

ENVIRONMENTAL ASSESSMENT REPORT

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MAJOR PROJECT – PART 3A

**ENVIRONMENTAL PLANNING
AND ASSESSMENT ACT, 1979**

PROPOSED SUBDIVISION

**LOT 3 DP 568613 and LOT 384 DP 755952
GEORGE EVANS ROAD AND JONSSON ROAD
MUNDAMIA**

Prepared for

Twynam Mundamia Pty Ltd

April 2013



Prepared by:

COWMAN STODDART PTY LTD

PROPOSED SUBDIVISION

LOT 3 DP 568613 AND LOT 384 DP 755952
GEORGE EVANS ROAD AND JONSSON ROAD
MUNDAMIA

Ref. 08/64

Town Planning, Agricultural & Environmental Consultants

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SUBMISSION OF ENVIRONMENTAL ASSESSMENT

Prepared under the Environmental Planning and Assessment Act 1979

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Part 3A activity	
Proponent Name	Allen Price & Associates on behalf of Twynam Mundamia Pty Ltd
Proponent Address	75 Plunkett Street, Nowra
Land on which activity to be carried out	George Evans Road, Mundamia Lot 3 DP 568613 and Lot 384 DP 755952
Project	Subdivision Comprising 312 Residential Lots, 4 Open Space Lots and 1 Large Lot Residential.
Environmental Assessment	An Environmental Assessment (EA) is attached.
Declaration	I declare that I have prepared this Environmental Assessment to the best of my knowledge: <ul style="list-style-type: none">• It has been prepared in accordance with the relevant provisions of the Environmental Planning and Assessment Regulation 2000;• The information which it contains is neither false nor misleading information.
Signature	
Name	Stuart Dixon
Date	5 th April 2013

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EXECUTIVE SUMMARY

This Environmental Assessment (EA) has been prepared in support of a Major Project application for a residential subdivision at Mundamia, located within the Shoalhaven City Council's New Living Area No. 5 which is to the west of the Nowra township. The application is made pursuant to Part 3A of the Environmental Planning and Assessment Act, 1979. The development is a major project given the location of the site within the Coastal Zone, and the scale of this subdivision which proposes 312 lots, well in excess of 25 allotments which trigger these provisions.

A Preliminary Assessment was submitted to the Department of Planning on 18 June 2008 to which the Minister subsequently replied by accepting the project as a Major Project and issued Director General's Requirements for the project. The DGRs were initially issued for a limited period which has subsequently lapsed, and as a result, amended DGRs were issued on 20th October 2010 reflecting new requirements. This Environmental Assessment considers the issues raised by the Director-General of the Department of Planning in the Environmental Assessment Requirements, issued 20th October 2010.

The proposed subdivision plan provides for the development of 312 residential allotments, one rural residential allotment, and public reserves, in a traditional Torrens Title scheme. This subdivision is within the residential release area proposed to be zoned R1 under the provisions of Draft Shoalhaven LEP 2013 to implement the *Nowra Bomaderry Structure Plan* (NBSP) adopted by SCC and endorsed by the Department of Planning.

The rezoning of the whole Mundamia release area in accordance with the NBSP envisages the creation of 720 residential dwellings (over a number of landholdings) and 9.5 ha of environmental conservation zone. This proposed zoning outcome is the result of extensive environmental studies carried out as part of the NBSP and consultation with the Department of Environment and Climate Change (DECC) and other agencies. The rezoning outcome is based on the creation of a residential R1 zone over the less constrained land being primarily highly disturbed and of lower habitat value, whilst rezoning the higher quality biodiversity land to E2 Environmental Conservation to enable its ongoing preservation.

The development will be undertaken in 12 stages, developed over a number of years dependent on market conditions.

In preparing this EAR, the following separate reports have been prepared to address the Environmental Assessment requirements and are relied upon:

- *Transport Report for Proposed Residential Subdivision, Mundamia* – Colston Budd Hunt & Kafes Pty Ltd;
- *Flora and Fauna Issues and Assessment Report* – SLR Global Environmental Solutions;
- *Preliminary Geotechnical and Constraints Assessment* undertaken by Martens Consulting Engineers;
- *Stage 1 Contamination Assessment, Stage 2 Environmental Site Assessment and Remedial Action Plan* prepared by Martens Consulting Engineers;
- *Bushfire Protection Assessment* – Eco Logical Australia;
- *Water Cycle Management Report* – Storm Consulting Pty Ltd, which incorporates a specific *Hydrogeological Assessment* prepared by Martens Consulting Engineers;
- *Mundamia Investigation Area, West Nowra, Aboriginal Heritage Assessment* – South-East Archaeology Pty Ltd;
- *Landscape Plan* – Peter Phillips Landscape Architecture;
- *Utilities Investigations Report* – Allen Price and Associates; and
- *Construction Management Plan* - Allen Price & Associates.

In addition, the proposal has been designed in cognisance of urban design masterplanning undertaken by the Cox Group in the development of the Mundamia Masterplan which was prepared for the Mundamia New Living Area.

Site and Surrounds

The subject site is legally described as Lot 3 DP 568613 and Lot 384 DP 755952 and has a total area of some 43 ha. The site is bounded generally by an unformed Crown Road reserve to the west, Jonsson Road to the north-west, private property to the north and east, Crown land to the south-east and an undeveloped portion associated with the University of Wollongong to the south-west.

The site is located approximately 2.7 km to the west of the Nowra CBD (straight line distance).

The site is identified in the *Nowra Bomaderry Structure Plan (NBSP)* as being within a New Living Area, to be known as Mundamia. This is being implemented in the provisions of Draft Shoalhaven LEP 2013 which proposes that 31.03 ha of the site is to be zoned residential R1 and 9.49 ha is proposed to be zoned E2 – Environmental Conservation, with the conservation zoning representing 22 % of the site area. This proposed zoning is based on conserving the higher biodiversity value land along the eastern periphery of the site to E2 Environmental Conservation, whilst locating the residential development largely on the highly disturbed low biodiversity value pasture land.

The site is adjacent to residential and rural allotments to the north, and the Shoalhaven Campus of the University of Wollongong and TAFE sited to the south west of the property.

The site is within the coastal zone as it is within one kilometre of the Shoalhaven River, however in practice, the site does not have a strong relationship with the riverine environment as a sandstone escarpment is a significant physical barrier which prevents access. Furthermore, the site is not visible from the Shoalhaven River.

Environmental Assessment

The proposed development has been designed in response to the environmental constraints that have been identified by the most recent Director-General's Environmental Assessment Requirements and in the reports prepared to accompany the application. It is intended that this will create a sustainable new living area.

Strategic Planning

SCC and the Department of Planning (DoP) have adopted the NBSP in order to plan for the further growth of the Nowra Bomaderry urban area for the next 20-30 year period. The NBSP is also acknowledged by the DoP in the *South Coast Regional Strategy* (SCRS). The NBSP, in addition to identifying certain lands for a variety of land uses, also addresses the release of residential expansion areas. The NBSP adopts 7 such areas, 3 of which are south of the Shoalhaven River, and 4 of which are to its north.

The NBSP has identified the site as being within New Living Area No. 5, to be known as Mundamia, and this has been designated as an area to provide for residential development. Having regard to the release of land in the Mundamia area, the NBSP has identified it as being favoured for development in the short term due to its location south of the Shoalhaven River with this development not adding to traffic congestion at the existing river crossing.

SCC is intending to implement segments of the NBSP in conjunction with the city-wide review of its LEP which is currently being undertaken in order to implement the Standard Instrument LEP. To this end, SCC is currently exhibiting Draft Shoalhaven LEP 2013 and this proposes to zone the site both Residential R1 and Environmental Conservation E2.

In preparing the NBSP, and in its further implementation, studies have been undertaken of the Mundamia area which, amongst other things, has identified areas having higher ecological significance. It is these lands which are proposed to be zoned E2 in Draft Shoalhaven LEP 2013, and these lands are proposed to be conserved in this major project subdivision.

Draft Shoalhaven LEP 2013 will require gazettal in order to allow the major project proposal to proceed.

Council has recently resolved to in principle agreement to the preparation of a planning agreement for the Mundamia Urban Release Area in conjunction with all landowners in the area. This will ultimately address matters including the provision of further infrastructure such as:

- external traffic improvements,
- realignment and construction of external roads,
- central open space,
- a community centre,
- drainage works in an ecologically sensitive manner, and
- contributions toward city-wide and planning area wide projects.

In addition to the statutory outcomes, Mundamia is also the subject of a number of Masterplanning Principles which have been adopted by SCC to guide its future development. These aim to achieve a new living area which is sustainable and has a character which sets it apart from other nearby urban areas. The proposal is consistent with the requirements of the Mundamia Masterplan and principles in the main, because the site will have a unique character with good integration with surrounding forested lands.

Subdivision Design, Layout and Desired Future Character

The site and proposed development are subject to a number of State Environmental Planning Policies (SEPP No 71, SEPP Major Projects), the Illawarra Regional Environmental Plan, Shoalhaven Local Environmental Plan, and Development Control Plan No 100 – Subdivision Code.

The site is not the subject of a place based Development Control Plan, however SCC has adopted a Masterplan and Masterplanning Principles and the proposal is consistent with these guidelines.

The proposal is also consistent with the provisions of Development Control Plan No 100 – Subdivision Code as it applies to land zoned for residential purposes.

Visual Impact

The site is not considered to be visually prominent due to the nature of the site, its location, and the topography of the site and surrounding lands.

Contained within this EA is a visual assessment to consider the visual impacts of the development, and in consideration of this matter, long sections have been produced along potential sight lines, and photographic analysis has been undertaken. This analysis demonstrates that the site is not prominent and is not visible from any waterbody, and visual impacts are generally internal.

Infrastructure Provision

The development proposes the establishment of residential allotments in a new living area which is planned for urban expansion. Accompanying the EA is a “*Utilities Investigation Report*” prepared by Allen Price and Associates (APA) which has identified all relevant infrastructure that is required for residential development. This has included an analysis of existing infrastructure, consultation with the relevant supply authorities, monetary contributions that may be applicable, and pre-notification of development where applicable.

Given that Mundamia is a new living area, infrastructure is planned to be provided by the relevant authorities in accordance with a typical development timetable and all agencies are aware of impending development and are planning the provision of new or augmented services, with the exception of reticulated gas, which will not be available to the locality. Council has timed the work for completion in 2016/17, however has resolved to bring forward the funding of the sewer and water infrastructure to allow early release of the development area in accordance with the land release schedule within Shoalhaven Draft LEP 2013.

As outlined above, Council has recently resolved to provide in-principle support to the preparation of planning agreement with relevant landowners in the Mundamia area in order to provide relevant infrastructure.

This assessment has concluded that there are no impediments to development based on the supply of infrastructure.

Traffic and Access

The proposed subdivision includes vehicular access to the public road network via an extension to George Evans Road. Accompanying this EA is a “*Transport Report for Proposed Residential Subdivision, Mundamia*” prepared by Colston Budd Hunt & Kafes Pty Ltd. This report has examined the impacts of the development having regard to the suitability of the proposed road system, and the impacts associated with the wider road network. The assessment included appropriate traffic modelling and included consideration of peak traffic volumes, existing traffic volumes and 10 year projected traffic volumes which concluded that the proposal is suitable, with the established road network able to accommodate additional traffic flows, subject to the provision of separate left and right turns at the intersection of Yalwal Road and Albatross Road at some time in the next 10 years to accommodate growth in traffic numbers over the 10 year horizon.

The recommendations of this report are supported in this EA.

Hazard Management and Mitigation

The subject site, although within the coastal zone, is on lands which are not subject to coastal processes or hazards such as shoreline erosion or tidal inundation, or general flooding.

Martens Consulting Engineers undertook a “*Stage 1 Contamination Assessment*” which indicated that a Stage 2 assessment was required due to past development practices. Martens Consulting Engineers has subsequently undertaken a Stage 2 Environmental Site Assessment which has included the collection of samples from a total of 48 separate locations across the site and included boreholes, test pits, stockpiles and from the lands surface. The Stage 2 Environmental Site Assessment undertaken by Martens Consulting Engineers revealed that site contamination was restricted to Area B located in the south-eastern corner of Lot 3 DP 568613 with contamination arising from empty fuel cans, motor oil containers, lubricants and disused motor vehicles. Following this, Martens Consulting Engineers prepared a Remedial Action Plan in order to identify remediation measures necessary to ensure that the site is suitable for the residential use proposed and these works are to be undertaken in conjunction with the subdivision works. Following this work, which will be undertaken as part of the initial stage of this subdivision, the site will be suitable for the residential use proposed.

Martens Consulting Engineers also prepared a *Preliminary Geotechnical and Constraints Assessment* which included an assessment of the geotechnical constraints and the presence of acid sulfate soils. This assessment confirmed that the site is unlikely to contain acid sulfate soils and that there are no geotechnical constraints to development.

The subject site is identified as being bushfire prone by mapping prepared by Shoalhaven Council and endorsed by the Rural Fire Service. An assessment of the bushfire threat has been conducted by Eco Logical Australia which recommends the provision of Asset Protection Zones, various levels of construction dependent on proximity to unmanaged bushland, along with staging and access requirements.

The recommendations of the various assessments are supported in this EA.

Water Cycle Management

The site drains generally to the west and north-west and Storm Consulting Pty Ltd were engaged to investigate water cycle management and the impact of the proposed development on surface and groundwater, and on Flat Rock Creek and other ecologically sensitive areas. The report of Storm Consulting also gave consideration to changing hydrological conditions due to climate change. The Storm Consulting report included recommendations to maintain water quality including bio-filtration trenches, along with measures to maintain flows within existing catchments.

The recommendations of this report are supported in this Environmental Assessment Report.

Heritage and Archaeology

An Aboriginal Heritage Assessment has been undertaken by South-East Archaeology (SEA) to investigate the heritage significance of the site and the presence of indigenous and non-indigenous cultural items.

The assessment undertaken by SEA revealed that the site does not contain any identified heritage items, and nor are there any within the vicinity of the site. Further, field work undertaken in accordance with established protocol failed to detect any items of aboriginal significance. SEA conclude that the impacts on Aboriginal heritage are very low and they have provided recommendations for management of archaeological and heritage items if they are found during development works.

Flora and Fauna

Development of the subject site and the subdivision design in particular, has included consideration of prior ecological assessments that have been undertaken as well as current survey carried out by SLR Global Environmental Solutions (SLR). Prior ecological assessment carried out as part of the NBSP and adopted in the proposed rezoning of the site identified land suitable for residential development whilst conserving land of high conservation value in a conservation zoning (proposed to be zoned E2 under the Draft LEP 2013).

The proposal has been assessed by SLR in the report entitled “*Flora and Fauna Issues and Assessment Report*”. This report has generally confirmed the findings of the ecological assessment previously undertaken, and in particular the eastern portion of land having higher ecological significance proposed for conservation E2 zone. The SLR assessment has also made a number of recommendations to further mitigate impacts, such as preparation of and compliance with a Vegetation Management Plan and appropriate control of sediment.

The conservation of 9.49 ha of the high biodiversity value habitat as part of the development of the site is a balanced outcome which serves to limit development to the disturbed and low habitat value land for residential purposes.

The measures recommended are supported in this EA.

Hydrogeological Assessment

A Hydrogeological Assessment was undertaken by Martens Consulting Engineers to assess Hydrogeological characteristics, examine potential impacts associated with the proposed subdivision and identify mitigation measures on the sites groundwater system and this is incorporated into the Water Cycle Management Report prepared by Storm Consulting as Annexure F to that report. The emphasis of the assessment was the impact the subdivision may have on the Spring Tiny Greenhood Orchid and Nowra Heath Myrtle which are identified

threatened species. The Nowra Heath Myrtle has been found on the site, and whilst the Spring Tiny Greenhood Orchid has not been identified, the site does provide potential habitat for the species.

The Hydrogeological Assessment prepared by Martens Consulting Engineers has recommended protection and mitigation measures to address potential hydrogeological impacts.

The measures recommended are supported in this EA.

Noise

The EA has considered the impacts of the development having regard to road traffic and aircraft noise, and proposed expansion of the Bamarang Power Station.

The site is not subjected to substantial through traffic, and as such noise associated with road traffic will be limited to that generated by the development itself. The development will not generate traffic beyond the environmental capacity of the road system, as outlined in the *Guide to Traffic Generating Developments* prepared by the Roads and Traffic Authority (RTA).

The site is well removed from the Bamarang Power Station such that noise impacts are not a concern. In this regard, according to assessment undertaken in support of that application, noise levels associated with sites in much closer proximity of the Bamarang Power Station will not be subject to unreasonable noise impacts. As such, it is considered that there will not be undue noise impacts at the subject site.

In relation to aircraft noise, the HMAS Albatross airfield is sited at Nowra Hill, 5.5 km to the south of the site and noise controls imposed as a result of Development Control Plan No. 69 do not affect the subject site. The area affected by DCP 69 stops 2 kilometres to the south of the subject property. Consequently, aircraft noise is not considered to adversely affect the proposed development.

Aviation/Defence

The concerns of the Department of Defence relate to development in the vicinity of HMAS Albatross, and possible noise complaints that may be made by future residential occupation of the site. It is noted that the concerns do not relate to issues such as safety. Noise issues are dealt with above.

Consultation

In preparing this EA, the following consultation was undertaken with staff of the Department of Planning (DoP), Shoalhaven City Council (SCC), Shoalhaven Water, the Nowra Local

Aboriginal Land Council, Telstra, Endeavour Energy, Jemena Pty Ltd (gas supplier), University of Wollongong and TAFE NSW.

Furthermore, the EA and other assessment reports were undertaken mindful of guidelines and policies prepared by SCC, DoP, Roads and Traffic Authority, DECC, and the NSW Rural Fire Service.

Conclusion

The proposed subdivision has properly addressed the requirements applying to this Major Project having regard to the relevant environmental, ecological, natural hazards and social constraints that apply to the site and surrounds.

The EA and the various sub-consultants reports that have been prepared, properly address those matters raised in the Director-General's Environmental Assessment Requirements.

The proposal properly considers the retention of lands which have higher ecological values, and the suitable development of the remainder of the property in a manner to provide residential accommodation consistent with the growth strategies of SCC and the DoP, as contained in the NBSP and the SCRS.

The design of the subdivision has been undertaken in accordance with the Mundamia Masterplan and associated principles adopted by SCC, and results in a sustainable layout that will provide good levels of solar access, and views to nearby bushland or Mount Cambewarra which is a feature of the district. Further, the subdivision has a permeable layout, which will enhance the sustainability of the project and encourages active transport options for local trips.

The relevant infrastructure agencies are aware of the proposal, and the plans of SCC to facilitate further residential development in accordance with its growth strategies. To this end, preparatory work is being undertaken by relevant supply authorities to provide all necessary infrastructure for the development and to expedite its delivery.

Given compliance with the Statement of Commitments, which includes the preservation of the ecologically constrained land in the conservation zoning, remediation of contaminated lands, provision of water quality control measures, payment of monetary contributions for public facilities and water and sewerage infrastructure and the implementation of suitable landscaping, the subdivision is considered suitable for approval.

1.0 INTRODUCTION

1.1 OVERVIEW AND BACKGROUND

This Environmental Assessment (EA) has been prepared in support of an application proposing a residential subdivision of the subject site into 312 residential allotments, 1 large lot residential and various public reserves in 12 stages. The site is located within Mundamia which is sited to the west of the Nowra Township, and has been identified by SCC in the *Nowra Bomaderry Structure Plan* (NBSP) as a New Living Area. In addition, work has been undertaken by the current and former developers with SCC in the preparation of a Masterplan to further guide the nature of development that will ultimately result to ensure that the area will have its own unique character. SCC is currently exhibiting Draft Shoalhaven LEP 2013 in order to implement some of the recommendations of the Structure Plan, and this includes the implementation of relevant residential and conservation zonings having regard to the Mundamia living area. Draft Shoalhaven LEP 2013 proposes to zone the site predominantly R1 and partly E2.

The subdivision proposed is a conventional Torrens Title scheme and it is expected that it will take approximately 10 years to complete.

The development is a Major Project as the site is located within the coastal zone and the subdivision proposes in excess of 25 allotments for residential development. Accordingly, the provision of Part 3A of the Environmental Planning and Assessment Act, 1979 (EP&A) apply in the consideration of this application.

In preparing this EA, consideration has been given to the following plans and specialist consultant reports:

- *Subdivision Sketch Plan* - Allen, Price and Associates (**Annexure 1**);
- *Transport Report for Proposed Residential Subdivision, Mundamia* – Colston Budd Hunt & Kafes Pty Ltd (**Annexure 2**);
- *Flora and Fauna Issues and Assessment Report* – SLR Global Environmental Solutions (SLR) (**Annexure 3**);
- *Preliminary Geotechnical and Constraints Assessment* undertaken by Martens Consulting Engineers (**Annexure 4**);
- *Stage 1 Contamination Assessment, Stage 2 Environmental Site Assessment and Remedial Action Plan* prepared by Martens Consulting Engineers (**Annexure 5**);
- *Bushfire Protection Assessment* – Eco Logical Australia (**Annexure 6**);

- *Water Cycle Management Report* – Storm Consulting Pty Ltd which has incorporated a *Hydrogeological Assessment* prepared by Martens Consulting Engineers (**Annexure 7**);
- *Mundamia Investigation Area, West Nowra, Aboriginal Heritage Assessment* – South-East Archaeology Pty Ltd (**Annexure 8**);
- *Utilities Investigations Report* – Allen Price and Associates (**Annexure 9**); and
- *Construction Management Plan* – Allen Price and Associates (**Annexure 10**).
- *Landscape Plan* – Peter Phillips Landscape Architecture (**Annexure 11**)
- *Coastal Policy Assessment* – Cowman Stoddart Pty Ltd (**Annexure 12**)

In addition, this report has given consideration to consultation that has been undertaken with a variety of persons and agencies, including State Government Agencies, SCC, and the local community.

The EA has been prepared in accordance with the Director-General's Environmental Assessment Requirements dated 20th October 2010 and addresses those matters which have been identified as key issues. These include matters relating to strategic planning, subdivision layout and future character, visual impacts, traffic and access, hazard management and mitigation, water cycle management, heritage and archaeology, flora and fauna, noise, aviation and defence considerations.

The application is considered to comply with the relevant State and Regional environmental planning policies that apply to the site. Furthermore, the proposal is consistent with the strategic aims of SCC, the provisions of the Draft Local Environmental Plan supported by SCC, and the provisions of the Mundamia Masterplan adopted by SCC.

The proposal is consistent with the proposed rezoning of the release area, having regard to the conservation of approximately 9.5 ha of higher biodiversity value land as identified in the NBSP whilst retaining that land which is primarily cleared and of lower conservation value due to past uses for agricultural purposes.

The proposal includes an appropriate lot layout and other measures to mitigate the impacts of the subdivision, including the preservation of those areas deemed to have significant ecological values, appropriate road layout to properly edge the subdivision and provide bushfire mitigation, and well sited public reserves to enhance amenity for future residents within the living area.

The proposed development builds upon established social infrastructure provided in the locality in the form of the Shoalhaven Campus of the University of Wollongong and TAFE, whilst the site will be serviced with all other essential infrastructure including reticulated water and sewer services, underground electricity and telephone services.

The proposal is recommended for support.

1.2 THE PROPONENT

The proponent is Allen Price and Associates (APA), as agents for Twynam Mundamia Pty Ltd, who are the developers of the proposal.

1.3 NEED AND JUSTIFICATION

The proposal seeks consent to a subdivision proposing the development of 312 residential allotments at Mundamia to the west of the Nowra township, along with 1 residual large lot residential allotment containing an existing rural dwelling. Mundamia is a new living area identified by SCC in order to provide for residential expansion consistent with its growth strategy, and as identified in the NBSP and the *South Coast Regional Strategy* (SCRS). The NBSP has demonstrated a need to provide additional lands for urban development to accommodate the continuous growth rate which has been experienced, and anticipated to occur in the future.

SCC in conjunction with the DoP, and the relevant infrastructure supply agencies have planned for the development of Mundamia as evidenced by the various growth strategies, and the preparatory planning and design work that is currently being undertaken.

1.4 ALTERNATIVES

In the consideration of Mundamia as a residential growth area, SCC has previously undertaken a number of studies in order to identify constraints and opportunities. Of particular note is the ecological analysis that has been prepared which has identified those areas which have higher ecological values and which are deemed unsuitable for urban development. Furthermore, our client has engaged with SCC to prepare a Masterplan for Mundamia in order to guide its development.

The result of the above is that constraints and opportunities were identified at an early stage, and whilst alternative subdivision layouts are available, by and large, the major constraints and overarching subdivision footprint and pattern have been pre-determined. Notwithstanding this, separate assessment undertaken as part of this EA has reconfirmed the constraints and opportunities which have been previously identified.

Finally, the new living area to be known as Mundamia has been identified in the NBSP as being favourable for short-term development. This is primarily due to its siting in close proximity to the Nowra township, and also being south of the Shoalhaven River and thereby avoiding traffic impacts on the existing river crossing which already experiences high traffic volumes.

2.0 SITE AND SURROUNDS

2.1 SUBJECT SITE

The subject site is made up of Lot 3 DP 568613 and Lot 384 DP 755952, Mundamia, within the City of Shoalhaven Local Government Area. Mundamia is identified within the Nowra Bomaderry Structure Plan as Living Area No. 5. These allotments are referred to throughout this report as 'the site'.

The parcels have the following characteristics:

<i>Lot</i>	<i>Area</i>	<i>Improvements</i>
Lot 3 DP 568613	21.63 hectares	Single dwelling (see Plate 1) with rural shedding
Lot 384 DP 755952	21.5 hectares	Single dwelling (see Plate 2) with rural shedding and a number of dilapidated buildings



Plate 1: View of existing dwelling on Lot 3 DP 568613.



Plate 2: View of existing dwelling on Lot 384 DP 755952.

The dwelling on Lot 3 DP 588613 (**Plate 1**) is proposed to be retained in the residual large lot residential allotment, whilst the dwelling and improvements on Lot 384 DP 755952 (**Plate 2**) are to be demolished to enable the residential subdivision to be undertaken.

The site, and some adjoining land, is currently proposed to be zoned predominantly R1 under Draft Shoalhaven LEP 2013 to enable its use for residential purposes. **Plate 3** shows the cleared nature of a portion of the site.

The site ranges in height from 36 m to 70 m AHD and is mostly level to gently undulating however it does steepen towards the eastern section.



Plate 3: View of cleared land proposed for urban development.

The site adjoins the following:

- undeveloped forested lands to the east and includes land which contains Flat Rock Creek;
- undeveloped lands to the west which are owned by SCC and the NSW Aboriginal Land Council are also contained within the Mundamia Living Area No. 5 and are likely to be the subject of further residential development in time;
- the Shoalhaven Campus of the University of Wollongong and TAFE (see **Plate 4**) to the south-west;
- undeveloped Crown Land which also contain Flat Rock Dam are sited along the eastern end of the southern boundary of the site;
- along the western end of the southern boundary of the site are undeveloped lands owned by the NSW Department of Education;
- to the north are privately owned lands developed for rural and rural residential purposes (refer **Plates 5 and 6**).



Plate 4: Shoalhaven Campus of University of Wollongong and TAFE.



Plate 5: View of adjoining site.



Plate 6: View of adjoining site.

The site is largely cleared and used for agricultural purposes, however some forest vegetation is located within the eastern and northern portion of the site, identified as Grey Gum – Blue-leaved Stringybark Forest Woodland.

Vehicular access to the site is provided via George Evans Road and Jonsson Roads.

Figure 1 is an existing site survey plan which shows the location of the land, its size and shape, contours and location of existing buildings. Further, **Figure 2** is a Site Analysis Plan and Locality Context Plan which identifies existing natural and physical elements applicable to the site and its development, and shows the location of the property and

the siting of nearby features and facilities including other developable lands, the Shoalhaven Campus of the University of Wollongong and TAFE and established urban area of West Nowra. Finally, an aerial photograph of the site and surrounds is also included in **Figure 2**.

2.2 LOCAL CONTEXT

Mundamia effectively is a new area, identified in the NBSP as the site for future residential growth. Mundamia is sited approximately 2 km west of the township of Nowra, which is the closest major regional town.

The urban area of Nowra consists of a number of localities including Bomaderry, North Nowra, Worrigea and South Nowra and based on the most recently available data, has a combined population of some 25,322¹. Population growth within these areas has been relatively strong and a compound growth rate of 1.9% and 1.1% was experienced for the periods of 1991 - 1996 and 1996 – 2001 respectively.

At present, Mundamia is largely undeveloped apart from established rural and rural residential properties; however it is close to the established site of the Shoalhaven Campus of the University of Wollongong/TAFE (**Plate 4**).

Access to Mundamia is provided via Yalwal Road which is a sealed public road maintained by SCC and links with Albatross Road to the south of the Nowra Township.

Nowra is provided with a wide range of commercial, retail, educational, medical and social infrastructure to service the 30,000 strong local population and surrounding rural areas and small coastal villages.

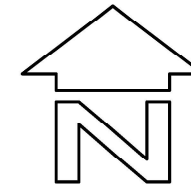
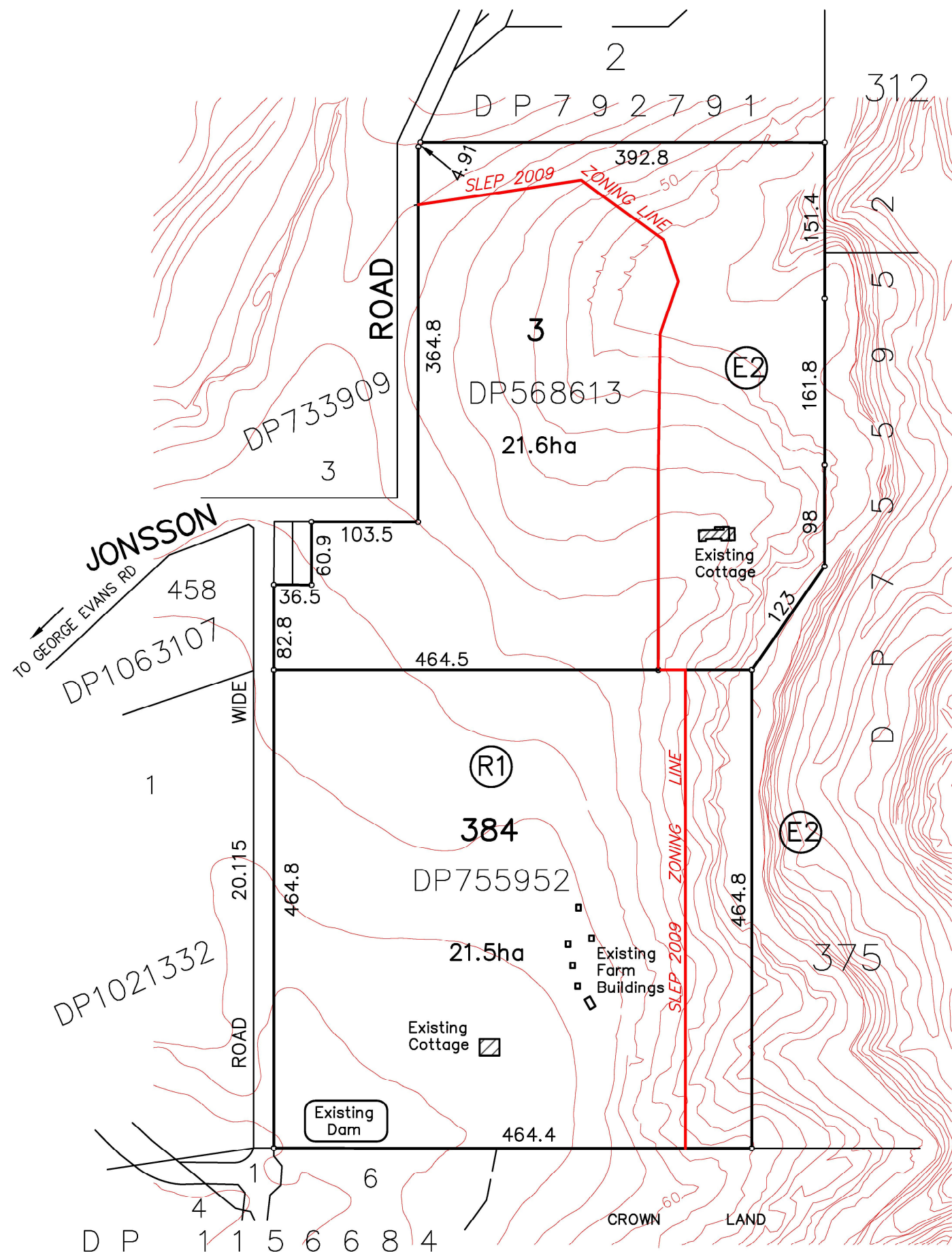
The Shoalhaven River physically separates North Nowra and Bomaderry from the Nowra CBD and southern localities. The Shoalhaven River meanders its way to the coast and the site is located approximately 250 metres south of a bend in the River. Although located in relative close proximity to the site, its relationship with this water course is restricted due to substantial sandstone cliff faces which impede physical connectivity.

Figure 2 is a Locality Context Plan showing the site within the context of Nowra, roads and other local features.

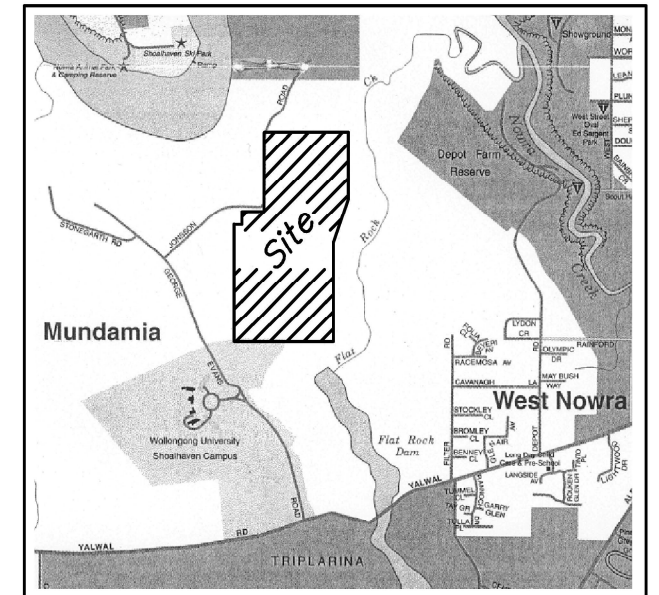
¹ Population Profile 2001 Published by Shoalhaven City Council

EXISTING SITE SURVEY PLAN

FIGURE 1



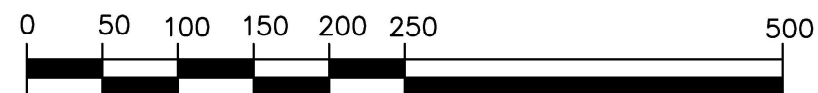
Locality Sketch



Map drawn and published by Cartodraft Aust P/L

LEGEND

- PROPOSED SLEP 2009 ZONING LINE
- R1 PROPOSED ZONING UNDER SLEP 2009



scale: - 1:5000
AT A3 SIZE



SKETCH PLAN SHOWING EXISTING SITE SURVEY AND PROPOSED ZONING OVER LOT 3 DP568613 & LOT 384 DP755952 AT MUNDAMIA FOR TWYNAM MUNDAMIA PTY LTD

- NOTES
- ALL DIMENSIONS AND AREAS ARE SUBJECT TO SURVEY.
 - CONTOURS PROVIDED BY SHOALHAVEN CITY COUNCIL FROM AERIAL PHOTOGRAPHY

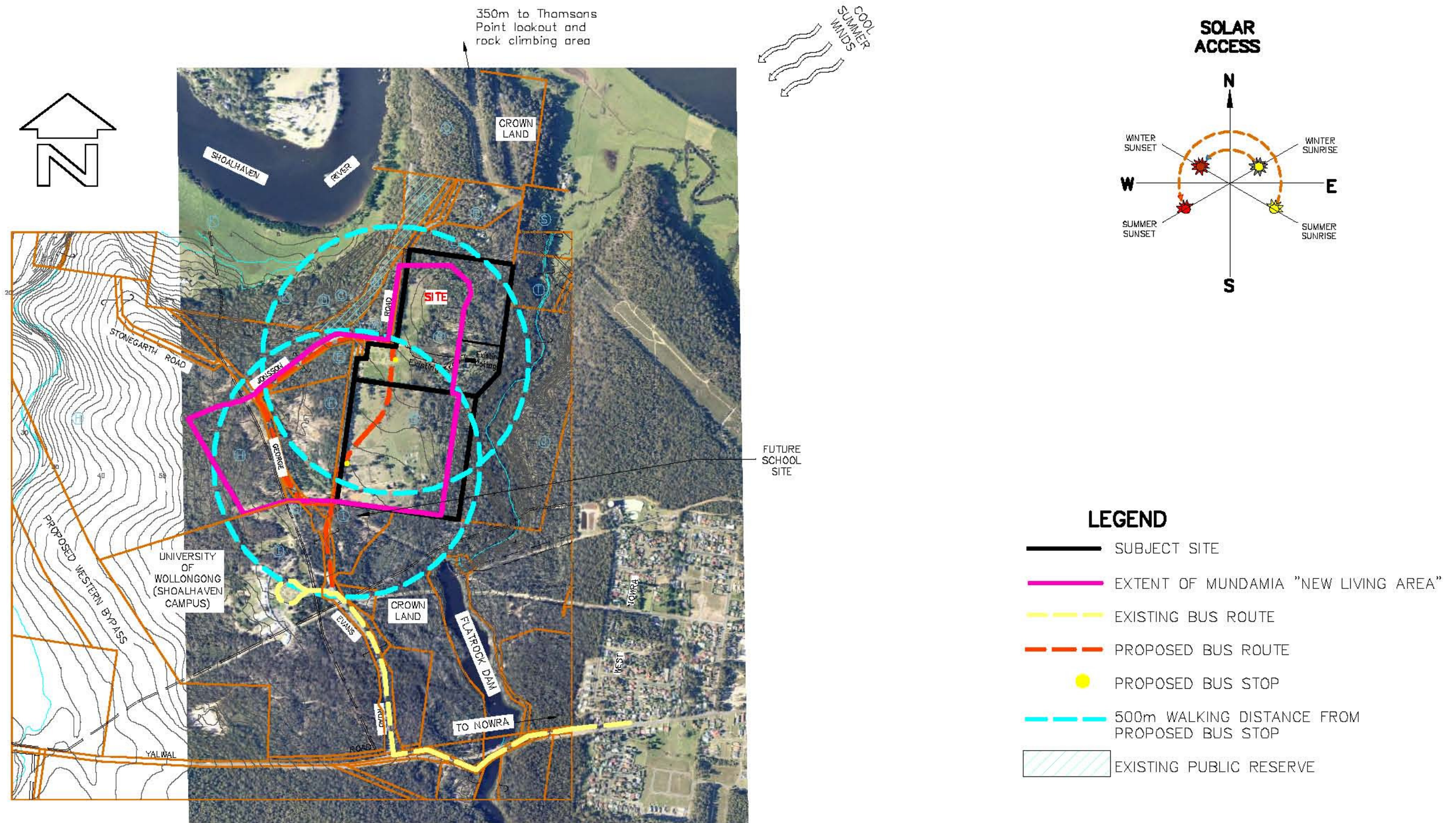
RATIO 1: 5000 DATE APRIL 2011 REF: 25489-05 REV. 0

REVISION	BY	DATE

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consultants@allenprice.com.au www.allenprice.com.au

LOCALITY / CONTEXT PLAN & SITE CONSTRAINTS PLAN

FIGURE 2



REVISION	BY	DATE

RATIO:	DATUM:
1:15000	ORIGIN:
	DATE OF PLAN: APRIL 2012

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PLAN SHOWING MUNDAMIA
 GROWTH AREA SHOWN ON SHOALHAVEN CITY
 COUNCIL'S NOWRA BOMADERY STRUCTURE PLAN
 FOR TWYNAM MUNDAMIA PTY LTD

REF. No.
25489-04
 REVISION 0

Liability limited
 by a scheme
 approved under
 Professional
 Standards
 Legislation.
 COVER OF
 EXCELLENCE

2.2.1 Existing Land Uses

In the vicinity of the site, existing land uses comprise predominantly rural and rural residential development, with the exception of the education precinct formed by the Shoalhaven Campus of the University of Wollongong and TAFE.

The current provisions of Shoalhaven LEP zone land in the vicinity of the site a variety of rural, open space, special use and environmental protection purposes.

2.3 LANDSCAPE CHARACTER

Regional

The regional landscape is dominated by relatively flat coastal and riverine plains associated with the Shoalhaven River, grading to the steep slopes of the Cambewarra Range to the west. The Shoalhaven River meanders through the Shoalhaven Floodplain and it joins the Crookhaven River as it approaches the Shoalhaven Bight.

The actual coastline is dominated by prominent headlands, long sandy beaches and dunal wetlands.

Regionally significant topographic features include the Cambewarra Range to the north of the site, and Nowra Hill to the south.

Mundamia

The area of Mundamia is sited to the south of the Shoalhaven River. The local landscape is gently undulating and vegetated with tall forest in areas not subject to historical clearing for residential development or grazing activities.

Prominent features in the local landscape include the Shoalhaven River and Thomsons Point to the north of the site.

2.4 BUILT ENVIRONMENT

In the vicinity of the site, built development is very limited due its rural character.

The area displays no particular built character or architectural style.

To the south of the site is the education precinct comprising the Shoalhaven campus of the University of Wollongong and TAFE campus. This development is contained within the one complex and consists of a single building having a contemporary design.

Plate 4 shows this site.

2.4.1 Likely Future Character

Development within Mundamia will be undertaken subject to a Masterplan prepared on behalf of Twynam Mundamia Pty Ltd and SCC. This has resulted in a conceptual subdivision pattern, and the adoption of a number of principles that will be applied to guide future planning decisions.

In relation to the built form, the following principles are considered to have relevance in determining the future character:

- Provide a residential living area of unique character and ambience which will provide a different choice to Worrigea and West Nowra.
- The rural landscaping along the University access road be extended via a major spine road through the subdivision to northern focal point at Thompson's Reserve.
- Commercial Centre including a village shop, community hall and public open space be located on the major spine road towards the southern boundary of the properties, within walking distance of the University. Following agreement of the main landowners, including Shoalhaven Council, it has been agreed that the village shop and community hall be located on Council land which is to be developed and is the subject of a separate development proposal. **Annexure 13** contains a copy of the File Note from Shoalhaven Council of this agreement.
- The passive open space be integrated with the major spine service road rather than "small pocket" reserves.
- The major east/west collector road shown on the Nowra Bomaderry Structure Plan be incorporated as an APZ zone on the southern boundary of the site.
- The internal road layout and provision of services must allow each owner to develop independently.
- Both high quality and affordable medium density to be located in the vicinity of the commercial/community area within walking distance of the University.
- The existing George Evans Road needs to be retained to provide access to the western residential sector and Jonsson Road to be included as an APZ perimeter road.
- The perimeter road around the total precinct to act as an APZ zone.
- Ensure a bus route can circulate through the subdivision, starting and finishing at the Community/Commercial focal point.

- As Council has contributed to the water and sewerage capacity, the Council land will be serviced first with spare capacity.
- The internal subdivision roads should provide rural views at end to the buffer zone.
- Solar access will need to be considered for all lots.
- Larger lots may be required on steeper slopes.
- Easements will be required for existing services, including the water pipeline.
- Pedestrian/bicycle paths should be strengthened along the major spine road.
- The acquisition of land from the Department of Education needs to be undertaken for the main spine road during Stage 1.
- Staging and implementation of the subdivision should radiate from the central Commercial/Community focal point where possible.
- Drainage should be dissipated rather than concentrated and downstream approvals need to be given for staging.
- Lot sizes need to be determined at master planning stage and relate to solar access, views, drainage.
- Consideration be given to architectural covenants over lots, to create a theme or standard.
- The ultimate boundary of the precinct to be defined by diversity certification.

