5: **MUSIC results – NORBE assessment – Lake Wollumboola**

Parameter	Pre-Development	Post-Development	Achieved Reduction (%)	Complies (Y/N)
TSS (kg/year)	164	143	13%	Y
TP (kg/year)	0.50	0.4	23%	Y
TN (kg/year)	5.2	4.3	18%	Y
Gross Pollutants	0.0	0.0	0%	Y

Table 6: **MUSIC results – NORBE assessment – (SEPP 14 Wetlands)**

Parameter	Pre-Development	Post-Development	Achieved Reduction (%)	Complies (Y/N)
TSS (kg/year)	1570	716	54%	Y
TP (kg/year)	4.67	3.9	16%	Y
TN (kg/year)	49.8	43.6	12%	Y
Gross Pollutants	0.0	0.0	0%	Y

Table 7: **MUSIC results – NORBE assessment – Seagrass and Oyster Leases**

Parameter	Pre-Development	Post-Development	Achieved Reduction (%)	Complies (Y/N)
TSS (kg/year)	12000	9860	18%	Y
TP (kg/year)	27.8	26.7	4%	Y
TN (kg/year)	201.0	187.0	7%	Y
Gross Pollutants	898.0	898.0	0%	Y

Table 8: **MUSIC results – NORBE assessment – Curleys Bay**

Parameter	Pre-Development	Post-Development	Achieved Reduction (%)	Complies (Y/N)
TSS (kg/year)	9150	8650	5%	Y
TP (kg/year)	17.3	16.2	6%	Y
TN (kg/year)	111.0	98.9	11%	Y
Gross Pollutants	898	898	0%	Y

The water quality impacts on the sensitive ecosystems that is, the SEPP 14 wetlands, the seagrasses, the oyster leases in the Crookhaven estuary and Lake Wollumboola are all assessed as being negligible.

The report concludes with recommendations for a monitoring regime to be put in place and a sediment and erosion control plan to be in place in the construction phase of the project.

All these recommendations are accepted by the proponent.

The Water Cycle Management Report is Appendix P.

3.5.2 Infrastructure Provision

The Infrastructure Report has been prepared by Allen Price and Associates. The lead consultant is Matt Philpott.

The first stage of development can be readily serviced by existing services in Culburra Road; which are part of the service system serving Culburra Beach. The development area of Stage 1 can be drained by gravity.

The new neighbourhood, Stages 2, 3 and 4, will be developed progressively from east to west. The rate of sales and housing starts will determine the length of time to complete the development. This development area will require new infrastructure. As part of the provision sections of the existing rising main (serving Greenwell Point) will be relocated to minimise conflict with future development areas. Initial discussions with Shoalhaven City Council have led to the identification of two options for sewerage. One is to install a

separate system dedicated to the new neighbourhood with 2 or 3 new pumping stations in the vicinity of the foreshore drive; the second is to integrate the proposed relocation of the rising main and the new neighbourhood system into one system serving both the new neighbourhood and Greenwell Point. Detailed studies will determine which option will be adopted. The exiting STP is designed to accommodate the additional growth implied by the new development.

The existing water supply to Culburra Beach has sufficient capacity to serve the development areas. No new infrastructure is necessary.

The subdivision roadworks, including surface water management swales and the first stage of the collector road will be built before the roundabout connection to Culburra Road is commenced. The latter will occur when sufficient land is available for sales to commence.

The substantial front end costs of getting the new neighbourhood established have yet to be fully detailed. They will determine the precise sequence of development.

The Infrastructure Report is Appendix Q.

3.5.3 The Transport and Accessibility Impact Assessment Report

The Transport and Accessibility Impact Assessment Report is prepared by GTA Consultants. The lead consultant is Ken Hollyoak.

The report commences with an investigation of existing conditions covering the following matters: the existing sub-regional road network; existing traffic volumes on this network; reporting the findings of a dedicated traffic survey; other relevant transport studies; public transport services; pedestrian infrastructure; cycle infrastructure; crash analysis; intersection operation and an assessment of the performance of the sub-regional road network.

The proposed development is then outlined in terms of the areas to be developed, the quantum of development and the principal elements of the proposed transport and access system.