In addition, SCC already has a number of established Development Control Plans and development policies affecting the development of residential development and future development of the proposed allotments is expected to be undertaken in accordance with these.

2.5 REGIONAL CONTEXT

SCC is situated on the NSW south coast some 2 hours south of Sydney. **Figure 3** identifies the Shoalhaven in a regional context. The Shoalhaven is connected to the north by the Princes Highway which provides access to Wollongong and Sydney.

Heavy rail transport is provided to the Region via the South Coast Railway Line.

The area is well regarded due to its high scenic qualities and natural environments, which includes a number of National Parks, State Conservation Areas and the Jervis Bay Marine Park, and also for its close proximity to Sydney and the ACT.

The Shoalhaven Region features a wide variety of environments, including beaches, native forests, estuaries, coastal floodplains, and escarpments.

The Shoalhaven has a population in excess of 80,000 and provides a variety of industries including tourism, agriculture, aquaculture, aviation and defence, and education.



Figure 3: Regional Context Map

2.5.1 Topography

The site, for the most part, is relatively flat to gently undulating however with a fall across the site from south to north and north east. Site topography is more pronounced in the eastern section of the site.

For that part of the site subject to this proposed residential development, maximum site elevations are approximately 70 m AHD whilst the minimum site elevations are 46 m AHD.

The site drains to the north-east towards Flat Rock Creek, which flows to the Shoalhaven River to the north.

In the area, other topographical features include Thompson's Point, which has a relative height of 30 m, Cambewarra Mountain, which is the southern extent of the Cambewarra Range, and is located to the north of the site with a peak elevation of 600 m AHD. To the south is Nowra Hill which has a peak elevation of 197 m AHD.

2.5.2 Climate

Nowra and surrounds has a temperate climate with four distinct seasons. Average maximum and minimum summer temperatures are 26 and 16 degrees Celsius respectively, and winter maximum and minimum averages are 16 and 6 degrees Celsius respectively. Average annual rainfall is 1,143 mm.

2.5.3 Soils

The 1:100 000 Soils Landscape Map for Kiama identifies the site as comprising Nowra Landscape soil. Soil conditions are moderately deep, brown podsollic soils on the upper slopes and crests, with the mid and lower slopes and drainage depressions consisting of yellow earths or yellow podsolics.

3.0 DESCRIPTION OF PROPOSAL

3.1 INTRODUCTION

The design of the subdivision has followed an extensive environmental assessment which has considered a range of environmental issues and constraints, along with development opportunities.

The development of Mundamia follows the principles of a Masterplan which has been prepared for the area which has identified key design principles that are to be applied to the site design having regard to the location and site characteristics. The Masterplan requirements are outlined below in Section 3.4.3.3.

Furthermore, the *Coastal Design Guidelines* also provide recommendations for the further development of coastal lands and this is addressed in Section 4.2.4.2.

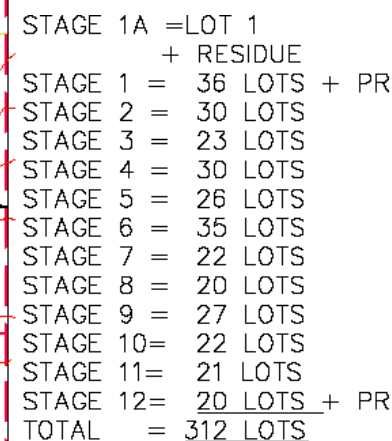
3.2 THE PROPOSAL

The subdivision proposal as prepared by Allen Price and Associates (APA) is shown in **Annexure 1** (Plan No 25489-01) and **Figure 4** of this EA over page. The subdivision layout has been derived in consideration of the opportunities and constraints provided by the site and surrounds.

3.2.1 Lot Size and Layout

The proposal seeks approval for the subdivision of the site in a Torrens title fashion and provides for the following:

- creation of 312 residential allotments;
- creation of one rural residential allotment to contain an existing rural dwelling and an appropriate curtilage within an area of 2.86 ha;
- creation of one parcel of open space at the entry to the site with an area of 1408 m².
- creation of two public open space allotments with areas of 2612 m² and 2048 m² centrally located to the Mundamia new living area;
- creation of one parcel of open space on the northern and north-eastern perimeter of the site with an area of 7.422 ha; and
- creation of one parcel of open space on the eastern perimeter of the site with an area of 2.07 ha.

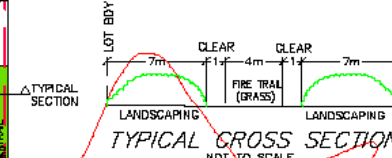


LOT & DWELLING YIELD:

- 284 RESIDENTIAL LOTS
- 21 MEDIUM DENSITY LOTS
(45 DWELLINGS)
- 7 DUAL OCCUPANCY LOTS
(14 DWELLINGS)
- 1 RURAL LOT

= 344 DWELLINGS

3 DP 875956



PROPOSED REALIGNED
GEORGE EVANS ROAD



Liability limited
by a scheme
approved under
Professional
Standards
Legislation.

**COVER OF
EXCELLENCE**

This plan was prepared for Twynam Property Group as a proposed subdivision to accompany a Major Project Application to the Department of Planning and should not be used for any other purpose.

The dimensions, areas and total number of lots shown hereon are subject to field survey and also to the requirements of the Department of Planning, Shoalhaven City Council and any other authority which may have requirements under any relevant legislation.

Allen, Price and Associates therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred arising from any party who uses or relies upon this plan for any purpose other than as a document prepared for the sole purpose of making a subdivision application to the Department of Planning and which may be subject to alteration for reasons beyond the control of Allen, Price and Associates.

This note is an integral part of this plan.

 POSSIBLE DIAL OCCUPANCY LOT

POSSIBLE MEDIUM DENSITY LOTS

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED

10

LEGEND

BUSHFIRE SETBACK

STAINING PROCEDURES

STAGING BOUNDARY

PROPOSED SHARED CYCLEWAY/FOOTPATH (2m WIDE)

(A) RESTRICTION - NO FENCING ADJACENT TO

PUBLIC RESERVE

 **allen, price & associates**
land and development consultants
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con: 02 4427 6524 email: enp@apc.nsw.au www.allenprice.com.au

PLAN SHOWING PROPOSED SUBDIVISION
OF LOT 3 DP 568613 & LOT 384 DP 755952
AT MUNDAMIA GROWTH AREA
FOR TWYNAM PROPERTY GROUP

REF. No.		25489-01	
	1		REVISION 04

RATIO: 1 : 1500 (AT A1 SIZE)	DATUM:	SURVEY	APA	REVISION		BY	DATE
	ORIGIN:	DESIGN	MJP	01	LOTS IN STAGES AMENDED	MJP	10.11.11
		DRAWN	DS	02	STAGE 1 LOTS AMENDED	MJP	02.12.11
		CHECK'D	MJP	03	APZ AREAS CLARIFIED	MJP	08.05.12
	DATE OF PLAN: 29 JUNE 2011			04	STAGE 1 LOT LAYOUT REVISED	MJP	16.05.12

3.2.2 Residential Allotments

The proposed allotments vary in size from a minimum of 503 m², to a maximum of 1101 m².

The majority of allotments proposed have a site area of between 600 and 700 m².

The breakdown of lot sizes and numbers is proposed as follows:

- Lot Type 1 (500 – 600 m²) – 15
- Lot Type 2 (600 – 700 m²) – 194
- Lot Type 3 (700 – 800 m²) – 70
- Lot Type 4 (> 800 m²) – 33

Larger allotments are generally proposed on the perimeter of the site given the need to provide greater separation from forested lands for Asset Protection purposes due to bushfire hazard.

The allotments are provided primarily with an east west orientation, enabling the longest length to enjoy a northerly exposure.

Allotment frontages range upwards from a minimum of 15.8 metres, however the vast majority of lots have widths in excess of 17 metres.

The allotments provide a range of sizes and shapes however principally, allotments are regular in shape. No battle axe lots are proposed, and therefore each lot has a wide street frontage. Appropriate splay corners are proposed to all allotments sited at intersections.

3.2.3 Rural Residential Allotment

The rural residential allotment has an area of 2.86 ha and has been designed in order to accommodate the existing masonry rural dwelling and a reasonable curtilage to enable its ongoing use for rural-residential purposes. The size of this parcel is consistent with rural residential holdings in the City of Shoalhaven.

The rural residential allotment is also the subject of a separate application made by Allen Price and Associates in order to rationalise site boundaries, and enable the early creation of this larger allotment. This is also addressed below in Section 3.3 which deals with the staging of the development.

3.2.4 Title

The proposed subdivision is intended to be subdivided in a conventional Torrens Title fashion involving the creation of separate allotment for individual purchase and further development, with roads and open space reserves to be created for dedication to SCC.

The traditional Torrens title system of subdivision is well accepted in the SCC area and is the most common form of subdivision utilised in existing residential localities and in the creation of new residential living areas.

3.2.5 Building Envelope and Built Form

This Major Project Part 3A application seeks consent to the subdivision of land. It is not intended to further control additional development on the resultant allotments by way of implementing additional rules or requirements.

In this regard, the SCC already has a number of Development Control Plans (DCP No. 91 – Single Dwellings and Ancillary Structures, DCP No. 71 – Medium Density Housing Guidelines, DCP No. 57 – Dual Occupancy Guidelines) which control the development of dwellings, and more dense residential developments, all of which include controls relating to height, setbacks, landscaping, overshadowing, and privacy (refer Section 4.6 of this EA).

It is considered unnecessary and unreasonable to further restrict future owners and home builders with additional requirements to limit design flexibility and potentially increase building costs and thereby reduce housing affordability which is essential in this locality. Further, any additional requirements would further burden SCC's Development Assessment staff with additional controls to consider and enforce when dealing with the proposed allotments in the future.

3.2.6 Road Pattern and Network

The subdivision pattern is based on a grid design, with a main road which will be centrally located when other lands within the new living area are also developed. This provides access up the spine of the residential lands, and provides an ideal opportunity to centrally site commercial and communal facilities on adjoining Council land, to service the locality.

The general grid pattern provides a very permeable layout, which encourages active transport options for local trips from residences to the public open space facilities, and future commercial development.

The subdivision pattern has a clear hierarchy with appropriate emphasis given to the central access road, and relevant weight given to lesser roads.

The road network generally rings the residential lands in order to facilitate good public access to the network of public open space which is proposed as part of the subdivision. A small exception to this is six allotments on the eastern edge of the site which are proposed to be contained within a fire trail.

The orientation of the main access road has been sited in order to enable views towards Mt Cambewarra to the north of the locality.

The main access corridor (Road No. 1) has a road reserve of 20 metres in width, reinforcing its primary status in the overall local road hierarchy. In addition, perimeter roads (Roads Nos. 5, 7 and 16) have a width of 20 metres in order to facilitate access by larger vehicles and fire tankers, as well as increase the buffer (APZ) to the bush fire threat. A wider road reserve of 22 metres is also proposed along an east-west axis (Road No. 10) in order to cater for drainage and feature landscaping, and this is also strategically located in order to provide a vista to bushland that surrounds the site from the proposed public reserve to the west of the site. Road No. 6 which is sited along an existing Crown Road Reserve maintains the 20.115 m width. Other road corridor widths are 16 m in order to make for the more efficient use of land resources.

A conceptual road layout and sections prepared by APA are included in **Annexure 1**.

3.2.7 Public Open Space

A public reserve allotment, with an area of 2612 m² is sited to the east of the proposed main access spine road (Road No. 1). It is expected that this will be embellished to enable its use and enjoyment by residents of the site and surrounds. Furthermore, a public reserve with an area of 2048 m² is proposed to the west of the central spine road which will link with the provision of open space on other adjoining lands once these are developed. These areas are to be embellished with plantings, a playground structure and picnic facilities.

A public reserve allotment is proposed at the entry to the subdivision adjoining the main access spine road having an area of 1408 m². This area is proposed to be embellished with landscaping, whilst it will also contain a pathway/fire trail.

In addition, a natural area of public open space is provided along the northern and eastern edges of the site, where the land is forested and steeper, and therefore inappropriate for residential use, yet provides for an open space environment that is attractive and visually interesting, and stimulating for users. This space, with a total in excess of 9.492 ha, represents 21.9% of the whole site. These areas are the most appropriate for the siting of some of the WSUD infrastructure given the lower topography associated with these lands.

3.2.8 Footpaths/Cycleways

The proposal incorporates a series of pedestrian/cycle pathways in order to encourage active transport options for local trips and also to embellish areas of public open space to

maximise liveability within the subdivision. Facilities are proposed in the following locations:

- Skirting the large areas of public reserve to the north and east;
- Along the main spine road;
- Along the widest east-west road (Road No. 10);
- Along the western edge of the subdivision (Road No. 6); and
- Along the southern boundary of the site (Road No. 7).

The pathways are to be finished in concrete, 2.0 m in width, to enable shared use for both pedestrians and cyclists.

3.2.9 Drainage

Stormwater is proposed to be conveyed via piped drains and biofiltration systems to the lower reaches of the site. To this end, a series of wider road reserves and drainage corridors are to be provided to assist in the conveyance of stormwater.

The relatively level nature of the site precludes the use of drainage swales and wetland areas in the carriage and storage of stormwater due to potential water-logging and extent of exposed bedrock apparent at the site. Instead, a series of biofiltration systems are to be provided for all catchments.

3.2.10 Landscaping

Landscaping of public reserves and other public areas is to be undertaken in accordance with the Landscape Plan prepared by Peter Phillips Landscape Architecture shown in **Annexure 11**. This plan includes the provision of planting schedules for each of the public roadways, and a typical treatment for the proposed park.

Landscaping of the roadways is to use a variety of species including various gums, lilly-pilly, and bottle-brush species. Tree plantings are to be undertaken in a schematic manner such that individual streets are provided some level of differentiation between the precincts. In all, a total of some 390 trees are proposed in conjunction with the subdivision.

Landscaping of the public reserve to the east of the main spine road is to include a child's play structure, picnic facilities, and strategically placed plantings.

3.2.11 Asset Protection Zones (APZ)

Asset Protection Zones are an effective strategy in the reduction of bush fire hazard by the suitable management of land to ensure appropriate fuel levels are minimised to levels which do not result in threat to people and infrastructure.

Asset Protection Zones (APZ) are proposed for the northern, eastern and southern edges of the site to protect the proposed allotments and resultant urban development. The APZ have been devised following consultation with Eco Logical Australia (ELA) and consideration of the requirements of *Planning for Bushfire Protection (2006)*.

These zones incorporate an Inner Protection Zone and Outer Protection Zone as required in order to address the requirements of Planning for Bushfire Protection and result in the effective management of bushfire risks identified for the locality. Furthermore, the analysis of this hazard has identified that buildings in certain portions of the site will require construction to a certain level in accordance with AS 3959.

3.2.12 Safer by Design

The NSW Department of Planning has produced a guideline under the Environmental Planning and Assessment Act, 1979 (EP&A) entitled *Crime Prevention and the Assessment of Development Applications*. This provides a useful guide in the consideration of this proposal in order to ensure that safety and crime prevention strategies are considered in the design of the proposed subdivision.

Having regard to crime prevention strategies, the guidelines apply four principles as follows:

- surveillance, which relates to the opportunities that are available so that people can see what other people are doing;
- access control, which relates to ensuring that physical and symbolic barriers are in place to attract, channel, or restrict the movement of people;
- territorial reinforcement, which is utilised to send positive signals to the public regarding the use of public space to encourage its use; and
- space management strategies, which are linked to territorial reinforcement and are used to ensure that space is appropriately utilised and maintained such that it used for its intended purpose.

The proposal responds to these principles as the feature public open space area is centrally sited which should result in a public space that residents are attracted to, and will have a sense of ownership. This open space area combines to form the community focal point for the site and this is well defined, with boundaries clearly identified by road reserves and private lands.

Lighting of all roads and public reserves is to be undertaken in accordance with the relevant Australian Standards to ensure that appropriate and safe levels of illumination are available.

Pedestrian pathways and cycleways within the site are to be provided entirely within road reserves, thereby ensuring maximum passive surveillance opportunities by the general public and residents.

3.2.13 Servicing

Submitted in support of the application as **Annexure 9** is a “*Utilities Investigation Report*” prepared by Allen Price and Associates (APA) which has examined the provision of all infrastructure necessary to support the proposed subdivision.

Water and Sewerage Services

SCC, through Shoalhaven Water, is the supply authority for water and sewerage services throughout the entire City.

Investigations have been undertaken and SCC are fast-tracking the supply of water and sewerage services to the locality in order to meet the development targets scheduled by the NBSP.

All allotments are intended to be supplied with reticulated water and sewerage services.

Electricity

Electricity services are to be provided underground in accordance with Shoalhaven Council requirements, and to provide a level of visual amenity expected in contemporary subdivision design. In addition, lines protected underground are preferable in areas identified as being bushfire prone, as is the site.

Electricity is proposed to be provided by way of underground supply.

Telecommunications

The site is already serviced by Telstra who supply telecommunications services to the existing dwellings.

The proponent is to supply telecommunications infrastructure to suit either Telstra's or NBN Co's requirements. Due to the proximity of the property to West Nowra and the University of Wollongong's Shoalhaven Campus, it is expected that infrastructure will be delivered by NBN Co.

All telecommunications infrastructure is to be installed by the developer in accordance with the relevant design and construction standards, and will be NBN Co. ready, being compatible with further infrastructure supplied by either Telstra or the NBN Co.

Gas

The availability of reticulated gas to residential areas is limited in the Shoalhaven with this dependent on feasibility assessments undertaken by Jemena Pty Ltd who obtain gas from Actew AGL. In relation to Mundamia, it has been advised that a reticulated gas supply will not be economically viable and as such, will not be made available.

Notwithstanding this, bottled gas is readily available, and resultant development will be able to be serviced.

3.2.14 Management and Maintenance of Open Space Areas

The proposal provides for the provision of open space allotments as follows:

- 7.422 ha area in the north-eastern corner of the site,
- 2.07 ha area in the south-eastern edge of the site,
- Public reserve having a total area of some 1986 m² to the east of the main spine road (Road No. 1),
- Public reserve having a total area of some 2048 m² to the west of Road No. 1,
- Public reserve at the entry to the development with an area of 1408 m².

The proposed two large parcels of public reserve on the eastern and north-eastern edges of the site have been designed around the ecological significance attributed to this area following flora and fauna assessment. It is intended to dedicate these to SCC to ensure the ongoing protection of habitat, and for conservation purposes, and such is considered an effective means of ensuring the ongoing preservation of such lands.

Management of these areas will be simplified by the public road and fire trail system which separates the reserves from the proposed residential allotments.

Management of these lands should be undertaken in accordance with a Vegetation Management and Habitat Restoration Plan recommended by SLR who undertook an Environmental Flora and Fauna Assessment for the proposal (Section 5.6) and the APZ requirements detailed by ELA. Whilst the details of such a plan are still to be determined, according to SLR, it will need to specifically address the removal of weeds.

The smaller public reserves are intended to be dedicated to SCC following embellishment with a play structure, seating and plantings for the use and enjoyment of future residents and the wider public. The proposal is generally consistent with the Masterplan Principles adopted by SCC and provides public reserves in the vicinity of the retail/community area in order to optimise the appeal of this precinct which will act as a focal hub for future residents.

3.2.15 Construction

Construction of the proposal is to be undertaken generally in accordance with the Construction Management Plan (Outline) (CMP) prepared by Allen Price & Associates (**Annexure 10**). Such plan details, in a conceptual manner, issues relating to occupational health and safety, site contamination, vegetation management, provision of existing and temporary services, pedestrian and traffic management, earthworks and excavation, construction waste management and working hours.

It is envisaged that a more detailed and specific CMP would be prepared for each stage considerate of more comprehensive design work necessary which will be prepared prior to construction.

3.2.16 Affordability

The proposal is intended to enhance the extent of affordable housing stock in the Shoalhaven by firstly, adding to the supply of housing and vacant allotments in order that prices are not artificially inflated. Secondly, the proposal includes a variety of allotment sizes and seeks to optimise the number of allotments developed in this new living area. Finally, the developer is committed to housing affordability through low cost modular building techniques during the design and construction process. To that end, our client, Twynam Property Group, is in the process of purchasing a separate company to pursue these objectives.

3.2.17 Site Remediation

The proposal includes the remediation of the property in accordance with the recommendations of Martens Consulting Engineers contained within the Remedial Action Plan. This work includes the excavation of identified material and its disposal off-site, with further sampling to validate the remediation undertaken.

3.3 STAGING OF DEVELOPMENT

The development will be completed in stages and included on the subdivision sketch plan comprising **Figure 4** above (also plan Reference 25489-01 in **Annexure 1**) is information which details the intended staging programme.

In this regard, it is anticipated that the subdivision will be undertaken in 12 stages, commencing in the south western corner and continuing along the western boundary generally in a northerly direction. The central and eastern portions of the development are to be undertaken generally from north to south in order to allow the infrastructure that is to be provided in conjunction with the development.

The staging pattern is a logical one that is mindful of the need to provide relevant services for residential development, particularly having regard to water supply pressure and sewerage service, along with appropriate maintenance of Asset Protection Zones in order to mitigate bushfire risk to enable the development of lots upon their release.

Release of land will be contingent on the buoyancy of the residential market and take up rates.

As outlined above in Section 3.2.3, Allen Price and Associates, subsequent to commencing this Major Project process, have made separate development application to Shoalhaven City Council, referenced SF 10328, seeking approval to the rationalisation of the site boundaries. That application, made over the two lots that comprise the subject site, proposes the creation of two allotments, being a 2.86 ha large lot residential parcel containing an existing dwelling, and a 40.424 ha development parcel. In essence, that application seeks the creation of Stage 1A, as shown in the Subdivision Sketch Plan comprising **Figure 4** above. That application can operate independently of the Major Project the subject of this Environmental Assessment, and if approved, simply enables the commencement of the overall development in a more timely and orderly fashion by separating the development lot from that parcel retaining its large lot residential land use with no further subdivision opportunities.

3.4 PROJECT JUSTIFICATION

3.4.1 Background

This EA has been prepared in support of a Major Project Part 3A application proposing the subdivision of the site into 312 residential lots, 1 residue large lot residential allotment, 5 public reserve lots and conservation areas, and the construction of roads and other essential civil infrastructure.

The site is located in a new living area proposed by SCC known as Mundamia, which is located to the west of the Nowra Township. Nowra, along with the entire Shoalhaven area has been undergoing significant population growth over recent years and Mundamia has been identified as a new urban release area in the *Nowra Bomaderry Structure Plan* (NBSP) as an area to accommodate additional residential development to cater for expected growth.

The NBSP is further acknowledged within the *South Coast Regional Strategy* (SCRS) which has supported its findings, and identified the area as an urban investigation area. The SCRS has identified the Shoalhaven as requiring an additional 26 300 dwellings in the next 25 years, of which 23 900 are potentially available by the development of vacant

urban land, and in the development of investigation areas. The purpose of the SCRS, as it applies to housing, is to ensure that there is adequate land available, appropriately located to accommodate the projected housing and employment needs of the region over the next 25 years (2006-31).

Furthermore, our clients in conjunction with SCC have prepared a Masterplan in order to implement components of the NBSP and to provide further principles and aims to guide further development of the area.

This development will therefore contribute to the anticipated population growth of the NSW South Coast and Shoalhaven area generally, and implement the NBSP more specifically. The population projections contained within the NBSP and SCRS all identify demand for housing within the area and the need to increase the extent of housing stock. The application proposes the development of 312 residential lots (along with support commercial precinct and open space land) within the ecological constraints identified for the area, and the characteristics that have been identified for the site.

3.4.2 Introduction

This section provides justification for the subdivision by addressing the following matters:

- consistency with strategic planning policies and documents;
- assessing the suitability of the site; and
- demonstrating that the project is in the public interest.

3.4.3 Strategic Planning Policies

The strategic planning framework as contained in various strategic and planning documents for the site is outlined below in both the regional and local context.

3.4.3.1 South Coast Regional Strategy (SCRS)

The SCRS applies to the Local Government Areas of Shoalhaven, Eurobodalla and Bega. The *“primary purpose of the Regional Strategy is to ensure that significant natural and scenic assets that define the region’s character and underpin its economy are not compromised by growth”*. The SCRS is to *“be implemented primarily through LEPs, development control plans and the State Infrastructure Strategy and funds collected through developer contributions”*. The SCRS applies to the 25 year period from 2006 to 2031.

In relation to residential growth, the SCRS provides background information and a series of goals for each of the relevant Local Government Areas that culminates in a number of

‘Outcomes’ and ‘Actions’ relating to various themes including the natural environment, natural hazards, housing and settlement, economic development and employment growth.

Furthermore, the SCRS includes within Appendix 1 a series of Sustainability Criteria which will require consideration in the development of additional new areas that are not specifically identified in the SCRS.

Natural Environment

Having regard to the natural environment, the SCRS makes a number of recommended actions, the majority of which relate to the preparation of local environmental plans. In relation to the site, the proposed subdivision layout has been considerate of ecological assessments that have identified areas having greater significance and these are to be preserved within the public reserve network to ensure the conservation of native vegetation.

Natural Hazards

The relevant actions proposed for the consideration of natural hazards relate to the preparation of flood investigations, considerate of climate change, the consideration of coastal erosion in LEPs, and consideration of proper risk assessment when rezoning land.

In relation to the site:

- it is not identified as being flood liable, with proposed urban development being above RL 46 m AHD, well in excess of known flood levels including the Probable Maximum Flood (PMF) (refer Section 5.4.1);
- a bushfire risk assessment has been undertaken and recommendations have been incorporated into the subdivision layout (refer Section 5.4.4);
- the site is relatively high, with urban development located at minimum of RL 46 m AHD, well above the potential sea level rise. Further, consideration of this matter is undertaken in Section 5.4.1.

Housing and Settlement

In relation to Housing and Settlement, the SCRS estimates 45 600 new dwellings will be required throughout the Region by 2031. Within the Shoalhaven local government area, the SCRS makes the following specific approximations:

An additional 26 300 dwellings will be required in the Shoalhaven over the next 25 years, of which 23 900 can potentially be accommodated by existing vacant urban land and existing investigation areas. A majority of this land is located around the major centre of Nowra–Bomaderry and the major towns of Ulladulla and Vincentia (includes the Jervis Bay–St Georges Basin area).

The 2400 dwelling 'supply gap' will be accommodated by medium-density development within the town centres.

Having regard to actions to achieve these goals, the SCRS outlines the following:

- *Infill housing and new residential subdivision located adjacent to existing well serviced centres and towns will be given priority in land release.*
- *Only urban areas which are/will be identified in the final versions of the following documents are supported (once endorsed by the Director General of Planning):*
 - *Nowra Bomaderry Structure Plan.*
- *Local environmental plans will include appropriate urban design and land use objectives as set out in the Neighbourhood Planning Principles to address issues such as*
 - *sustainability principles, e.g. walkable neighbourhoods, compact centres, water and energy efficiency, and transit-oriented development*
 - *promoting community development and wellbeing, e.g. through the provision of adaptable housing, accessibility, safety and crime prevention, and quality public domain areas and facilities that provide opportunities for social interaction*
 - *quality architecture and character, e.g. coastal design, streetscape and heritage*
 - *promoting community health and wellbeing through a clean and healthy environment and a built form that affords people a variety of recreation options (e.g. through the provision of green spaces) and transport alternatives (e.g. walking and cycling).*

The site is within Mundamia, a locality planned as a new living area near Nowra, an area which is well serviced with a range of commercial, social, educational, medical and community infrastructure. Further, the site is clearly identified in the NBSP as an area suitable for urban growth. As such, the project is consistent with the recommendations of the SCRS.

The site is planned to be provided with key infrastructure including water and sewerage services, electricity and telephone. Consultation has been had with the relevant supply authorities and no objection is raised to the proposal (refer to Section 6.7 and **Annexure 9**). Staging will be considerate of servicing constraints.

The project is the subject of a Masterplan prepared to respond to the opportunities and constraints identified in early planning for the site and locality. This has resulted in a subdivision layout which follows sustainability principles by incorporating walkable neighbourhoods and a centrally located commercial precinct which is intended to act as a hub for social and community interaction in the neighbourhood. Further, the site is

ringed by open space on its northern and eastern boundaries in close proximity to all allotments which will encourage an active and healthy lifestyle. The Masterplan gives consideration to streetscape design by orientating the grid pattern and streets such that views to Cambewarra Mountain or surrounding bushland are available and this will provide the site with a distinctive character.

Economic Development and Employment Growth

This section of the SCRS seeks to preserve economic growth and employment opportunities by:

- protecting lands that are currently zoned for employment;
- adding to the supply of employment lands in existing economic centres;
- monitoring the supply of employment lands;
- ensure provision of tourism infrastructure in new LEPs.

These actions relate to additional considerations required in the preparation of LEPs and have no major bearing on this project.

Water, Energy and Waste Resources

This Section relates to the provision of essential services in an efficient and secure fashion and culminates in the following actions:

- Council shall identify suitably located and appropriately zoned land for new water supply, waste water treatment and recycling, energy, waste avoidance and resource recovery infrastructure, to support growth in major regional centres and major towns.
- Councils will be encouraged to reduce town water demand through water conservation such as replacement of potable water use with harvested Stormwater and/or highly treated waste water for non-potable uses.
- Suitable locally generated and/or renewable energy projects such as wind, solar, bio-waste and wave power, shall be supported.
- Councils will be encouraged to promote waste avoidance and resource recovery in demolition and building work as well as in the design and occupancy of residential, commercial and industrial development.

Shoalhaven Water is the supply authority for water and sewer services and plans are underway to provide relevant infrastructure to support the development.

Having regard to the waste generation, SCC has adopted DCP No. 93 – Waste Minimisation and Management which aims to reduce the extent of waste generated by all phases of development, and requires the submission of a Waste Minimisation and

Management Plan for all development applications, including single dwellings and development that is defined as Complying Development. This will assist in controlling the amount of waste, along with its storage and disposal that is generated by this project.

The provision of alternative power energy sources are outside the scope of this project however Endeavour Energy, who supply electricity in the Shoalhaven Local Government Area, allows its customers to select renewable energy as an option under its 'INgreen' programme, and this will be available to future residents of the site.

Sustainability Criteria

Appendix 1 applies additional Sustainability Criteria for any additional investigation areas which have not been specifically identified within the SCRS. This is to ensure that any new investigation areas meet stringent criteria to enable further consideration to be given. By reference to the heading of the table contained within Appendix 1, it clearly states that it relates to "Threshold Sustainability Criteria for any proposed development site outside designated areas in South Coast Regional Strategy". The subject site is identified within the NBSP (refer Sections 3.4.3 and 4.7.1), clearly a designated area, and as such, the provisions of Appendix 1 have no specific application to this proposal.

Despite this, the proposal is considerate of the issues raised in Appendix 1 having regard to the provision of:

- essential infrastructure in a planned and methodical manner,
- a site which is accessible by public transport, whilst road access builds upon the established road network,
- a development that contributes to the planned supply of additional housing,
- a development that gives proper consideration of the risks to development and natural hazards including flood, geotechnical constraints and bushfire,
- development that properly considers ecological constraints of development, and addresses issues relating to water quality and stormwater management.

The proposal is consistent with the sustainability criteria outlined in Appendix 1.

Concluding Comment on South Coast Regional Strategy

The SCRS is a strategic document to guide future decisions, principally in relation to LEPs and DCPs, however it is considered that the proposal is consistent with its aims and objectives given that:

- the project is on land identified with the NBSP, a planning document that is specifically identified in the SCRS as being one where its provisions are supported.

- the layout is of good design that properly considers ecological constraints and opportunity;
- the subdivision proposes significant quantities of open space;
- the proposal is based on masterplanning principles adopted by SCC;
- the development is on land that is not visually prominent, and therefore visual impacts are minimised.

3.4.3.2 *Nowra Bomaderry Structure Plan (NBSP)*

The NBSP was adopted by Council on 24th October 2006, and endorsed by the Department of Planning on 25th February 2008. According to the NBSP, it “*sets the development-conservation agenda for Nowra Bomaderry for the next 20-30 years*”. The NBSP addresses the following key issues:

- Sustainable population;
- Natural environmental and values and biodiversity;
- Residential development;
- Sustainable transport system;
- Urban infrastructure provisions.

The NBSP includes a comprehensive assessment of population growth trends, along with economic trends to establish employment growth opportunities. Having regard to population growth, the NBSP predicts that population growth within the Nowra Bomaderry area will grow from 31,681 in 2006, to 53,710 by 2036, being the 30 year life of the NBSP. In response to this, the NBSP has identified certain areas where population growth could be supported, based on an analysis of land capability and site constraints. This process culminated in the identification of seven (7) New Living Areas for future development. These are shown in **Figure 5**. These areas are distributed around the existing urban area, and are sited both north and south of the Shoalhaven River.

Mundamia is identified in the study as Living Area Number 5, which comprises an area of 53 hectares, and has a residential capacity of some 720 dwellings and this area is shown in detail in **Figure 6**. The site the subject of this Major Project Part 3A Application makes up a portion of the New Living Area, with the balance comprising of land owned by other private holders, SCC, Local Aboriginal Land Council and the NSW Aboriginal Land Council.

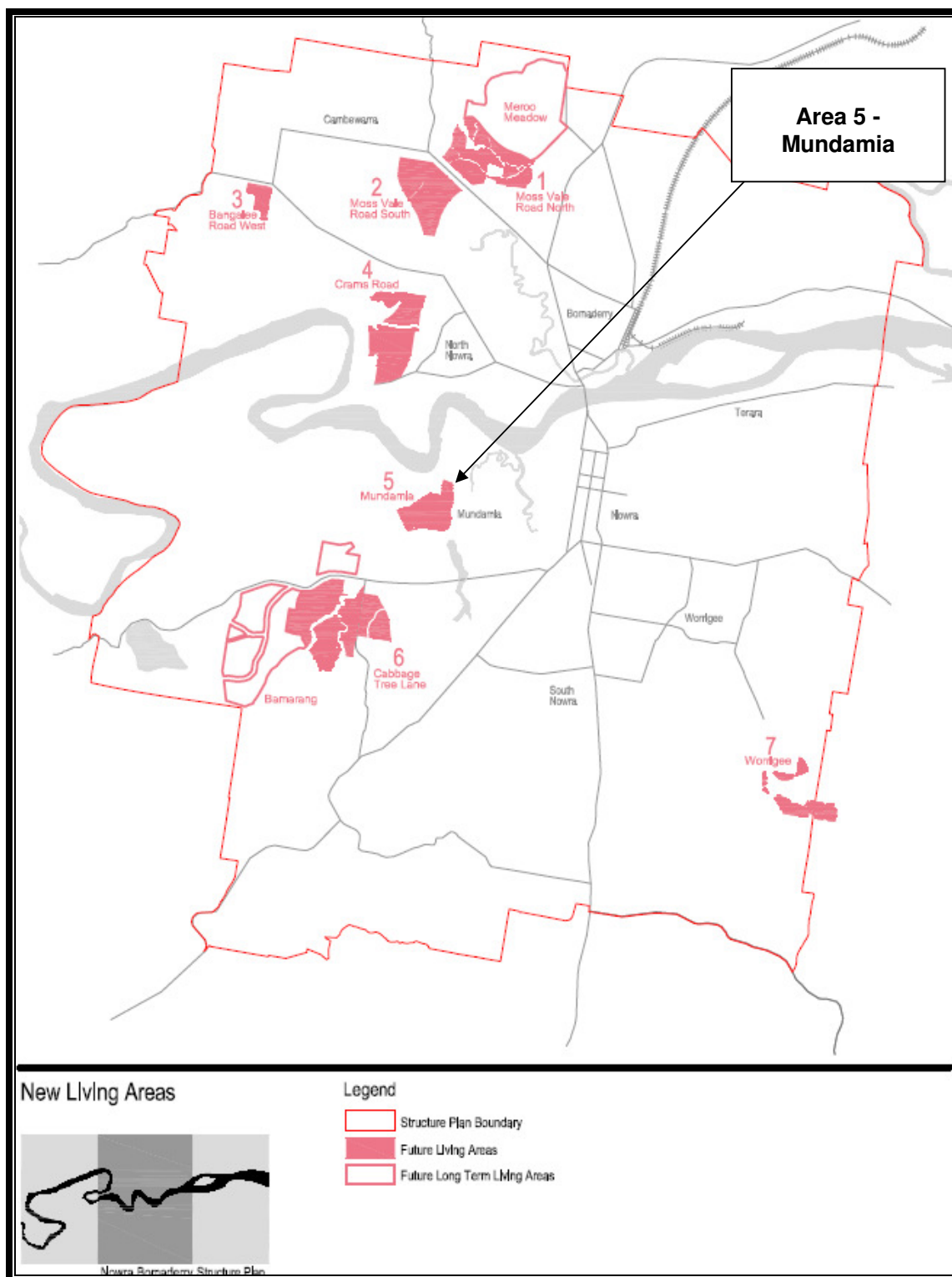


Figure 5: New Living Areas adopted by NBSP.

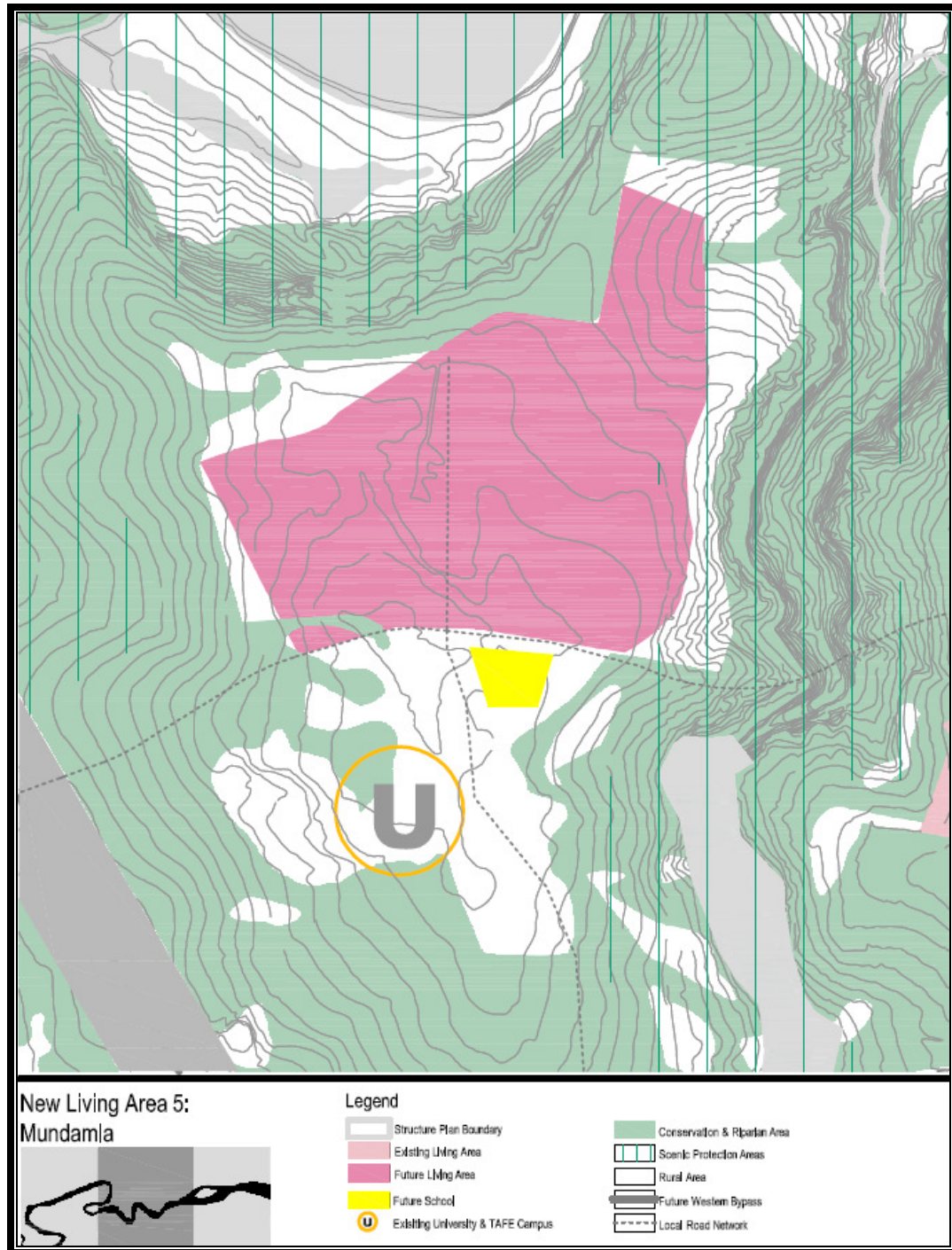


Figure 6: Mundamia New Living Area No. 5.

The NBSP adopts a Desired Future Character for the New Living Area at Mundamia as follows:

"The neighbourhood of Mundamia will be a contained area of residential development to the west of Nowra, within an area of abundant native bushland. This is an asset to be preserved and protected as a significant part of the biodiversity and natural processes in the area. The neighbourhood will achieve a high level of environmental performance to ensure the quality of watercourses in close proximity to the neighbourhood, being the Shoalhaven River, Flat Rock Dam, Flat Rock Creek, Cabbage Tree Creek and numerous tributaries into the creeks.

The neighbourhood will afford views and vistas to Cambewarra Range and adjoining bushland. The bushland will provide a valuable natural setting for the neighbourhood and determine the local landscape character. An entry point into the neighbourhood will communicate a sense of arrival and contribute to neighbourhood identity. Residential development will consist of a mix of medium density and detached dwellings.

A grid based street layout will provide a connected movement system, and include a wide main street running north/south from the neighbourhood entrance. The neighbourhood is in close proximity to the Nowra campus of Wollongong University and Thompson's Point rock climbing area. Opportunities for linkages between these areas will be developed through convenient movement and access and the provision of services and facilities within the neighbourhood such as small scale commercial activities and short term accommodation for visitors and students."

The NBSP also adopts Planning and Design Principles for the locality as follows:

"The neighbourhood will achieve a considered balance between urban development and the protection of environmentally significant areas. Threatened species and valuable ecological communities will be retained and protected through appropriate land use zones, continuous riparian corridors, stormwater and drainage management. The natural bushland adjoining the neighbourhood will be conserved. The local landscape character of the neighbourhood will be enhanced by retaining existing vegetation within open spaces, road reserves and on individual lots, where appropriate. Planting local native species in open spaces, streets and private gardens will also contribute to the local landscape character.

View corridors along streets will provide long distance views of the Cambewarra Range and adjoining bushland. Views from along the Shoalhaven River to the steep river embankments and native vegetation will be preserved by providing a treed buffer between the neighbourhood and the river.

An entry point into the neighbourhood will create a sense of arrival and place. A grid based street layout is required that is predictable, easy to navigate (legibility) and move through (permeability), and maximises north/south facing lots (optimising the potential to minimise energy use). George Evans Road (off Yalwal Road) will provide vehicle access to the neighbourhood and connections to the University and Thompson's Point rock climbing area will be maintained.

Access points for pedestrians and cyclists to the adjoining bushland will be formalised to clearly define access routes. In some instances it will be necessary to restrict public access to adjoining areas that are environmentally significant.

Meet current planning requirements for coastal land, threatened species and potential natural hazards."

3.4.3.3 Masterplan – Mundamia

Following on from NBSP, SCC has, in conjunction with our client, pursued a masterplanning process in order to guide the final design and form of the subdivision. At its meeting of 22nd July 2008 considered a report of its Property Steering Committee regarding the Mundamia Masterplan and resolved that:

- a) *Council adopt the Masterplan (Ref: Mundamia New Living Area No 5 dated 03/07/08) and the road geometry (including the roundabout) (Ref: 24532-11 Option A) and proceed to open and close the appropriate roads to achieve the Masterplan;*
- b) *Higher Density zoning be applied to the south of the commercial areas on both sides of the spine road.*

The Masterplan was prepared by the Cox Group on behalf of Malbec Mundamia Pty Ltd (the then developer which has subsequently become Twynam Mundamia Pty Ltd) and the SCC, following an extensive assessment of the constraints and opportunities presented by the site and surrounds. This included consideration of flora and fauna matters, bushfire constraints, traffic and access, heritage (aboriginal and non indigenous), social infrastructure and urban design principles.

This process resulted in the preparation of an overall Masterplan for the locality which is shown as **Figure 7** and **8**.

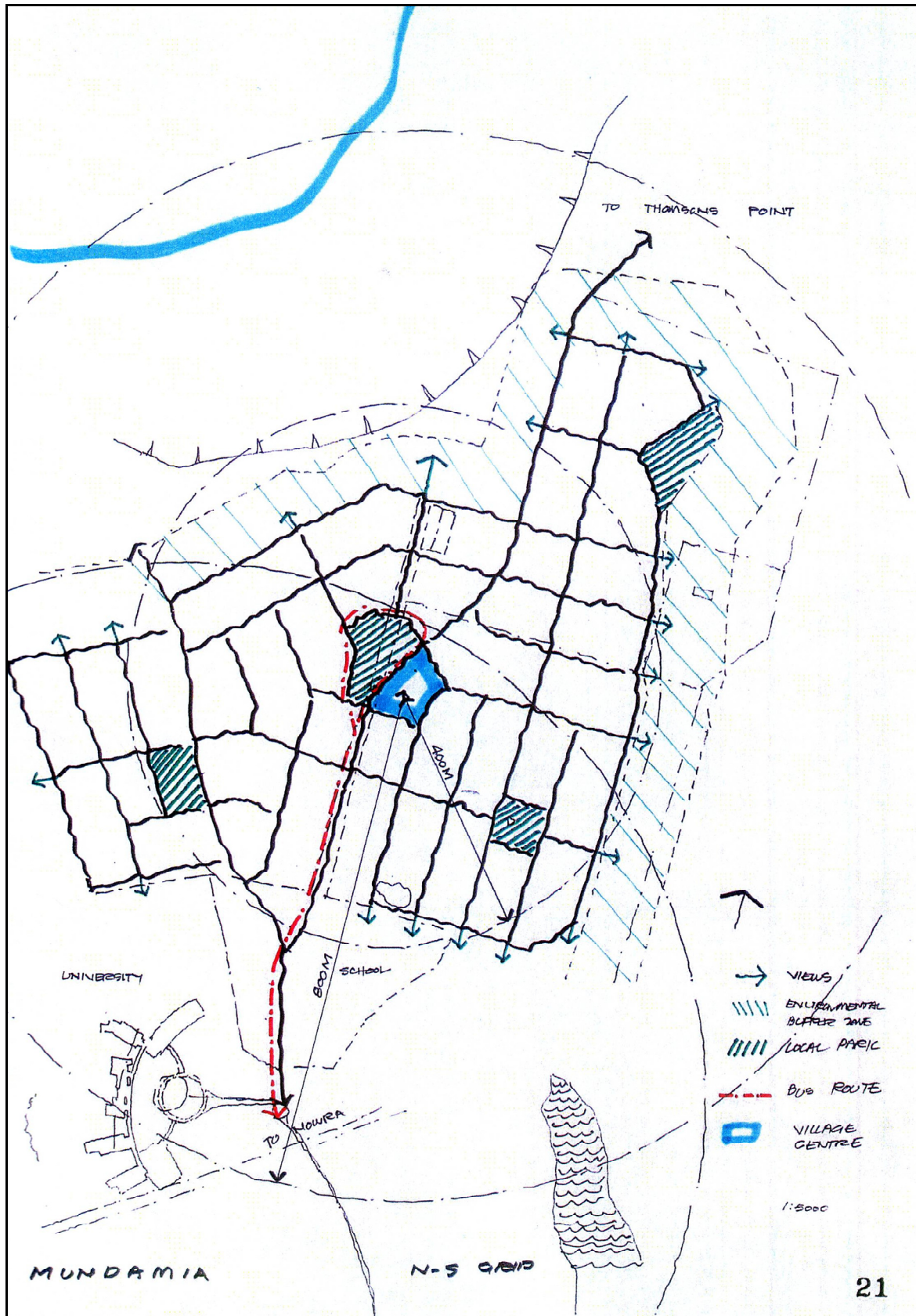


Figure 7: Mundamia Masterplan

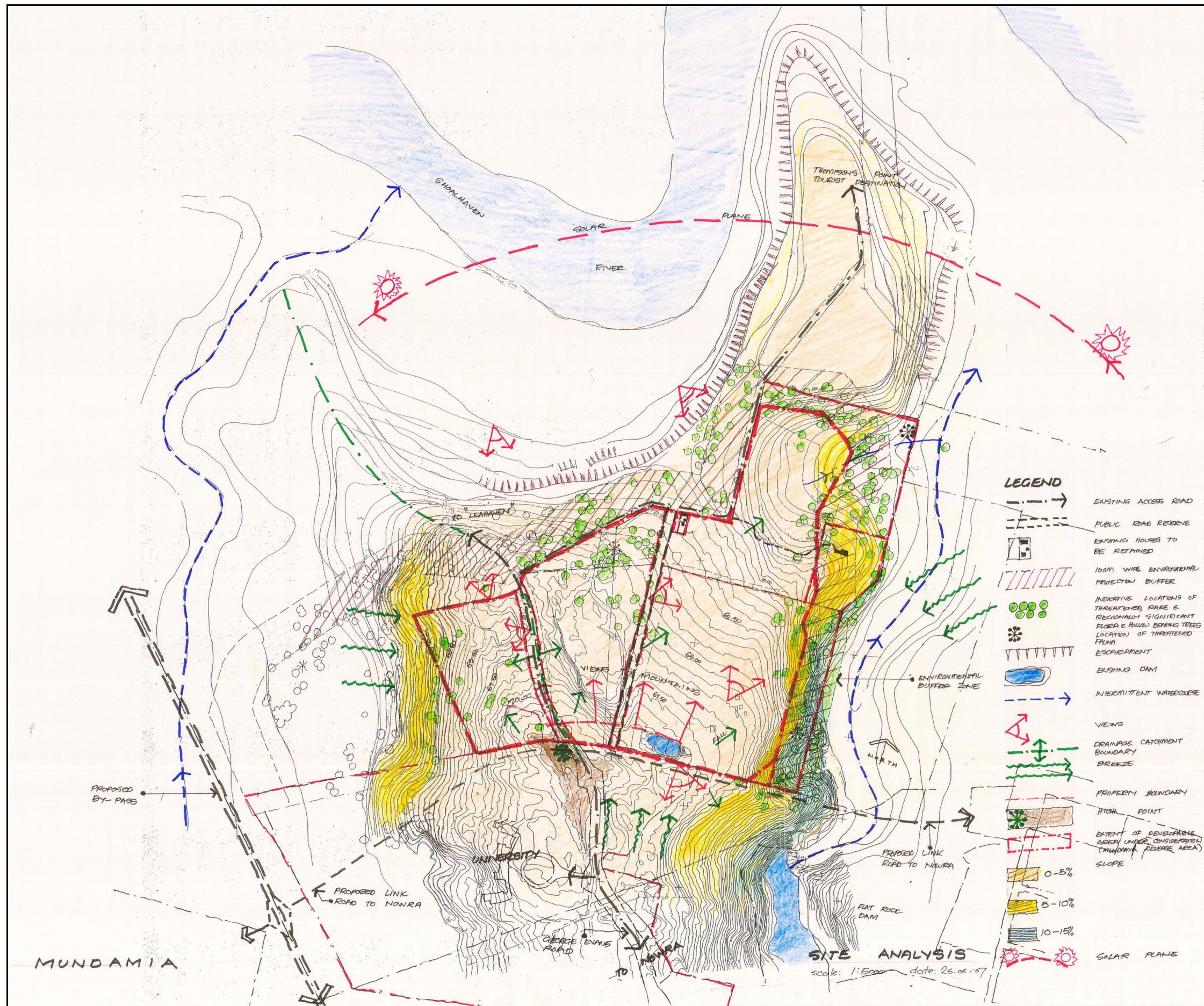


FIGURE 8
Site Analysis Plan
prepared by
Cox Group

The subdivision layout prepared by Allen Price and Associates generally accords with the principles established in the Masterplan prepared by the Cox Group.

Furthermore, in addition to the conceptual layout, SCC adopted 22 Masterplanning Principles to be applied in the development of the Mundamia urban release area (**Table 1**) as follows:

Table 1
Mundamia Urban Release Area Masterplanning Principles

Planning Principles	Comments
1. <i>Provide a residential living area of unique character and ambience which will provide a different choice to Worrigee and West Nowra.</i>	The layout provides an attractive subdivision which will have a unique character through the street pattern which enables distant views to the Cambewarra Mountain range, and closer views to bushland at the edges of the site. This will provide a suitable ambience that will differentiate it from other estates at Worrigee and West Nowra which are based on a hierarchy of roads that include cul-de-sacs accessing collector roads.
2. <i>The rural landscaping along the University access road be extended via a major spine road through the sub-division to northern focal point at Thompson's Reserve.</i>	The proposed road network includes a major spine road that will be appropriately landscaped as an extension of George Evans Road and this continues through to the north of the site. According to the Transport Report of Colston Budd Hunt and Kafes (Annexure 2), the road reserve will result in roadside verges of 5.5 m along each side for effective landscaping. The conceptual Landscape Plan (Annexure 11) shows the provision of roadside landscaping to maintain a rural landscape character.
3. <i>Commercial Centre including a village shop, community hall and public open space be located on the major spine road towards the southern boundary of the properties, within walking distance of the University.</i>	Since initial consideration of the Mundamia Masterplan, through agreement of the main landowners, including SCC, it has been agreed to locate the retail facility (village shop) and community hub (community hall) wholly onto Council land. A File note containing this agreement is contained in Annexure 13 . Proposal respects this arrangement and includes public reserves in the vicinity of the retail/community hub in order to optimise the appeal of this precinct.
4. <i>The passive open space be integrated with the major spine service road rather than "small pocket" reserves.</i>	The most prominent open space is the public reserve which is to be integrated with the commercial precinct adjacent the major spine road. The layout also provides open space on the edges of the site to enable conservation in accordance with the ecological assessment undertaken for the site.
5. <i>The major east/west collector road shown on the Nowra Bomaderry Structure Plan be incorporated as an APZ zone on the southern boundary of the site or not integrated.</i>	The subdivision sketch plan has appropriately considered the future collector road along with identified APZ requirements.

Table 1 (continued)

Planning Principles	Comments
6. <i>The internal road layout and provision of services must allow each owner to develop independently.</i>	The proposed layout and staging will enable other lots within the Mundamia area to develop independently.
7. <i>Both high quality and affordable medium density to be located in the vicinity of the commercial/community area within walking distance of the University.</i>	The proposal includes larger allotments to the south of the proposed commercial precinct which could be developed for higher densities if required which is permissible under the proposed R1 zoning. See below for justification.
8. <i>The existing George Evans Road needs to be retained to provide access to the western residential sector and Jonsson Road to be included as an APZ perimeter road.</i>	The proposal is consistent with this principle.
9. <i>The perimeter road around the total precinct to act as an APZ zone.</i>	The proposal incorporates a perimeter road which also adds to the provision of APZ.
10. <i>Ensure a bus route can circulate through the subdivision, starting and finishing at the Community/Commercial focal point.</i>	The proposed layout facilitates accessibility by buses, with potential bus stops ensuring reasonable walking distances are provided from each proposed allotment (as shown in Plan No. 25489-01 in Annexure 1).
11. <i>As Council has contributed to the water and sewerage capacity, the Council land will be serviced first with spare capacity.</i>	The proposal will be able to be serviced with all necessary infrastructure.
12. <i>The internal subdivision roads should provide rural views at end to the buffer zone.</i>	The layout has been designed to enable views to bushland on the perimeter of the site, and to Cambewarra Mountain in the distance.
13. <i>Solar access will need to be considered for all lots.</i>	The layout is based on a grid pattern which provides most allotments with an east-west alignment, or a north-south alignment. Solar access is considered to be suitable for all lots.
14. <i>Larger lots may be required on steeper slopes.</i>	Contours demonstrate that the site is not unduly steep where development is proposed. This is justified by the Geotechnical Assessment that has been undertaken which is discussed in Section 5.4.3. Notwithstanding this, the eastern portion of the site is the steepest and the subdivision layout does include larger allotments on these lands.
15. <i>Easements will be required for existing services, including the water pipeline.</i>	Easements can be provided as required.
16. <i>Pedestrian/bicycle paths should be strengthened along the major spine road.</i>	Pedestrian pathways are provided along the major spine road and extend to link all destination desire points and public open space areas.
17. <i>The acquisition of land from the Department of Education needs to be undertaken for the main spine road during Stage 1.</i>	SCC has subsequently undertaken the necessary acquisition and road realignment.
18. <i>Staging and implementation of the subdivision should radiate from the central Commercial/Community focal point where possible.</i>	The commercial precinct is at the entry of the subdivision and is to be developed in the first stage. Further staging is mindful of servicing, drainage and APZ requirements.

Table 1 (continued)

Planning Principles	Comments
19. <i>Drainage should be dissipated rather than concentrated and downstream approvals need to be given for staging.</i>	Stormwater drainage is to be undertaken via a series of piped drains and bio-filtration systems. Staging of the development is considerate of drainage requirements.
20. <i>Lot sizes need to be determined at master planning stage and relate to solar access, views, drainage.</i>	Lot sizes enable appropriate residential development and the proposed layout facilitates desirable solar access to the lots. Larger lots are provided where an east-west or north-south orientation is not achieved due to the curvature in the spine road. The road pattern facilitates sight desire lines to points of interest including the Cambewarra Mountain Range and nearby bushland. Drainage has been accounted for in the layout.
21. <i>Consideration be given to architectural covenants over lots, to create a theme or standard.</i>	Consideration has been given to the establishment of architectural covenants however it is considered that this is unreasonable and unnecessary given the controls SCC has in place on dwellings. Further, the subdivision itself will result in the creation of a distinctive character.
22. <i>The ultimate boundary of the precinct to be defined by diversity certification.</i>	The boundary of developable land is determined by the sites constraints, including ecological matters.

The provision of larger allotments specifically for medium density purposes to accommodate university students is not proposed. Consultation with the University of Wollongong indicated that there would be limited demand for student housing in the Mundamia living area, and therefore specific medium density housing for students was not required. Having regard to the wider population, medium density housing is better sited close to areas provided with a more complete range of urban and social infrastructure to most efficiently utilise the services that are provided. Mundamia is not considered to be such an area where medium density should be specifically targeted for increased development. In this regard, the area will be provided with a limited range of commercial and social facilities, and Nowra will still be regularly relied upon by residents to provide the necessary support facilities.

Investigations undertaken by SCC in the preparation of the NBSP included a preliminary assessment on the potential dwelling unit yield through the urban consolidation of existing residential lands. This assessment identified that a potential yield of some 6670 dwellings exists through the urban consolidation process. According to the NBSP, this represents some 35.7% of all new housing stock anticipated to be provided, and as such, it is considered that this will result in the provision of a reasonably diverse and

affordable housing choice for residents of the Shoalhaven, despite no medium density housing specifically being identified at Mundamia.

Notwithstanding the above, a number of lots are of a size and shape, and in a location that could be merged to form an allotment capable of development for higher densities. Furthermore, a number of corner allotments, or lots having a larger area, are sited throughout the proposal and these could be developed for dual occupancy purposes.

On balance, it is considered that the proposal will result in suitable housing style for an area such as Mundamia.

3.4.3.4 *Consistency with NSW SEPP 71*

The provisions of SEPP 71 – Coastal Protection have been assessed in Section 4.2.3 of this EA. The proposal is considered to be compliant with the requirements.

3.4.3.5 *Local Environmental Plans*

The provisions of SLEP 1985 and Draft LEP 2013 have been addressed within Sections 4.5.1 and 4.5.2 of this EA.

3.4.3.6 *Development Control Plans*

The proposal has been assessed against the requirements of DCP No 100 – Subdivision Code adopted by SCC (refer Section 4.6.3).

The site is not subject to any place based DCP, however as outlined above, SCC has adopted a Masterplan which is addressed in Section 3.4.3.

3.4.3.7 *Conclusion*

On the whole, it is considered that the proposal is consistent with all relevant strategic and statutory provisions applying to the site.

3.4.4 *Suitability of the Site for Development*

The proposal has been the subject of extensive separate specialist environmental assessments to properly consider the opportunities and constraints associated with the subject site. These include an ecological assessment, geotechnical and soils analysis, infrastructure provision, bushfire assessment, aboriginal archaeological investigations, traffic assessment, site contamination, along with the preparation of a water cycle management report.

The site has been identified in an Environmental Site Assessment undertaken by Martens Consulting Engineers that site contamination is confined to a restricted area of the site and which has emanated from empty fuel cans, motor oil containers, lubricants

and disused motor vehicles. A Remedial Action Plan has therefore been prepared by Martens Consulting Engineers which has recommended certain works in the form of excavation of identified material and disposal off site, with further sampling to validate the remediation works undertaken. These remediation works are to be undertaken in conjunction with the works to implement this subdivision. This is further discussed in Section 5.4.2 of this EA.

The specialist assessments outlined above have identified the extent of developable land and guided the proposed subdivision layout, including road pattern and public open space provision, Asset Protection Zones, sizing and location of stormwater infrastructure.

The final result being a development proposal that will not adversely affect water quality, or result in the removal of any native vegetation having any ecological significance given the developable area is sited on land having low ecological significance.

The site is considered a suitable one for the establishment of a new residential area given its identification within NBSP as an area capable of supporting new urban development.

3.4.5 Public Interest

The development is considered to be entirely in the public interest as it:

- is of a design that is considerate of the extensive environmental investigations that have been made;
- does not result in the removal of any significant vegetation, nor impose significant environmental impacts as it utilises predominantly cleared land, along with land having lower quality ecological qualities;
- provides additional housing stock to meet the demand identified by SCC in the NBSP and the Department of Planning in the SCRS;
- is consistent with provisions of the Draft Shoalhaven LEP 2013 as being currently exhibited;
- results in the provision of a greater choice in housing;
- proposes high quality urban design to create an area having a distinct character.

3.4.6 Conclusion

It is considered that the proposed subdivision makes a positive contribution to the provision of additional housing for the Nowra Bomaderry urban area which is consistent with both the NBSP and the SCRS.

The proposal will result in the provision of additional housing stock and is to be undertaken on land that is predominantly cleared or otherwise disturbed and therefore, it avoids development on environmentally sensitive lands. The design of the subdivision proposes appropriate mitigation measures including the provision of suitable stormwater management, conservation of all environmentally sensitive lands, provision of landscaping within public areas, subdivision layout that is permeable and incorporates pathways to encourage active transport methods, and the implementation of bushfire mitigation measures.

Further, the proposal is consistent with the Mundamia Masterplan principles adopted by SCC and these result in a subdivision layout that incorporates appropriate lot sizes with good orientation for direct solar access, commercial precinct sited along the proposed spine road and the creation of an area with a distinctive character.

3.5 DEVELOPMENT OPTIONS

The extent of developable area has been determined based on the extensive assessment that has been undertaken by SCC and our clients in the consideration of the development of the site. This has resulted in the identification of constrained areas, including those having greater ecological significance, along with that part of the site adjacent to native forest which requires provision of an Asset Protection Zone. This process has identified that part of the site which is suitable for residential development, and that portion which is not suitable for further more intensive development.

This assessment also has been considered in the preparation of Draft Shoalhaven LEP 2013 which proposes to zone only a portion of the site for development (R1), with the remainder having a conservation zone (E2).

The subdivision layout itself has been guided by the principles conveyed in the Mundamia Masterplan adopted by SCC.

The Masterplan considered two options for the subdivision of the developable area, with the main difference being the orientation of the proposed allotments, with one being based on a north south grid, the other on an east-west grid.

The final Masterplan adopted by Council, and the subdivision layout currently proposed in this Major Project application, is based on the north-south grid. This proposal is considered to have the following advantages over the east-west grid pattern:

- Maximises the properties which have an east-west orientation, thereby enabling longer boundaries with a northern aspect to maximise passive solar benefits.
- Orientation of road reserves enables maximum outlook towards adjoining forested lands and the Cambewarra Mountain Range to provide the desired character.
- Enables an appropriate hierarchy of roads to service the subdivision with good legibility and connectivity to desire lines.
- Maximises the permeability of the subdivision in order to encourage pedestrian and cycle movements within the subdivision.
- Enables the development of adjoining lands within the Mundamia New Living Area to maintain the desired character in a consistent fashion.

In addition, the selected design provides the opportunity to address all environmental constraints identified in the assessments that have been undertaken and allows the conservation of those areas identified as having ecological significance. Further, the proposal enables the development of relevant infrastructure (stormwater drainage, water and sewer) in an efficient manner.

Further, the selected subdivision layout enhances the public domain through the provision of a wider road reserve running east-west to visually connect the proposed public reserve with the substantial bushland to the east which is to be conserved. This road reserve will also function as a biofiltration system allowing the combined carriage and treatment of stormwater.

The Mundamia Living Area has been well planned by SCC and our client through the Masterplanning process. This has not only addressed the ecological constraints and other hazards, but has also thoroughly considered the liveability of the area, and the appropriate siting of support infrastructure, such as public reserves and neighbourhood shopping precincts. The layout provides for bus routes, and the permeable layout ensures that residents will not have to rely on motor vehicles for local trips, thereby enhancing the sustainability of the community.

In addition, the proposal has been mindful of the further planned extension of the Mundamia Living Area to the west and the layout enables the efficient extension in due course. The completion of relevant road works in Stage 1 of the development, along

with alternative access opportunities that are available to these lands, will enable the adjoining lands to be developed independently of the subject site.

Staging of the proposal has been considerate of the need to provide for the efficient implementation of infrastructure, and also the need to provide appropriate levels of cleared land for asset protection purposes.

4.0 PLANNING AND LEGISLATIVE PROVISIONS

4.1 COMMONWEALTH LEGISLATION

4.1.1 Environment Protection & Biodiversity Conservation Act

The Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* specifies that approval is required from the Commonwealth Minister for the Environment for actions that have, will have or are likely to have a significant impact on a matter of “*national environmental significance*”, including:

- (i) declared World Heritage Areas;
- (ii) declared RAMSAR wetlands;
- (iii) listed threatened species and ecological communities;
- (iv) listed migratory species;
- (v) nuclear actions; and
- (vi) the environment of Commonwealth marine areas.

Actions on or outside Commonwealth land that have, will have or are likely to have a significant impact on the environment on or outside Commonwealth land must also be referred to the Commonwealth Minister for assessment and approval.

The Department of Environment and Heritage (2005) has published guidelines to assist in determining whether an action will have or is likely to have a significant impact on a matter of national environmental significance and, hence, whether a referral should be submitted to the Department for a decision by the Minister on whether assessment and approval is required under the EPBC Act.

The Guidelines state that, to make a decision as to whether or not to refer an action to the Minister, you should consider the following questions:

1. *Are there matters of national environmental significance located in the area of the proposed action?*
2. *Considering the proposed action at its broadest scope, is there potential for impacts on matters of national environmental significance?*
3. *Are there any proposed measures to avoid or reduce impacts on matters of national environmental significance?*
4. *Are any impacts of the proposed action on matters of national environmental significance likely to be significant impacts?*

The Guidelines provide the following important definitions:

"A *significant impact* is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts. You should consider all of these factors when determining whether an action is likely to have a significant impact on matters of national environmental significance."

"To be *likely*, it is not necessary for a significant impact to have a greater than 50% chance of happening, it is sufficient if a significant impact on a matter of national environmental significance is a real or not remote chance or possibility."

"*Population*, in relation to critically endangered, endangered or vulnerable, threatened species, means:

- a geographically distinct regional population, or collection of local populations; or
- a regional population, or collection of local populations occurring within a particular bioregion."

"An *important population* is a population that is necessary for a species' long-term survival and recovery. This may include populations that are:

- key source populations either for breeding or dispersal;
- populations that are necessary for maintaining genetic diversity; and/or
- populations that are near the limit of the species' range.

"*Habitat critical to the survival of a species* refers to:

- habitat identified in a recovery plan for the species as habitat critical for those species or communities; and/or
- habitat listed on the Register of Critical Habitat maintained by the Minister under the Act; and/or
- areas that are necessary:
 - for activities such as foraging, breeding, roosting, or dispersal,
 - for succession,
 - to maintain genetic diversity and long term evolutionary development, or
- for the reintroduction of populations or recovery of the species."

This Environmental Assessment Report is supported by an Environmental Flora and Fauna Assessment carried out by SLR which forms **Annexure 3**. In relation to the requirements the EPBC Act, this assessment concludes:

"It is the conclusion of this Report that the proposal is not "likely" to impose a "significant impact" upon any MNES.

Despite the above conclusion, the matter was referred to the Commonwealth for review and consideration as to whether the proposal triggered the requirements of the EPBC Act. By letter dated 26th April, 2012 the Department of Sustainability, Environment, Water, Population and Communities advised that the proposal is not a controlled action. Therefore, the EPBC Act clearly has no further implications for this development proposal.

Flora and Fauna issues are addressed in Section 5.6 of this report.

4.2 STATE LEGISLATION

4.2.1 Environmental Planning and Assessment Act 1979

State Significant Development - Part 3A and the Repeal of Part 3A Environmental Planning & Assessment Act

The proposal involves a concurrent Project Application (MP08_0141) made pursuant to Part 3A of the Environmental Planning & Assessment Act. DGRs for this project were originally issued on 17th October 2008.

The introduction of Part 3A to the Environmental Planning & Assessment Act 1979, and the introduction of *State Environmental Planning Policy (Major Development)* in 2005, brought about a change in the regime concerning the assessment of state significant development. Part 3A initially targeted the streamlining of the assessment of projects deemed to be of state significance, including critical infrastructure projects.

Following the 2011 NSW election, the newly elected Coalition Government have instigated measures seeking to implement change to the planning, environmental legislative and policy regime applicable to projects previously subject to Part 3A.

According to Planning Circular PS 11-014 issued by the Department of Planning & Infrastructure and dated 13th May 2011 no new applications for any of the development that remains identified as Part 3A in the Major Development SEPP will be accepted and assessed during this interim period.

Projects currently awaiting declaration will not be declared. Generally, applications for the assessment of these projects will be able to be lodged once the new legislation has

commenced, provided the category of development is one to which the new system of state significant development applies.

The NSW Parliament has passed the *Environmental Planning & Assessment (Part 3A Repeal) Act* (the “Part 3A Repeal Act”) to repeal Part 3A of the *Environmental Planning and Assessment Act 1979* (the EP&A Act). The Part 3A Repeal Act creates an alternative assessment system which allows the NSW Government to assess and determine projects which are of State significance.

The Part 3A Repeal Act establishes two separate assessment frameworks for either State Significant Infrastructure (SSI) or State Significant Development (SSD). Projects that fall under these two categories will be assessed by the Department of Planning and Infrastructure (the ‘Department’).

To this end, the Act largely returns to the situation before Part 3A where two separate assessment pathways were in place for projects to be assessed by the State, namely:

- Linear public infrastructure projects such as railways, water supply systems, pipelines and transmission lines, or other development by a State agency which has a significant environmental effect; and
- Significant development types which require consent such as mines, chemical and manufacturing plants, warehousing and distribution facilities, hospitals and associated ancillary development.

The Act also introduces a number of changes to the operation and make-up of the Planning Assessment Commission (PAC) and Joint Regional Planning Panels (Regional Panels), seeking to provide additional transparency and greater local government input.

Supporting Regulations and a new State Environmental Planning Policy (SEPP) associated with the Part 3A Repeal Act have been introduced and came into effect from the 1st October 2011. These supporting provisions provide additional detail with respect to the classes and thresholds for development to be considered as State Significant.

This new SEPP is called *State Environmental Planning Policy (State and Regional Development) 2011* and is known as the “State and Regional Development SEPP”. This new SEPP approximately halves the number of proposals dealt with by the State when compared with the former Part 3A system.

The *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) has also be amended to update a number of procedural and administrative arrangements.

This is an interim assessment system which will be reviewed as part of the proposed overall review of the NSW planning system that the new NSW Government has also instigated.

For the purpose of the *Environmental Planning & Assessment (Repeal of Part 3A) Act* (the '*Repeal of Part 3A Act*'), this proposed subdivision however is termed a *Transitional Part 3A Project* under the Repeal Part 3A legislation.

These circumstances are clarified in Planning Circular PS 11-021 issued by the Department of Planning & Infrastructure on the 30th September 2011. This Circular confirms that Part 3A continues to apply to certain projects subject to transitional provisions identified in Schedule 6A of the Act.

Schedule 6A of the *Repeal of Part 3A Act* makes provisions for such projects. Essentially, a *Transitional Part 3A Project* includes:

- (a) *an approved project (whether approved before or after the repeal of Part 3A),*
- (b) *a project for which environmental assessment requirements were notified or adopted before the repeal of Part 3A,*
- (c) *a project that is the subject of a Part 3A project application and that the regulations declare to be a transitional Part 3A project.*

As the DGRs for this project were originally issued on 17th October 2008, and subsequently re-issued on the 20th October 2010 this project is considered a *Transitional 3A Project* for the purposes of this legislation.

In this regard *environmental assessment requirements* are defined for the purposes of Schedule 6A as meaning:

Environmental assessment requirements means:

- (a) *environmental assessment requirements for approval to carry out a project notified to the proponent of the project under Part 3A, or*
- (b) *environmental assessment requirements accepted by the Director-General as environmental assessment requirements for approval to carry out a project under clause 8J of the Environmental Planning and Assessment Regulation 2000, but does not include draft environmental assessment requirements for the purposes of the approval of a concept plan.*

Clause 3 of Schedule 6A provides for the continuation of Part 3A and Transitional Part 3A projects. Essentially it states that Part 3A continues to apply to and in respect of transitional Part 3A projects. Clause 3 reads:

3 Continuation of Part 3A – transitional Part 3A projects

- (1) *Part 3A continues to apply to and in respect of a transitional Part 3A project.*
- (2) *For that purpose:*
 - (a) *any State environmental planning policy or other instrument made under Part 3A, as in force on the repeal of that Part and as amended after that repeal, continues to apply to and in respect of a transitional Part 3A project, and*
 - (b) *declarations, orders, directions, determinations or other decisions with respect to a transitional Part 3A project continue to have effect and may continue to be made under Part 3A (including for the purpose of the application or continued application of Part 4 or 5 or other provisions of this Act in relation to the project).*
- (3) *The regulations may modify provisions of Part 3A (and the instruments or decisions referred to in subclause (2)) as they apply to a transitional Part 3A project.*
- (4) *The declaration of development as a project under Part 3A (or as a critical infrastructure project) is revoked if the development is not, or ceases to be, a transitional Part 3A project.*
- (5) *A transitional Part 3A project is not State significant development or State significant infrastructure.*
- (6) *This clause is subject to the other provisions of this Schedule.*

Given these circumstances, Part 3A will continue to apply for the proposed subdivision project.

Under these circumstances, and as confirmed in Circular PS 11-021, Part 3A continues to apply to:

- Approved projects, whether they were approved before or after 1st October 2011.
- Additionally, Part 3A continues to apply to most undetermined project and concept plan applications where the DGRs were issued before 1st October 2011 and a current major project declaration remains in force. These undetermined applications continue to be assessed and determined under Part 3A, as in force immediately before its repeal.

Relevant legislation and other approvals

Approvals under eight Acts listed under Section 75U Clause 1 of the EP&A Act are not required for developments identified as Major Projects. These Acts include:

- a) *the concurrence under Part 3 of the [Coastal Protection Act 1979](#) of the Minister administering that Part of the Act,*
- (b) *a permit under section 201, 205 or 219 of the [Fisheries Management Act 1994](#),*
- (c) *an approval under Part 4, or an excavation permit under section 139, of the [Heritage Act 1977](#),*
- (d) *a permit under section 87 or a consent under section 90 of the [National Parks and Wildlife Act 1974](#),*
- (e) *an authorisation referred to in section 12 of the [Native Vegetation Act 2003](#) (or under any Act to be repealed by that Act) to clear native vegetation,*
- (f) *a permit under Part 3A of the Rivers and Foreshores Improvement Act 1948,*
- (g) *a bush fire safety authority under section 100B of the [Rural Fires Act 1997](#),*
- (h) *a water use approval under section 89, a water management work approval under section 90 or an activity approval under section 91 of the [Water Management Act 2000](#).*

4.2.1.1 *Environmental Planning and Assessment Act (1979) Objects*

Section 5 deals with the objects of the EP&A which are as follows:

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

- (b) *to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and*
- (c) *to provide increased opportunity for public involvement and participation in environmental planning and assessment.*

It is considered that the proposal is consistent with these objects as it:

- is consistent with growth strategies adopted by SCC and the DoP;
- has been developed after consideration of a number of separate assessments which have identified the constraints and opportunities available at the site;
- results in the preservation of ecologically constrained lands identified during ecological assessment;
- properly considers natural hazards applying to the locality, restricted to bushfire;
- results in the development of land that has been identified for urban purposes, which will lead to the orderly and economic use of land;
- builds upon established infrastructure in the locality, and other essential infrastructure which is currently being coordinated by the relevant providers;
- protects the environment by enabling the preservation of land identified as having ecological significance;
- increases the availability of housing stock within the SCC area thereby maintaining housing affordability by ensuring that real estate prices are not artificially inflated due to land shortages; and
- public participation has already been provided in the development of the NBSP and SCRS, the preparation of the Aboriginal Archaeological Assessment, and through the assessment of this major project.

4.2.2 Other Acts

Pursuant to Section 75U of the EP&A Act authorisation, the provisions of the following Acts do not require consideration in relation to Part 3A projects:

The Threatened Species Conservation (TSC) Act;

The Heritage Act 1977;

The National Parks and Wildlife (NPW) Act 1974;

The Native Vegetation Act 2003;

The Water Management Act 2000; and

The Coastal Protection Act 1979.

4.2.3 State Environmental Planning Policies

The following State Environmental Planning Policies (SEPPs) require consideration in the assessment of this major project.

4.2.3.1 *State Environmental Planning Policy (SEPP) – Major Projects (2005)*

As outlined above in Section 4.2.1, the provisions of SEPP Major Projects continue having regard to the current project due to the transitional arrangements applying under the *Environmental Planning & Assessment (Part 3A Repeal) Act*.

The aims of this Policy are as follows:

- (a) *to identify development to which the development assessment and approval process under Part 3A of the Act applies;*
- (b) *to identify any such development that is a critical infrastructure project for the purposes of Part 3A of the Act;*
- (c) *to facilitate the development, redevelopment or protection of important urban, coastal and regional sites of economic, environmental or social significance to the State so as to facilitate the orderly use, development or conservation of those State significant sites for the benefit of the State;*
- (d) *to facilitate service delivery outcomes for a range of public services and to provide for the development of major sites for a public purpose or redevelopment of major sites no longer appropriate or suitable for public purposes;*
- (e) *to rationalise and clarify the provisions making the Minister the approval authority for development and sites of State significance, and to keep those provisions under review so that the approval process is devolved to Councils when State planning objectives have been achieved.*

It is considered that the subdivision would constitute a Major Project under the provisions of Schedule 2 of the Major Projects SEPP under clause 1(1)(j).

Schedule 2 Clause 1(1)(j) Coastal Area identifies the following development as a major project:

“subdivision for residential purposes of land that is not in the metropolitan coastal zone (unless it is wholly or partly in a sensitive coastal location):

- (i) *into more than 25 lots”*

The NSW Coastal zone applies:

- three nautical miles seaward of the mainland and offshore islands;
- one kilometre landward of the open coast high water mark;
- a distance of one kilometre around:
 - ⇒ all bays, estuaries, coastal lakes, lagoons and islands;

- ⇒ tidal waters of coastal rivers to the limit of mangroves, as defined by NSW Fisheries (1985) maps or the tidal limit whichever is closer to the sea.

The site is identified in relevant mapping as being within the coastal zone applies, and as the proposal comprises a residential subdivision consisting of some 312 residential allotments, the Part 3A Major Project provisions are triggered.

A Preliminary Environmental Assessment (PEA), prepared by Allen Price and Associates was provided to DoP for the purpose of attaining confirmation that the proposed subdivision is indeed a Part 3A Major Project, and to inform the DoP of the general details of the proposed subdivision application. Advice provided from the DoP confirmed that the proposed subdivision application was a Part 3A Major Project.

4.2.3.2 State Environmental Planning Policy (Infrastructure) 2007

SEPP (Infrastructure) was made by the NSW Government on the 21st December 2007. The stated aims of the SEPP are to facilitate the effective delivery of infrastructure across the State by:

- (a) *improving regulatory certainty and efficiency through a consistent planning regime for infrastructure and the provision of services, and*
- (b) *providing greater flexibility in the location of infrastructure and service facilities, and*
- (c) *allowing for the efficient development, redevelopment or disposal of surplus government owned land, and*
- (d) *identifying the environmental assessment category into which different types of infrastructure and services development fall (including identifying certain development of minimal environmental impact as exempt development), and*
- (e) *identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure development, and*
- (f) *providing for consultation with relevant public authorities about certain development during the assessment process or prior to development commencing.*

Of particular relevance to this proposal is Clause 104 of SEPP Infrastructure which deals with Traffic Generating Developments (replacing the provisions previously contained within SEPP 11 which have been repealed) and requires that development applications for certain development that have a "*relevant size or capacity*" be referred to the Roads and Traffic Authority of NSW for consideration of traffic matters. Developments having the "*relevant size or capacity*" are outlined in Schedule 3 of SEPP Infrastructure, and **Table 2** below reproduces the relevant part of Schedule 3 that applies to development of the type assessed in this EA. Column 1 relates to the type of

development, whilst Columns 2 and 3 outline the traffic generation that trigger referrals dependent on whether the site has frontage to a classified road, or any road.

Table 2
Schedule 3 of SEPP Infrastructure

<i>Column 1</i>	<i>Column 2</i>	<i>Column 3</i>
Purpose of development Note: The development may be the erection of new premises or the enlargement or extension of existing premises	Size or capacity - site with access to any road	Size or capacity - site with access to classified road or to road that connects to classified road (if access within 90m of connection, measured along alignment of connecting road)
Sub-division of land	200 or more allotments where the subdivision includes the opening of a public road	50 or more allotments

Having regard to this proposal, as it comprises more than 200 allotments and will result in the opening of new roads, the application must be referred to the NSW Roads and Traffic Authority. A Transport Report prepared by Colston Budd Hunt & Kafes has been undertaken and is reproduced as **Annexure 2**. Traffic matters are further discussed in Section 5.3 of this EA.

4.2.3.3 State Environmental Planning Policy No 14—Coastal Wetlands

The aim of this policy is to “*ensure that the coastal wetlands are preserved and protected in the environmental and economic interests of the state.*”

In respect of land to which this policy applies, development consent is required to:

- a) “*clear that land;*
- b) *construct a levee on that land;*
- c) *drain that land; or*
- d) *fill that land.*”

The maps which accompany SEPP No. 14 have been reviewed with respect to this proposal and in this regard, the site is NOT identified as containing a coastal wetland, and nor does it drain towards a coastal wetland. Consequently, the provisions of this SEPP have no relevance to the proposal.

4.2.3.4 *State Environmental Planning Policy No. 44 - Koala Habitat*

The Shoalhaven is one of the local government areas in which *State Environmental Planning Policy No.44 - Koala Habitat Protection* (SEPP 44) (New South Wales 1995) applies. SEPP 44 encourages the conservation and management of natural vegetation that provides habitat for Koalas, to ensure a permanent free-living population over the species' present range and to reverse the current trend of Koala population decline.

SEPP 44 helps to identify "potential Koala habitat", namely "areas of native vegetation where the trees of the types listed in Schedule 2 [of SEPP 44] constitute at least 15% of the total number of trees in the upper or lower strata of the tree component". If no Schedule 2 tree species are present or if they constitute less than 15% of the total number of trees present, then no further provisions of the Policy apply.

If more than 15% of the trees in the area are Schedule 2 tree species, then an assessment must be made by a qualified person to determine whether the area contains "core Koala habitat", a term applied to "an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population".

According to SLR (refer **Annexure 3**) the study area does contain some feed trees listed on Schedule 2 of SEPP No. 44, which forms more than 15% of the tree species, and as such, is potential koala habitat as defined in the SEPP. However, according to SLR, there are no recent recordings of koalas in the locality or site and consequently there are no resident populations of koalas. As such, the site does not constitute core koala habitat.

Consequently, SLR considers that the provisions of State Environmental Planning Policy No. 44 have no effect on the proposal.

4.2.3.5 *State Environmental Planning Policy No 71—Coastal Protection*

The provisions of SEPP 71 apply to the coastal zone and are intended to provide a consistent approach to planning within this area. Clause 8 identifies additional matters for consideration where SEPP 71 applies which are to be assessed by an authority when it determines developments to be carried out on lands within the Coastal Zone. The site is located within the Coastal Zone, and is therefore subject to these additional considerations. The following table (**Table 3**) addresses these requirements:

Table 3
Clause 8 – Matters for Consideration

Clause 8 – Matters for Consideration	Compliance
(a) The aims of this Policy set out in clause 2.	<p>The proposal is considered to comply with the aims of the SEPP as it is considerate of ecological and social constraints of the site and surrounds.</p> <p>The proposal includes the conservation of areas having ecological significance or subject to natural hazards.</p> <p>The site does not have direct frontage to any watercourse, beach or other foreshore location.</p>
(b) Existing public access to and along the coastal foreshore for pedestrians or persons with a disability should be retained and, where possible, public access to and along the coastal foreshore for pedestrians or persons with a disability should be improved.	<p>Although the site is located within the coastal zone, it does not have direct frontage or access to the coastal foreshore.</p> <p>As such, this has no further relevance to the proposal.</p>
(c) Opportunities to provide new public access to and along the coastal foreshore for pedestrians or persons with a disability.	<p>The site is within the coastal zone as it is located within 1km of the Shoalhaven River however its relationship with the River is limited due to local topography which does not permit access. Consequently, no impacts are expected.</p>
(d) The suitability of development given its type, location and design and its relationship with the surrounding area.	<p>The design of the subdivision has followed an extensive environmental assessment featuring an analysis of ecological and social matters, and the constraints to development.</p> <p>This assessment demonstrates the site is suitable for the proposed development.</p> <p>Additionally, this was preceded by studies undertaken by SCC as part of the NBSP process. This identified land suitable for further urban expansion of Nowra Bomaderry.</p> <p>Such has been further explored during a Masterplan process undertaken by our clients with support of SCC.</p> <p>The site is considered to be suitable for the subdivision now proposed.</p>
(e) Any detrimental impact that development may have on the amenity of the coastal foreshore, including any significant overshadowing of the coastal foreshore and any significant loss of views from a public place to the coastal foreshore.	<p>Due to the location of the site, there will be no impacts on the coastal foreshore.</p> <p>The site is well removed from the foreshore and will not result in any view loss or overshadowing.</p> <p>Further visual assessment is undertaken in Section 5.1.</p>
(f) The scenic qualities of the New South Wales coast, and means to protect and improve these qualities.	<p>As outlined above, the subject site is well clear of any waterway and is not visible. As such, direct scenic impacts are largely avoided. Visual impact is further addressed in Section 5.1.</p>

Table 3 (continued)

Clause 8 – Matters for Consideration	Compliance
(g) Measures to conserve animals (within the meaning of the Threatened Species Conservation Act 1995) and plants (within the meaning of that Act), and their habitats.	An Environmental Flora and Fauna Assessment has been undertaken by SLR which has built upon preliminary assessment undertaken on behalf of SCC and this has identified an area of land which has higher conservation values and this is not to be developed, being retained in a conservation zone. This is further addressed in Section 5.6.
(h) Measures to conserve fish (within the meaning of Part 7A of the Fisheries Management Act 1994) and marine vegetation (within the meaning of that Part), and their habitats.	As the site is well removed from any watercourse, no direct impacts are expected. According to SLR, it is unlikely that the proposal will adversely impact on native fish or fish habitat (refer Annexure 3). Consequently, impacts on fish species, marine vegetation and habitats are unlikely.
(i) Existing wildlife corridors and the impact of development on these corridors.	The site is not identified as containing a habitat corridor or ecologically sensitive lands by either Shoalhaven LEP or the deemed SEPP – Illawarra REP. In considering the suitability of the site, ecological assessment has been undertaken and this is expected to result in the biodiversity certification of the LEP. Further, the assessment by SLR has concluded that suitable corridors will be maintained within proposed environmental conservation zones.
(j) The likely impact of coastal processes and coastal hazards on development and any likely impacts of development on coastal processes and coastal hazards.	The site, due to its location, is not subject to coastal hazards or processes such as flooding, tidal inundation or shoreline erosion.
(k) Measures to reduce the potential for conflict between land-based and water-based coastal activities.	While the site is located within the coastal zone, it is not directly adjacent to a coastal foreshore area and as such, conflict between land and water based coastal activities are unlikely.
(l) Measures to protect the cultural places, values, customs, beliefs and traditional knowledge of Aboriginals.	The proposal has been the subject of an assessment undertaken by South East Archaeology Pty Ltd (SEA) (Annexure 8) which has assessed the site as having low to very low probability of containing artefacts or other indigenous heritage evidence.
(m) Likely impacts of development on the water quality of coastal waterbodies.	Storm Consulting have been engaged to provide a Water Cycle Management Report (WCMR) (Annexure 7). Stormwater quality modelling undertaken as part of the WCMR utilising MUSIC modelling demonstrates that the benchmark 85% removal of Suspended Solids, and 65% removal of Total Phosphorus loads, and 45% removal of Total Nitrogen is achieved.