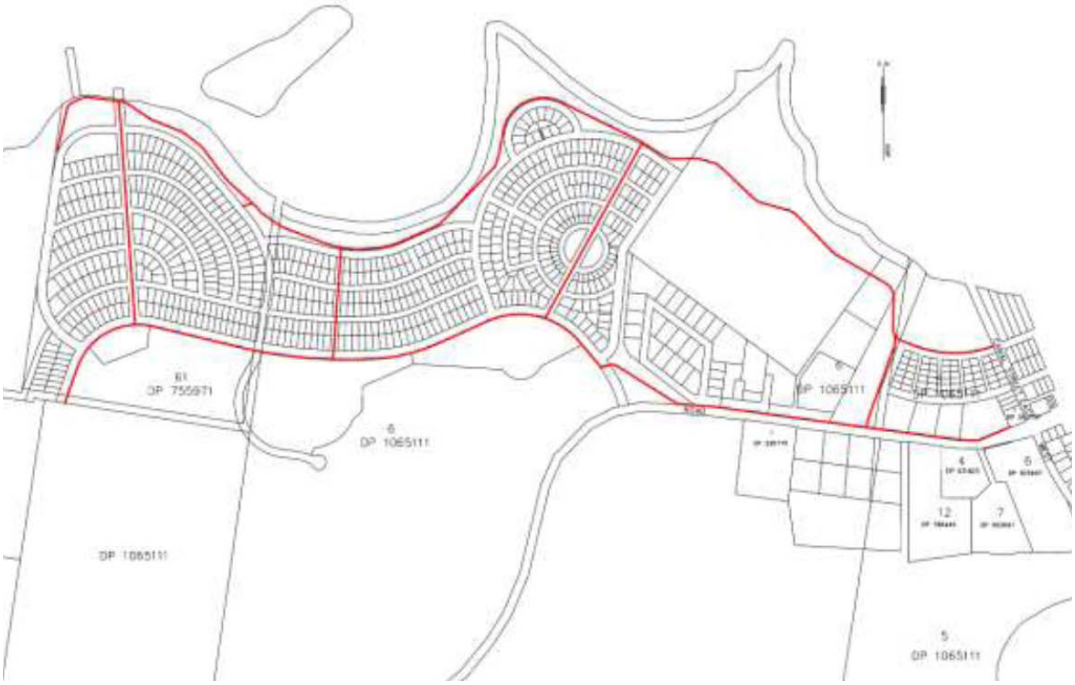


Figure 2: Proposed Cycleways

Figure 3: Prince Edward Avenue Existing Shared Path, Proposed and Possible Future Cycleways

The proposed cycle/walkways are then considered in relation to their purpose of linking the development with key destinations such as the town centre, the industrial zone and the proposed oval. The report endorses the concept,

making recommendations for a dedicated cycleway adjacent to the collector road and a shared way through the foreshore park.

The report then estimates the traffic generation of the proposed development when completely developed, estimated to be in 2022.

This is followed by an assessment of the traffic generated by the proposed development that leaves leaving the Culburra area, its assignment to routes and the weighting to be given to seasonal peaks. The impact of this traffic on the various roads and intersections affected is assessed.

The proposed location of the intersection between the proposed collector road and Culburra Road is then considered. The roundabout is endorsed as satisfying engineering design requirements; a concept design is developed and included in the report.

The consultants recommend that the 50 kph speed limit be moved to a position west of the roundabout in line with 'NSW Speed Zoning Guidelines (2012)' and that the 50 kph speed limit be applied to the collector road.

The Sustainable Transport Policies of the State Government and Shoalhaven City Council are then reviewed. The routing of the existing bus service to serve the new estate is then assessed in terms of the potential catchment of bus stops; the consultants present a diagram demonstrating the fact that more than 90% of the population will be within 400m of the proposed service.