Table 3 (continued)

Clause 8 – Matters for Consideration	Compliance
	<p>Furthermore, the report of SLR (Annexure 3) has considered the impacts of this on the receiving environment and has concluded that due to the location of this, a considerable distance from the site, coupled with extensive native vegetation that is to be retained, the proposal will have no impact on the Shoalhaven River.</p> <p>This is further discussed in Section 5.4.5.</p>
(n) The conservation and preservation of items of heritage, archaeological or historic significance.	<p>An Aboriginal Heritage Assessment has been undertaken by SEA (Annexure 8) to consider this project which included a reconnaissance inspection, and research of aboriginal sites registers, which failed to identify, or detect any features of significance on this site. Predictive modelling has identified the site as having low to very low probability of containing artefacts or other indigenous heritage evidence.</p> <p>Despite this, mitigation measures have been recommended for implementation during construction works.</p> <p>According to the Aboriginal Heritage Assessment, no items of non-indigenous heritage are identified on the site. Furthermore, no items in the vicinity of the site are identified.</p> <p>Heritage matters are further considered in Section 5.5.</p>
(o) Only in cases in which a council prepares a draft local environmental plan that applies to land to which this Policy applies, the means to encourage compact towns and cities.	<p>The proposal relies on the site being zoned for residential purposes. The site is identified in the NBSP and Draft LEP 2013 as being one to enable the further residential expansion of the Nowra/Bomaderry urban area.</p> <p>The proposal encourages a compact town by conforming to the Masterplan prepared for the locality, with residential development centred around a commercial precinct (sited on adjoining land owned by Shoalhaven Council), with suitable walking distances and appropriate infrastructure being provided, in order to encourage active transport options.</p>
<p>(p) Only in cases in which a development application in relation to proposal is determined:</p> <p>(i) The cumulative impacts of the proposal on the environment.</p> <p>(ii) Measures to ensure that water and energy usage by the proposal is efficient.</p>	<p>Not applicable to this project given made under the provisions of Part 3A.</p>

4.2.4 State Policies

4.2.4.1 NSW Coastal Policy

The NSW Coastal Policy applies:

- three nautical miles seaward of the mainland and offshore islands;
- one kilometre landward of the open coast high water mark;
- a distance of one kilometre around:
 - ⇒ all bays, estuaries, coastal lakes, lagoons and islands;
 - ⇒ tidal waters of coastal rivers to the limit of mangroves, as defined by NSW Fisheries (1985) maps or the tidal limit whichever is closer to the sea.

The subject site is located within the coastal zone and as such the NSW Coastal Policy 1997 applies. The Policy guides the management and planning of the coastal zone and has a strong emphasis on ecologically sustainable development. The Policy essentially brings together all policies, programs and standards that apply to the coastal zone into the one document. In addition, the Policy seeks to co-ordinate the multiple agencies and authorities, and various levels of government, to ensure consistency in application of the Policy, outlining who is responsible for implementing the Policy, and at what stage in the development process.

The requirements of the NSW Coastal Policy have been considered and are addressed in **Annexure 12**.

4.2.4.2 Coastal Design Guidelines 2003

The Coastal Design Guidelines for NSW were prepared by the NSW State Government with reference to the NSW Government's Coastal Policy 1997 and complement the Government's Coastal Protection Package (which included SEPP No. 71). The Coastal Design Guidelines are based upon the principles of ecologically sustainable development. The Guidelines provide additional direction to supplement the limited design matters contained in the Coastal Policy and are broad brush guidelines that support the place-based planning approaches espoused in PlanFirst, the NSW Government's plan making reform package released in 2002.

The Guidelines operate by applying the hierarchy of coastal settlements, which provides seven different settlement types ranging in size from Coastal Cities down to isolated coastal dwellings on large rural allotments.

Part 1 of the Guidelines outlines the relevant issues, opportunities, and desired future character which apply to each of the seven settlement types.

Part 2 of the Guidelines outlines the 5 Design Principles that should apply to each of the Settlements, providing a series of 'desirable' and 'undesirable' practices that are to be applied to coastal settlements. The 5 Design Principles relate to:

- defining the footprint and boundary of settlements;
- connecting open spaces;
- protecting the natural edges;
- reinforcing the street pattern;
- appropriate buildings in a coastal context.

Part 3 concludes the document and outlines how the Guidelines are to be implemented.

The following addresses the 5 Design Principles contained with the NSW Coastal Design Guidelines that are considered to have relevance to this proposal:

Principle 1 - Defining the Footprint and Boundary of Settlements

The project has been designed following extensive assessment of the relevant constraints and opportunities, along with the strategic assessment undertaken by SCC in the NBSP and Mundamia Masterplanning process.

Such has resulted in the identification of land which is considered suitable for urban development, and those lands which are constrained by topographical features, natural hazards, or are of ecological importance and therefore, are not considered suitable for more intensive development.

This process has determined the extent of development, and the footprint and boundaries of this New Living Area.

The proposal allows for the following:

- Retention of significant vegetation;
- Provision of a permeable subdivision pattern allowing for pedestrian and cycle movements both within and beyond the site to places of importance, such as the community facilities and future neighbourhood shopping site;
- Connection of all relevant services.

Principle 2 - Connecting Open Space Networks

The subdivision provides for the provision of open space along the eastern edge of the site identified in the Mundamia Masterplan, and which is to be linked by a wide road reserve which is to be appropriately landscaped. Furthermore, open space is proposed in the vicinity of the commercial and community precinct identified in the Mundamia Masterplan, which is to be owned by Shoalhaven Council

The open space network is guided by the Mundamia Masterplan and Planning Principles adopted by SCC.

The open space network provides passive recreation opportunities, as well as maintaining visual amenity through the provision of a large expanse of green space. Streets have been oriented such that bushland views are available to motorists and pedestrians as they travel the road network, thereby providing a distinct character to this Living Area.

In addition to the open space areas, a series of pathways providing cycling and walking opportunities is to be provided to link the network of open spaces, future potential commercial facilities and the identified desire lines.

Principle 3 - Protecting the Natural Edges

The subject site does not have direct frontage to the actual coastline or foreshore areas. At present, the site has no identifiable edge, however it is noted that the land does slope more steeply to the east away from the site. As such, the edge will be defined by this subdivision layout. In this regard, the subdivision has been the subject of assessment to determine constraints and opportunities, and this has formed the subdivision layout the subject of the major project.

The natural edges will be protected by the subdivision layout, which proposes either new roads, and in a small section a fire trail, to contain all of the proposed residential allotments. This is considered an appropriate manner in which to protect the natural edge and prevent incursions into natural or ecologically sensitive areas.

Principle 4 - Reinforcing the Street Pattern

As this is a new area, there is no established street pattern. The Masterplanning process and the guiding principles adopted by SCC have determined the street pattern.

The layout is generally of a grid pattern which is readily legible to the travelling public and also permeable thereby encouraging pedestrian and cycling movements to access local facilities and open space.

Further, the road pattern is orientated such that distant views are obtained of the Cambewarra Mountain Range or adjoining bushland to provide the desired character.

Finally, the street pattern is provided with appropriate street width to enable bus movements, emphasise more prominent streets and enable provision of suitable Asset Protection Zones.

Principle 5 - Appropriate Buildings for a Coastal Context

Although no buildings are proposed as part of this Major Project application, it is crucial that the allotments that are created allow for the development of appropriate buildings in accordance with that espoused in the Coastal Design Guidelines. In this regard, it is considered that the proposal allows for suitable residential development due to:

- suitably sized residential allotments;
- the proposed orientation of lots;
- suitable road pattern;
- due regard to natural hazards; and
- preservation of reasonable native vegetation within the site.

It is considered that the proposal is generally consistent with, and will result in development that will comply with, the requirements of the NSW Coastal Design Guidelines 2003.

4.3 DEEMED STATE ENVIRONMENTAL PLANNING POLICIES

4.3.1 Illawarra Regional Environmental Plan (IREP) 1986

The subject site is affected by the provisions of a deemed State Environmental Planning Policy namely the Illawarra Regional Environmental Plan No 1, 1986 (IREP).

The objectives of this former Regional Plan that apply to living areas are:

- *to ensure that urban expansion is orderly and efficient having regard to the constraints of the natural environment and that sufficient land is available to prevent price rises resulting from scarcity of land,*
- *to ensure that new residential land or land for higher density development is only developed where there are adequate utility and community services available or there is a commitment from the relevant authorities or developer to provide those services,*
- *to provide for a range of lot sizes, dwelling types and tenure forms to cater for varying household needs in all local government areas,*
- *to ensure that residential development does not take place on hazard-prone lands, and*
- *to minimise bush fire risks to urban development.*

It is considered that the application is consistent with these objectives as follows:

- the land has been identified in the NBSP as an area suitable to provide for additional residential accommodation;
- the project appropriately considers the natural hazards applying to the site, principally restricted to bushfire risks;
- the site is well located to the township of Nowra and in the vicinity of an established educational complex;
- all relevant services are or will be available and can be connected to the proposed lots.

A series of maps are attached to the Plan, which identify localities where specific policy issues apply. In relation to these maps, the subject land is:

- NOT identified as containing rainforest vegetation.
- NOT identified as a wildlife corridor.
- NOT Identified as land with prime crop and pasture potential.
- NOT identified as containing extractive resources.
- identified as land with landscape or environmental attributes.

In addition, it is noted that the site is NOT identified in Schedule 1 of IREP as containing an item of environmental heritage.

Landscape and Environmental Attributes

The former Regional Plan does not provide provisions relating directly to the assessment of Major Project proposals.

The “*Illawarra Region Landscape and Environment Study*” supports the IREP and provides recommendations in terms of these attributes. The site is located within Unit 6 – Shoalhaven Delta as identified by this study. The subject land is affected by the VI policy recommendation area of the “*Illawarra Region Landscape and Environment Study*”. The relevant aspects of this policy recommendation stipulate:

VI Development Control

“Requires zoning to ensure preservation and continuation of existing relatively non polluting non-urban land uses.”

Clearly this policy recommendation has been superseded by subsequent planning studies and strategies which have largely identified the site as suitable for further residential growth. Further, as the region has grown, development has taken place in

the vicinity of the subject property as evidenced by the educational complex to the south of the site.

4.3.2 Drinking Water Catchments Regional Environmental Plan No. 1

The aims of this REP include:

- (a) *to create healthy water catchments that will deliver high quality water while sustaining diverse and prosperous communities, and*
- (b) *to provide the statutory components in Sustaining the Catchments that, together with the non-statutory components in Sustaining the Catchments, will achieve the aim set out in paragraph (a), and*
- (c) *to achieve the water quality management goals of:*
 - (i) *improving water quality in degraded areas and critical locations where water quality is not suitable for the relevant environmental values, and*
 - (ii) *maintaining or improving water quality where it is currently suitable for the relevant environmental values.*

The Drinking Water Catchments REP applies to some of the SCC LGA, however it does not apply to the area the subject of this major project which is well outside of its catchment. As such, it has no further consequence.

4.4 REGIONAL STRATEGIES

The provisions of the South Coast Regional Strategy have been addressed above in Section 3.4.3.

4.5 LOCAL PLANNING INSTRUMENTS

The site has been identified in local and regional planning instruments and strategy documents as one that is suitable for residential development, specifically via the NBSP, and this is further discussed in Section 3.4.3.

In addition, SCC, along with other Councils throughout the State, is in the process of implementing the Standard LEP Instrument. As part of this process, SCC has adopted a Draft LEP which is currently being considered by the Department of Planning.

The Draft LEP, which was recently exhibited, proposes to zone the site both R1 and E2. That part to be zoned R1 is consistent with that area included for residential subdivision in this project the subject of this EA.

4.5.1 Shoalhaven Local Environmental Plan 1985

As previously outlined, the site is currently zoned both Rural (General Rural) 1(d) and Environmental Protection (Scenic) 7(d1). The objectives of the Rural General 1(d) zone are:

- (a) *to conserve and maintain the productive potential of prime crop and pasture land,*
- (b) *to ensure that existing or potential agricultural land use is not jeopardised by non-agricultural land uses, and*
- (c) *to conserve cultural landscapes.*

The objectives of the Environmental Protection 7(d1) zone are:

- (a) *to conserve and enhance scenic quality,*
- (b) *to protect natural and cultural features of the landscape which contribute to scenic value, and*
- (c) *to ensure that development is integrated with the landscape values of the area.*

Figure 9 shows the siting of current zone boundaries.

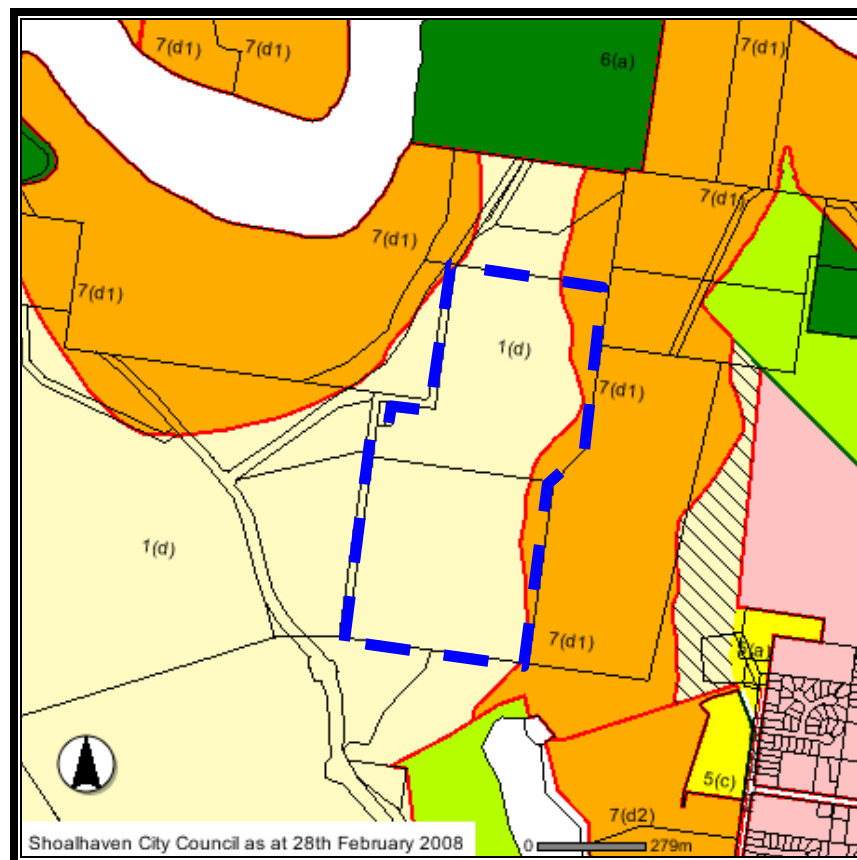


Figure 9: Shoalhaven LEP Zoning Plan (extract from SCC GIS)

The subdivision provisions of Shoalhaven LEP as applicable to rural and environmental protection zones are contained within Clause 11. In essence, these require a minimum lot size of 40 ha for each allotment to be created. This Major Project Part 3A application does not conform with this requirement, however as has been outlined above, the site is within an area that has been identified for urban growth in accordance with the NBSP and SCRS. In order to implement the NBSP, SCC has resolved to support Draft Shoalhaven LEP 2013 in order that alternative zones apply to the site which allows the subdivision as is currently proposed. Approval of this application will rely on the gazettal of the Draft Shoalhaven LEP 2013. This is further detailed in Section 4.5.2 below.

The provisions of Shoalhaven LEP 1985 include requirements that apply to certain lands dependent on site characteristics and features, natural hazards and constraints, and these are outlined in Division 5, which is addressed in **Table 4** below.

Table 4
Division 5 – Environmental Management of Land

LEP Clause	Comments on this proposal
Clause 21 – Land of Ecological Sensitivity	The subject land is not mapped as being of ecological sensitivity, therefore this clause does not apply to this development proposal.
Clause 21A – Vegetation Linkage	The land is not within an area mapped as being within a designated vegetation linkage area.
Clause 22 – Activities in Zone No. 1(c), 7(a), 7(c), 7(d2), 7(e), 7(f1), 7(f2) and 7(f3)	This clause relates to tree clearing in certain zones, none of which affect the proposal the subject of this EA.
Clause 23 – Protection of Streams – this clause applies to perennial watercourses in rural zoned lands, indicated by continuous blue lines on a topographic map.	The 1:25000 topographic map for 'Nowra' has been reviewed and this has revealed that the site does not contain a perennial water course, and as such, this clause has no effect. Impacts on water quality are addressed in Section 5.4.5.
Clause 24 – Water Catchment Areas	The subject land is not located within a drinking water catchment area.
Clause 24A – Hydrological Catchment	The subject land is not located within a hydrological catchment boundary as the site is not within the area affected by the Drinking Water Catchment REF.
Clause 25 – Steep lands	This clause applies to land with slopes in excess of 20%, there is no land which is proposed to be developed which has a slope in excess of 20%.
Clause 26 – Soil, Water and Effluent Management	Water, sewer, and drainage services will be available to the site.
Clause 27 – Acid Sulfate Soils	The land is not mapped by Council as having a high probability of containing acid sulfate soils. As such, this clause has no effect. Notwithstanding this, acid sulfate soils are addressed in Section 5.4.3.

Table 4 (continued)

LEP Clause	Comments on this proposal
Clause 28 – Danger of Bushfire	The subject land is mapped by SCC as being bushfire prone land. Bushfire safety has been addressed by Eco Logical Australia in Annexure 6 and this is further discussed in Section 5.4.4 of this report.
Clause 29 – Development on Flood Liable Land	The land is not mapped by Council or otherwise identified as being flood prone land, nor is it known to be such as the level of the site is relatively high, being RL 46 m AHD, well above known flood levels.

4.5.2 Draft Shoalhaven LEP 2013

As outlined above, the provisions of Draft LEP 2013 currently being exhibited by Council seek to rezone the site R1 and E2. **Figure 10** below is an extract from SCC showing the location of the various proposed zones. The siting of the R1 zone is identified on the subdivision sketch plan prepared by Allen Price & Associates and the siting of the residential lots is consistent with this location.

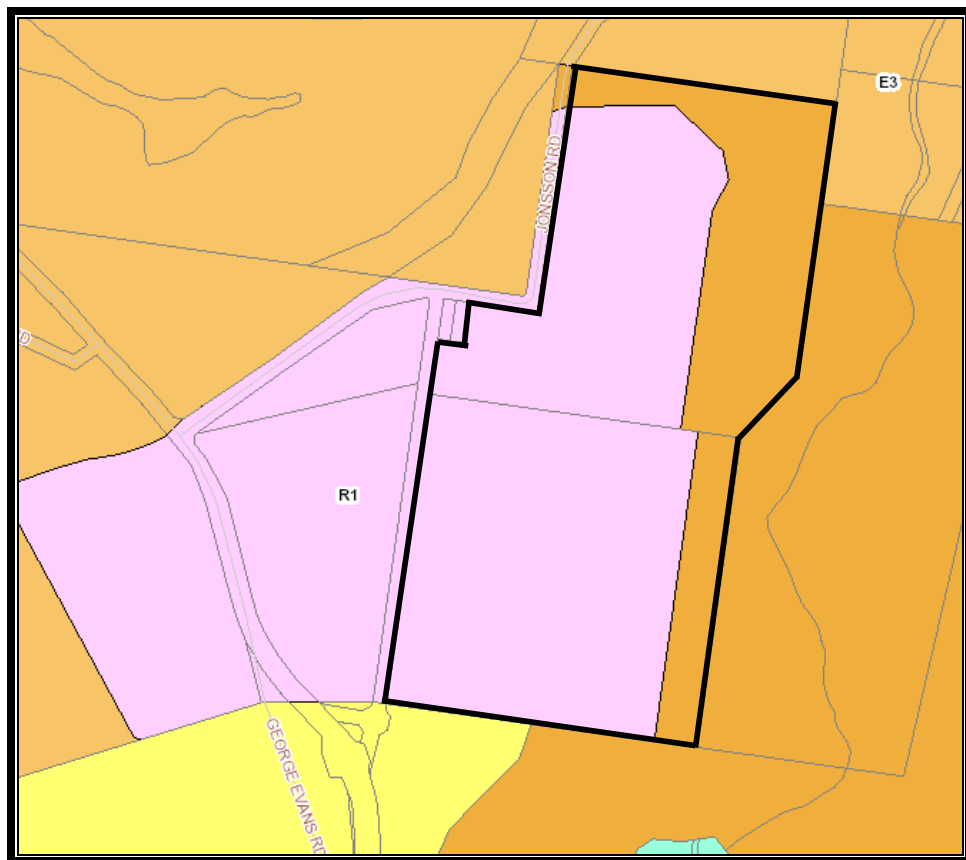


Figure 10: Draft Shoalhaven LEP 2013

The objectives of the R1 zone are:

- *To provide for the housing needs of the community.*
- *To provide for a variety of housing types and densities.*
- *To enable other land uses that provide facilities or services to meet the day to day needs of residents.*
- *To identify land suitable for future urban expansion.*

The following summarises the zoning table as it is proposed to apply to the R1 zone:

2 Permitted without consent

Home occupations.

3 Permitted with consent

Attached dwellings; Boarding houses; Boat launching ramps; Boat repair facilities; Boat sheds; Building identification signs; Business identification signs; Child care centres; Community facilities; **Dual occupancies;** **Dwelling houses;** Emergency services Facilities, Environmental protection works; Exhibition homes; Exhibition villages; Group homes; Home-based child care; Home businesses; Home industries; Hostels; Jetties; **Multi-dwelling housing;** Neighbourhood shops; Places of public worship; Recreation areas; Registered clubs; Residential care facility; **Residential flat buildings;** Roads; Seniors housing; Sewerage systems; Shop top housing; Signage; Telecommunication facilities; Tourist and visitor accommodation; Veterinary hospitals; Water supply systems.

(Note: Authors' bolding to highlight development permitted at the site)

4 Prohibited

Farm stay accommodation; Serviced apartments; Any other development not specified in item 2 or 3.

The objectives of the E2 zone are:

- *To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.*
- *To prevent development that could destroy, damage or otherwise have an adverse effect on those values.*
- *To protect water quality and the ecological integrity of water supply catchments.*
- *To protect the scenic, ecological, educational and recreational values of wetlands, rainforests, escarpment areas and fauna habitat linkages.*
- *To conserve and, where appropriate, restore natural vegetation in order to protect the erosion and slippage of steep slopes.*

The following summarises the zoning table as it applies to the E2 zone:

○ ***Permitted without consent***

Nil.

3 *Permitted with consent*

Aquaculture; Bed and breakfast accommodation; Dwelling houses; Emergency services facilities; Environmental facilities; Environmental protection works; Home businesses; Home industries; Recreation areas; Research stations; Roads; Sewerage systems; Water recreation structures; Water supply systems

4 *Prohibited*

Business premises; Hotel or motel accommodation; Industries; Multi dwelling housing; Recreation facilities (major); Residential flat buildings; Restricted premises; Retail premises; Seniors housing; Service stations; Warehouse or distribution centres; Any other development not specified in item 2 or 3

It should be noted that in relation to land zoned E2, these contain forested lands which are to be created as public reserves for dedication to SCC to ensure their conservation into the future. An exception is the proposed large allotment containing an existing rural dwelling and its curtilage, and this large lot residential allotment will be maintained into the future.

Part 4 of Draft Shoalhaven LEP deals with Principle Development Standards, and in relation to the subdivision of land, Clause 4.1 deals with minimum lot sizes. Clause 4.1 specifies the following:

- (1) *The objectives of this clause are as follows:*
 - (a) *to ensure that subdivision is compatible with and reinforces the predominant or historic subdivision pattern and character of an area,*
 - (b) *to minimise any likely impact of subdivision and development on the amenity of neighbouring properties,*
 - (c) *to ensure that lot sizes and dimensions are able to accommodate development consistent with relevant development controls.*
- (2) *This clause applies to a subdivision of any land shown on the Lot Size Map that requires development consent and that is carried out after the commencement of this Plan.*
- (3) *The size of any lot resulting from a subdivision of land to which this clause applies is not to be less than the minimum size shown on the Lot Size Map in relation to that land.*

Direction – An exemption to the minimum size shown on the Lot Size Map may be provided in certain circumstances, for example, in the case of land that is to be used for attached dwellings.

- (4) *This clause does not apply in relation to the subdivision of individual lots in a strata plan or community title scheme.*

The minimum lot size map exhibited by SCC proposes a lot size requirement of 500 m² for those lands zoned R1. The proposed residential allotments all exceed the minimum lot size requirements with the smallest lot having an area of 503 m².

Having regard to the E2 zone, the minimum lot size map exhibited by Council specifies a lot size requirement of 40 ha. The proposed large lot residential allotment does not comply with this however it is expected that as the proposed lot contains an existing dwelling, the creation of this allotment will be resolved through the process of Draft LEP 2013 being finalised and a submission was made to SCC during the earlier exhibition of Draft LEP with regard to this matter.

Final approval of this Part 3A Major Project Application is contingent on the completion of Draft Shoalhaven LEP 2013.

4.6 DEVELOPMENT CONTROL PLANS

4.6.1 Development Control Plan No. 91 – Minimum Building Code Requirements

This DCP applies to the construction of dwellings on residential allotments. The aims of this DCP are:

- *to ensure a high standard of residential development and ancillary structures, is achieved throughout the city*
- *to ensure that development is sympathetic to the physical constraints encountered on the site*
- *to encourage innovative design in residential development which reflects the need to preserve the amenity of the area, whilst having due regard to the physical constraints encountered in these areas*
- *to encourage residential development that is ecologically sustainable*
- *to ensure that appropriate levels of amenity are achieved, including privacy, over-shadowing and access to sunlight, noise and open space*
- *to set appropriate environmental criteria for energy efficiency, passive solar design, privacy, and vehicular access*
- *to provide a comprehensive design oriented approach to residential development*
- *to provide clear guidelines for the planning and construction of buildings within the City of Shoalhaven*

- *to provide a document with flexible performance-based criteria to guide development.*

The DCP includes controls relating to overall height, building envelope planes, floor space ratios, and privacy.

The major project does not require consideration against the provisions of this DCP, however it does demonstrate that SCC has appropriate controls over residentially zoned land to be applied in respect of future residential development, and the dwellings to be constructed on the proposed allotments.

4.6.2 Development Control Plan No. 93 – Waste Minimisation and Management

DCP No. 93 is implemented by a requirement to provide a Waste Minimisation and Management Plan (WMMP). Each WMMP is required to outline the amount of waste expected to be generated, its storage, and future re-use or disposal method. It is ordinarily the case that such information is provided before actual construction works commence and a condition of consent can be imposed requiring such plan for further consideration. The provisions of this DCP can be addressed by the future preparation of a WMMP.

4.6.3 Development Control Plan No. 100 – Subdivision Code

The proposal, being for the subdivision of the site into residential allotments, is subject to the provisions of DCP No. 100 – Subdivision Code which applies when the subdivision of land is proposed. The aims of the DCP are:

- *To encourage high quality urban design and residential amenity;*
- *To set appropriate environmental criteria for subdivision development;*
- *To provide a comprehensive design approach for residential, rural, industrial and commercial subdivision;*
- *To provide a user friendly document with flexible performance-based criteria to guide development; and*
- *To provide for the ecologically sustainable subdivision of land.*

DCP No. 100 outlines a number of Performance Criteria with objectives that need to be met in the subdivision of land, along with Acceptable Solutions which are simply examples of what may be considered acceptable in complying with the Performance Criteria. The Acceptable Solutions are generally numerically based, and include requirements relating to minimum allotment size, along with width and depths.

In relation to this subdivision, the following compliance table (**Table 5**) addresses the Acceptable Solutions that are considered to have relevance to this proposal.

Table 5
DCP No. 100 - Subdivision Code

<i>Issue</i>	<i>Compliance</i>	<i>Comments</i>
Lot Size <i>Minimum lot size of 500 m²</i>	Yes	The application proposes 312 allotments, all of which exceed the 500 m ² minimum with the smallest lot being 503 m ² and increasing up to 1101 m ² .
Dimensions <ul style="list-style-type: none"> Rectangular non-corner lots <i>Minimum width of 16 m and depth of 30 m.</i> Rectangular corner lots <i>Square width of 20 m depth of 30 m</i> Battle-axe Lots <i>Minimum lot size of 650m² (excluding access handle) with right of way width of 4.0 m with rectangular building envelope of 15 m x 15 m and 5 m setbacks to adjoining property boundaries.</i> Irregular shaped lots <i>Square width of 12 m Width at building line of 16 m Mean width 18 m Depth of 30 metres</i> Corner Splays <i>4 metres</i> 	<p>Yes (with exceptions)</p> <p>Yes (with exceptions)</p> <p>N/A</p> <p>Yes</p> <p>Yes</p>	<p>The proposed regular shaped allotments generally have a minimum width of 16 m or wider, and a minimum depth exceeding 30 m.</p> <p>An exception to this is a small number (5) of allotments which front Road No. 4 which have a width of between 15.8m and 15.9 m. This represents a 0.1 to 0.2 m, or approximately up to 1% departure to that outlined.</p> <p>Further, 2 lots fronting Road No. 1 propose widths at the street of approximately 15m, however this increases at the building line. Justification of this is provided below.</p> <p>The proposed corner allotments are all of a reasonable shape with width and depth that comply with the minimum requirements. There are however some exceptions where the width of the proposed allotments is less than that specified in DCP 100 by up to 2.5 m. This is further discussed below.</p> <p>No battle-axe shaped allotments are proposed.</p> <p>All irregular shaped allotments are of a size and shape that exceed the minimum requirements.</p> <p>Splays are provided to all corner allotments.</p>
Energy efficiency Allotments Design to achieve 5 star rating in accordance with Council's Energy Efficiency Policy	Yes	<p>The allotments are orientated mostly on an east-west axis which maximise opportunities of achieving good levels of solar access to future dwelling houses. Where an east west axis is not possible, the allotments are provided with a north south axis.</p> <p>The only exception to the above is where the curvature of the proposed spine road servicing the subdivision requires departure to the general grid pattern. These allotments are relatively generous in area considerably exceeding the minimum lot size requirements to compensate for this and will provide acceptable direct solar access.</p>

For the most part, the subdivision layout complies with the Acceptable Solution requirements of DCP No. 100. In this regard, the proposal is entirely compliant with the minimum lot size requirements and orientation. The subdivision layout does depart from the requirements of Council's Subdivision Code in respect of a number of allotments due to the following:

- Regular shaped lots with widths less than 16 m,
- Corner shaped lots with width less than 20 metres,

As outlined above, compliance with the Acceptable Solutions is only an example of achieving compliance, and alternatives can be proposed provided that it is demonstrated that the alternative will satisfy the design objective and criteria. The objectives of Council's Subdivision Code as it relates to Allotment Layout are contained within Element RE 14 as follows:

Objectives

- 01*** To provide a range and mix of lot sizes to suit a variety of dwellings and household types, with areas and dimensions to meet user requirements.
- 02*** To provide lots that are oriented where practicable to enable the application of energy conservation principles.
- 03*** To provide lots of sufficient size to protect environmental features and take into account site constraints.
- 04*** To provide for smaller lots in locations adjacent to neighbourhood centres, public transport stops and adjacent to higher amenity areas.

The Performance Criteria applying to the Allotment Layout (and minimum lot size) is as follows:

- P1*** Lots have the appropriate area and dimensions for the siting and construction of a dwelling and ancillary outbuildings, the provision of private outdoor space, convenient vehicle access and parking.
- P2*** Lot areas and dimensions take into account the slope of the land and the desirability of minimising earthworks / retaining walls associated with dwelling construction.
- P3*** Lot areas and dimensions enable dwellings to be sited to:
 - Protect natural or cultural features
 - Acknowledge site constraints including soil erosion and bushfire risk
 - Retain special features such as trees and views
- P4*** Lot frontages are oriented to streets and open spaces so that personal and property security, deterrence of crime and vandalism and surveillance of footpaths and open spaces are facilitated.

- P5** *Lot design precludes the need to reverse onto a major or minor distributor road.*
- P6** *Lots to provide appropriate dimensions for the siting and construction of residential development and ancillary outbuildings or facilities*
- P7** *Adequate provision to be made for access to the property.*
- P8** *Suitable building envelope, of relatively flat land that can be developed.*
- P9** *Minimise overshadowing and privacy impacts on adjoining residents.*
- P10** *Provide opportunity for future dwellings to have good solar access.*
- P11** *Retain character of location by preserving existing mature trees or provide opportunities for future planting.*

It is considered that the proposed allotments are reasonable and comply with the Performance Criteria and objectives, for the following reasons:

- Those allotments which depart from the Acceptable Solutions are of regular shape which maximises the extent of land available for the construction of a dwelling, ancillary outbuildings and private outdoor space, along with access and parking;
- The land is relatively level, again maximising the extent of land available for residential development on each lot;
- The general subdivision layout is one that facilitates efficient land use by maximising extent of developable land;
- The subdivision design is mindful of relevant constraints with the result being that the proposed residential allotments themselves are generally unconstrained and do not contain any natural or cultural features requiring protection;
- Each allotment is provided with frontage to a public road thus providing suitable access;
- Each allotment is sited on land having suitable grades which will not constrain further development;
- The typical grid pattern and orientation of the allotments is such that good exposure to direct sunlight will be available; and
- The generally level nature of the site is such that substantial changes in grade are unlikely, thus maximising privacy between allotments.

Consequently, it is considered that the proposal is compliant with the Objectives and Performance Criteria, and therefore the requirements of DCP No. 100.

4.6.4 Area Specific Development Control Plans

The site is not subject to any specific area based DCP adopted by Council. The area is however the subject of a Masterplan which has been addressed in Section 3.4.3.3.

4.7 COUNCIL POLICIES

4.7.1 Nowra Bomaderry Structure Plan

The provisions of the NBSP have been addressed in detail above in Section 3.4.3.2.

4.7.2 Masterplan – Mundamia

The provisions of the Mundamia Masterplan have been addressed above in Section 3.4.3.3.

4.7.3 Shoalhaven Cycleway Strategy

SCC adopted a Cycleway Strategy on 16th December 1997 in order to recognise the needs of cyclists, to ensure that the Shoalhaven is a 'cycle friendly' city and to identify a realistic network of cycleways for implementation. A series of maps accompanies the strategy in order to identify appropriate routes for cycleways, and the nature of the facility to be provided. These apply to developed areas only and as such, do not affect the site the subject of this major project.

Notwithstanding this, the subdivision does include a series of formal and informal opportunities for cyclists within the property and the goal of a 'cycle friendly' city is enhanced by the proposal.

4.7.4 Reflective Building Materials - Use in Coastal and Rural Areas

SCC has adopted a policy to control the use of reflective materials in locations where the natural landscape is of such quality it should be pre-eminent, structures should not strongly contrast with the background and highly reflective materials are not permitted in such locations. The Draft Design Guidelines discourage the use of highly reflective materials such as galvanised iron and as such, compliance with this policy can be implemented in future residential development.

Visual impact matters are further addressed in Section 5.1.

5.0 ENVIRONMENTAL ASSESSMENT

5.1 VISUAL IMPACT

5.1.1 Introduction

The subject site is located within the NSW Coastal Zone due to its proximity to the Shoalhaven River which meanders to the coast generally to the north of the site. The site is also relatively close to the western edge of the Nowra township, which is 0.6 km away (direct line), separated by land vegetated with native forest.

The proposal has the potential to result in visual impacts due to the removal of vegetation and the conversion of existing pasture to a residential land use and the resulting physical works that would follow including earthworks, road and other infrastructure construction, and ultimately the construction of dwellings on each proposed lot.

This section of the EA will address the visual impacts associated with the proposal, and address any mitigation measures required in order to minimise visual impacts associated with the development of the land.

5.1.2 Existing Environment

Local Context

The immediate locality predominantly has a rural and rural residential character and contains a variety of land uses including rural residential allotments having a variety of lot sizes and an educational facility (Shoalhaven Campus of the University of Wollongong and TAFE). The site itself is principally fringed with vegetation along all boundaries. The road network in the immediate locality is not extensive which significantly restricts opportunities to view the site.

In a local context, the site is not considered to be prominent from public places due to the gentle topography, extent of existing vegetation surrounding the site, and the limited road network providing few opportunities to view the site.

The site is visible from private lands which adjoin the site. For the most part, these lands are of a large size which reduces impacts where visual amenity is provided for within those sites themselves, however an exception to this exists in the form of two smaller allotments (1115 m²) sited in the north-western corner of the site and these are shown in **Plates 5 and 6** in Section 2.0.

Although the site is visible from other lands in the locality, it is not considered to be prominent as it does not contain any particular topographic features or the like to heighten its visibility.

District Context

The broader (district) locality includes the Nowra urban area, surrounding rural and rural residential areas and the Shoalhaven River.

To the north, the site is not visible from the Shoalhaven River due to the siting of the property well above the level of the River, and the existence of a sandstone escarpment with substantial vegetation atop this which further blocks and restricts views to the site.

The site would be visible from Mount Cambewarra which contains a well utilised public lookout and café which provides extensive views over the entire northern and central Shoalhaven, including the Nowra urban area.

To the south, the property may be visible from Nowra Hill, a relative high point which contains a public lookout and provides views to the north towards Nowra, and also to the east towards Jervis Bay and the central Shoalhaven.

The gentle nature of the topography to the east and west of the subject site is such that no particular vantage points or high points allow views into the Mundamia area.

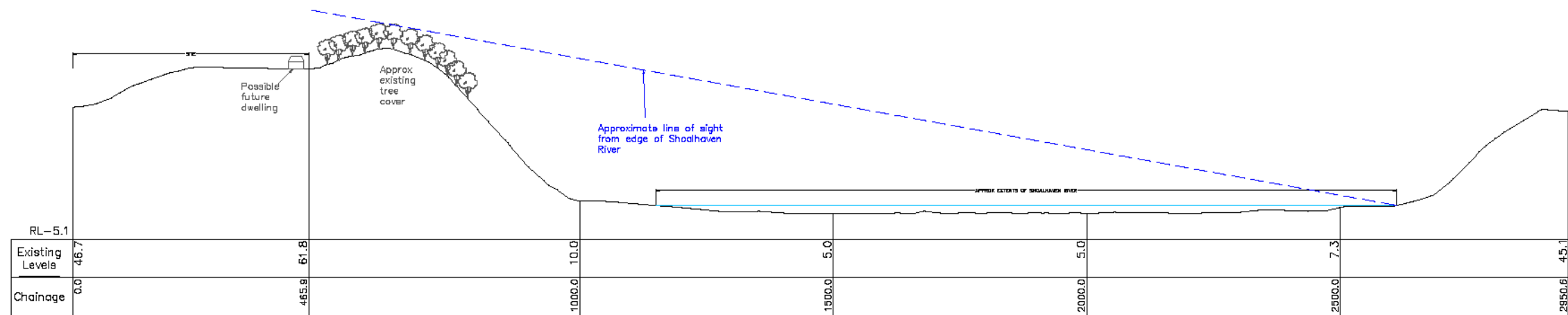
To the east is a property identified in Shoalhaven LEP as an item of environmental heritage and some consideration is required as to the prominence of the site from this location.

5.1.3 Methodology

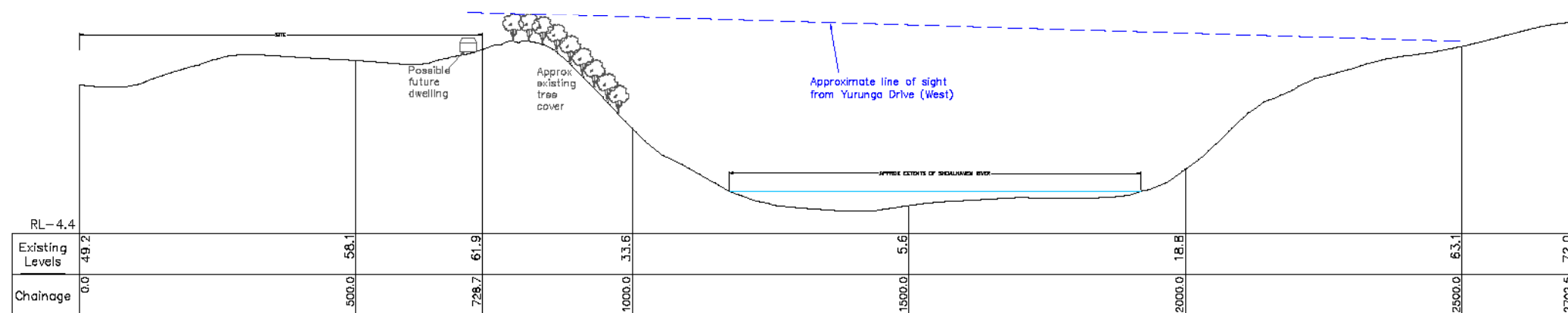
The assessment of visual impact has been undertaken by:

- examining the locational context of the site,
- identify its prominence and determining places from where the site is visible, and
- consider existing controls that will affect further development along with the consideration of mitigation measures.

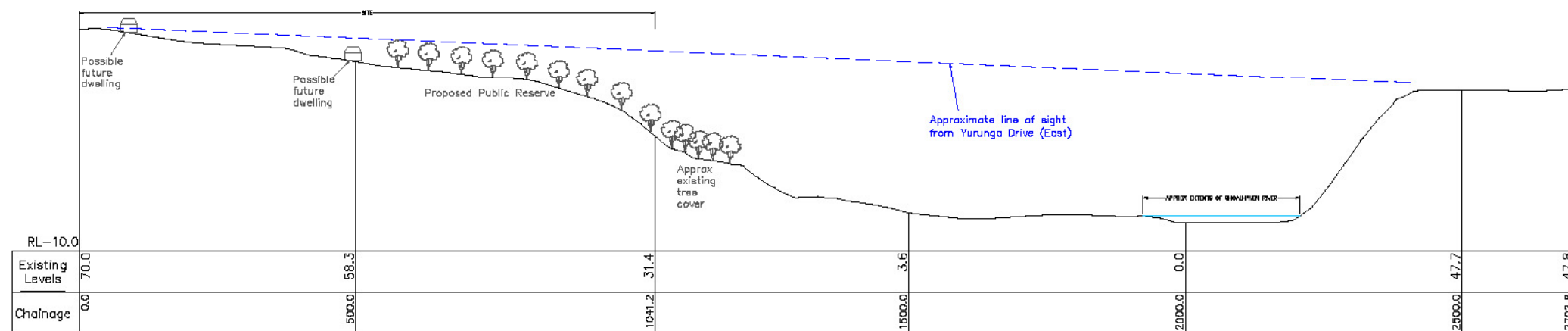
In the consideration of this issue, resources relied upon and assessment included relevant topographic maps, various aerial photographs, site inspections and photography undertaken specifically for the purposes of this assessment. In addition, a series of cross-sections have been prepared by Allen Price and Associates (APA) to review potential view lines to assist in determining actual impacts and this is shown in a plan titled “Lines of Sight to Proposed Subdivision” in **Figure 11**.



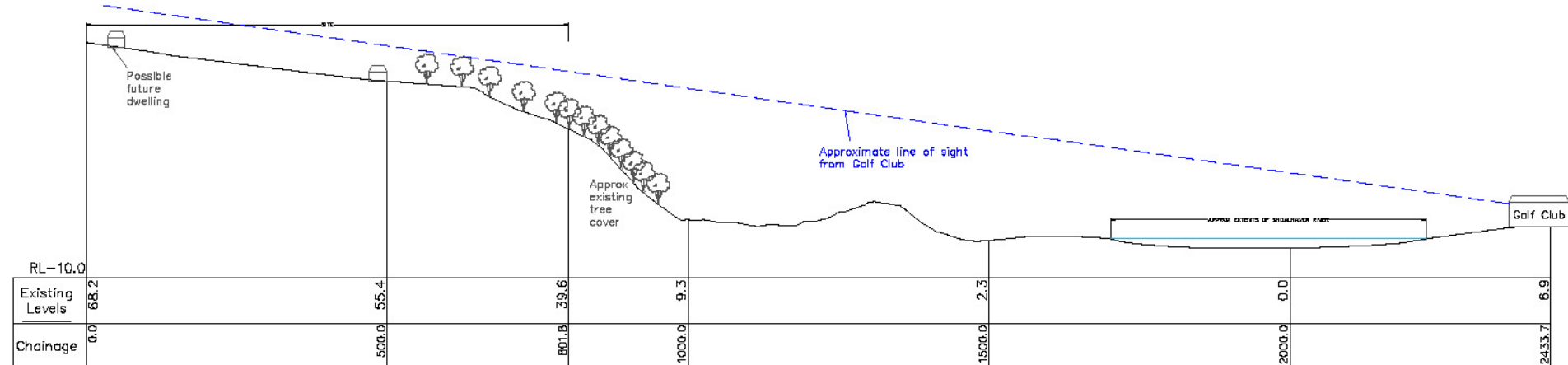
Section A -Scales: H: 1 in5000 V: 1 in1000 of Google Earth Image



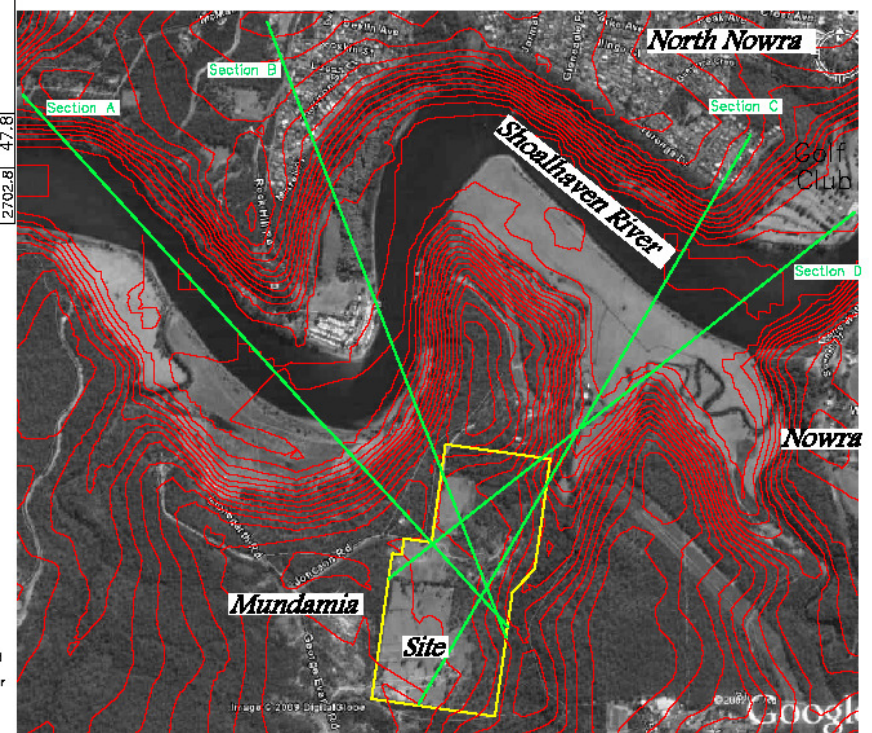
Section B -Scales: H: 1 in5000 V: 1 in1000 of Google Earth Image



Section C -Scales: H: 1 in5000 V: 1 in1000 of Google Earth Image



Section D -Scales: H: 1 in5000 V: 1 in1000 of Google Earth Image



PLAN VIEW, IMAGE AND CONTOURS SUPPLIED BY GOOGLE EARTH (NOT TO SCALE)



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COVER OF
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	DATE OF PLAN: APRIL 2012	CHECK'D				

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consultant@allprice.com.au www.allprice.com.au

PLAN SHOWING LINES OF SIGHT TO PROPOSED SUBDIVISION
OF LOT 3 DP 568613 & LOT 384 DP 755952
AT MUNDAMIA
FOR TWYNAM MUNDAMIA PTY LTD

REF. No.	25489-02	
SHEET	1	OF 1 SHEETS
REVISION	0	

FIGURE 11: LINE OF SIGHT PLAN
prepared by Allen Price & Associates

5.1.4 Assessment

The assessment considers firstly the localities from where the subject site may be visible, and secondly, considers the potential impacts of the development from those areas.

The section analysis undertaken by APA (**Figure 11**) has considered the potential views taken at four different areas where it has been identified that the site may be visible, to determine actual sight lines available in the locality. The identification of sight lines requiring further analysis was undertaken following inspection of the locality, review of topographic mapping and aerial photography. The analysis has resulted in 4 sections as follows:

- Shoalhaven River to the west of the site (Section A);
- Public Reserve along western end of Yurunga Drive at North Nowra (Section B);
- Public Reserve at eastern end of Yurunga Drive at North Nowra (Section C); and
- Clubhouse at the Nowra Golf Course (Section D).

Section A

Section A clearly shows that the site is not visible from the upper reaches of the Shoalhaven River to the west of Nowra as the topography of the valley walls along the southern banks of the escarpment prevent viewing into the site.

Section B and C

Sections B and C address potential views to the north towards Yurunga Drive. The public reserve to the south along Yurunga Drive contains an area known as the Grotto Walk. This area descends the northern escarpment which separates Yurunga Road from the Shoalhaven floodplain and Nowra Golf Course. The Grotto contains native vegetation and has a variable width however the extent of vegetation effectively screens the River valley itself, and provides very limited views at best. **Plates 7 and 8** depict attempts to view the site from the escarpment edge of the Grotto looking towards Mundamia and these show that vegetation along the edge of the southern banks of the prevent views to the site.



Plate 7: View looking south along Section B.



Plate 8: View looking south along Section C.

Section D

Section D shows the view corridor from the Nowra Golf Course to the site and this also enable consideration of the sight lines available from the level of the Shoalhaven River itself to the east of the site nearer the Nowra township. **Plate 9** shows the views available towards the site from the Nowra Golf Course. Views of the site are not possible from this area due to existing vegetation sited within the golf course itself and along the banks of the Shoalhaven River.



Plate 9: View looking south along Section D.

Section D demonstrates that a view of the site is not possible due to the slope of nearby lands, and the extent of existing vegetation, both of which prevent viewing to the developable area of the subject site.

Mount Cambewarra Lookout

As outlined above, the site is likely to be visible from Mount Cambewarra which has a lookout which provides panoramic views over the district generally.

Plate 10 is a view from Mount Cambewarra which has an elevation of some 600 m AHD, and is sited 8.5 km to the north of the site. This plate shows the panoramic view that is available of the northern Shoalhaven area, including the Nowra township, Shoalhaven floodplain, rural lands and forested lands which surround the town. The variable land uses undertaken within the district and visible from Mount Cambewarra results in a mosaic landscape.

The Mundamia Living Area would be visible from the lookout however it is not considered to be prominent due to the distance the area is from the lookout. Further, the gentle topography surrounding the Nowra township, when compared with the more dramatic elevation associated with Mt Cambewarra, ensures that no one feature is prominent. Rather, it is the panoramic nature of the view which is special and distinctive.

The consequences of developing the subject site are that the current cleared lands and fringe bushland areas would be replaced with residential development. It is considered that this is unlikely to result in any significant visual impacts from Cambewarra Mountain as the new use will simply add to the existing mosaic of land uses that is visible.

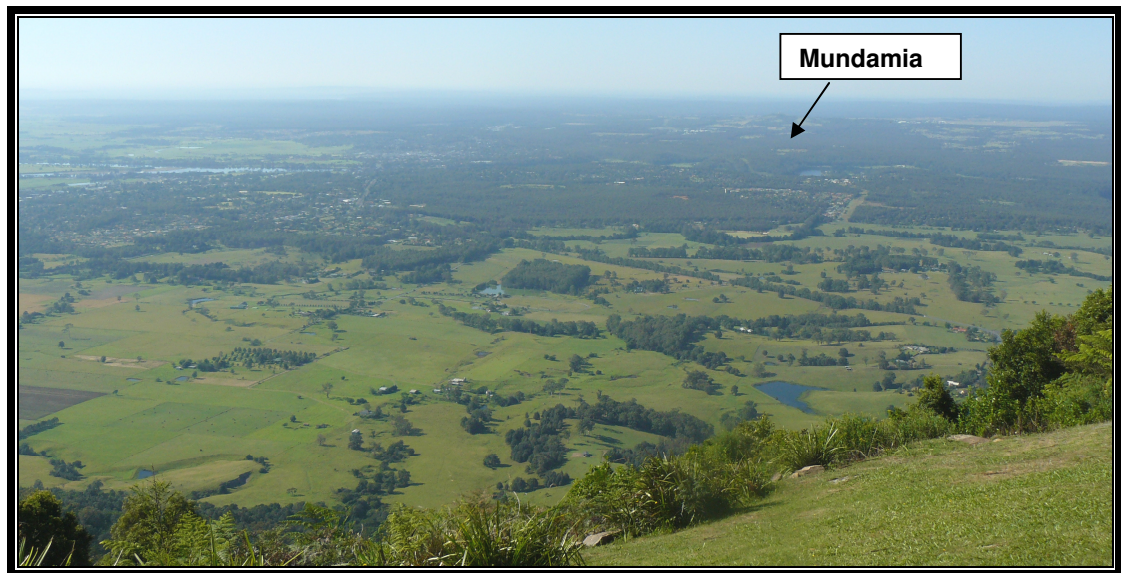


Plate 10: View from Mt Cambewarra.

Nowra Hill Lookout

Nowra Hill is located 5.5 km to the south of Nowra near HMAS Albatross and although it provides a view to the north towards Nowra, it is however more known for the view which it provides over the central Shoalhaven towards Jervis Bay. The peak of Nowra Hill is used for Department of Defence purposes being the site of radio equipment and as

such, the general public is not authorised to access this point. **Plate 11** shows the view that is available towards Nowra from the point available to the general public.

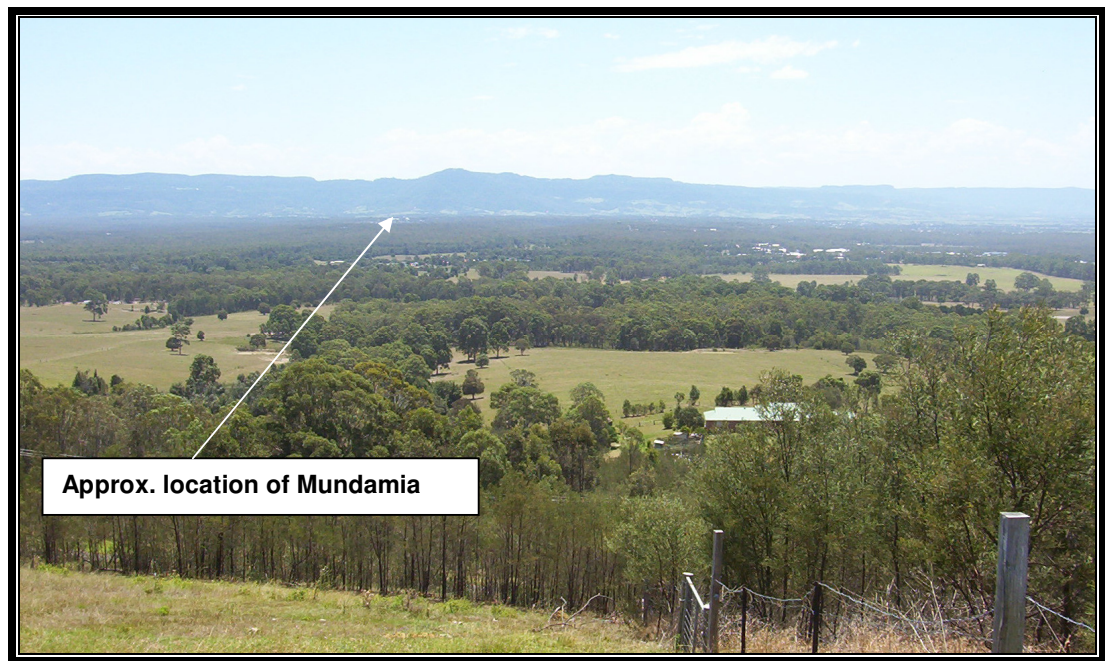


Plate 11: View from Nowra Hill.

This view features cleared and scattered forested land in the foreground, forested lands interspersed with the Nowra township in the middle ground, with the Cambewarra Mountain Range as a backdrop. As with the visual impacts associated with Mount Cambewarra, although the site is potentially visible, the subject site is not prominent due to the gentle topography that prevails in the area, and the extent of forested lands in the locality which rises up to screen other lands.

Adjoining Lands

As outlined above, the site is visible from adjoining lands due to their proximity however the only properties where visual amenity is potentially affected are those sited in the north-western corner, shown in **Plates 5** and **6**. These properties contain single storey dwellings with access provided directly off Jonsson Road and are fenced along the common boundaries with the subject site.

Although the subject site is visible, it is not considered that visual amenity will be significantly affected given that the properties are well defined and the established dwellings are oriented within the properties themselves, or to the adjoining public road reserve which is sited to the north and away from the subject lands.

5.1.5 Conclusion

The visual impacts anticipated by this proposal are not unexpected given the intended zoning of the land for residential purposes. Despite this, it is considered that the impacts will be localised in their effects, and will in no way affect the visual amenity of the locality or the coast. It is considered that the nature of the subdivision proposal will ensure that the locality maintains a distinctive character.

Furthermore, it is considered that the controls already adopted by SCC should ensure that the local impacts are not unreasonable.

It is reasonable to conclude that the proposal will not be visible from the more immediate north of the site, including the Shoalhaven River and the North Nowra urban area.

Impacts on sight lines are avoided as the site itself is not visible due largely to the nature of topography and the extent and height of existing vegetation which is to be retained in the proposal.

5.2 INFRASTRUCTURE PROVISION

5.2.1 Background

This proposal will result in the creation of 312 residential allotments and a rural residential parcel which will require essential servicing. Allen Price and Associates (APA) were engaged to prepare a Utilities Investigation Report to examine the proposed development and the ability of relevant infrastructure service providers to cater for the demands generated by the proposed development. This report is reproduced as **Annexure 9**.

This section of the EA is based on the findings of APA.

5.2.2 Methodology

APA examined and undertook the following:

- Existing capacity and requirements of the development for sewerage, water, electricity, waste disposal, telecommunications and gas, in consultation with relevant agencies;
- Identify and describe staging of infrastructure works; and
- Address and provide the likely scope of a planning agreement and /or developer contributions with Council/government agencies.

APA undertook their assessment based on review of relevant documentation such as Shoalhaven Water's Development Servicing Plans for Sewerage and Water Supplies, investigations with relevant agencies such as Endeavour Energy and Telstra.

5.2.3 Assessment

The assessment undertaken by APA examined the following infrastructure:

- sewer services;
- water services;
- electricity;
- waste disposal;
- telecommunications;
- gas; and
- general infrastructure.

5.2.3.1 Sewerage Infrastructure

Shoalhaven Water is the supply authority for sewerage services in the Shoalhaven City area. The site is currently un-serviced with sewerage infrastructure however Shoalhaven Water in 2005 prepared a series of Development Servicing Plans for Sewerage Supply Services (SDSP 2005) which have identified sewerage service needs for planned developments. This has specifically addressed the Mundamia area and has identified the need for a sewerage pumping station (SPS) and rising main to service the subject site, to be located generally in the north eastern corner of the site, and is shown on the plan comprising Annexure A in the APA report. In addition, it is likely that an existing gravity main will require augmentation to cater for the additional load to be generated by new development undertaken in the Mundamia area.

This infrastructure is to be undertaken by Shoalhaven Water, funded through developer contributions. Council endorsed at its General Meeting of the 27th January 2009 that the funding for the Mundamia New Living Area No. 5 infrastructure be in line with the land release priorities set out in the NBSP. SCC is placing a high priority on the Mundamia area in providing urban expansion in the short term, with the result being that the construction will be brought forward to enable the earlier release of the land.

The provisions of SDSP 2005 currently require the payment of monetary contributions towards the provision of the infrastructure identified above, currently amounting to \$8096 per ET (allotment).

The provision of sewerage reticulation to each allotment will be undertaken by the developer as part of their responsibilities. APA as part of their assessment prepared a conceptual sewerage reticulation plan to show a possible layout for the reticulation network and this is shown as Appendix D. This demonstrates that, for the most part,

allotments will be able to gravity drain to the proposed SPS. There are a number of lots however which will be unable to economically drain to the SPS due to the extent of excavations that are required, along with the extent of rock in this area, which is likely to result in a low pressure sewer system being provided.

According to APA, there are no constraints to development due to the provision of sewerage infrastructure.

5.2.3.2 *Water Infrastructure*

Shoalhaven Water is also the supply authority for water services in the Shoalhaven City area. The site is currently provided with a limited service to the existing residence on the proposed rural residential allotment.

Shoalhaven Water in 2005 prepared a Development Servicing Plan for Water Supply Services (WDSP 2005) which has identified the need for an additional trunk main to service the proposed development which will extend from the existing trunk main located west of George Evans Road to the subject site, with the alignment being through private land owned by SCC, with the final route to be resolved in conjunction with relevant land owners.

This water services infrastructure is to be undertaken by Shoalhaven Water, funded through developer contributions. Council endorsed at its General Meeting of the 27th January 2009 that the funding for the Mundamia New Living Area No. 5 infrastructure be in line with the land release priorities set out in the NBSP.

The provisions of WDSP 2005 currently require the payment of monetary contributions towards the provision of water infrastructure, currently amounting to \$6386 per ET (allotment).

Water supply reticulation to each allotment will be undertaken by the developer as part of their responsibilities. APA have advised that water mains will be provided within the roadway adjacent to each allotment to the requirements of Shoalhaven Water, cognisant of pressure and flow requirements, and to allow hydrants to be provided in accordance with AS 2419.1.

The assessment of APA has also considered the use of alternatives to the town water supply. To that end, APA have outlined that the implementation of BASIX requirements and developer commitments will see rainwater tanks installed to capture stormwater for use in flushing toilets, clothes washing, and for outdoor irrigation purposes such as watering gardens. Furthermore, APA considers that alternative primary potable water is not appropriate for consideration for public health reasons. Consideration could also be given to the use of treated sewage for outdoor irrigation and other suitable purposes,

however the sensitive nature of downstream lands would preclude this as it would upset the water balance affecting habitat of threatened species and their communities.

According to APA, there are no constraints to development due to the provision of water infrastructure.

5.2.3.3 Electricity

Electricity is currently provided to the two existing dwellings on the subject site by way of overhead aerial cables owned and operated by Endeavour Energy (EE). APA undertook consultation with EE who have advised as follows:

“At present there is capacity in the existing 11kV network to supply the proposed subdivision. The 11kV supply for the proposed subdivision will be required to be connected to existing padmount substation 20291 which is located off George Evans Road within the University of Wollongong Shoalhaven Campus. An alternative 11kV supply will be required to be provided for the subdivision from the 11kV network located adjacent the proposed subdivision in accordance with Endeavour Energy's supply security standards.”

Low voltage reticulation is to be undertaken and is the responsibility of the developer. An electrical reticulation plan will be required in the future to detail the technical aspects relating to the supply of electricity.

The existing development on the proposed rural residential parcel is currently supplied with an overhead service and this is to be progressively converted with an underground supply. The existing residence on Lot 384 will be demolished and its current electricity connection removed.

Funding of electricity infrastructure is subject to the Independent Pricing and Regulatory Tribunal (IPART) report “Capital Contributions and Repayments for Connections to Electricity Distribution Networks in New South Wales”. This documents who is responsible for the payment of various items of works, with some being the responsibility of the developer, and others being the responsibility of the service provider, being EE. The final extent of contributions will not be determined until such time as detailed electrical designs are undertaken.

According to APA there are no significant constraints to the development having regard to power supply.

5.2.3.4 Waste Disposal

Waste services are undertaken by SCC through its Waste Services Section, at present via its contractor, SITA. Council also operates various waste disposal facilities throughout the Shoalhaven, the closest being West Nowra approximately 2 km from the site.

Council has advised that kerbside collection of waste will be provided subject to a number of conditions which will be met by this proposal.

No developer contributions are payable in relation to waste services, with waste collection being paid through the annual or quarterly rate collection process.

Waste disposal and collection will be undertaken by SCC, and will require that the roads be publicly owned and maintained, and as such, waste services are to be provided to the development.

5.2.3.5 *Telecommunications*

According to APA, Telstra currently serve the two existing dwellings on the property. For future infrastructure, APA advise that this will be provided by the developer to suit the requirements of either Telstra or the NBN Co.

The site is in close proximity to the University of Wollongong's Shoalhaven Campus, along with West Nowra which is being serviced by the NBN Co, and consequently, it is expected by APA that telecommunications infrastructure will be supplied by the NBN Co. However, regardless of this infrastructure will be provided by the developer and which will be compatible with services supplied by either Telstra or the NBN Co.

No developer contributions are required in relation to telecommunications services, however Telstra will liaise with the developer during the implementation of the subdivision.

5.2.3.6 *Gas*

Having regard to the provision of a reticulated gas supply, APA advise that the site is not currently serviced. Within the SCC area, Actew AGL supplies the gas, and Jemena Pty Ltd is responsible for the installation of the gas reticulation system. Jemena Pty Ltd are currently investigating the suitability of providing a reticulated gas supply to the Mundamia area, however such investigations are yet to be completed. Notwithstanding, APA advises that gas is not an essential service and as such, this matter does not affect the subdivision proposal.

Furthermore, it is noted that bottled gas is supplied by a number of distributors and is available throughout the SCC area, including the new living area at Mundamia.

5.2.3.7 *General Infrastructure*

APA advise that SCC are currently in the process of reviewing the infrastructure needs for the Mundamia Living Area and this may ultimately form a Development Control Plan

along with a Section 94 Contributions Plan in order to fund identified infrastructure needs where appropriate.

SCC have committed to liaising further with the developers of this new living area in the development and implementation of these plans.

As SCC is still in the process of preparing the Contributions Plan component, contribution figures are still to be determined however it is expected that the developers of the site will be required to pay reasonable monetary contributions similar to other localities throughout the City.

5.2.4 Conclusion

In conclusion, the subject site along with the Mundamia Living Area is planned for further urban expansion to meet the needs of the Shoalhaven. The relevant infrastructure agencies are mindful of the need to undertake works to provide, or augment, relevant supplies and consultations are already underway in order that the infrastructure needs of this development will be met.

The provision of infrastructure is not anticipated to be a constraint in the development of the site.

5.3 TRAFFIC AND TRANSPORT

5.3.1 Introduction

Colston Budd Hunt and Kafes Pty Ltd (CBHK) were engaged to undertake a transport report for the proposed residential subdivision of the site. This section of the EA is based on the report by CBHK and considers the impacts of the project on the surrounding road network, and assesses traffic and transport issues that affect the site and proposal. The full CBHK Report is included as **Annexure 2** of this EA.

5.3.2 Methodology

In order to consider transport and traffic issues, CBHK identified the surrounding road network, considered previous work undertaken in relation to the site, undertook traffic surveys at various intersections that may be affected by the proposal to determine existing traffic flows, assessed existing transport and traffic conditions, undertook a number of surveys and modelling utilising the SIDRA program to evaluate the capacity of intersections to cater for peak period traffic flows.

Assessment of the implications of the subdivision on traffic and transport situations in the local area were also investigated, including the potential for increased public transport

services, proposed access and internal layout and traffic generation and associated effects as a result of the development.

Proposed traffic generation figures and intersection operations analyses were based on RTA standards and modelled using the SIDRA program.

5.3.3 Existing Conditions

Road Network

The site is located to the west of Nowra and the road network in the immediate vicinity of the site servicing Mundamia includes Albatross Road, Yalwal Road, George Evans Road, Jonsson Road and Stonegarth Road.

Albatross Road provides Nowra with access to the Flinders Industrial Estate and this also forms part of a network that ultimately connects Nowra with Braidwood via Main Road 92.

Yalwal Road connects with Albatross Road at West Nowra to the east of the subject site, with Burrier and Yalwal in the west. Yalwal Road is provided with a sealed surface, and to the west of Mundamia, Yalwal Road has a 100 km per hour speed limit, whilst to the east, a 60 km per hour speed limit prevails. Yalwal Road intersects with Albatross Road with an unsignalised t-intersection, with Albatross Road having priority.

George Evans Road extends off Yalwal Road to the north via an unsignalised t-intersection, where give way signs provide Yalwal Road with priority. At this intersection, turning via Yalwal Road into George Evans Road, there are two marked westbound lanes, enabling westbound traffic to pass a vehicle turning right into George Evans Road. George Evans Road provides one traffic lane in each direction, with a sealed surface to the south of the University of Wollongong campus, and beyond this complex (to the north) the road is unsealed.

Both Jonsson and Stonegarth Roads are unsealed, and connect surrounding rural properties with George Evans Road.

A plan prepared by CBHK showing the existing road network is reproduced as **Figure 12** below.



Location Plan

Figure 12: Existing road network. (Plan prepared by CBHK Pty Ltd)

Traffic Flow Counts

According to CBHK, traffic generated by the proposed subdivision will have the greatest impacts during weekday morning and afternoon peak periods. In order to assess these impacts, traffic counts were undertaken at various intersections during these periods to establish existing traffic movements. The intersections included:

- Albatross Road/Yalwal Road;
- Yalwal Road/George Evans Road;
- George Evans Road/university access.

The results of these surveys are summarised in **Table 6** below and show the greatest traffic flows occurring along Albatross Road, with some 1050 to 1150 vehicles per hour two-way during the morning and afternoon peak periods. Significantly lower flows were recorded on Yalwal Road, George Evans Road, and the University access.

Table 6
Existing Two-Way (sum of both directions) Peak Hour Traffic Flows

<i>Road</i>	<i>Location</i>	<i>AM Peak Hour</i>	<i>PM Peak Hour</i>
Albatross Road	North of Yalwal Road	1050	1130
	South of Yalwal Road	595	710
Yalwal Road	West of Albatross Road	605	630
	East of George Evans Road	275	280
	West of George Evans Road	175	155
George Evans Road	North of Yalwal Road	120	145
	North of University access	15	15
University Access	West of George Evans Road	105	130

Intersection Operations Analysis

The capacity of the existing intersections around the site were analysed using the SIDRA program in order to ascertain the ability of the intersections and road networks to cater for peak period traffic flows. SIDRA is an analytical tool to evaluate alternative intersection designs in terms of capacity, level of service, a wide range of performance measures including delay, queue length and the like. A useful measure is the average delay per vehicle which results in the allocation of a level of service (LOS), ranging from A to F with A representing a good LOS, and F indicating an unsatisfactory LOS that requires additional capacity.

Based upon the above modelling, the analysis undertaken by CBHK indicates that all existing intersection currently operate with an average delay of less than 15 seconds per

vehicle on both the morning and afternoon peaks periods, which represents a LOS of A/B, which is a good LOS.

Public Transport

A bus service is currently provided in the area by Nowra Coaches which services the University of Wollongong Campus, and connects with the Bomaderry Railway Station via the Nowra town centre.

5.3.4 Assessment of Proposal

Access and Internal Layout

Vehicular access to the site will be provided via George Evans Road which will require some realignment to the south of the site, and extension to the north to service the proposed subdivision. In addition, a new roundabout will be provided to facilitate access to the University of Wollongong Campus, and other properties to the west.

According to CBHK, the new roundabout will function with average delays of less than 15 seconds per vehicle during peak periods, which represents a LOS of A/B which is good.

The proposed subdivision is to be provided with a collector road (major spine road) which is to have a reserve width of 20 metres, with a nine metre constructed carriageway to accommodate buses, and 5.5 m verges on both sides. Local streets are provided with an 18 m wide reserve, with nine metre wide carriageways, and 4.5 metre verges. Access streets are to have a 16 m reserve, with four metre verges and eight (8) metre constructed carriageways. Access places are to have a 13 m wide reserve, with four metre verges on each side, and therefore a 5 m wide carriageway.

Internal road layout and access provisions will be designed in accordance with Council's DCP 100 - Subdivision Code, a document which is based on AMCORD requirements. AMCORD identifies two levels of streets, being local streets and collector streets.

- Local streets are those where the residential environment dominates. Traffic volumes and speeds are low and pedestrian and cycle movements are encouraged, with cycle movements on street. According to AMCORD, vehicle speeds should be restricted by street length, parked cars, landscape design, built form and activity along the frontage.
- Collector streets carry higher traffic volumes as they collect traffic from access streets. Residential amenity and safety is to be maintained to a good standard by restricting traffic volumes and vehicular speeds. Speeds are to be controlled through street alignment, parked cars, street length, intersection design and built form.

CBHK consider that use of Council's Subdivision Code and AMCORD guidelines provides an appropriate assessment base in order to promote alternative travel modes to private vehicle trips such as cycling and pedestrian movements.

Traffic Generation Impacts

According to CBHK, traffic generation will have its greatest effect during the morning and afternoon peak periods. According to surveys carried out by the RTA, residential subdivisions generate approximately 0.85 two-way vehicular movements per hour per lot during peak hours. On the other hand, Council's Subdivision Code DCP No. 100 calculates traffic generation based on an estimated 10 trips per day, two-way. The assessment undertaken by CBHK has used the higher traffic generation rates utilised in Council's Subdivision Code DCP No. 100.

The application proposes 312 residential allotments, some of which have the potential to be developed to accommodate medium density housing and dual occupancies. According to CBHK, total traffic generated by the project will result in some 310 to 300 two-way vehicle trips in the morning and afternoon peak hours. Approximately 70 percent of traffic generated in the morning peak period would be outbound, and this is expected to be reversed in the afternoon.

CBHK in their assessment have assigned the additional traffic to the road network, and reassessed the existing conditions utilising SIDRA. A summary of proposed traffic generation as produced by CBHK is reproduced below as **Table 7**.

Table 7
Projected Two-Way Peak Hour Traffic Flow (CBHK 2008)

<i>Road</i>	<i>Location</i>	<i>AM Peak Hour Existing</i>	<i>AM Peak Hour Plus Development</i>	<i>PM Peak Hour Existing</i>	<i>PM Peak Hour Plus Development</i>
Albatross Road	North of Yalwal Road	1050	+ 245	1130	+ 245
	South of Yalwal Road	595	+ 45	710	+ 45
Yalwal Road	West of Albatross Road	605	+ 290	630	+ 290
	East of George Evans Road	275	+ 290	280	+ 290
	West of George Evans Road	175	+ 15	155	+ 15
George Evans Road	North of Yalwal Road	120	+ 305	145	+ 305
	North of University Access	15	+ 330	15	+ 330
University access	West of George Evans Road	105	+ 25	130	+ 25

The analysis undertaken by CBHK demonstrates traffic increases of 245 to 330 two way vehicle trips would occur on Albatross Road (north of Yalwal Road), Yalwal Road (east of George Evans Road) and George Evans Road during peak hours.

Increases on Albatross Road (south of Yalwal Street), Yalwal Road (west of George Evans Road) and the university access are likely to be less than 50 vehicles per hour two-way.

Within the subdivision itself, traffic is expected to carry less than 100 trips per hour two-way, apart from the collector road.

SIDRA analysis of these traffic volumes has determined that the existing unsignalised intersections of Yalwal Road with Albatross Road, and George Evans Road, and the roundabout at the intersection of George Evans Road and the University will operate with average delays of less than 20 seconds, representing a LOS of B, which is a reasonable or better LOS.

In accordance with the DG's EARs, CBHK have also considered 10 year future traffic flows, along with holiday traffic. According to CBHK, accounting for traffic growth requires an increase in traffic of 2% compound over this 10 year period, and then adding the traffic generated by this project. Consideration of the 10 year future growth, plus additional traffic reveals that existing afternoon peak hour traffic flows would increase by some 30% over current volumes. The intersection of Albatross and Yalwal Roads has been reanalysed by CBHK using SIDRA, and this found that the intersection would benefit from an upgrade at some time in the 10 year horizon encompassing the provision of a separate left and right turn lanes from Yalwal Road into Albatross Road. With this treatment, the SIDRA analysis found that the intersection would perform with average delays of some 25 seconds or less per vehicle, which represents a LOS B, which is a reasonable LOS with acceptable delays and spare capacity.

Local surveys undertaken by CBHK during holiday periods indicate that afternoon peaks experience an increase of some 30% over non holiday periods. During morning peaks, holiday flows are less than non-holiday periods and as such, it is not necessary to assess this any further. According to CBHK, SIDRA analysis of the additional traffic generated during holiday periods, coupled with the 10 year growth, results in an average delay of less than 28 seconds at the intersection of Albatross and Yalwal Roads, which represents a LOS of B, which is a reasonable LOS with acceptable delays and spare capacity. Consequently, with the separate left and right turn lanes implemented at some time prior to the ten year horizon at the Yalwal Road/Albatross Road intersection, CBHK consider that the road network will have capacity to accommodate traffic from the

proposed development, future growth over a 10 year period, plus additional flows generated during holiday periods.

Public Transport

The locality is already provided with a bus service which provides public transport to the nearby University of Wollongong campus. The proposed collector road within the proposed subdivision layout will enable access by buses, and the additional residential population will improve overall demand, and therefore the viability of any service, the result being that this new living area will result in an improved public transport service.

5.3.5 Conclusions

CBHK have undertaken a Transport Assessment to assess potential traffic impacts associated with this major project. The analysis undertaken has included an assessment of the existing road network and public transport in the locality, as well as traffic volume counts at relevant intersections, along with surveys and modelling using the specified SIDRA program to evaluate the capacity of intersections to cater for peak period traffic flow. Furthermore, the analysis has included future growth for a 10 year period, and includes an assessment of traffic conditions experienced during holiday periods.

Results of the assessment reveal that the existing road network and intersections currently operate with good LOS, and the addition of traffic expected to be generated by this proposal will not have significant traffic and transport impacts, however provision of separate left and right turn lanes from Yalwal Road into Albatross Road is recommended some time over the ten year horizon to cater for the next ten years growth which is anticipated.

Having regard to the provision of public transport, the report acknowledges the existence of a regular bus route servicing the University, and the viability of and demand for this service is likely to be strengthened by the project. This existing service can readily be extended into the residential subdivision to cater for the new living area and the road network will be designed to cater for this potential bus route.

5.4 HAZARD MANAGEMENT AND MITIGATION

5.4.1 Coastal processes and flooding

This Section of the EA deals with the impacts of coastal processes and flooding and considers the impacts of the proposed subdivision the subject of this EA.

5.4.1.1 *Introduction*

The subject site is located within the coastal zone due to its proximity to the Shoalhaven River. However, the property is sited well away from the actual coastline being some 16 kilometres (direct line) from the ocean which is to the east of the locality. The site does not form part of the Shoalhaven River floodplain, as it comprises land having an elevation which ranges between RL 36 m and 70 m AHD, separated by a large sandstone cliff face. Developable parts of the property are sited at a minimum level of RL 46 m AHD. The height of the subject site is well above known flood levels identified by SCC. The provisions of Shoalhaven LEP 1985 identify flood affected properties by either applying a specific zone such as Rural 1(g) – Flood Liable in rural areas or Urban Floodways 9(a) in urban areas, or alternatively identifying such lands with a distinctive line. The subject site is not so identified by Shoalhaven LEP 1985 and therefore, is not mapped as being subject to flooding hazards.

5.4.1.2 *Coastal Processes*

The subject property is sited well away from the actual coastline and is not subject to coastal processes and hazards such as beach erosion, shoreline recession, or coastal inundation. Consequently, these processes are unlikely to have any impact on the site or the proposal.

Having regard to sea level rise, Storm Consulting have advised in their Water Cycle Management Report (**Annexure 7**) that sea level rise has no impact on the development as the lowest portion of the site is at least RL 30 m AHD. This height is well above expected sea level rise predictions that have been forecast due to climate change impacts.

5.4.1.3 *Flooding*

The proposed developable portions of the subject land have an elevation that ranges between RL 46m AHD to RL 70m AHD. This is well above known flood levels. According to SCC's Flood Mitigation Engineer, the planning level flood (i.e. the 1 in 100 year ARI) at the crossing of the Shoalhaven River at Nowra, has a height of RL 6.5 m AHD, whilst the Probable Maximum Flood (PMF) has a height of RL 9.3 m AHD. The proposed site is clearly well above these levels by at least 36 metres. Although the bridge crossing is downstream from the subject site, it is considered reasonable to utilise this information as flood levels for the Shoalhaven River are not expected to vary significantly and certainly not to the extent that would affect the 36 metre height difference available in this instance.

Given the above, it is reasonable to consider that the subject site is not affected by flooding associated with the Shoalhaven River.

The site is in the vicinity of the Flat Rock Creek dam and Flat Rock Creek watercourse, however mapping prepared by SCC does not identify this as flood prone. Furthermore, perusal of the 1:25000 topographic map for 'Nowra' shows that Flat Rock Dam has a height of approximately RL 40 m AHD, whilst Flat Rock Creek in the vicinity of the subject site, falls from 40 m AHD to below 20 m AHD to the north of the site. Consequently, it is unlikely that the subject site, and therefore the proposal, would be subject to localised flooding from Flat Rock Creek given the developable portion of the subject site (at minimum RL 46 m) is well above these levels.

The site itself is not traversed by any existing watercourses that are likely to lead to flooding of the property.

Localised drainage and stormwater matters are dealt with in Section 5.4.5 of this EA.

5.4.1.4 Conclusion

The subject site is very remote from the actual coastline and is physically separated, and is therefore unlikely to be affected by coastal processes. Further, the site is of an elevation that is well above known flood levels, or sea level rise predicted by the IPCC, by in excess of 30 metres.

Consequently, it is considered that coastal processes and flooding will not affect the development of the subject site.

5.4.2 Site Contamination

5.4.2.1 Introduction

This section deals with the potential of the subject property to be affected by site contamination and the impacts such may have on the Part 3A Major Project. This section is based on the reports titled Stage 1 Contamination Assessment, Stage 2 Environmental Site Assessment and Remedial Action Plan prepared by Martens Consulting Engineers which forms **Annexure 5** of this EA.

5.4.2.2 Contamination Assessment

Martens Consulting Engineers were engaged to undertake a Stage 1 Assessment in accordance with the requirements of SEPP 55 – Remediation of Land. This assessment included:

- A review of previously existing land uses and site history including a review of development consent history, interview of existing land owners, search of SCC records;
- Search of NSW Environment Protection Authority records; and
- Aerial photograph interpretation.

The research undertaken by Martens Consulting Engineers has revealed that the site has been the subject of predominantly a rural land use with low to medium intensity for approximately 35 years, which is confirmed by both the oral history and aerial photograph interpretation. This rural land use also dominates the use of other local and nearby properties for greater than 50 years and presents a low risk of impacting on the subject site. The subsurface investigations that were undertaken revealed no visual or olfactory (odour) evidence of contamination. The southern portion of the site contains a number of rubbish piles and these contain various materials including chemical drums, fibrous cement sheeting, rusted farm machinery, chain link wire fencing whilst Lot 384 contains a dilapidated building which contains some fibro sheeting. Site inspections undertaken by Martens Consulting Engineers did not detect any evidence of chemical contamination, usually apparent by way of soil staining or plant stress.

The assessment undertaken by Martens Consulting Engineers identified the following potential 'hotspots', shown in tabular form as **Table 8**:

Table 8
Potentially Contaminated Locations, Contaminating Activities and Contaminants

<i>Location</i>	<i>Activity</i>	<i>Potential Contaminants</i>
Dwellings, livestock yards and sheds, southern portion of the site (Lot 384).	Storage of machinery, fertilisers and other chemicals. Sheds and dwellings possibly containing asbestos materials.	HM Herbicides, OCP/OPP asbestos.
3 dams located on Lot 384.	Accumulation of heavy metals, herbicides and pesticides from various farm activities.	HM, Herbicides, OCP/OPP.
Scattered disused machinery and areas of rubbish fill and soil stockpiling, across the site (see Figures 1 & 2 of that report).	Dumping of old car parts, various pieces of machinery, fibro sheeting and other building products.	HM, TRH, BTEX, PAH's, OCP/OPP and asbestos.
Paddocks of Lot 3 and Lot 384.	Agricultural activity utilising pesticides, herbicides and fungicides.	HM, OCP/OPP.

According to Martens, the potential for site contamination is limited to the identified hotspots which surround existing dwellings, rural sheds, yards, and the various rubbish piles, paddocks used for cropping and grazing, and sedimentation of dams which may have resulted in an accumulation of heavy metals, herbicides and pesticides over the 35 year history of this activity. The Stage 1 Contamination Assessment recommended that additional assessment be undertaken in order to determine the extent of actual contamination at the site.

5.4.2.3 *Stage 2 – Environmental Site Assessment*

Following the preliminary Stage 1 Assessment undertaken by Martens, a Stage 2 Environmental Site Assessment was undertaken to more fully assess the site and actual levels of contamination existent at the site.

The assessment undertaken by Martens Consulting Engineers was done in accordance with the requirements of the NSW Office of Environment and Heritage (OEH) and Department of Environment and Conservation (DEC). The assessment included the collection of samples from a total of 48 separate locations across the site and included boreholes, test pits, stockpiles and from the lands surface. These samples were subsequently tested at a NATA accredited laboratory for the presence of chemicals of concern. The Environmental Site Assessment undertaken by Martens Consulting Engineers revealed that site contamination was restricted to Area B located in the south-eastern corner of Lot 3 DP 568613 with contamination arising from empty fuel cans, motor oil containers, lubricants and disused motor vehicles which have been discarded on the property.

Martens in the Environmental Site Assessment recommended that a remediation action plan be prepared.

5.4.2.4 *Remedial Action Plan*

Martens Consulting Engineers prepared a Remedial Action Plan in order to identify remediation measures necessary to ensure that the site is suitable for the residential use proposed.

The assessment of Martens considered the following options for site remediation:

- *On-site treatment of the contamination so that it is destroyed and the associated risk is reduced to an acceptable level.*
- *Off-site treatment of excavated soil, so that the contamination is destroyed or the associated risk is reduced to an acceptable level, after which the soil is returned to the site.*

- *Removal of contaminated material to an approved facility, followed (where necessary) by replacement with appropriate material.*
- *Cap and contain material onsite with an appropriately designed barrier.*
- *Do nothing.*

In order to meet the objectives of the project and suitably address the range of contaminants identified at the site, Martens has recommended that remediation be undertaken by way of excavation, and offsite disposal. The Remedial Action Plan prepared by Martens Consulting Engineers has outlined a methodology to ensure suitable remediation of the site and which involves identification of a remediation strategy, soil validation, and waste management, culminating in a Validation Report outlining that the site is suitable for the residential use. These works are to be undertaken in conjunction with the subdivision works.

5.4.2.5 *Conclusions and Recommendations*

Martens Consulting Engineers have prepared a comprehensive Contamination Assessment that has included a Stage 1 Preliminary Assessment, Stage 2 Environmental Site Assessment that has involved soil sampling and analysis, and finally a Remedial Action Plan.