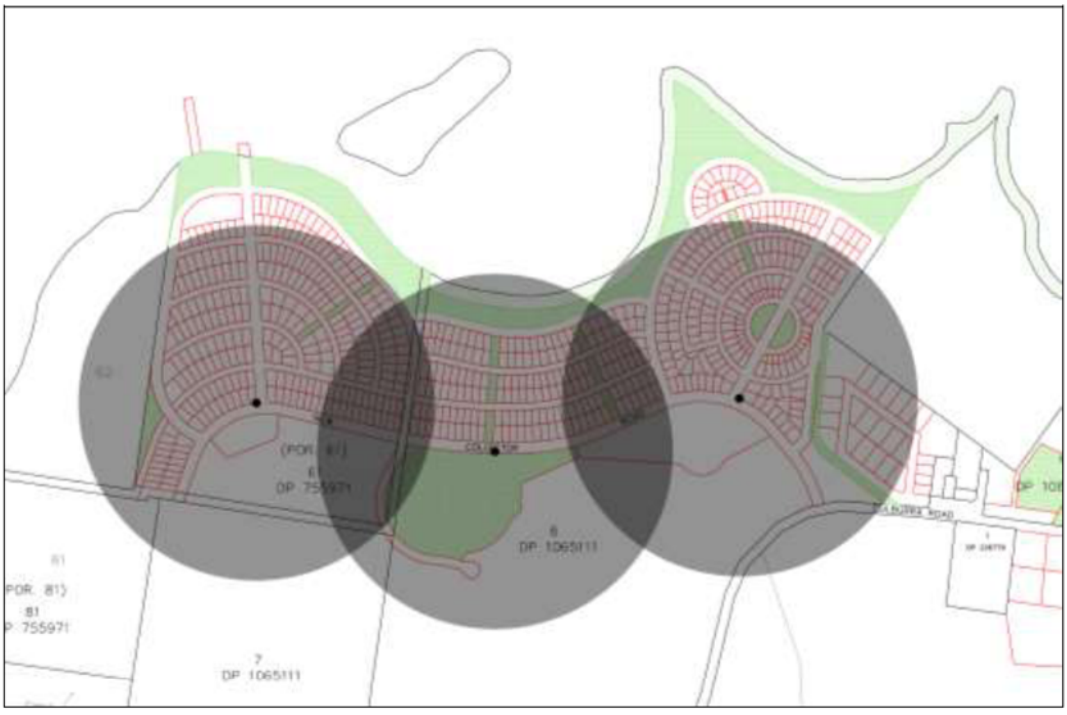


Figure 4: Potential bus stop locations and indicative 400 metre walking catchment

Based on the analysis presented in the report the consultants make the following conclusions:

i The West Culburra subdivision development involves approximately 105ha on land west of the established area of Culburra.

ii The subdivision is comprised of six key land units, proposed to be developed in stages over a period of approximately 8 years. On completion, the West Culburra Development will include a mixture of medium density housing types, ranging from small lots 2 bedroom villas for the 55+ aged group to multi-storey units.

iii The overall development includes a total of 685 dwellings consisting of:

- 500 dwelling houses
- 47 x small-lot two bedroom, single storey villas for the 55+ aged group
- 30 x mixed use, 3 bedroom town houses
- 10 x 1 bedroom units
- 83 x 2 bedroom apartments
- 15 x 3 bedroom units

iv The majority of development will be concentrated in land units 3, 4 and 5.

v A new Collector Road within a 25 metre wide road reserve is proposed through land units 3, 4 and 5 which will have two connections to Culburra Road. The eastern access will be the primary means of accessing these areas, as the western access will not be provided until a later stage of the development.

vi GTA Consultants undertook an assessment of the proposed eastern intersection of the Collector Road with Culburra Road to determine the most appropriate location, layout and dimensional requirements of the intersection. Based on this assignment, GTA Consultants produced an indicative concept design of the intersection consisting of a four arm single lane roundabout layout. The southern leg of the roundabout has been included in the concept design to show an alternative access point to the proposed Long Bow Point golf course.

vii It is anticipated that the existing 50km/hr speed limit in place on Culburra Road, approximately 350 metres east of Strathstone Street, will be extended west of the intersection to provide a 50km/hr speed limit on the western approach in line with the *NSW Speed Zoning Guidelines* (RMS, 2011).

viii The cycle network proposed as part of the development includes two key routes:

- East-west route along the foreshore area providing access to Culburra shops.

- East-west route along the proposed Collector Road and the northern side of Culburra Road providing access to Culburra shops.

The foreshore route is considered to be an excellent opportunity for a recreational cycle route and to promote cycle tourism in the region. The new Collector Road is considered to be the optimum alignment for a cycleway through land units 3, 4 and 5 to connect with Culburra shops to the east.

ix The Collector Road through land units 3, 4 and 5 will serve as the key route for the Culburra-Nowra public bus service and for school bush services and as such all accesses to the Collector Road are required to accommodate bus turning movements.

x It is recommended that the existing bus stops within Culburra and Orient Point be upgraded as part of the development to improve amenity and promote the use of public transport for existing residents outside the development areas.

xi It is recommended that all new bus stops provide shelter, seating, lighting, timetable information as a minimum.

xii A minimum of a 1.2 metre wide footpath is required on local and collector streets within a subdivision in line with DCP 100.

xiii With consideration of likely vehicle speeds and volumes along the Collector Road, it is recommended that a separated cycle facility be provided along this alignment in line with the NSW Bicycle Guidelines.

xiv For shared pedestrian and cycle paths associated within the development, it is recommended to provide a minimum 3 metre width given their potential as recreational routes.

xv Given the traffic volumes along Culburra Road, it is recommended to provide a separated facility along the northern side of Culburra Road to provide access between land units 3, 4 and 5, Culburra shops and land unit 1.

xvi Further consideration is required for the connection of footways and cycleways constructed as part of the development with the existing cycling network to provide a consistent standard of facility.

xvii It is anticipated that refuse collection for the new development areas will be undertaken by a standard 12.5 metre long Council garbage vehicle.

xviii Based on empirical traffic generation rates calculated from analysis of