The works recommended in the Remedial Action Plan are to be undertaken in conjunction with the works to implement the proposed subdivision.

5.4.3 Geotechnical Issues and Acid Sulfate Soils

5.4.3.1 *Introduction*

This section deals with geotechnical constraints, and the potential for the existence of acid sulfate soils affecting the site and the major project subdivision proposal. This section is based on the report titled Preliminary Geotechnical Constraints Assessment prepared by Martens Consulting Engineers which forms **Annexure 4** of this EA. It addresses the methodologies that were adopted, along with the findings and recommendations.

5.4.3.2 *Methodology*

Martens Consulting Engineers were engaged to undertake a geotechnical constraints assessment, including:

- Site classification in accordance with AS 2870 (1996): Residential slabs and footings – Construction;

- Hazard risk assessment to review slope stability, hazard identification, viability of proposed development, and recommended treatment measures if required;
- Drainage and subsurface moisture conditions; and
- Acid sulfate soils assessment.

5.4.3.3 Acid Sulphate Soils Assessment

GIS mapping information of the property prepared by SCC indicates that the property is not mapped as a potential acid sulfate soil site. This is reproduced as **Figure 13**.

According to Martens Consulting Engineers, the site has

“an elevation of 36-70m AHD with an underlying geology of sedimentary rock. Soil profiles observed on site are residual or colluvial in character and are not recent (Holocene or Pleistocene) deposits. As such, there is considered to be negligible risk of acid sulfate soils on the site.”

The findings of Martens Consulting Engineers confirm the mapping prepared by SCC and contained within their GIS.

Consequently, it is unlikely that acid sulfate soils are present on the site and therefore do not pose a constraint to development of the site and further testing is not warranted. Further, as acid sulfate soils are unlikely to be present at the site, further mitigation or management in the development of the project is considered unnecessary.

5.4.3.4 Geotechnical Assessment

Geological Conditions

Martens Consulting Engineers undertook a preliminary desk top assessment and research involving a review of the relevant NSW Geological sheet (Wollongong 5609) as well as onsite investigation, sampling and testing which showed that the site was underlain by Nowra Sandstone which is a subgroup of the Megalong Conglomerate Group geology.

According to Martens Consulting Engineers, the site is underlain by weathered sandstone of various grades, whilst a site inspection of the southern portion of the site revealed it is underlain by Limonite or Geothite concretions, the full extent of which is unknown at this time. Field investigations undertaken by Martens revealed that the depth to weathered rock ranges from 0.5 metres below ground level (b.g.l.) in the southern portion of the site, to greater than 2.5 m b.g.l. at lower elevations which occur in the northern section of the property.

According to Martens Consulting Engineers, some rock outcropping was evident along the eastern portion of the site.

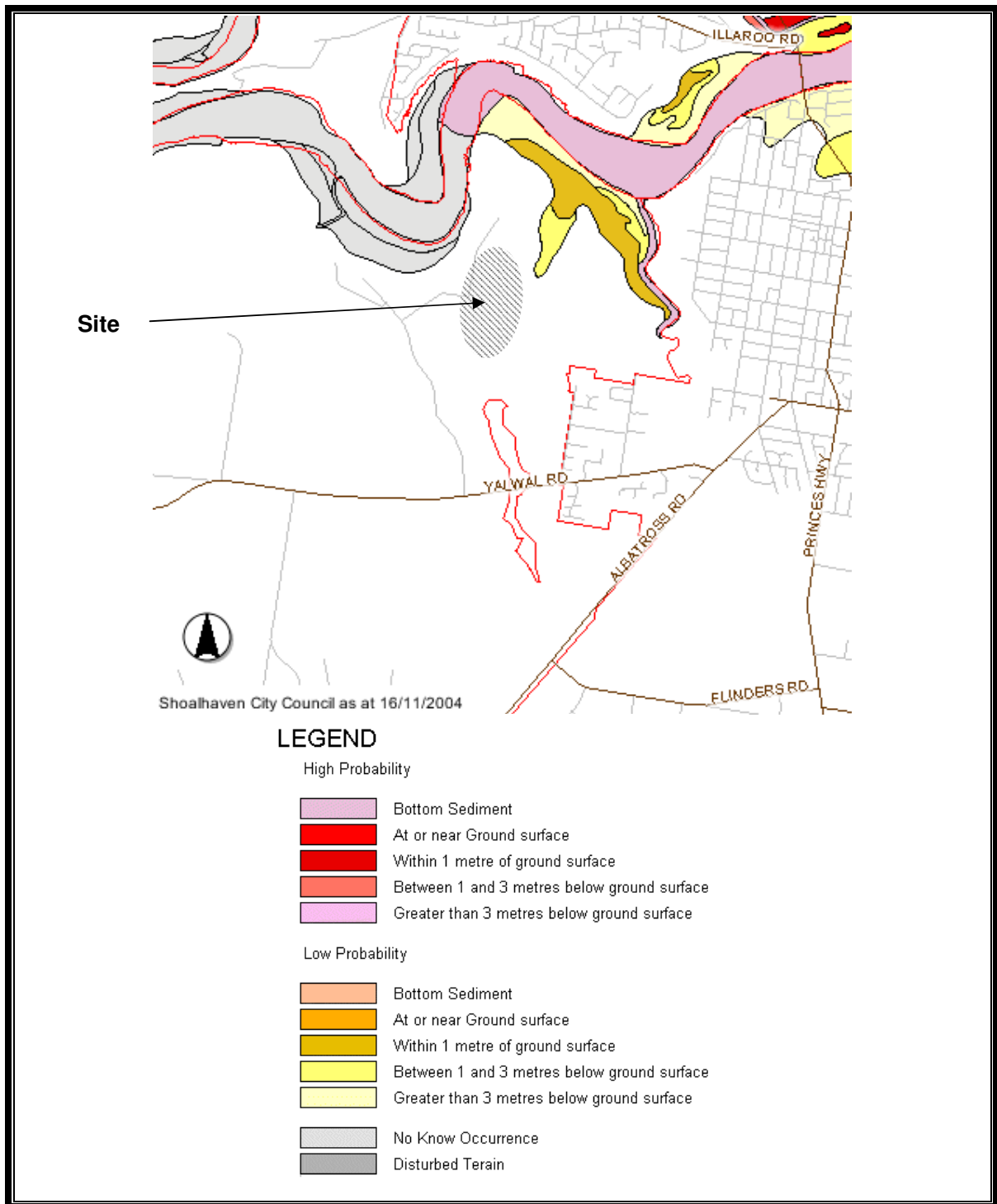


Figure 13: Acid Sulfate Soil mapping (Extract from SCC GIS)

Soil Landscape Mapping

The subject site is mapped on the 1:100 000 Soil Landscape Map for Kiama as being within the Nowra Landscape. Within the Nowra Landscape soils conditions are moderately deep, being between 0.5 m and 1 metre in depth with the soil being brown podsolic on crests and upper slopes, with yellow earths or yellow podsolic soils on mid slopes and drainage depressions.

According to Martens Consulting Engineers, the Nowra Landscape has moderate to high erosion potential, with limitations apparent due to shallow soil profiles, rock outcropping and low wet bearing strength.

Inconsistent sub surface conditions apply across the site due to the changes in topography, however according to Martens Consulting Engineers, the soil profile is organic silty sand, overlying clayey sand, which overlies residual soils, which at varying depths grades to extremely weathered rock.

Soil testing undertaken by Martens Consulting Engineers indicated that the site contains the following sub-surface conditions:

- ❑ Category One – generally found along the upper elevations and eastern portions of the site (dominated by very shallow soil profiles < 1 m / exposed sandstone bedrock).
- ❑ Category Two – located on the upper elevations in the south western portion of the site (soil profiles 1 - < 2 m).
- ❑ Category Three – located along the drainage depression in the north western area of the site (deeper soil profiles > 2 m).

Findings

Foundation Class

Based on the findings of the assessment undertaken, Martens Consulting Engineers have been able to allocate a foundation class to each of the relevant sub-surface conditions identified above in accordance with the requirements of AS 2870. In this regard, it has been advised that Category 1 is “A”, Category 2 is generally considered “S”, and Category 3 is considered “M” or “H” in accordance with AS 2870.

Risk and Constraints

The assessment undertaken by Martens Consulting Engineers has enabled them to identify hazards and risks associated with the development of the site. Whilst Martens Consulting Engineers advised that the potential for rock fall, due to the presence of steep

slopes and rock outcropping along the eastern perimeter of the site existed, this did not present a risk to development from slope instability, as this area is located in the proposed conservation zone and would not be developed. The steeper slopes are also associated with the eastern portion of the site which comprises native forest vegetation and will comprise the conservation zone. The layout of the subdivision does not propose the development of lands in this portion of the site, which is to be preserved in its current vegetated state for conservation purposes.

Based on the assessment undertaken by Martens Consulting Engineers, development of the site contains only minor geotechnical constraints, with these limited to shallow groundwater table, poor drainage, and low bearing strength and erodibility of the sub-surface soils.

Management and Monitoring

Based on the findings of the work undertaken through assessment of relevant geological and soil maps, coupled with an inspection of the subject site and surrounds, a series of recommendations have been made in relation to the further development of the site that deals with issues such as the placement of fill, control of excavations, footings and foundations and retaining structures.

Conclusions

Martens Consulting Engineers have undertaken an assessment of the subject site and prepared a Preliminary Geotechnical Constraints Assessment for the subdivision the subject of this Part 3A Major Project application.

Martens Consulting Engineers conclude that “from a geotechnical perspective, we consider that the site is suitable for the proposed development, subject to the recommendations and preliminary treatment measures as outlined in the report.”

5.4.4 Bushfire Risk Assessment

5.4.4.1 Introduction

The subject site is identified by mapping prepared by Shoalhaven Council and endorsed by the NSW Rural Fire Service (RFS) as being bushfire prone. In this regard, **Figure 14** below is an extract from SCC's GIS which shows the extent of bushfire prone lands affecting the subject site and surrounding lands. This shows that the western portions of the site are either not identified as being bushfire prone, or alternatively contain buffer to forest vegetation, and this coincides with the extent of cleared land on the subject site. Lands to the east are identified as containing vegetation Category 1 and a buffer, generally coinciding with land comprising native forest.

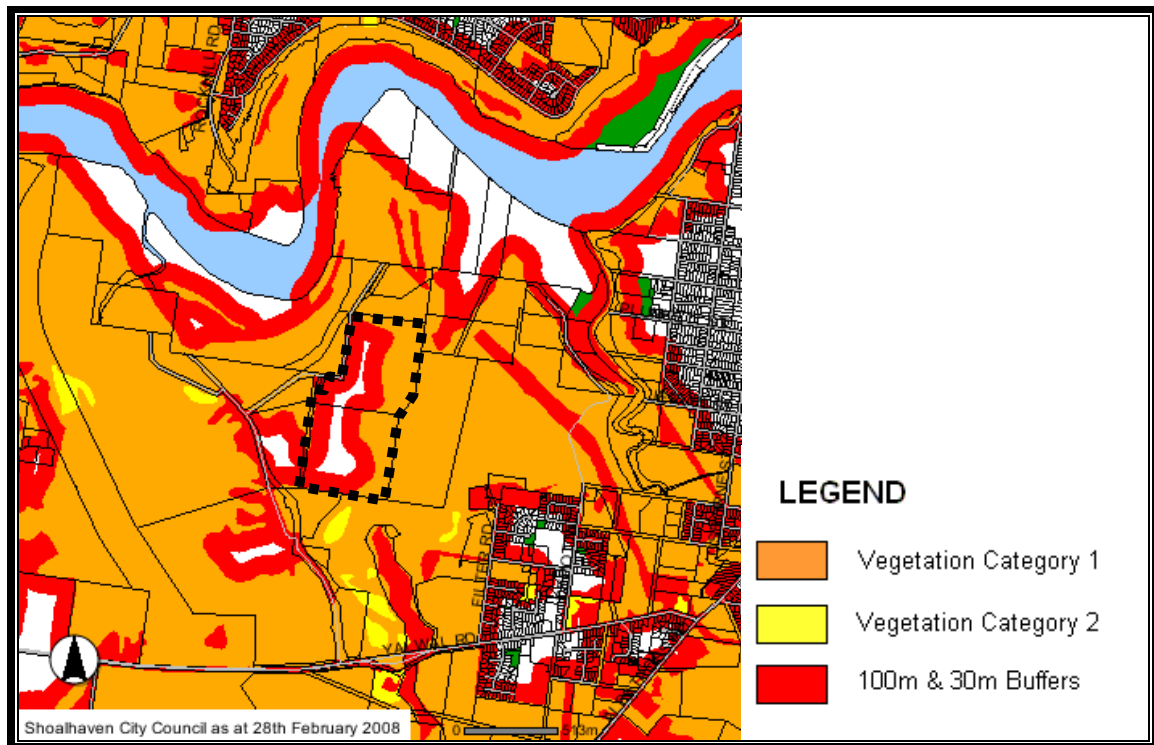


Figure 14: Extent of Bushfire Prone Lands (extract from SCC GIS).

Furthermore, the extent of native forest in the vicinity of the site would indicate that the site is subject to some risk of bushfire hazard.

In response to this Eco Logical Australia (ELA), were engaged to prepare a Bushfire Protection Assessment to assess the impacts of bush fire risk on the major project application. This is shown as **Annexure 6**.

The following sections of the EA are based on the findings of this report.

5.4.4.2 Methodology

This Bushfire Protection Assessment undertaken by ELA has been prepared in accordance with the documents “*Building in Bush Fire Prone Areas – Guidelines for Subdivision Applications*” (NSW Rural Fire Service) and “*Planning for Bushfire Protection*” (PBP guidelines) (NSW Rural Fire Service, DIPNR).

5.4.4.3 Assessment

Vegetation Types and Slopes (Part B of PBP)

ELA have assessed the relevant vegetation type for a distance of 140 metres from the site, and slope most significantly affecting fire behaviour for a distance of at least 100 m as required under PBP. According to ELA, the predominant vegetation type is forest in

all directions. Having regard to slopes, ELA advise that these are predominantly downslope and generally $> 0 - 5^\circ$ and $> 5^\circ - 10^\circ$, with slopes in the south-eastern corner of the site falling downslope $> 15^\circ - 18^\circ$ and these are shown in Figure 3 of the ELA report.

Asset Protection Zone (APZ) (Part C of PBP)

ELA have assessed the relevant vegetation and slopes, and have advised of relevant APZ requirements for implementation. ELA have recommended APZ ranging from a minimum of 20 m up to a maximum of 60 m.

ELA have advised that existing APZs around the established dwelling which is to be retained are adequate.

The subdivision layout has been prepared in accordance with the recommendations.

APZ Maintenance (Part D of PBP)

Fuel management within the APZ is to be as follows:

- No tree or tree canopy is to occur within 2 m of the dwelling roofline.
- The presence of a few shrubs or trees in the Inner Protection Area is acceptable provided that they:
 - are well spread out and do not form a continuous canopy;
 - are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period; and
 - are located far enough away from the building so that they will not ignite the building by direct flame contact or radiant heat emission.
- Any landscaping or plantings should preferably be local endemic mesic species or other low flammability species.
- A minimal ground fuel is to be maintained to include less than 4 tonnes per hectare of fine fuel (fine fuel means ANY dead or living vegetation of < 6 mm in diameter eg. twigs less than a pencil in thickness. 4 t/ha is equivalent to a 1 cm thick layer of leaf litter); and
- Any structures storing combustible materials such as firewood (eg. sheds) must be sealed to prevent entry of burning debris.

Construction Standards (Part E of PBP)

ELA have advised that further development on the allotments can be undertaken in accordance with the requirements of AS3959 – 2009, which will be determined at the development application stage for each dwelling. ELA advise however the Bushfire Attack Levels (BALs) within the proposed subdivision are likely to range from BAL-29 down to BAL-12.5, whilst lots sited in excess of 100 m from an identified bushfire hazard will not require any will not require any specific bushfire protection measures.

The existing dwelling which is proposed to be retained will require upgrading in order to comply with AS3959 in the form of aluminium flyscreen mesh to openable windows and wire screening of other openings.

Water Supply (Part F of PBP)

The subject site is to be serviced with reticulated water supply which will be available for use by the RFS for fire fighting purposes. ELA have made recommendations relating to the provision and design of such supply and in particular the location of hydrants. The proposal can comply with the provisions of PBP in relation to supply of water.

Gas and Electricity Supply (Part G of PBP)

The site is to be provided with underground electricity supply which will be reasonably protected in the event of bushfire.

In relation to gas supplies, ELA have advised that any gas supply be installed and maintained in accordance with AS 1596, and metal piping be used in its installation.

The proposal will comply with respect to these matters.

Property Access Roads and Public Road System Capacity (Part H of PBP)

According to ELA, the property has connection to the high capacity public road system in the south-western corner of the site, formed by Yalwal Road. In addition, alternative access and egress routes are available from the western and north-western sides via Jonsson Road.

ELA have identified egress/ingress routes from the south-west, west and north-west.

ELA have advised that the proposed fire trail surrounding six allotments will comply with the design standards of PBP.

ELA have examined the proposed road network and fire trail and have concluded that these will comply with the requirements of PBP.

5.4.4.4 Staging

The assessment of ELA has considered the impact of the staging of the proposed subdivision. In this regard, ELA have recommended either a perimeter road or a perimeter fire trail in accordance with the requirements of PBP for each stage in the subdivision, plus the provision of APZs for those lots sited on the perimeter of a stage.

5.4.4.5 Recommendations and Conclusion

The subject site is identified by mapping prepared by SCC and endorsed by the NSW RFS as being bush fire prone. In consideration of the risk, ELA were engaged to prepare a Bushfire Protection Assessment (BPA) and assess the proposal against the requirements of PBP. ELA have made the following recommendations in order to ensure compliance with the requirements of the PBP:-

Recommendation 1: Asset protection zones are to be provided to the proposed subdivision indicated in Figure 3 of the BPA.

Recommendation 2: Asset protection zone landscaping is to comply with the NSW Rural Fire Service document 'Planning for Bush Fire Protection 2006' inner protection area requirements as listed in Appendix 2 Section A2.2 of PBP and guided by the fuel management principles listed in Section 4 of this report.

Recommendation 3: Future landscaping for individual lots across the subdivision is to comply with the principles listed in Appendix 5 of PBP.

Recommendation 4: A hydrant water supply should be installed in accordance with Australian Standard AS 2419.1.

Recommendation 5: Public roads are to comply with the NSW Rural Fire Service document 'Planning for Bush Fire Protection 2006' as listed in Section 8 of this report.

Recommendation 6: Electrical services should be underground.

Recommendation 7: Gas services are to be installed and maintained in accordance with AS/NZS 1596:2008 (Standards Australia 2008).

Recommendation 8: Each stage of the subdivision is to be provided with either a perimeter road or a perimeter fire trail to the standards described in Table 1 and Table 2 of the BPA (respectively).

The Bushfire Protection Assessment prepared by ELA concludes with respect to this proposal:

"In the author's professional opinion the bushfire protection requirements listed in this assessment provide an adequate standard of bushfire protection for the proposed development, a standard that is consistent with the Planning for Bushfire Protection guidelines (RFS 2006) and appropriate for the issues of a Bushfire Safety Authority."

5.4.5 Water Cycle Management

5.4.5.1 Introduction

Storm Consulting were engaged to undertake a hydrological assessment of the proposed development and consider issues pertaining to water quality and quantity, and identify management strategies to implement in order to mitigate the impact of the development on the environment. The assessment undertaken by Storm Consulting culminated in the preparation of a Water Cycle Management Report which is reproduced as **Annexure 7**. In addition to the hydrological issues, the Water Cycle Management Report prepared by Storm Consulting considered flood risks and potential impacts of climate change through increased flood levels and rainfall intensity.

The proposal incorporates a number of measures to mitigate impacts on both the quantity of water leaving the site, as well as the quality of water that is discharged from the site including strategically located bio-filtration trenches within each identified catchment, and on-site storage of rainwater and infiltration within allotment boundaries.

This section of the EA discusses the Storm Consulting report and water cycle management.

5.4.5.2 Methodology

The Water Cycle Management assessment undertaken by Storm Consulting includes consideration of a range of matters including:

- Planning context including consideration of Shoalhaven LEP 1985 and Shoalhaven Council's DCP 100 – Subdivision Code;
- Water quality objectives including suspended solids, and nutrient loads, and Stormwater quality benchmarks provided within “*Stormwater Treatment Techniques – Environmental Targets*” prepared by the DECC;
- Climate change impacts, including increased rainfall and therefore run-off, and sea level rise;
- Water quantity objectives including runoff volumes, peak flows and runoff frequency.

Work undertaken by Storm Consulting included the following modelling:

- MUSIC which simulates urban stormwater systems operating at a range of temporal and spatial scales for catchments between 0.01 km² to 100 km² in size and modelling time steps ranging from 6 minutes to 24 hours to match the catchment scale.
- RAFTS models rainfall runoff and assist by determining the onsite detention requirements generated by the proposal.

Storm Consulting included an assessment of the site conditions including soil types, topography and slopes, established land use patterns, climatic conditions, drainage regime, and the extent of vegetation covering the site.

The assessment undertaken by Storm Consulting assessed the site, the nature of the proposal, undertook the modelling, recommended mitigation measures, and provided a final report. Work undertaken by Storm Consulting included an inspection of the site and surrounds.

Storm Consulting identified relevant constraints and opportunities for the development which included the following:

- Shallow soils and exposed bedrock;
- Site topography;
- Minor drainage line traversing the northern half of the property, along with smaller drainage depressions draining local runoff;
- Water quality benchmarks; and
- Water Sensitive Urban Design principles able to be implemented.

5.4.5.3 Findings

Construction Impacts

During construction, Storm Consulting recognise that there is a potential for higher levels of stormwater pollution to occur. This can be attributed to sight disturbances and vegetation removal necessary to construct the subdivision.

Storm Consulting have recommended mitigation of these impacts by way of preparing a detailed Soil and Water Management Plan in accordance with “Managing Urban Stormwater: Soils & Construction, Version 4 (Landcom, 2004)” commonly referred to as the “Blue Book”. Such can assist in minimising the potential for soil erosion by appropriately staging the development to minimise the extent of land exposed at any one time and ensuring that appropriate soil erosion measures are employed and properly located.

Water Quality Modelling

Stormwater quality benchmarks required by the Department of Environment & Climate Change, (DECC) requires that stormwater discharges meet the following standards (**Table 9**):

Table 9
DECC Water Quality Benchmarks

Total Suspended Solids (TSS)	Reduce by 85%
Total Phosphorus (TP)	Reduce by 65%
Total Nitrogen (TN)	Reduce by 45%

In order to treat stormwater, the proposal incorporates a range of measures to reduce pollutant loads includes strategically placed bioretention areas, with appropriate diversions to ensure that water is redirected to pass through the systems prior to discharge from the site. The nature of the site, and in particular the topography of the land, according to Storm Consulting, precludes facilities such as wetlands and ponds which require large areas, whilst the shallow soils and waterlogged nature of some of the site has excluded the use of drainage swales.

According to modelling work undertaken by Storm Consulting, the proposal will result in the following pollutant loads and concentrations (**Table 10**):

Table 10
Pollutant Load (kg/annum) for development with and without treatment

	<i>No Treatment</i>	<i>With Treatment</i>	<i>% Load Reduction</i>	<i>Meets Criteria Y/N</i>
Suspended Solids (kg/y)	36000	5640	84.3%	N
Total Phosphorus (kg/y)	67.7	19.8	70.8%	Y
Total Nitrogen (kg/y)	558	212	62.1%	Y

Modelling undertaken by Storm Consulting reveals that the proposal will comply with the water quality benchmarks established by the DECC having regard to Total Phosphorous and Total Nitrogen, however is marginally (0.7%) below the required load reduction when it comes Total Suspended Solids (TSS). Having regard to TSS, Storm Consulting consider that although this is marginally below the benchmark removal requirements, this is satisfactory as it is a conservative assessment that has not included modelling of the positive effects of the proposed bioretention system which will have a practical benefit and will further increase TSS removal.

Water Quantity Modelling

According to the modelling undertaken by Storm Consulting utilising the MUSIC programme, stormwater runoff from the site will increase upon the development of the

subdivision. This can be attributed to the additional extent of sealed and hard stand areas resulting from the development and the current nature of the site which is undeveloped and vegetated with a variety of forest and pasture grasses. The impacts of this increase however will not adversely affect the downstream environment or infrastructure provided the measures for mitigation and management recommended by Storm Consulting are implemented and these are discussed in the following sections.

Having regard to total flows, utilising the MUSIC programme, Storm Consulting have assessed pre-development flows at 56.2 ML/yr, whilst post development, these are expected to increase to 110 ML/yr, whilst average flow rates from the site are modelled to be similar following the development. In addition, the assessment undertaken by Storm Consulting has shown that the installation of bioretention system across the site will enable an annual supplementary infiltration of 111 ML/yr to be achieved. According to Storm Consulting, this is equal to the supplementary recharge necessary to minimise impacts on the hydrologic regime to reduce impacts on ecological considerations including flora and fauna communities. This is further discussed in Section 5.6.5.3 of this EA.

The assessment of Storm Consulting has considered impacts on the Flat Rock Creek Catchment. In this regard, Storm Consulting has determined that the catchment of Flat Rock Creek is approximately 1,000 ha in area, whilst the proposed development area accounts for approximately 3% of this catchment, representing approximately 33 ha. As a consequence, Storm Consulting considers that the development will have a negligible impact on the hydrology of Flat Rock Creek, particularly as the development is at the lower end of the catchment.

Storm Consulting have also assessed the need for on site detention and retention in conjunction with the proposed development. With respect to this, Storm Consulting consider that as the site flows into a natural creek, the modest increase in flows that are modelled to result, will not adversely impact on any assets or infrastructure downstream. Storm Consulting also consider that the development will not increase flooding due to the nature of the floodplain which is wide and flat. As a result, Storm Consulting consider that retention or detention will have no benefits on the receiving catchment and is therefore not required.

Overland Flow Assessment

In addition to the overall quantity of water discharging from the site, Storm Consulting undertook an assessment of the overland flow to determine road widths and drainage design requirements where current discharges are concentrated. The areas of concern

relate to a drainage line traversing the northern half of the site, and smaller depressions which drain localised runoff, and which discharge at the south-eastern boundary.

The assessment undertaken by Storm Consulting included hydrological modelling using RAFTS to estimate peak flows, and their assessment accounts for conditions expected due to the impacts associated with climate change.

According to Storm Consulting the peak flow within the roadway at the lower end of the site is 6.72 m³/s.

The assessment undertaken by Storm Consulting has resulted in a series of recommendations regarding drainage design as follows:

- Flow depths within the roadway must not exceed 200 mm with a maximum velocity depth multiple of 0.4;
- Approximately 2 m³/s can be suitably conveyed within the roadway, and the remaining 4.72 m³/s is to be conveyed as pipe flow;
- The piped flow at 4.72 m³/s would result in a single 1200 mm diameter pipe.

In consideration of increased rainfall intensity to account for anticipated conditions under climate change impacts, Storm Consulting has recommended that a 30% increase be adopted consistent with the Floodplain Risk Management Guideline for the Practical Consideration of climate change. This will see peak flows increase to 8.74 m³/s, which would necessitate duplicating the 1200 mm pipe, or alternatively a widened road pavement in order to provide greater capacity to convey stormwater. Such can be calculated for input into detailed design at construction stage.

According to the assessment undertaken by Storm Consulting, the development can satisfactorily accommodate the overland flow of stormwater, including additional peak flows anticipated due to the potential impacts of climate change.

Ecological Issues

The assessment of Storm Consulting has been considerate of ecological matters pertinent to the development concerning impacts on habitat and receiving environments. In particular, Storm Consulting have considered the hydrological impact on *Triplarina nowraensis* and Flat Rock Creek, and have consulted with SLR Global Environmental Solutions who undertook ecological evaluations detailed in Section 5.6, in preparing their assessment.

In relation to *Triplarina nowraensis*, this species was detected by SLR in the wetter portions of the site, generally in the eastern and northern portions of the site,

predominantly in those areas to be zoned for conservation purposes and not subject to development proposed by this Major Project. According to SLR, this species is well adapted to a wet environment and as such, it is necessary to protect existing wet areas, and ensure that discharges are arranged such that low points continue to receive stormwater.

Having regard to water quality, Storm Consulting have advised that the proposal will meet the recognised nitrogen and phosphorous reduction loads of 45% and 65% respectively such that adverse impacts are unlikely. Storm Consulting have advised that roads should be designed to direct drainage to biofiltration systems prior to stormwater being discharged within the current catchments to existing low points in order to maintain flows.

In relation to Flat Rock Creek, Storm Consulting consider that impacts are unlikely as the catchment of Flat Rock Creek is some 1000 ha, and the development site at 33 ha, representing only 3% of such catchment, and on that basis, impacts are unlikely. It should be noted that although the site itself, in part, drains towards Flat Rock Creek, the water quality treatment devices to be installed, coupled with the substantial vegetated buffer between the site and Flat Rock Creek, should further minimise impacts.

The favourable assessment of Storm Consulting is also supported by SLR (**Annexure 3**).

Given consideration to the above during the detailed design of drainage at the construction stage, impacts are unlikely.

Climate Change Impacts

Storm Consulting has considered the impacts of climate change in their assessment having regard to sea level rise and increased rainfall intensity.

With respect to increased rainfall intensity, Storm Consulting advises that the Floodplain Risk Management Guideline for the Practical Consideration of Climate Change suggests that in the absence of any detailed information, a worst case sensitivity analysis involving a 30% increase in intensity should be assessed. The assessment of Storm Consulting has assumed the 30 % increase. The assessment undertaken by Storm Consulting recommends that a duplicate 1200 mm pipe would be required to convey this additional flow.

Having regard to sea level rise, Storm Consulting has indicated that the maximum predicted sea level rise by 2100 is 0.9 m. Contour surveys on the plan prepared by Allen Price and Associates (**Annexure 1**) indicate the subject site and location of lots as having a minimum height of RL 46 m where residential development is to be undertaken. Storm Consulting considers that the increase flooding of the Shoalhaven River and Flat

Rock Creek, coupled with predicted sea level rise will not have an impact on the proposed subdivision.

Impact of Filling

The proposal will require the filling of land in order to enable the reshaping of land to accommodate the proposed road system. Storm Consulting have considered the impact of filling by undertaking a preliminary investigation of peak flows and overland flow path sizing which has demonstrated that the passage of flood flows within pipes and the roadway reserve is feasible. Due to the siting of the property at the top of an escarpment away from the Shoalhaven River and its floodplain, according to Storm Consulting the proposal will have no impact on the flood regime.

Sediment Controls

Accompanying the proposal as **Annexure 1** is a Typical Sediment and Erosion Control Plan prepared by Allen Price and Associates which shows the provision of typical sediment control measures to be implemented in the construction of Stage 1 of the proposed subdivision. The plan includes details of topsoil mounds, diversion drains, stabilised access arrangements, straw bale sediment filters, sediment fencing and filter treatment of inlets. The typical details outlined for Stage 1 can be utilised in subsequent stages of the proposed subdivision.

It is expected that more detailed plans would be prepared following approval of this project for implementation during the physical works and, in the following stages in order to control erosion and maintain water quality.

5.4.5.4 Conclusion

According to Storm Consulting, water quality impacts are minimised due to the best practice stormwater treatment systems to be implemented in the construction of the proposed subdivision, with the development generally meeting the recognised EPA guidelines. Such treatment will mitigate impacts on the threatened *Triplarina nowraensis*, Flat Rock Creek, and the receiving environment generally. Storm Consulting concludes with the following recommendations:

- *Implement treatment systems and stormwater management measures outlined in this report and drawings. We would also suggest the addition of controls at the lot level, such as rain gardens and impervious area controls to further improve post development impacts.*
- *Further design of stormwater drainage should be cognisant of the shallow bedrock on site.*

- *Undertake a detailed assessment of peak flows and main overland flow paths through the development site.*

Such works are supported by this EA and can be undertaken during the detailed design and construction of the project.

5.5 CULTURAL HERITAGE

This Section of the EA deals with cultural heritage matters, considering both indigenous and non-indigenous heritage, and considers the impacts of the proposed subdivision the subject of this EA.

This section of the EA in part, is based on the Aboriginal Heritage Assessment prepared by South East Archaeology (SEA) which deals specifically with indigenous heritage matters.

5.5.1 Non Indigenous Heritage

5.5.1.1 Introduction

The subject site is predominantly undeveloped, being cleared and used for agricultural purposes, mostly restricted to grazing. The site contains no significant structures, with buildings being restricted to ancillary dwellings and rural sheds.

There are no heritage items of non-indigenous significance on or in the near vicinity of the site, and therefore Cowman Stoddart Pty Ltd prepared a preliminary heritage assessment of the site and surrounds to determine whether there was a demonstrable need for the preparation of a more thorough heritage assessment or heritage impact statement. It is noted however that SEA also undertook a similar desk top assessment for the purposes of their Aboriginal Heritage Assessment (**Annexure 8**).

5.5.1.2 Methodology

Cowman Stoddart Pty Ltd has prepared a preliminary desk-top assessment of the non-indigenous heritage items located within the vicinity of the site and surrounds. The desktop review included a review of the NSW State Heritage Inventory/Register, Shoalhaven LEP, Illawarra REP No. 1, and the Commonwealth Australian Heritage on-line databases.

5.5.1.3 Results

The review found that the subject site is not identified in Shoalhaven LEP 1985 as containing an item of environmental heritage. Furthermore, the site is not identified in the Illawarra Regional Environmental Plan, the NSW State Heritage Register or the Commonwealth Australian Heritage database.

Beyond the subject site, the closest property that is identified by Shoalhaven LEP as containing an item of environmental heritage is associated with the Flat Rock Creek dam. In this regard, Lots 6 and 12 DP 805611 fronting Filter Road at West Nowra contains an inter-war reinforced concrete building and storage dam. An extract from SCC GIS is reproduced as **Figure 15** and shows the siting of this property in relation to the subject site. The identified heritage item is separated from the subject site by a distance of some 500 metres with this area containing substantial forested lands. The consequences being that the property does not have any connection to the heritage item. On this basis, it is not considered to be within the vicinity of the subject site.

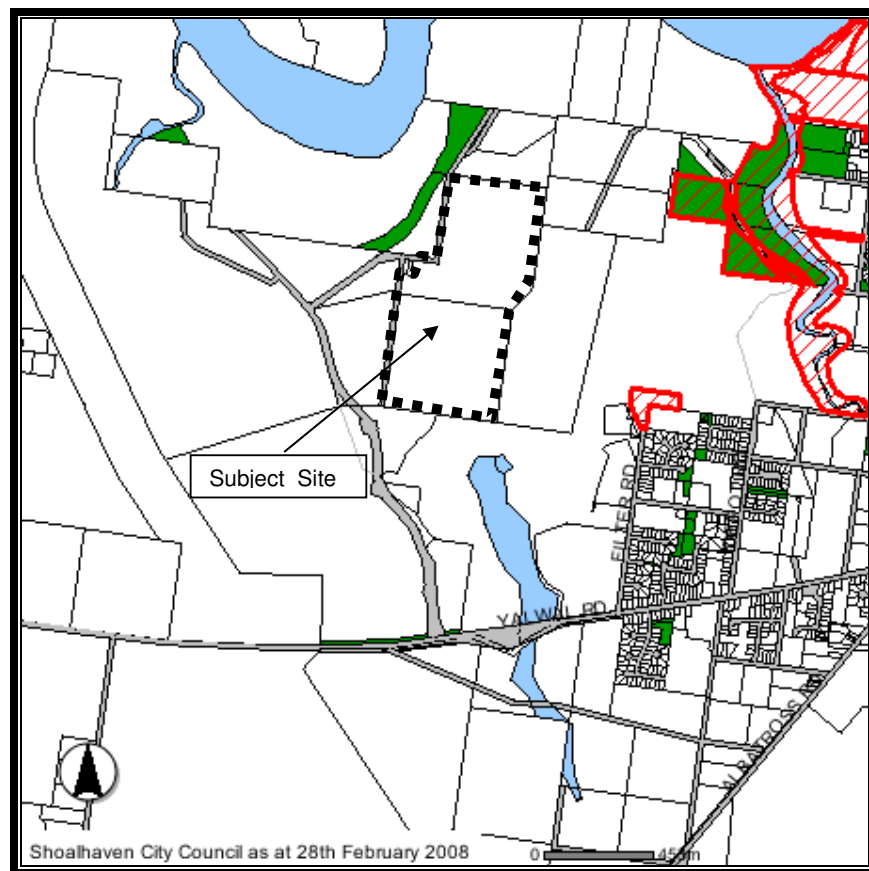


Figure 15: Identified Items of Environmental Heritage.

5.5.1.4 Anticipated Impact

Given that none of the identified heritage items are located on, or in the vicinity of the site, it is anticipated that the proposed subdivision of the property, and future development for residential purposes, will not have a direct impact on any of the identified items of environmental heritage at West Nowra.

The subject site is remote from the identified heritage item as it has frontage to a different road, is sited a minimum of 500 m from the subject site with this area being vegetated with native forest such that it is visually separated from it. The subject site is not visible from the identified heritage item.

5.5.1.5 Findings of South East Archaeology

According to the report of SEA (**Annexure 8**), their preliminary assessment identified that the study area did not contain any non-indigenous heritage items listed on any heritage register or planning instrument, and nor have any relics as defined under the Heritage Act 1977 been identified during detailed field investigations. Consequently, SEA considers that non indigenous heritage matters do not require further consideration and supports the findings of this EA.

5.5.1.6 Conclusion

The preliminary heritage assessment undertaken found that the subject site is not identified as containing an identified item of environmental heritage of either local, regional, state or federal significance.

Investigation of identified heritage items in the West Nowra area determined that none have a visual link or connection to the subject site.

Therefore the proposed development is unlikely to have an impact on any heritage items.

This is supported by the findings of SEA in **Annexure 8**.

5.5.2 Indigenous Heritage

The subject site is not identified in Shoalhaven LEP or other environmental planning instrument as containing any known items of cultural indigenous heritage. Notwithstanding this, in consideration of this issue an Aboriginal Heritage Assessment (AHA) was prepared by SEA which has examined the proposal and its impacts on Aboriginal and cultural heritage. A copy of this report is included as **Annexure 8**. This section is based on the findings and recommendations of the AHA.

5.5.2.1 Methodology

The AHA undertaken by SEA was undertaken in accordance with the provisions of the *National Parks and Wildlife Act 1974* and the *Environmental Planning and Assessment Act 1979*. The Assessment included the following tasks:

- undertake research of past archaeological publications;

- investigate registers and undertake searches to determine any existing identified sites;
- consultation with local Aboriginal community in accordance with DECC requirements outlined in *Interim Community Consultation Requirements for Applicants*;
- carry out field work within the study area;
- assess the significance of any Aboriginal heritage evidence;
- make recommendations for the management of any identified Aboriginal heritage evidence; and
- Make recommendations, including opportunities for impact mitigation and site protection.

5.5.2.2 Cultural and Archaeological Context

The AHA prepared by SEA examined a study area of some 71.33 ha, and which included the subject site. According to SEA, the area was close to the boundary of the Wodi Wodi and the Wandandian people. In the vicinity of the subject site, the Wodi Wodi people occupied lands generally north of the Shoalhaven River, whilst the Wandandian people occupied lands extending from the lower Shoalhaven to Ulladulla.

According to SEA, both the Wodi Wodi and Wandandian peoples would have relied upon a range of fauna (aquatic, mammal and reptile) and floral species as feed resource. These feed resources are found within ten kilometres of the coast.

The South Coast is presently home to an energetic and large Aboriginal population, including within the Nowra area, who are actively engaged in the identification and management of indigenous cultural heritage.

5.5.2.3 Survey Results and Predictive Modelling

Aboriginal Heritage Information Management Systems (AHIMS)

A search of the Aboriginal Information Management System (AHIMS) database, managed by the NSW Department of Environment & Climate Change (DECC) was undertaken by SEA as part of the AHA in September 2007.

The search found that there are no known sites located within the subject site or study area.

The search found that there are two sites within several hundred metres from the subject site, as follows (**Table 11**):

Table 11
Items of Indigenous Significance

<i>Site Number</i>	<i>Description</i>
52-5-25	Rock shelter with deposit and art
52-5-26	Rock shelter with art

The location of these sites is shown in Figure 1 of the SEA Report.

Previous Surveys in the Study Area

Previous surveys within the immediate vicinity of the study area have included:

- Survey of the route of the Eastern Gas Pipeline by Kuskie, Navin and Officer within 1 kilometre to the west of the Mundamia area which found several sites including:
 - 52-5-0304 / scarred tree.
 - 52-5-0305 / rock shelter with deposit adjacent to Cabbage Tree Creek.
 - 52-5-0306 / artefact scatter on a low broad crest on the southern side of the Shoalhaven River.
 - 52-5-0307 / artefact scatter on northern side of Shoalhaven River.
- Extension to the West Nowra Waste Depot by Rich which did not detect any evidence of aboriginal heritage.
- Investigations undertaken for the Shoalhaven Water Supply Augmentation Scheme by Paton to the south of the Mundamia area which detected no sites.
- Attenbrow undertook investigations concerning proposed pipeline works undertaken by SCC including a section which traverses the Mundamia Study Area and did not detect any evidence of Aboriginal heritage near the subject site.

Predictive Modelling

Clarke and Kuskie have developed a spatial model using key environmental variables in order to predict Aboriginal site occurrence, and this results in the classification of sites into a number of resource zones. Predictive modelling undertaken by SEA utilising this system has indicated that the subject site was assessed as being an *“area outside of a primary or secondary resource zone”* and occupation of these area would have been for *“hunting and/or gathering (without camping) and transitory movement and is likely to have been sporadic and very short in duration”*.

5.5.2.4 *Surveys*

The field survey was undertaken by SEA on 28 to 30 May 2007 following consultation with Mr Henry (Sonny) Simms of the Nowra Local Aboriginal Land Council (NALC). Whilst arrangements were made for NALC to attend they were unable to supply a representative at the time of the survey, however they were satisfied with the survey methodology and agreed for it to be conducted in their absence.

The study area was divided up based on environmental variables that were assumed to relate to the usage of the study area. These units, termed archaeological terrain units by SEA, were based on landform element and class of slope. This strategy enables areas more likely to contain evidence of aboriginal cultural heritage being targeted and receiving greater attention, than areas that are unlikely to contain any evidence. For example, the former quarry on SCC land is highly modified and not expected to contain any evidence. Results of the survey were recorded on survey record forms to detail relevant environmental variables and heritage resources that were identified.

During the survey, surface visibility was generally moderate to high, however, pasture grasses reduced visibility in certain areas.

Surveys were undertaken on foot by an archaeologist, with emphasis on areas that afforded higher ground visibility.

During the field surveys, a total of 24,000 m² of the site was inspected, which amounts to 5.1% of the study area, based on a 2 m wide strip per person over the transects that were investigated, which enables a much greater survey area for obtrusive sites, such as scarred trees.

According to SEA, this survey that was undertaken is considered to represent a reasonably high sample of visible ground present at the site and enables an effective assessment of the heritage resources identified as potentially present at the site. This provides a valid basis to determine the probable impacts of the proposal, and formulation of management recommendations of the identified and potential heritage resources.

The survey undertaken by SEA did not detect any evidence of aboriginal heritage sites (deposits/scars), or other cultural evidence or values during the period of their assessment.

5.5.2.5 *Consultation*

The preparation of the Aboriginal Heritage Assessment included a comprehensive program of consultation that is consistent with the requirements of the DECC and which

are outlined in their *Interim Community Consultation Requirements for Applicant's* document.

This included notification to the Local Aboriginal Land Council (LALC), Registrar of Aboriginal Owners, NSW Native Title Service, and SCC, along with placement of media advertisements.

This resulted in direct consultation with the Nowra LALC, Jerrinja LALC, Jerrinja Consultants, South East Coast Gadu Elders Aboriginal Corporation, Merrimans LALC, Ulladulla LALC, South Coast Aboriginal and Elders and Friends Group organisation, Yuin Traditional Owner.

No Aboriginal organisations registered an interest in the assessment, and SEA deemed the Nowra LALC to be a stakeholder for the purposes of the heritage assessment.

Consultation was had with Mr Henry (Sonny) Simms of the Nowra LALC prior to survey work being undertaken.

The Nowra LALC was provided with a copy of the draft Aboriginal Heritage Assessment with a request to review and provide comments.

5.5.2.6 *Cultural Significance of the Subject Site*

Assessment undertaken by SEA entailed research of existing registers to identify sites already known, consultation with relevant Aboriginal stakeholders, and detailed field surveys based on established practices.

The investigations of existing information revealed that the site contains no known items of Aboriginal significance. The site surveys revealed no archaeological sites. Consultations with the Nowra LALC revealed that the site has no cultural values to Aboriginal people.

Furthermore, SEA consider that the potential for Aboriginal heritage evidence to occur, other than stone artefacts, is very low to negligible and artefact deposits or sites having a high local or regional significance are not expected at the site.

5.5.2.7 *Conclusions*

The Aboriginal Heritage Assessment undertaken by SEA found that:

- Relevant registers and environmental planning instruments did not identify the site as containing sites of Aboriginal heritage or cultural significance;
- The field work undertaken by SEA did not detect any evidence of Aboriginal heritage;

- Potential for sub-surface deposits of artefacts having research value is very low;
- Other types of heritage evidence are not anticipated to occur within the study area;
- Consultation with the relevant Aboriginal community did not identify the site as having any significance;
- No further subsurface testing is required;
- The management and mitigation measures proposed are limited to retrieval of artefacts if they are found during construction works and normal DECC procedures associated with the finding of heritage items as the impacts on Aboriginal heritage are expected to be very low.

Therefore it is concluded that the possibility of archaeological items being found on the subject site is negligible. However, in order to ensure the proper protection and management of archaeological items that may be discovered during construction, SEA have made recommendations relating to the management and monitoring of the development works during the construction phase.

5.5.2.8 *Management and Monitoring*

The Aboriginal Heritage Assessment included several recommendations for management and mitigation measures for the protection of the indigenous heritage and archaeological significance of the site. The mitigation measures include the preparation of an Environmental Management Plan for the project to include management procedures and liaison with the LALC and relevant agencies if previously unrecorded heritage evidence and skeletal remains are found during construction.

SEA conclude that implementation of these management and mitigation measures, will ensure that the impact of the proposal on Aboriginal heritage can be satisfactorily managed.

5.6 FLORA AND FAUNA (INCLUDE HYDROGEOLOGICAL ASSESSMENT DETAILS)

5.6.1 Introduction

SLR Global Environmental Solutions (SLR) was engaged to undertake an Environmental Flora and Fauna Assessment of the site. This section discusses the flora and fauna issues potentially affecting the site and the Part 3A Major Project proposal the subject of this EA. The SLR report discusses site investigations, findings and recommendations with regard to impact of development on native vegetation and wildlife, including

threatened species and endangered ecological communities. The Environmental Flora and Fauna Assessment is included as **Annexure 3** of this EA.

It should be noted that the Environmental Flora and Fauna Assessment undertaken by SLR has resulted in significant modification to the proposed subdivision layout from that originally considered. In the main, this has reduced the development footprint in the northern portion of the site, thus enabling the retention of some 9.5 ha of land being proposed for dedication to SCC for conservation purposes, and this land contains the most ecologically significant portions of the site.

5.6.2 Methodology

The Environmental Flora and Fauna Assessment carried out by SLR is based on the following:

- Review of existing reports and fauna assessments undertaken on behalf of SCC in the consideration of the Nowra Bomaderry Structure Plan.
- Field surveys over a number of days which included:
 - Targeted surveys for the threatened flora species Nowra Heath Myrtle *Triplarina nowraensis*.
 - Botanical surveys.
 - GPS mapping.
 - Nocturnal fauna surveys including spotlighting, call playback and ultrasonic bat detection,
 - Diurnal avifauna surveys,
- Review of published scientific literature.
- Utilisation of experience, skills and knowledge of the assessment team.
- Review of vegetation mapping undertaken by SCC.

The Environmental Assessment undertaken by SLR was done so in accordance with the draft *Threatened Biodiversity and Assessment- Guidelines for Development and Activities* and the draft *Guidelines for Assessment of Impacts on Threatened Species under Part 3A* (DEC 2005).

5.6.3 Existing Flora and Vegetation

5.6.3.1 Vegetation Mapping

According to SLR, investigations relating to the subject site have identified a total of six native vegetation community types, the location and extent of which is depicted in Figure 4 of the SLR Report. The vegetation communities identified include the following:

- Grey Gum – Blue Leaved Stringybark Forest/Woodland;
- Spotted Gum – Blackbutt Forest;
- Scribbly Gum – Bloodwood Forest;
- Paperbark Closed Forest;
- Regrowth Woodland and Scattered Trees;
- Kunzea Shrubland/Heathland; and
- Pasture.

The vegetation communities identified by SLR are not identified as endangered ecological communities (EECs).

5.6.3.2 *Native, Introduced and Threatened Plant Species Recordings*

Prior ecological assessment undertaken in the consideration of the NBSP resulted in the identification of a total of 269 individual plant species occurring in the Mundamia Investigation Area. Further detailed site investigations undertaken by SLR identified a further 22 native plant species occurring on the site. Of these, one plant species, Nowra Heath Myrtle *Triplarina Nowraensis*, is listed as “*endangered*” under Part 1 of the Threatened Species Conservation Act.

In addition, three Rare or Threatened Australian Plants (ROTAP) have been recorded on the site including *Acacia subtilnervis*, *Leptospermum epacridoideum* and *Leptospermum sejunctum*. Furthermore, *Acacia hispidula* was recorded on the site, and this is a plant species which is regionally significant to the Shoalhaven.

5.6.3.3 *Vegetation Significance*

The proposal results in the development of land which is mostly cleared and vegetated with pasture grasses or alternatively vegetated with poor quality native vegetation, and the retention of large areas on the eastern and northern boundaries of the site which are to be retained for conservation purposes. This is consistent with the prior studies and assessment undertaken by SCC in the consideration in the NBSP.

The proposal will involve the removal of 31.03 ha of land, which represents some 71.68% of the property. Of this, 21.41 ha is land which has already been disturbed, modified or cleared, with much of it being used for agricultural activities, whilst an additional 0.67 ha comprises regrowth vegetation or scattered trees.

The proposal also involves the retention of 9.49 ha of land which is to be dedicated for biodiversity conservation purposes and this represents high quality vegetation and habitat which will be maintained within the conservation area (proposed to be zoned E2 Environmental Conservation) along the eastern and northern boundaries of the site.

The proposal will result in the retention of the majority of the three ROTAP listed plant species, whilst the regionally significant *Acacia hispidula* will be retained within the proposed conservation area.

In relation to the threatened plant species listed under the TSC Act, Nowra Heath Myrtle, *Triplarina nowraensis* the majority of these specimens will be retained within the conservation area.

The site does not contain any endangered ecological communities, or endangered populations of vegetation.

SLR do not consider that the proposal will have any significant effects on identified flora values, essentially on the basis of the conservation of high quality habitat on the periphery of the subdivision.

5.6.4 Existing Fauna and Fauna Habitats

5.6.4.1 Fauna

According to SLR, the open farmland portion of the site is structurally simple and provides little habitat opportunities for fauna. The forested portions on the northern and eastern portions of the site are more complex, and provide high diversity in habitat for forest dependent species. Further, the site contains a substantive rock outcrop which comprises small caves and rock overhangs. It is the forested lands and rock outcrop which are largely contained within the conservation area proposed as part of the proposal.

Fauna surveys undertaken by SLR recorded a total of 120 native species of mammals, birds, reptiles and amphibians, and 7 introduced or domestic mammal species on the site and surrounding lands.

Of the native species identified by SLR, a total of eight are listed threatened fauna species. Favourable habitat for these species is largely confined to the eastern and northern portions of the site, the majority of which will be retained within the conservation area zoning.

Species that were identified by SLR include the Square-tailed kite, Gang-Gang Cockatoo, Glossy Black Cockatoo, Powerful Owl, Yellow-bellied Glider, Grey-headed Flying Fox, East-coast Free-tail bat and Common Bent-wing Bat. These species are all identified as vulnerable pursuant to Schedule 2 of the TSC Act.

The subject site contains a significant number of hollow bearing trees, an abundant number of which are sited within that part of the site identified as a conservation area.

SLR did identify and locate 60 hollow bearing trees on the site, containing a total of 165 hollows of varying size, which are sited in the development area and the adjacent asset protection area. SLR consider that of the 60 hollow bearing trees, 39 will require removal in order to enable the development to proceed, however do not consider that this will have a significant impact. This is due to the implementation of a “Hollow-Bearing Tree Protocol” which will result in no net reduction in hollow-bearing tree resources, the siting of a substantial number of trees within the conservation area which is to be dedicated, coupled with substantial other hollow-bearing tree resources in the immediate area and locality.

Avifauna

SLR detected a total of seventy four (74) bird species within and surrounding the subject site, and of these, four are threatened, being listed as vulnerable under the TSC Act. These included the Square-tailed kite, Gang-Gang Cockatoo, Glossy Black Cockatoo, and the Powerful Owl.

According to SLR, the species are all highly mobile, are wide ranging, and unlikely to be solely dependent on the subject site for their habitat and survival. Furthermore, the proposal retains the high quality habitat for the species and the most significant vegetation in the conservation area.

Amphibians and Reptiles

Habitat for amphibians is restricted to a number of small farm dams scattered throughout the site, a small drainage depression in the central section of the property, and a sandstone creekline which is not subject of any direct disturbance. Two threatened amphibian species are known to occur in the local area, including the Giant Burrowing Frog, and the Green and Golden Bell Frog.

Previous studies undertaken in support of the NBSP failed to record the Giant Burrowing Frog, whose habitat would be retained within the conservation area regardless, and as such is not affected by the proposal.

The SLR survey included searches for the Green and Golden Bell Frog, however this intensive survey effort failed to detect the species.

The subject site has the potential to provide habitat for reptiles due to the diverse structure of habitat across the site, particularly involving the rock outcrops. Two reptile species, the Broad-headed Snake and Rosenberg’s Monitor, are known to occur in the locality, however virtually all potential habitat for these species is to be retained within the conservation area.

Mammals

Twenty three native mammal species were recorded on the site, along with eight introduced or domestic species. Of these, four are listed as vulnerable and these include the Yellow-bellied Glider, Grey-headed Flying Fox, East-coast Free-tail bat and Common Bent-wing Bat.

These species are all forest dependent, utilising habitat in the eastern and northern portions of the site, the vast majority of which will be retained in the conservation area. Of the four species detected, the only species that is likely to be resident on the site is the Yellow-bellied Glider as the other three are highly mobile, and are likely to have habitat requirements that are more wide ranging than that offered by the subject property.

According to SLR, the Yellow-bellied Glider and the Eastern Free-tail Bat utilise tree-hollows for denning and roosting purposes. Hollow-bearing trees were identified and mapped by SLR, and the vast majority are to be retained within the conservation area, whilst consideration of lands to the east of the subject site reveals that these contain extensive tree-hollow resources which are available for use by these species.

5.6.5 Ecological Considerations

5.6.5.1 Environmental Constraints

According to SLR, the proposed development of the subject land is affected by the following ecological constraints:-

- individuals and patches of the threatened Nowra Heath-myrtle *Triplarina nowraensis*;
- the potential presence of the Spring Tiny Greenhood orchid, although this species has not been recorded on the site;
- hollow-bearing trees, which provide potential habitat for a number of threatened species;
- the loss (albeit relatively small) of foraging habitat and/or some potential roosting habitat (open forest/woodland and tall shrubland) for a number of threatened fauna species; and
- the potential direct and indirect impacts upon habitat for or individuals of a number of threatened biota.

SLR do not consider that impacts on groundwater dependent ecosystems presents a constraint to development as the Swamp Paperbark Forest and moss gardens which are existent are not solely dependent on water sourced from the subject site. Similarly, SLR

do not consider that there are any pertinent riparian issues requiring consideration as the site lacks any substantive watercourses.

Potential Environmental Impacts

SLR have identified the potential environmental impacts as being the removal of approximately 8.9 ha of open forest and heathland vegetation. However, it is considered by SLR that the majority of this is in a disturbed condition, and is largely offset by the conservation of high quality vegetation in an Environmental Conservation zone, and the implementation of a Vegetation Management and Habitat Restoration Plan. Consequently, general environmental impacts are not expected to constrain development.

Potential Impacts on Threatened Species

Having regard to the potential impact on threatened species, SLR have advised that those species requiring consideration include the Nowra Heath-myrtle flora species and several threatened fauna species being the Square-tailed kite, Gang-Gang Cockatoo, Glossy Black Cockatoo, Powerful Owl, Yellow-bellied Glider, Grey-headed Flying Fox, East-coast Free-tail bat and Common Bent-wing Bat. There are no endangered ecological communities identified at the subject site.

Having regard to the Nowra Heath-myrtle, SLR have advised that the proposal will result in the removal of approximately 0.29 ha of land in the northern part of the site where there is a dense stand of this species, along with a number of individual in less dense shrubby woodland and open forest along the eastern side of the development footprint. As a result of the assessment of SLR, the project has been modified in the northern portion of the site, thus enabling the retention of the vast majority of the large stand of Nowra Heath-myrtle. SLR have also noted that this area is either upslope or across slope from the proposed subdivision which will therefore not impact on stormwater run-off. SLR also advises that the impacts are offset by the following measures:-

- *the retention of the majority of the population and most of the suitable habitat for the species within the Conservation Area on the subject land;*
- *the proposal to implement a dedicated Vegetation Management Plan within the Conservation Area, designed specifically inter alia to protect and enhance populations of the Nowra Heath-myrtle; and*
- *a commitment within the Statement of Commitments (SoC) to monitor the population of the Nowra Heath-myrtle within the Conservation Area, and to provide data and information to Council and/or the OEH until the Conservation is dedicated to Council or the OEH for biodiversity conservation purposes.*

With respect to the threatened fauna species, SLR have identified the following impacts:

- the site contains a small hollow bearing tree and sap feed trees which are utilised by the Yellow-bellied Glider and these are located within the development footprint. However, SLR also indicate that these resources are abundant within that area which is to be conserved, and also in adjoining lands;
- the open forest and woodland vegetation to be removed represents only a minute portion of that present in the locality and which is to be retained for biodiversity conservation purposes;
- any loss of hollow-bearing trees utilised by microchiropteran bats as roost sites, and foraging open forest or woodland habitat will represent only a minor reduction in the extent of available resources in the locality;
- a Hollow-bearing Tree Protocol is to be implemented as part of the project to enable the salvage, re-use and/or replacement of tree-hollows;
- substantial resources of Allocasuariana species are available in the locality for the Glossy-Black Cockatoo. Further, only one or two potential nest trees for the Glossy Black Cockatoo will be removed, whilst there is no evidence of any breeding by Glossy Black Cockatoos on the site;
- the proposal will remove a small area of habitat that the Powerful Owl may potentially forage within however, there are no hollow trees suitable for this species; and
- the highly mobile and wide-ranging Greyheaded Flying Fox and Square-tailed Kite will not be significantly impacted by the removal of woodland vegetation as there are no specific resources of value for these species on the site.

Impact Analysis

SLR considers that the proposal will result in the following impacts on threatened fauna and their habitats:

- removal of 30 - 40 hollow bearing trees;
- removal of some Yellow-bellied Glider feed trees in the eastern portion of the proposed development;
- removal of some Glossy Black Cockatoo feed trees;
- having regard to the Nowra Heath-myrtle, the loss of a small proportion of this species.

Assessment of impacts and mitigation and amelioration measures are discussed below.

Impact on Stormwater Management Regime

The assessment of SLR has referenced the Water Cycle Management Report prepared by Storm Consulting which has incorporated a specific Hydrogeological Assessment prepared by Martens Consulting Engineers (as Annexure F to that report).

SLR considers that there are two vegetation types that are partly dependent on groundwater drainage and discharges being the Swamp Paperbark Community in and around a shallow drainage line, to the north-east, and small moss gardens in the eastern portion of the site. SLR note that these vegetation types are not restricted to the subject site, whilst they do not have any special conservation significance. In addition, SLR considers that these vegetation types are not dependent solely on groundwater, rather rainfall is also an essential requirement for both populations.

Having regard to the vegetation type Nowra Heath-myrtle, SLR notes that whilst this vegetation type is often associated with moist areas, there are many examples on the subject lands where it occupies dry locations. Furthermore, SLR note that the vast majority of this vegetation type are located outside of the hydraulic catchment of the project, and therefore will not be impacted.

SLR have assessed the stormwater management measures proposed by Storm Consulting and consider that although there may be some impact as a result of changes to the discharges of stormwater, the proposal implements appropriate measures such that no significant impact on any native biota is anticipated. These measures include ensuring low points continue to receive stormwater discharge and drainage is directed via bio-filtration systems.

The Hydrogeological Assessment undertaken by Martens Consulting Engineers has assessed Hydrogeological characteristics, examine potential impacts associated with the proposed subdivision and identify mitigation measures on the sites groundwater system. The emphasis of the assessment is the Spring Tiny Greenhood Orchid and Nowra Heath Myrtle which are identified threatened species. The Nowra Heath Myrtle has been found on the site, and whilst the Spring Tiny Greenhood Orchid has not been identified on the site, the property does contain potential habitat Kunzea Shrubland/Heathland community where this species has been known to occur.

The assessment undertaken by Martens has advised that urban development has the potential to affect groundwater through reduction in groundwater recharge due to increases in impervious areas, and a reduction in site vegetation. As a consequence of the potential impacts, Martens Consulting Engineers recommends a mitigation strategy

that mimics the existing stormwater characteristics by enabling the supplementary recharge of the drainage system at regular intervals. The Supplementary Recharge System recommended by Martens Consulting Engineers consists of road side swales, bio-retention swales, bio-retention basins and rain gardens. The Hydrogeological Assessment prepared by Martens Consulting Engineers concludes that the implementation of the recommended protection and mitigation measures will ensure neutral impacts result. As a consequence, the proposal will not have any adverse impacts on the groundwater requirements of the Nowra Heath-myrtle, or the potential habitat of the Spring Tiny Greenhood Orchid.

Impact of Bushfire Projection Measures

The subject site is identified as being bushfire prone by mapping prepared by Shoalhaven Council and endorsed by the NSW Rural Fire Service. As a result, development will require implementation of Asset Protection Zones in order to mitigate the bushfire threat. The provision of the relevant APZ will require:

- thinning of dense shrub and reduction in leaf litter;
- some removal of trees to ensure a discontinuous tree canopy prevails;
- ongoing maintenance of the required fuel levels.

SLR consider that impacts will not be unreasonable as compliance with the Vegetation Management Plan accompanying their assessment will ensure that suitable measures are taken, including:

- preservation of hollow bearing trees and Yellow-bellied Glider trees;
- preservation of Nowra Heath-myrtle; and
- on-going monitoring to refine the management regime.

SLR note that having regard to the Nowra Heath-myrtle, management of the APZ is likely to be beneficial as this species has responded well in the past to intermittent slashing.

Cumulative Impacts

The DGRs have required consideration be given to cumulative impacts of projects on threatened floral and fauna. SLR have considered that the proposal will not result in unreasonable cumulative impacts as:-

- the development is restricted to that area identified for future growth by the NBSP,

- the assessment undertaken by SLR has guided the project and resulted in a reduced development footprint in order to preserve the Nowra Heath-myrtle;
- stormwater management will maintain water quality and soil moisture requirements;
- enables the implementation of APZ requirements in a sustainable manner;
- provides for the conservation of relevant lands in a conservation area to preserve these areas in perpetuity.

Impact Amelioration and Management

SLR have considered the ecological impacts of the project on threatened flora and fauna species and notes the following amelioration measures:

- *the design and the subsequent management of stormwater control features, both during construction activities and following completion and occupation of the land, to limit the potential discharge of contaminants and to maintain existing hydrologic regimes within the Conservation Area. These features will be constructed and managed according to current 'best practice' principles, and as outlined in the Water Cycle Management Report of Storm Consulting (2012);*
- *the implementation of 'Water Sensitive Urban Design' principles, including the capture and re-use of stormwater runoff, the treatment of water to be discharged from the development, and the avoidance of the use of potable water for other purposes; and*
- *detailed design of the peripheral bioretention swale and detention basin system to maintain.*

Environmental Management Measures

SLR recommends a range of measures to ameliorate impact in addition to the retention of the more significant vegetation resources in the conservation area. These additional measures are as follows:

- *the use of sediment fences and other appropriate control measures during construction activities to manage and/or avoid erosion and sediment discharge or the discharge of other contaminants;*
- *the ongoing management of stormwater discharge volumes and water quality from the development area, both during construction activities and following completion and occupation of the site, according to current 'best practice' principles and as outlined in the Water Cycle Management Report of Storm Consulting (2012);*
- *the ongoing management of the peripheral bioretention swale system to maintain water quality, soil moisture and groundwater regimes, and to provide supplementary habitat for native biota;*

- *the ongoing management of the APZs to ensure that habitat and resources for, and individuals of, threatened species are protected;*
- *the implementation of a management regime during the construction process to ensure that no wastes (including building rubble, garbage, contaminants, fuels, oils, paints or other chemicals) are discharged from the construction area, and that all such wastes and contaminants are contained within the construction footprint and are appropriately managed;*
- *management of the Asset Protection Zones (APZs), where required, around the development to retain specimens of and habitat or resources for the relevant threatened biota, including inter alia:*
 - *the preferential and selective retention of hollow-bearing trees;*
 - *the preferential and selective retention of identified Yellow-bellied Glider and Glossy Black Cockatoo feed trees;*
 - *the slashing of shrub layer and understorey vegetation at selected locations to promote the Nowra Heath-myrtle;*
- *the implementation of a Vegetation Management Plan (VMP) for the E2 – Environmental Conservation Zone to ensure the long-term viability of flora and fauna populations which utilise the land, particularly the Glossy Black Cockatoo, Yellow-bellied Glider and Nowra Heath-myrtle.*
- *the collection of native vegetation removed from development areas and its re-use within the Conservation Area for bushland rehabilitation and/or landscaping purposes and/or the provision of that material to Council for bushland management and rehabilitation purposes;*
- *the destruction or appropriate removal of weeds from the development footprint and from the Conservation Area; and*
- *the implementation of a Hollow-bearing Tree Protocol, involving:*
 - *the segmental ‘dismantling’ by professional tree experts of hollow-bearing trees in order to salvage tree-hollows, wherever possible;*
 - *the placement of salvaged tree-hollows on existing large trees or dedicated poles in the Conservation Area;*
 - *alternatively, the placement of salvaged tree-hollows on the ground as hollow log habitat, where placement in existing trees is not practical; and*
 - *the use of artificial nest boxes to replace tree-hollows which cannot be salvaged and to supplement that resource on the site.*

In addition, the report of SLR has provided a VMP for implementation and this includes requirements relating to:

- general protection measures;

- management recommendations for vegetation within the conservation area and asset protection zone areas;
- stormwater management;
- maintenance; and
- a monitoring program.

5.6.6 Conclusions

SLR have conducted an ecological assessment in accordance with the requirements of the *Draft Guidelines for Assessment of Impacts on Threatened Species Under Part 3A (2005)*. The assessment by SLR has addressed all matters outlined in the DGR's having regard to ecological matters.

The assessment has concluded that the proposal results in the retention of high quality habitat in the conservation area which will largely ameliorate ecological impacts associated with the proposal.

The assessment by SLR builds upon that already undertaken by various ecologists on behalf of SCC in the identification of developable areas under the NBSP. This process has enabled the characterisation of the high value habitat (which is proposed to be conserved as part of the proposal and future zoning) as well as land having low ecological value, primarily being that land affected by past rural land uses and site disturbances. It is primarily this disturbed and cleared area which is to be developed by the Major Project application. Based on the assessment undertaken by SLR, it is considered that the proposal will not adversely impact on threatened species or their habitats, whilst broader ecological objectives are attained through the habitat and vegetation retained in the conservation area as part of the project.

5.7 NOISE IMPACT

5.7.1 Introduction

The DG's EARs issued for the EA require the consideration of potential noise impacts, on the proposed development in particular from road traffic, aircraft noise, and noise generated by the development of the proposed Bamarang Power Station.

It is considered that these are the most likely to impact on the amenity of residents proposed in this subdivision as other surrounding land uses are restricted to rural and rural residential activities which are unlikely to result in noise impacts.

The location of the site is subject of negligible through traffic and as such noise impacts should be restricted to that generated by the development itself.

Figure 16 is an aerial photo which shows the siting of the subject property in relation to HMAS Albatross and the proposed Bamarang Power Station.

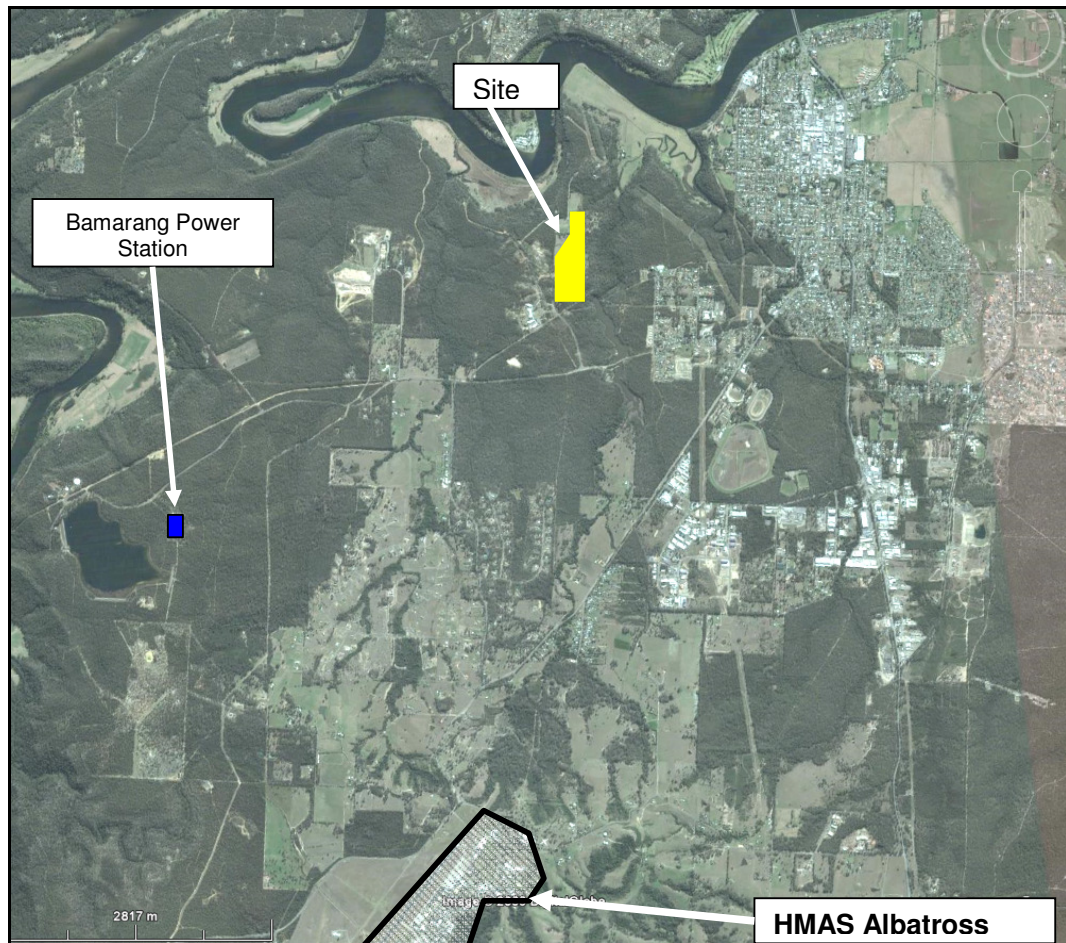


Figure 16: Aerial Photo of Locality.

5.7.2 Road Noise

As outlined above, the site is subject to minimal through traffic generation and traffic noise will primarily emanate only from that traffic generated by the development itself, which is not a large volume. Section 4.3 of the Roads and Traffic Authority's *Guide to Traffic Generating Developments* deals with impact on amenity from vehicles and road noise, often referred to as the environmental capacity. The RTA *Guide to Traffic Generating Developments* at Table 4.6 indicates that an environmental goal of 200 trips per hour, up to a maximum of 300 trips per hour, is considered reasonable for Local

Streets, whilst, the range of 300 to 500 trips is considered reasonable for Collector Streets.

The Transport Report prepared by CBHK (Section 5.3), prepared to assess the traffic implications of the proposal outlines that the proposed development is likely to generate a maximum of 330 trips per hour in the peak hour.

The proposed subdivision pattern is very permeable with a collector road proposed through the centre of the release area. The permeable layout will ensure that traffic flows are not concentrated on any one local street but are distributed evenly throughout the subdivision. Consequently, for local streets, traffic is expected to be within the environmental goals established by the RTA.

The proposed collector road is projected to carry a maximum of 330 trips in the peak hour, according to CBHK, which is at the lower end of the range of the environmental capacity of a collector road as identified by the RTA Guidelines.

Based on the above, it is considered that road noise should be acceptable for residents of the proposed subdivision and within guidelines established by the RTA.

5.7.3 Aircraft Noise

HMAS Albatross is sited near Nowra Hill to the south west of the Nowra Township. Infrastructure at HMAS Albatross includes two runways, one orientated generally north-south, the other generally east-west and ancillary support facilities including maintenance buildings, aircraft control tower and administrative offices. HMAS Albatross is the largest operational Naval establishment and the Navy's only Air Station, and its primary task is to support the four Naval Air Squadrons, which provide air support to the Navy fleet. At present, HMAS Albatross is the base for the 723 Squadron which flies AS350 Squirrel helicopters; 816 Squadron which uses the S-70B Seahawk helicopters; and 817 Squadron which utilizes the SK50 Westland Sea King helicopters.

In addition, HMAS Albatross is the site of the Fleet Air Arm Museum (previously known as, and now incorporating, Australia's Museum of Flight). Aircraft movements associated with the museum are very limited due to the static nature of displays, however there are occasional Air Show days, usually on an annual basis.

The airfield is also used for occasional private aircraft movements.

The City of Shoalhaven is not subject to any other significant aircraft movements, apart from occasional small aircraft and more regular coastal patrols.

It is reasonable to restrict the consideration of aircraft noise to that generated from HMAS Albatross.

Immediately surrounding HMAS Albatross are rural and rural-residential land uses. SCC has adopted Development Control Plan No. 69, the aims and objectives of which are to:

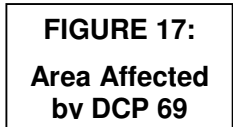
- *to ensure that RANAS Nowra's strategic national and local importance is not compromised by inappropriate residential development;*
- *to alert owners or prospective owners wishing to live in the vicinity of RANAS Nowra that they should consider that noise from aircraft movements using RANAS Nowra now or in the future may be found by them to be a problem;*
- *to control the establishment or growth of residential areas in the vicinity of RANAS Nowra by taking into account present or future noise levels from aircraft movements;*
- *to minimise land use conflict and the impact of aircraft noise on residential areas in the vicinity of RANAS Nowra;*
- *to ensure that in the consideration of applications for new dwellings, where permissible in the LEP, that design and siting criteria are appropriately addressed; and*
- *that owners, inquirers or applicants for residential development or associated building works are advised and urged to consider insulation against aircraft noise.*

A map outlining the area to which DCP No. 69 applies is shown as **Figure 17**.

The area which is affected by the provisions of DCP No. 69 is generally sited around HMAS Albatross, and is 2 km from the subject site at the closest point.

The provisions of DCP No. 69 serve to advise developers and property owners that are potentially affected by aircraft noise that consideration be given to implementing noise attenuation in the design and construction of any future dwellings in order to achieve compliance with Australian Standard 2021. In this instance, as the property is well clear of this area (by 2 km), no special requirements apply.

Twynam Mundamia Pty Ltd – George Evans Road and Jonsson Road, Mundamia



AS 2021 deals with Acoustics, Aircraft noise intrusion and Building siting and construction. The Standard includes Table 2.1, a portion of which applies to residential and commercial development. Those matters applicable to the proposal are reproduced below in **Table 12**:

Table 12
Extract from AS 2021

<i>Building Type</i>	<i>ANEF Zone of Site</i>		
	<i>Acceptable</i>	<i>Conditional</i>	<i>Unacceptable</i>
House, home, unit, flat	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Commercial building	Less than 25 ANEF	25 to 35 ANEF	Greater than 35 ANEF

The table outlines circumstances whereby residential development is either acceptable, acceptable subject to the imposition of conditions (noise attenuation measures) or is unacceptable due to the extent of aircraft noise, contingent on the Australian Noise Exposure Forecast (ANEF) contour the area is sited within. ANEF are the official forecasts of future noise exposure patterns around an airport or field. This table outlines that properties subject to less than 20 ANEF are generally acceptable for residential use, properties sited between the 20 to 25 ANEF are generally acceptable subject to conditions, whilst this sited above 25 are generally unacceptable for residential use. The subject site is located well clear of the 20 ANEF, and therefore, any future residential development will be acceptable in accordance with the requirements of AS 2021 Acoustics – Aircraft noise intrusion – Building siting and construction. Consequently, the provisions of AS 2021 would not apply to the proposal.

Given the site is not located within the area affected by the requirements of SCC's DCP No. 69, and that area mapped as being affected by aircraft noise, any future dwellings do not require the implementation of noise attenuation as required by AS 2021, and it is considered that the proposed residential allotments will not be unduly affected by aircraft noise.

5.7.4 Bamarang Power Station

The Bamarang Power Station is sited to the south-west of the subject property. Approval was issued for a Major Project application in 2007 for the following:

- Concept approval for the Bamarang Gas Turbine Facility'; and
- 'Project approval for the construction and operation of an open cycle gas-fired power station (stage one)'.

The physical works already approved include:

- Construction and operation of onsite equipment/infrastructure that would enable the power facility to operate as a peaking facility in open cycle configuration, including:
 - Two gas turbines, each with a capacity of approximately 140 megawatts,
 - Step-up transformers,
 - 132 kilovolts switchyard,
 - Installation of a fuel gas supply system,
 - Electrical and control building,
 - A single storey administration building; and
- Other on-site facilities including roads, car parking area, security and site drainage.
- A gas pipeline, approximately 900 metres in length, to connect the facility to the Eastern Gas Pipeline; and
- A 132 kilovolts electricity transmission line, approximately 7.2 kilometres in length, to connect the facility to the electricity distribution network via the existing substation located at the corner of Yalwal and Albatross Roads in West Nowra.
- Construction works (including clearing) associated with the above.

A further Major Project application (MP08_0021) seeks project approval to Stage 2 of the Power Station. An Environmental Assessment has been prepared by GHD to assess the proposal, dated April 2008. An extract from this EA states that:

"Delta is seeking project approval for the construction and operation of infrastructure required to enable the Bamarang gas turbine power facility to operate as a base load facility (in combined cycle configuration) and provide a constant supply of electricity. These works and infrastructure are referred to as 'the project' for the purposes of this environmental assessment and were described as 'stage two – base load facility' by the 2006 environmental assessment. It should be noted that following investigation of water supply options for water cooling of the facility, Delta has decided to implement dry cooling of the facility as it requires significantly less water than wet cooling. This has resulted in a modification of the layout of the proposed facility.

Approval is sought for the construction and operation of the following equipment and infrastructure:

Combined cycle equipment:

- *Two heat recovery steam generators which would be connected to the approved gas turbines; and*
- *A steam turbine.*

A cooling system including an air cooled condenser proposed as the cooling medium.

- *Other facilities:*
 - *Water treatment plant (to treat the small amount of process water to be used in the dry cooled facility).*
 - *Piping.*
 - *Steam generator step-up transformers.*
 - *Additional electrical equipment in the switchyard; and*
 - *Water storage tanks – above ground tanks would be used to store sufficient water on site for at least two continuous days of operation.*
 - *A pipeline from the rising main that runs along the western boundary of the site (approximately 140m in length within the Delta site) to provide the water supply to meet process water requirements.”*

A Noise Assessment undertaken by Heggies Pty Ltd was included in that EA. This assessment examined the impacts of the proposal on surrounding sensitive land uses. This report has assessed the proposal and given it is intended to operate 24 hours a day, has done so using stringent night time criteria of LAeq of 35 dBA for all receivers. In the consideration of this proposal, Heggies has examined sensitive receptors, and has identified these as residences sited at Lot 22 Yalwal Road, No. 213 Gannet Road and No. 190 Bamarang Road. It is noted that these are sited in much closer proximity to the Power Station than the subject site. For example, Lot 22 Yalwal Road is located some 750 m from the Power Station, whilst the subject site is a minimum of 4.5 km away. It is also noted that this Noise Assessment did not consider the Shoalhaven Campus of the University of Wollongong as a sensitive use, and this significant facility, and sensitive land use, is sited closer to the Power Station than the subject site.

The Noise Assessment concluded that the proposed Power Station, subject to the implementation of major mitigation works, will result in the generation of noise that will only exceed the recommended 35dBA by 1dBA.

Furthermore, the Noise Assessment undertaken by Heggies has included Noise Contours (Appendix B3) which demonstrate that the noise levels fall below LAeq 35 dBA contour, approximately 1.9 km to the south west of the subject property, and therefore will not affect the proposed subdivision.

Given the subject site is located a further 2.6 km from the Bamarang Power Station than Lot 22, and well outside that area identified by Heggies Pty Ltd as being affected by the LAeq 35 dBA noise contour, it is considered that the Power Station is unlikely to generate noise that would adversely impact on the development of the subject site.

5.7.5 Conclusion

The proposal has the potential to be impacted upon by road noise, noise associated with the use of HMAS Albatross, and the further development of the Bamarang Power Station.

The assessment undertaken with this EA has demonstrated that the site is remote from external noise sources such that these are unlikely to result in any noise impacts on the site or future residential development of the proposed allotments. In relation to road noise, traffic generation which is less than that identified by the RTA as being acceptable, is unlikely to be of a level that would result in amenity impacts.

As such, noise issues are unlikely to affect the proposed subdivision and no mitigation is required.

5.8 AVIATION ISSUES

5.8.1 Introduction

The subject property is located to the west of the Nowra Township, which is sited to the north of HMAS Albatross. The EA has been required to consider potential impacts of the proposal of the operations of HMAS Albatross and consider flight path implications from military aircraft operations on the proposal.

Noise implications are dealt with in Section 5.7 of this EA and are not addressed further in this Section, which deals with other concerns of the Department of Defence.

The Department of Defence in response to the Preliminary Assessment outlined concern with the proposal having regard to the following matters:

- The subject site is identified as being land affected by the Defence (Areas Control) Regulation for HMAS Albatross which controls the height of man made structures within 15 km of Albatross, which requires that structures in residential areas having a height greater than 45 m above natural ground level obtain approval from the Department of Defence.
- Aircraft noise impacting on future residential development, possibly leading to community complaints, and
- The subject site is over flown by military aircraft from time to time.

5.8.2 Height of Structures

This Part 3A Major Project Application seeks approval to the subdivision of land only and no buildings are proposed at this time. Notwithstanding this, approval to the subdivision will, in time, result in the further construction of residential development on the resultant lots.

In relation to further residential development, SCC has a number of policies, including Development Control Plans, which imposes controls on the bulk and scale, (and overall height) of buildings. These restrict development to a maximum of 8.5 metres in height, well below the 45 m height limit that would trigger referral to the Department of Defence.

Notwithstanding this, in the extremely unlikely event that a structure of greater than 45 m in height is ultimately proposed on the resultant allotments, consideration to such an application can be given at that time, and the Department of Defence, and the relevant consent authority, can undertake an appropriate level of environmental assessment for such a proposal.

5.8.3 Noise

As is outlined above, the affects of aircraft noise are dealt with in Section 5.7 of this EA.

5.8.4 Flight Paths

According to the Department of Defence the subject site is over flown by military aircraft from time to time and the altitude of aircraft transiting the area generally being at 1000 feet, however may be lower dependent on operational requirements and weather conditions.

The concerns of the Department of Defence relate solely to noise levels which may disrupt and annoy future residents and these are addressed in Section 5.7 of this EA. It is noted therefore that the Department of Defence is not concerned in relation to other matters such as safety or security.

As is outlined in Section 3.4.3 of this EA, the subject site is within the Mundamia Living Area No. 5, identified in the NBSP as an area to meet the future demand for residential development. The NBSP followed a comprehensive analysis of constraints to development and was prepared by Shoalhaven City Council, which included consideration of the impacts of aircraft movements and flight paths from HMAS Albatross. Section 8 of the NBSP deals with constraints to development and includes those relating to physical, biodiversity, cultural and operational matters. Section 8.4 of the NBSP deals with the operational constraints, and includes HMAS Albatross in these considerations, principally relating to the impacts of takeoffs and flight paths.

The NBSP includes a plan identifying ANEF contours for both the periods 2006 and 2014 based on projected flight paths. This Plan (identified as Map 8.10 in the NBSP) is reproduced as **Figure 18**. The relevant contours do not affect the Mundamia Living Area, which is well to the north of affected land.

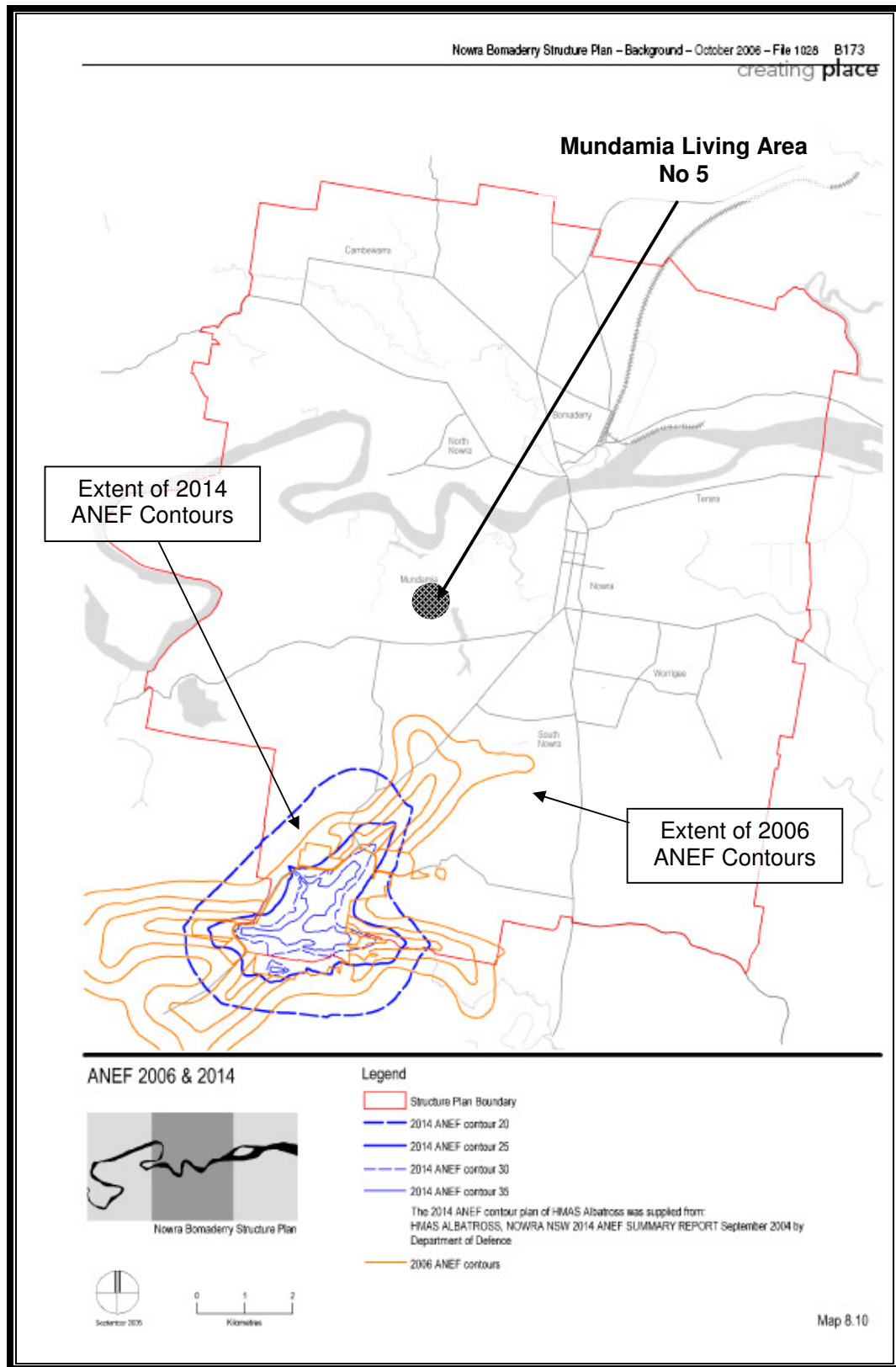


Figure 18: ANEF Contours - Extract from Nowra Bomaderry Structure Plan (map N.T.S.)

In undertaking the NBSP process, the Department of Defence were provided an opportunity to comment when the NBSP was in draft form. The Department of Defence raised concerns in regards to Area No. 6 - Cabbage Tree Lane Living Area, (according to the report prepared to Shoalhaven City Council's Policy and Planning Committee), and not the subject site or the Mundamia new living area. This is reasonable as it is the Cabbage Tree Lane living area which is most potentially affected by the impacts associated with aircraft movements emanating from HMAS Albatross rather than the subject site due to its closer proximity.

The subject site is unlikely to be significantly affected by aircraft movements associated with HMAS Albatross and mitigation is not considered necessary.

5.8.5 Conclusion

The subject site is located within the general locality of HMAS Albatross however is well clear of any area that is directly affected by a higher level of aircraft noise, or frequent aircraft movements. The nature of the proposed development is such that it does not require approval from the Department of Defence in relation to the Defence (Areas Control) Regulations due to the height of structures, whilst the subject site is not affected by unreasonable levels or frequency of noise attributed to aircraft movements.

Consequently, it is unlikely that the subject site or the proposal will be adversely impacted by the operations of HMAS Albatross.

SCC has considered the impact of HMAS Albatross in the NBSP and has not identified any constraints in relation to the development of the Mundamia Living Area or the subject site.

6.0 CONSULTATION

In preparing this Environmental Assessment, the Director-General specified that “*an appropriate and justified level of consultation*” occur with a number of government agencies, SCC, Nowra Aboriginal Land Council and the community.

Having regard to the “appropriate and justified” consultation requirements, different forms of consultation where necessary based on the particular issue for consideration and the agency concerned. As such, it was considered that no one form of consultation would meet all community and agency needs. Consequently, consultation was carried out in a variety of ways, including formal written correspondence, telephone conversations and meetings, or a combination thereof. The following section details the consultation processes carried out with the relevant authorities and stakeholder groups.

6.1 THE COMMUNITY

SCC officially acknowledges Principal Consultative Bodies (PCB) which are formally notified of applications and other relevant information relating to Council’s affairs. In relation to Mundamia, as the locality is newly proposed, it does not have an established PCB. Consequently, no community group is formally recognised by SCC.

The general Shoalhaven community has been consulted by Shoalhaven Council in the formulation of the NBSP, and the Draft Shoalhaven LEP 2013 which is currently being exhibited.

6.2 SHOALHAVEN CITY COUNCIL

Various staff of SCC have been informed of the project throughout its evolution as follows:

- consideration of Preliminary Assessment and inclusion of its requirements in the Director General’s Environmental Assessment Requirements;
- meeting with Council’s Strategic Planners and Development Assessment Planners on 28th October 2008 to discuss the proposal;
- Various informal meetings to discuss further development and provision of infrastructure within the Mundamia living area;
- Email advising that Council is currently preparing a DCP and CP regarding public open space which will address its ongoing maintenance, a copy of which is reproduced in **Annexure 14**;

- Council at its meeting of 26th March 2013 resolved to give in principle agreement to the preparation of a planning agreement for the Mundamia Urban Release Area which will address the provision of infrastructure in the locality.

6.3 STATE AGENCIES

6.3.1 Office of Environment & Heritage – OEH (formerly Department of Environment and Climate Change)

Advice from the Department of Planning is that the Office of Environment & Heritage (formerly the Department of Environment and Climate Change) required consultation in relation to Climate Change and Flooding matters.

Having regard to climate change, the developable area is sited well above sea level (approximately 46 m) and existing watercourses. Consequently, the proposal is unlikely to be affected by sea level rise which has been predicted to result from climate change.

Similarly, having regard to flooding matters, the proposed development area is at least 36 metres above the PMF level.

The OEH is also the government agency responsible for threatened species. The proposal has been assessed in accordance with the relevant threatened species and Part 3A assessment guidelines prepared by OEHC.

Furthermore, the OEH will be provided with formal opportunity to comment on this EA and as such, sufficient consultation has been carried out to this point.

6.3.2 Department of Primary Industry (formerly Industry and Investment)

The Department of Primary Industry is responsible for matters relating to agriculture, fishing and aquaculture, mineral resources and forests.

The subject site is not used for intensive agricultural activities, and it is not identified as being a prime crop and pasture resource.

The proposal does not impact on any watercourse or a local fish population.

The site does not contain a forest resource, nor is it identified within the Illawarra REP as containing mineral resources.

Given the above, direct consultation with the Department of Primary Industry is unnecessary.

6.3.3 Rural Fire Service

The Bushfire Protection Assessment prepared by Eco Logical Australia was prepared strictly in accordance with the provisions of Planning for Bushfire Protection, prepared by the RFS. Furthermore, the RFS will be provided with formal opportunity to comment on this EA and as such, sufficient consultation has been carried out to this point.

6.3.4 NSW Office of Water – OoW (formerly Department of Water and Energy)

The NSW Office of Water (formerly the Department of Water and Energy) provided comprehensive comments to the DoP during the preparation of the DG's EARs. In this regard, the OoW advised of concerns relating to the protection and enhancement of watercourses and riparian corridors, wetlands and groundwater resources. These issues have been considered in the EA by Storm Consulting (**Annexure 7**) and SLR (**Annexure 3**).

Furthermore, the OoW will be provided with formal opportunity to comment on this EA and as such, sufficient consultation has been carried out to this point.

6.3.5 Roads and Maritime Services (formerly Roads and Traffic Authority)

In preparing the Transport Report, Colston Budd Hunt and Kafes considered the prior comments of the Department of Planning and the then Roads and Traffic Authority (now Roads and Maritime Services – RMS). In this regard, their analysis addressed:

- traffic modelling utilising the SIDRA analytical tool;
- holiday peaks;
- 10 year projected volumes;
- adequacy of intersections and performance.

The RMS will be provided with formal opportunity to comment on this EA and as such, sufficient consultation has been carried out to this point.

6.3.6 Department of Planning

The Department of Planning provided comment on the initial Environmental Assessment lodged in 2009. Formal consideration of that proposal was not possible as the provisions of Shoalhaven Draft LEP 2013 had not been certified for exhibition at that time. Notwithstanding that, informal comments were provided by way of email dated 1st April 2009, outlining various matters requiring additional consideration, assessment or attention. The contents of that email have been addressed in the EA and supporting expert reports.

6.3.7 Crown Land Division (formerly Land and Property Management Authority)

Direct consultation with the Crown Lands Division was undertaken by way of direct letter dated 7th November 2012, a copy of which is included in **Annexure 14**. The Crown Lands Division responded by letter dated 26th November 2012, a copy of which is also included in **Annexure 14**. The Crown Lands Division has raised issues in relation to the following:

- Transfer of any upgraded Crown roads to Shoalhaven Council for ongoing management as a public road,
- Ensuring that the proposal does not impact on the adjoining Crown land.

The proposal does not impact on the matters of concern raised by the Crown Lands Division.

6.3.8 NSW Police Force (formerly NSW Police) and NSW State Emergency Service

The proposal was directly referred to both the NSW Police Force and NSW State Emergency Service for comment by way of direct correspondence dated 7th November 2012, a copy of which is included in **Annexure 14**. To date, no response has been received.

Notwithstanding this, these organisations can be included in any public exhibition for a period of this Project Application by the DoP. This will enable agencies to make written submissions on the Project Application. Any submission will be considered in a Preferred Project Report, responding to each issue raised and make relevant changes to the project to minimise impacts, with a further report identifying such changes being prepared.

6.4 COMMONWEALTH AGENCIES

6.4.1 Department of Defence

The Department of Defence were consulted by SCC in the preparation of the NBSP. At that time, the Department of Defence raised no objection in relation to the Mundamia Living Area No. 5, with concerns being restricted to the Cabbage Tree Lane Living Area only.

The subject site is well clear of HMAS Albatross and lands which are identified as being subject to aircraft noise by all adopted policies and Development Control Plans. Furthermore, the proposal does not result in buildings of a height requiring further

detailed consultation with the Department of Defence. Issues relating to HMAS Albatross and noise are outlined in Sections 5.8 and 5.7 respectively of this EA.

Furthermore, the Department of Defence will be provided with formal opportunity to comment on this EA and as such, sufficient consultation has been carried out to this point.

6.4.2 Commonwealth Department of Sustainability, Environment, Water, Population and Communities

The Department of Sustainability, Environment, Water, Population and Communities (D of SEWPC) were directly consulted by SLR in the preparation of their Flora and Fauna Issues and Assessment Report (**Annexure 3**). This consultation was specifically in relation to whether the proposed subdivision constituted a “controlled action” under the provisions of the EPBC Act. Following assessment of the submission, the D of SEWPC determined that the proposal is not a controlled action and no further assessment or approval under the EPBC Act is required.

6.5 WOLLONGONG UNIVERSITY

The University of Wollongong and TAFE have been involved in discussions with SCC and the former developer (Malbec Mundamia Pty Ltd) having regard to the development of the Mundamia Living Area and the Masterplan, and included a meeting between the relevant stakeholders on 11 June 2008, the results of which were reported to SCC Property Steering Committee on 10th July 2008. Of particular note in relation to the development of the subject site is that the TAFE and University of Wollongong:

- did not desire the provision of commercial facilities within walking distance of the Shoalhaven Campus;
- did not desire university student accommodation within the Mundamia Living Area.

The proposal is consistent with these matters and sufficient consultation has been undertaken.

6.6 NOWRA LOCAL ABORIGINAL LAND COUNCIL AND OTHER ABORIGINAL COMMUNITY GROUPS

In preparing the Aboriginal Heritage assessment, SEA undertook extensive consultation in accordance with the DECC requirements entitled *Interim Community Consultation Requirements for Applicants* and this is detailed in **Annexure 8**.

Consultation undertaken included written correspondence with the Nowra Local Aboriginal Land Council, as well as the Jerrinja, Merrimans and Ulladulla Local

Aboriginal Land Councils after receiving advice from DECC, Registrar of Aboriginal Owners and SCC as to relevant stakeholders. Following this, various telephone conversations and meetings were held to discuss the proposal and proposed fieldwork methodology with the Nowra LALC who were the only group requesting further involvement.

It is considered that the consultation undertaken is appropriate, and justified given compliance with the *Interim Community Consultation Requirements for Applicants* requirements imposed by DECC.

6.7 RELEVANT INFRASTRUCTURE SERVICE PROVIDERS

Shoalhaven Water

Direct consultation with Shoalhaven Water has occurred through APA and is outlined in the Utilities Investigations Report (**Annexure 9**). This is in relation to both water and sewer services.

In addition, Shoalhaven Water has provided input into the NBSP throughout the development of this Strategy. Furthermore, it is expected that Shoalhaven Water will provide input into the Draft LEP 2013 process currently being undertaken by SCC.

Endeavour Energy

Consultation with Endeavour Energy has been undertaken directly by APA and is outlined within the Utilities Investigations Report.

Telstra

Consultation with Telstra has been undertaken directly by APA and is outlined within the Utilities Investigations Report. Furthermore, the project has been registered in order that the pre-provisioning of services can be undertaken.

In addition, the project will be NBN Co ready in the event that relevant infrastructure is ultimately provided by that authority.

Jemena Pty Ltd

Jemena Pty Ltd are involved on the provision of reticulated gas supply and direct consultation has been undertaken directly by APA and is outlined within the Utilities Investigations Report. Jemena Pty Ltd has concluded that reticulated gas services will not be provided.

6.8 CONCLUDING COMMENTS

In conclusion, it is considered that consultation undertaken with regard to this EA is justified and appropriate under the circumstances and builds upon that undertaken by SCC in the preparation of the NBSP, and being undertaken in the preparation of Draft Shoalhaven LEP 2013. The consultation has:

- been considerate of the relevant key issues requiring resolution;
- provided opportunities for feedback and consideration in final design of the subdivision and other ameliorative and mitigating measures; and
- resulted in the provision of information allowing consideration and analysis of the key issues.

7.0 STATEMENT OF COMMITMENTS

The commitments listed below have been compiled based on the EA and separate specialist assessments which have been undertaken and the constraints and opportunities available at the site. They provide a commitment from the developer indicating their responsibilities in developing the site as proposed to ensure that the development is environmentally, socially, and economically sustainable. In developing the subdivision, the developer gives the following commitments in order to minimise the impact on the environment:

Item	Commitment	Timing
General	1. The developer will carry out the development in accordance with this Environmental Assessment (EA), prepared by Cowman Stoddart dated January 2009, plans prepared by Allen Price & Associates and supporting reports.	For the duration of the subdivision.
Legislative Controls/Requirements	2. The developer will obtain and maintain the following licences, permits and approvals for the residential subdivision: <ul style="list-style-type: none"> • Shoalhaven City Council - Construction Certificates for engineering works for each stage of the subdivision. The application for Construction Certificates will contain Design Drawings submitted containing, where relevant, detailed designs relating to earthworks, drainage, Soil erosion and Sediment Control and site rehabilitation, tree clearing and site stability, roadworks, footpaths/cycleways, water supply (both potable and use of reclaimed water) and sewerage works, and landscaping. • Shoalhaven City Council - Road Opening Permit from Shoalhaven City Council as required; • Shoalhaven City Council - Section 138 Consent for roadworks (Roads Act 1993); • Endeavour Energy - Design Certification; • Endeavour Energy - Notification of Arrangement; • Telstra/NBN - Compliance Certificate; • Shoalhaven Water - Certificate of Compliance; • Shoalhaven City Council – Subdivision Certificates for each stage; • Department of Land and Property Information - registration of the subdivision. 	For the duration of the subdivision.

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Item	Commitment	Timing
Final Plan of Subdivision	3. The developer will prepare a final plan of subdivision for each stage of the development in accordance with the recommendations of the Environmental Assessment, as amended by the Preferred Project Report and requirements of Shoalhaven City Council.	Prior to the release of Subdivision Certificates.
Ecological	4. The proponent will develop a management regime for peripheral Asset Protection Zones (APZs) and proposed E2 - Environmental Conservation Zone around the development to ensure that maintenance is undertaken in an environmentally sensitive manner and that habitat and resources for, and individuals of, threatened species are protected;	Prior to release of certificate for subdivision for each stage/s containing public reserve.
Public Open Space	5. The developer will prepare a Vegetation Management and Habitat Restoration Plan (VMHRP) and embellish public reserves in accordance with the approved VMHRP and detailed landscape design plans to be approved by Shoalhaven Council as part of the Construction Certificate.	Prior to release of certificate for subdivision for each stage/s containing public reserve.
	6. The developer will dedicate all public/drainage reserves to Shoalhaven City Council.	Prior to release of Subdivision Certificate and dedicated upon registration.
Waste Minimisation and Management	7. The developer will prepare a Waste Minimisation and Management Plan for subdivision construction works in accordance with Development Control Plan No. 93 for approval by Shoalhaven City Council for implementation.	Prior to the release of the Construction Certificate for each stage.
Construction	8. The developer will prepare a detailed Construction Management Plan for approval by Shoalhaven Council including education of workers in the approvals and conditions requiring compliance (including soil erosion and sediment controls, flora and fauna and aboriginal archaeological issues), details of the environmental management procedures during the development and measures relating to waste minimisation and management.	Prior to the commencement of construction and for the duration of the development.
	9. The CMP shall include a management regime for the construction process to ensure that no other wastes (including building rubble, garbage, contaminants, fuels, oils, paints or other chemicals) are discharged from the construction area, and that all such wastes and contaminants are contained within the construction footprint and are appropriately managed;	Prior to the commencement of construction and for the duration of the development

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Item	Commitment	Timing
<i>Construction continued</i>	10. The use of sediment fences and other appropriate control measures during construction activities to manage and/or avoid erosion and sediment discharge or the discharge of other contaminants.	Prior to the commencement of construction and for the duration of the development
Bushfire Management	Provision of Asset Protection Zones	
	11. The developer will establish and maintain Asset Protection Zones (APZs) in accordance with Figure 3 of the Bushfire Assessment, prepared by Eco Logical Australia.	Prior to the release of the Subdivision Certificate for each stage.
	12. The developer will install relevant infrastructure as required, including fire hydrants.	Prior to the release of the Subdivision Certificate for each stage.
Water Quality Management and Soil Control	13. The management of stormwater discharge volumes and water quality from the development area, both during construction activities and following completion and occupation of the site, according to current 'best practice' principles and as outlined in the <i>Water Cycle Management Report</i> of Storm Consulting (2012).	Prior to the release of the Subdivision Certificate for each stage.
	14. Detailed design of the peripheral bioretention swale system to maintain soil moisture and groundwater regimes.	Prior to the release of the Subdivision Certificate for each stage.
	15. The developer will design, install and maintain water quality control measures in accordance with the Construction Certificate Plans approved by Shoalhaven City Council.	Prior to the release of the Subdivision Certificate for each stage.
	16. The developer will prepare a soil and water management plan to control run off during construction in accordance with the principles of the Landcom publication Managing Urban Stormwater (MUS): Soils and Construction Volume 1, 4 th Edition and Construction Certificate Plans approved by Shoalhaven City Council and DCP 100.	Prior to release of the Construction Certificate for each stage.
Site Contamination	17. The developer will remediate the site in accordance with the recommendations of the Remedial Action Plan prepared by Martens Consulting Engineers. A Site Validation Report shall be prepared at the completion of the remediation works.	Prior to the release of the Subdivision Certificate for Stage 1 of the development.

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Item	Commitment	Timing
Cultural Heritage	18. The developer will implement the management and mitigation measures recommended in the report prepared by South East Archaeology Pty Ltd.	For the duration of the development.
	19. The developer will inform the Nowra Local Aboriginal Land Council of progress of the development.	Ongoing through the construction of the subdivision.
Infrastructure	Roads	
	20. The developer will construct all roads and fire trails in accordance with DCP 100 and approved Construction Certificates.	Prior to the release of the Subdivision Certificate for each relevant stage.
	21. The developer will provide a minor street drainage system to accommodate the 5 year A.R.I. storm event in accordance with plans approved by Shoalhaven City Council with the Construction Certificate.	Prior to the release of the Subdivision Certificate for each relevant stage.
	22. The developer will provide a major street drainage system to accommodate the 100 year A.R.I. storm event in accordance with plans approved by Shoalhaven City Council with the Construction Certificate.	Prior to the release of the Subdivision Certificate for each relevant stage.
	23. The developer will construct footpaths and cycleways as shown on the plans prepared by Allen Price and Assoc and approved Construction Certificates.	Prior to the release of the Subdivision Certificate for each relevant stage.
	24. The developer will provide street signs in accordance with the requirements of Shoalhaven City Council.	Prior to the release of the Subdivision Certificate for each stage.
	25. The developer will provide street lighting in accordance with the requirements of SCC and Endeavour Energy.	Prior to the release of the Subdivision Certificate for each stage.
	Electricity and Telecommunications	
	26. The developer will provide underground power to each residential lot in the subdivision in accordance with the requirements of Endeavour Energy	Prior to the release of the Subdivision Certificate for each stage.
	27. The developer will provide underground telecommunications infrastructure to each lot in the subdivision in accordance with requirements of Telstra/NBN Co.	Prior to the release of the Subdivision Certificate for each stage.

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Item	Commitment	Timing
<i>Infrastructure continued</i>	Drainage	
	28. The developer will install street and interallotment drainage as necessary in accordance with plans approved by Shoalhaven City Council.	Prior to the release of the Subdivision Certificate for each stage as applicable.
	Water and Sewer Services – Residential Allotments	
	29. The developer will provide reticulated water and sewerage services to each lot in the subdivision in accordance with the requirements of Shoalhaven Water	Prior to the release of the Subdivision Certificate for each stage.
Landscaping Plans	30. The developer will use native species, endemic to the locality in the preparation of landscaping plans, and subsequent works undertaken in conjunction with this subdivision as shown on plans prepared by Peter Phillips Landscape Architecture.	For the duration of the subdivision
Geotechnical	31. The developer will provide a lot classification geotechnical report to Shoalhaven City Council for each stage of development prior to the release of the final plan of subdivision for that stage.	Prior to the release of the Subdivision Certificate for each stage.
Staging	32. The developer will construct the subdivision in accordance with the Staging details prepared by Allen Price and Associates or as otherwise approved in Construction Certificate plans approved by Shoalhaven City Council.	For the duration of the subdivision.
Developer Contributions	33. The developer will pay Section 94 developer contributions in accordance with Shoalhaven City Council's Section 94 Contributions Plan on a "per ET" basis for each stage of the residential subdivision.	Prior to the release of the Subdivision Certificate for each stage.
	34. The developer will pay Section 64 water and sewer developer contributions in accordance with the development servicing plan applicable at the time of payment.	Prior to the release of the Subdivision Certificate for each stage.
Signage	35. The developer will provide estate marketing signs in accordance with the provisions of DCP 89 – Exempt and Complying Development or as otherwise approved by Shoalhaven City Council.	For the duration of the subdivision.

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Item	Commitment	Timing
Ecological	<p>36. The developer will implement the mitigation and amelioration measures recommended by SLR Consulting as follows:-</p> <ul style="list-style-type: none"> the use of sediment fences and other appropriate control measures during construction activities to manage and/or avoid erosion and sediment discharge or the discharge of other contaminants; the installation of stormwater infrastructure to manage stormwater discharge volumes and water quality from the development area according to current 'best practice' principles and as outlined in the <i>Water Cycle Management Report</i> of Storm Consulting (2012); the installation of stormwater infrastructure to maintain water quality, soil moisture and groundwater regimes, and to provide supplementary habitat for native biota; the selective removal of vegetation to create APZs and to ensure that habitat and resources for, and individuals of, threatened species are protected; the implementation of a management regime during the construction process to ensure that no wastes (including building rubble, garbage, contaminants, fuels, oils, paints or other chemicals) are discharged from the construction area, and that all such wastes and contaminants are contained within the construction footprint and are appropriately managed; the selective removal of vegetation to create the <i>Asset Protection Zones</i> (APZs), where required, around the development to retain specimens of and habitat or resources for the relevant threatened biota, including <i>inter alia</i>: <ul style="list-style-type: none"> the preferential and selective retention of hollow-bearing trees; the preferential and selective retention of identified Yellow-bellied Glider and Glossy Black Cockatoo feed trees; the slashing of shrub layer and understorey vegetation at selected locations to promote the Nowra Heath-myrtle; 	For the duration of the subdivision.

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Item	Commitment	Timing
	<ul style="list-style-type: none">the preparation and implementation of a <i>Vegetation Management Plan</i> (VMP) for the <i>E2 – Environmental Conservation Zone</i> to ensure the long-term viability of flora and fauna populations which utilise the land, particularly the Glossy Black Cockatoo, Yellow-bellied Glider and Nowra Heath-myrtle.the collection of native vegetation removed from development areas and its re-use within the <i>Conservation Area</i> for bushland rehabilitation and/or landscaping purposes and/or the provision of that material to Council for bushland management and rehabilitation purposes;the destruction or appropriate removal of weeds from the development footprint and from the <i>Conservation Area</i>; andthe implementation of a <i>Hollow-bearing Tree Protocol</i>, involving:<ul style="list-style-type: none">the segmental ‘dismantling’ by professional tree experts of hollow-bearing trees in order to salvage tree-hollows, wherever possible;the placement of salvaged tree-hollows on existing large trees or dedicated poles in the <i>Conservation Area</i>;alternatively, the placement of salvaged tree-hollows on the ground as hollow log habitat, where placement in existing trees is not practical; and the use of artificial nest boxes to replace tree-hollows which cannot be salvaged and to supplement that resource on the site.	

8.0 DIRECTOR GENERAL ENVIRONMENTAL ASSESSMENT REQUIREMENTS

The Director-General issued EAR dated 20th October 2010. The following table details all of the key issues which have been identified in the EAR, and outlines the relevant Section of the EA which has addressed the issues.

ASSESSMENT TABLE

<i>General Requirements</i>	<i>Comments</i>
<p>The Environmental Assessment (EA) for the Project Application must include:</p> <ol style="list-style-type: none"> 1. An executive summary. 2. A detailed description of the proposal 3. An outline of the scope of the project including: <ul style="list-style-type: none"> • any development options; • justification for the project taking into consideration any environmental impacts of the project, the suitability of the site and whether the project is in the public interest; • outline of the staged implementation of the project if applicable. 4. A thorough site analysis including constraints mapping and description of the existing environment. 5. Consideration of any relevant statutory and non-statutory provisions and identification of any non-compliances with such provisions, in particular relevant provisions arising from environmental planning instruments, Regional Strategies (including draft Regional Strategies) and Development Control Plans. 6. Consideration of the consistency of the project with the objects of the Environmental Planning and Assessment Act 1979. 	<p>Executive Summary provided as part of the EA.</p> <p>A comprehensive description of the proposal is included in Section 3.0 of this EA.</p> <p>Section 3.0 of the EA details the scope of the project and addresses development options (Section 3.5) justification for the project (Section 3.4); suitability of the site (Section 3.4.4); and the public interest. The staging of the development is detailed in Section 3.3 of the EA.</p> <p>A Site Analysis is undertaken in Section 2.0 and Figure 2 of this EA.</p> <p>Relevant statutory and non-statutory planning provisions are dealt with in Section 4.0 of the EA and this includes relevant environmental planning instruments, regional strategies and Development Control Plans. Non-statutory planning provisions are dealt with in more detail in Section 3.4.3 which addresses Project Justification. Section 4.0 identifies areas of non-compliance and addresses suitability of departures.</p> <p>Objects of the EP&A Act are dealt with in Section 4.2.1 of the EA.</p>

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General Requirements	Comments
7. Consideration of impacts, if any, on matters of National Environmental Significance under the Environmental Protection and Biodiversity Conservation Act 1999 (Cth);	NES matters specified in the Commonwealth EPBC Act are addressed in the Environmental Flora and Fauna Assessment (Annexure 3) prepared by SLR, and Section 4.1.1 of the EA.
8. An assessment of the potential impacts of the project and a draft Statement of Commitments, outlining environmental management, mitigation and monitoring measures to be implemented to minimise any potential impacts of the project.	A Statement of Commitments is provided in Section 7.0 of the EA.
9. The plans and documents outlined in Attachment 2.	Plans and documents required in Attachment 2 of the DG's EARs are provided in this EA and also Annexure 1 .
10. A signed statement from the author of the Environmental Assessment certifying that the information contained in the report is neither false nor misleading.	A signed statement from the author of this EA is contained in the EA.
11. An assessment of the key issues specified below and a table outlining how those key issues have been addressed.	Assessment of key issues and how they have been addressed appears below.

Key Issues	Comments
1. STRATEGIC PLANNING	
1.1 Justify the proposal with reference to relevant local, regional and State planning strategies, policies and plans, including the Mundamia Master Plan. Provide justification for any inconsistencies.	Justification for the proposal is provided in Section 3.4. The property is within the Mundamia new living area identified by Shoalhaven Council.
1.2 Demonstrate consistency with the South Coast Regional Strategy, specifically the Sustainability Criteria; and the use of the delivery of key infrastructure such as electricity, water and sewer as a tool to implement the staging program.	The provisions of the SCRS are detailed in Section 3.4.3.1 and the proposal is consistent with its aims and objectives being consistent with the NBSP, adopted Masterplanning principles with appropriate open space and essential infrastructure. Infrastructure is addressed in a separate Utilities Investigations Report prepared by Allen Price and Associates (Annexure 9) and in Section 5.2 of this EA. The proposed subdivision will be serviced by all essential infrastructure.

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Key Issues	Comments
<p>1.3 Address the Nowra Bomaderry Structure Plan, specifically the Considerations, Desired Future character, and Planning and Design Principles identified for the area. Address how the proposal will be linked to the remainder of the new Living Area (not included as part of the proposal) identified within the Structure Plan.</p> <p>1.4 Address the findings of the investigative work for the Draft Shoalhaven Comprehensive LEP (proposed Draft LEP). Address the permissibility framework provided by the proposed Draft LEP, noting that approval of the Major Project will not occur until gazettal of the proposed Draft LEP.</p>	<p>The NBSP is addressed in Section 3.4.3.2 of the EA.</p> <p>The provisions of the Draft Shoalhaven LEP 2013 are addressed in Section 4.5.2 of this EA and the proposal is consistent with its provisions.</p> <p>It is noted that approval to this Major Project application cannot be granted until gazettal of the Draft Shoalhaven LEP 2013.</p>
2. SUBDIVISION DESIGN, LAYOUT AND DESIRED FUTURE CHARACTER	
<p>2.1 Demonstrate the consistency of the proposal with the character of existing development in terms of the locality, street frontage, scale, building envelopes and future built form controls, aesthetics, energy and water efficiency, and safety.</p> <p>2.2 Demonstrate the consistency of the proposed subdivision design and layout with the <i>Coastal Design Guidelines for NSW, NSW Coastal Policy 1997 and SEPP 71 – Coastal Protection</i>.</p>	<p>The proposal is sited within Mundamia, a New Living Area proposed by SCC, which will change the existing rural and rural residential character of the locality. In creating this New Living Area, SCC has adopted the Mundamia Masterplan and Principles to guide its future development. This includes provisions relating to character, orientation and layout, and lot size. The proposal is consistent with the provisions of this Masterplan, and they are dealt with in Section 3.4.3.3 of this EA.</p> <p>It is not intended to impose building envelopes or other controls to guide further development on the resultant allotments as SCC already has adopted policies which are suitable and will be applied. This is addressed in Section 3.2.5 of this EA.</p> <p>Safety by design issues are dealt with in Section 3.2.12 of this EA.</p> <p>The Coastal Design Guidelines are addressed in Section 4.2.4.2 of this EA and the proposal is consistent with suitable lot sizes, appropriate consideration of natural hazards and preservation of native vegetation.</p> <p>The NSW Coastal Policy is addressed in Section 4.2.4.1 and in Annexure 12 which provides a checklist of specific relevant requirements.</p> <p>The provisions of SEPP 71 are addressed in Section 4.2.3.5.</p>

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Key Issues	Comments
2.3 Identify the proposed titling of subdivision across the site (ie. community, Torrens, strata).	The proposed method of land titling, Torrens Title, is outlined in Section 3.2.4 of this EA.
2.4 Provide details of potential building envelope, built form, design quality and 'safety by design' controls, and the means for implementing them.	It is not intended to identify specific building envelopes, or require any design controls given the suitable established controls SCC already have in place for residential development. This is outlined in Section 3.2.5 of this EA.
2.5 Demonstrate a subdivision layout that accommodates housing choice with a mix of medium density and detached dwellings, and potentially some appropriate student accommodation.	The proposed layout provides a variety of allotment sizes ranging in size from 503 m ² to 1101 m ² . Justification of the proposed lot sizes is provided in Section 4.6.3. The proposed lot sizes comply with the requirements of SCC.
2.6 Provide details of any staging that demonstrates the lots will be released in an orderly and co-ordinated manner.	The subdivision is to be undertaken in a staged fashion and this is outlined in Section 3.3 and within the Subdivision Sketch Plan No 25489-01 prepared by APA as shown in Annexure 1 . The proposed staging is logical and efficient, and pays due regard to servicing and natural hazard mitigation.
2.7 Outline long term management and maintenance of any areas of open space or conservation including ownership and control, management and maintenance funding, public access, revegetation and rehabilitation works, and bushfire management.	Management and maintenance of the open space and conservation areas is addressed in Section 3.2.14 and it is intended that this be undertaken by SCC.
3. VISUAL IMPACT	
3.1 Address the visual impact of the proposal in the context of surrounding development and relevant mitigation measures. In particular, address impacts on the amenity of the foreshore, overshadowing of public reserves, loss of views from public places and cumulative impacts.	The visual impact of the proposal is addressed in Section 5.1 of this EA. The site is not prominent, and is not visible from the coast, foreshore or river. The site is not prominent from any public place. Views of the site are generally restricted to longer distances where the prominence is significantly reduced, with the property blending into the surrounding landscape.

<i>Key Issues</i>	<i>Comments</i>
4. INFRASTRUCTURE PROVISION	
4.1 Address existing capacity and requirements of the development for sewerage, water, electricity, waste disposal, telecommunications and gas, in conjunction with relevant agencies, identify and describe staging of infrastructure works.	The provision of infrastructure is addressed in the Utilities Investigation Report as Annexure 9 and in Section 5.2 of the EA. This site will be provided with all essential infrastructure including reticulated water and sewerage services, power and telecommunication services.
4.2 Address and provide the likely scope of a planning agreement and/or developer contributions with Council/government agencies.	Developer contributions are addressed in Section 5.2 of the EA. Contribution rates are still to be determined by Shoalhaven Council. Furthermore at its meeting of 26 March 2013 Council gave in principle agreement to the preparation of a planning agreement with relevant landowners in the Mundamia urban release area
5. TRAFFIC AND ACCESS	
5.1 Prepare a traffic impact study in accordance with Table 2.1 of the RTA's Guide to Traffic Generating Developments which addresses matters, including the following: <ul style="list-style-type: none"> • Connectivity to existing, surrounding developments, including West Nowra, Wollongong University and the Thompsons Point area; • Provision for a future road reserve on both sides of George Evans Road to link to the west Bypass corridor and to the Nowra CBD; and • Upgrade requirements for Yalwal/George Evans Road and Yalwal/Albatross intersections. 	A separate Transport Report has been prepared by CBHK and is shown as Annexure 2 . Traffic matters are also considered in Section 5.3 of the EA. In particular, the assessment concludes that vehicular access will be provided to existing and surrounding developments, a proposed roundabout will include provision for connections to a future by-pass, and the need to upgrade the intersection of Yalwal and Albatross Roads with a separate left and right turn lanes.
5.2 Undertake intersection modelling using SIDRA for the key junctions in the area including Yalwal Road and MR92 intersection, and consider: <ul style="list-style-type: none"> • AM and PM peak volumes and holiday peak volumes; • Existing traffic volumes with and without development; and • 10 year projected volumes with and without the proposal. 	A separate Transport Report has been prepared by CBHK and is shown as Annexure 2 . Traffic matters are also considered in Section 5.3 of the EA. The assessment concludes that reasonable LOS will be provided and modelling by SIDRA has included 10 year projections.

<i>Key Issues</i>	<i>Comments</i>
6. HAZARD MANAGEMENT AND MITIGATION	
<i>Coastal Processes</i>	
6.1 Address coastal hazards and the provisions of the <i>Coastline Management Manual</i> . In particular consider impacts associated with wave and wind action, coastal erosion, sea level rise and more frequent and intense storms. Provide details of proposed safeguards to mitigate any impacts of such hazards on the proposal.	Coastal Processes are addressed in Section 5.4.1 of the EA and due to the location of the property, these have no impacts. A separate Water Cycle Management Report has been prepared by Storm Consulting and is shown as Annexure 7 and this addresses impacts associated with higher intensity storm events.
6.2 A risk management assessment of climate change impacts to the year 2100, is to be undertaken using the latest available information from the International Panel on Climate Change (IPCC), Department of Environment and Climate Change (DECC), and the CSIRO. This should include sensitivity analyses for low level, mid range and high level ocean impacts as set out in the relevant DECC Guideline (<i>Floodplain Risk Management Guidelines: Practical Consideration of Climate Change</i> , 2007).	Impacts of climate change are addressed in Section 5.4.1 of this EA and in the Storm Consulting report (Annexure 7). Impacts are generally restricted to higher intensity rainfall.
<i>Contamination</i>	
6.3 Prepare a preliminary site assessment and identify any contamination on site and appropriate mitigation measures in accordance with the provisions of SEPP 55 – Remediation of Land.	Martens Consulting Engineers prepared a comprehensive suite of assessments including a Stage 1 Preliminary Assessment, Stage 2 Environmental Site Assessment and Remedial Action Plan (RAP) and these are contained in Annexure 5 . Contamination matters are also addressed in Section 5.4.2 of the EA. Some contamination has been identified and the RAP has identified methodology and validation works necessary to ensure the site is suitable for the proposed residential use.
<i>Acid Sulfate Soils</i>	
6.4 Identify the presence and extent of acid sulfate soils on the site and, where relevant, appropriate mitigation measures.	Martens Consulting Engineers prepared a separate Preliminary Geotechnical and Constraints Assessment which included an assessment of acid sulfate soils and this is shown as Annexure 4 . Acid sulfate soils are also addressed in Section 5.4.3 of the EA. The site is not mapped as being affected by acid sulfate soils, and nor have the investigations undertaken by Martens revealed presence of acid sulfate soils, and consequently, no mitigation is required.

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Key Issues	Comments
<p><i>Bushfire</i></p> <p>6.5 Address the requirements of <i>Planning for Bush Fire Protection 2006</i> (RFS). Demonstrate that the proposal can provide asset protection zones, access arrangements, water supplies and utilities, building construction and design, and emergency management arrangements in accordance with <i>Planning for Bush Fire Protection 2006</i>.</p>	<p>Eco Logical Australia has prepared a separate Bushfire Protection Assessment which is shown as Annexure 6. Bushfire matters are also discussed in Section 5.4.4 of this EA. The proposal will comply with the provisions of PBP with mitigation measures proposed including APZ, suitable access and appropriate management.</p>
<p><i>Geotechnical</i></p> <p>6.6 Provide an assessment of any geotechnical limitations that may occur on the site and if necessary, appropriate design considerations that address these limitations.</p>	<p>Martens Consulting Engineers prepared a separate Preliminary Geotechnical and Constraints Assessment which included an assessment of geotechnical constraints and this is shown as Annexure 4. Geotechnical constraints are also addressed in Section 5.4.3 of the EA. The proposed subdivision is not significantly constrained by geotechnical matters.</p> <p>The assessment of Storm Consulting (Annexure 7) considered sea level rise due to the impacts of climate change however it is noted that the site is very well elevated such that it is not impacted by expected increases to sea levels.</p>
<p><i>Flooding</i></p> <p>6.7 Provide an assessment of any flood risk on site including the potential effects of sea level rise and an increase in rainfall intensity in consideration of any relevant provisions of the <i>NSW Floodplain Development Manual</i> (2005); NSW Government Sea Level Rise Policy Statement (DECCW, October 2009); Draft Coastal Risk Management Guide: Incorporating Sea Level Rise Benchmarks in Flood Risk Assessments (DECCW, 2009); and NSW Coastal Planning Guideline: Adapting to Sea Level Rise (DoP, August 2010).</p>	<p>The site is not affected by wider flooding impacts, being sited well above known flood levels. Flooding matters, which are localised only, are addressed in Section 5.4.1 of this EA.</p> <p>The assessment of Storm Consulting (Annexure 7) has considered impacts of climate change through increased rainfall intensity in the water quality and drainage recommendations and which is outlined in Section 5.4.5 of this EA.</p>

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Key Issues	Comments
6.8 Consider the potential impacts of filling on the flood regime of the site and adjacent land.	This is addressed in the assessment of Storm Consulting (Annexure 7) and Section 5.4.5.3 of this EA. Minor filling is necessary to ensure that large flow events are confined to the proposed drainage through the site which will have a negligible impact on the flood regime as the proposed development is at the lower end of the Flat Rock Creek catchment and no detention is required.
7. WATER CYCLE MANAGEMENT	
7.1 Address and outline measures for integrated water cycle management (including stormwater) based on water sensitive urban design principles which address impacts on the surrounding environment, mitigate impacts on water quality downstream, drainage and water quality controls for the catchment, and erosion and sedimentation controls during construction and for the life of the proposal.	A separate Water Cycle Management Report has been prepared by Storm Consulting and is shown as Annexure 7 . This is further addressed in Section 5.4.5 of this EA. Furthermore, a Construction Management Plan (Annexure 10) prepared by APA details conceptual construction methods.
7.2 Assess the impacts of the proposal on surface and groundwater hydrology and quality during construction and occupation of the site.	These matters are addressed in the Storm Consulting report (Annexure 7). This matter has been addressed through the proposed installation of bioretention systems which will ensure that infiltration is similar to pre development conditions and there will be minimal impacts to groundwater hydrology and quality. Furthermore, some level of stormwater retention will be provided in the form of rainwater tanks and bioretention. To protect potentially vulnerable vegetation, stormwater discharge shall be as diffuse as possible. Detention is not required on the site as the site is at the lower end of the Flat Rock Creek catchment and the Shoalhaven River is immediately downstream.
7.3 Address safeguards to mitigate any impacts upon water quality, including impacts downstream on Flat Rock Creek, Flat Rock Creek Dam and the Shoalhaven River. Provide details of proposed effluent management, stormwater, road drainage, alterations to town water supply and water quality management for the site, for example, description and locations of on-site wastewater systems, swales, water quality retention ponds, etc.). Address the requirements, where relevant, of the Flat Rock Creek Notification Area under the <i>Mining Act 1992</i> (NSW) and the <i>Dam Safety Act 1978</i> (NSW).	These matters are addressed in the Storm Consulting report (Annexure 7) and the Environmental Flora and Fauna Assessment prepared by SLR (Annexure 3). Safeguards are proposed in the form of water quality control measures including strategically located bio-filtration trenches within each identified catchment, and on-site storage of rainwater and infiltration within allotment boundaries.

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Key Issues	Comments
7.4 Include consideration of any specific existing or draft Estuary Management Plan and Coastline Management Plan.	Matters relating to the draft Estuary Management Plan and Coastline Management Plan are addressed by Storm Consulting in Annexure 7 . Of particular relevance to this site is the requirement that the development must take into consideration potential stormwater impacts on the estuary and wetlands. This has been addressed through the preparation of a stormwater management plan and demonstrated through the use of water quality modelling showing that the proposal will meet BMP guidelines for water quality management.
8. HERITAGE AND ARCHAEOLOGY	
8.1 Identify whether the site has significance to Aboriginal cultural heritage and identify appropriate measures to preserve any significance. The assessment must address the information and consultation requirements of the draft <i>Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation</i> (DEC 2005). <u>Note that the personal/contact details of any individual should not be publicly disclosed without first making it known to those concerned that their details may be publicly disclosed in the EA.</u> 8.2 Identify any items of European heritage significance and, where relevant, provide measures for the conservation of such items.	SEA prepared a separate Aboriginal Heritage Assessment (Annexure 8) which is further considered in Section 5.5.2 of this EA. This assessment, which included consultation with the Aboriginal community and field work, did not detect any evidence of Aboriginal heritage, whilst predictive modelling indicated a very low potential for deposits. This is addressed in Section 5.5.1 of this EA. Furthermore, the Aboriginal Heritage Assessment (Annexure 8) also includes an assessment of European heritage matters. The site is not identified as containing any items of environmental heritage, whilst the property is not in the vicinity of identified items and therefore this issue does not constrain development.

Key Issues	Comments
9. FLORA AND FAUNA	
<p>9.1 Prepare a Flora and Fauna Assessment Report in accordance with the <i>Draft Guidelines for Threatened Species Assessment</i> (DEC, DPI, Jul 2005), <i>Threatened Biodiversity Survey and Assessment Guidelines Working Draft</i> (DEC 2004), and the <i>Threatened Species Assessment Guidelines: The Assessment of Significance</i> (DECC Aug 2007). Address potential impacts of development on the flora and fauna of the site and setting in the landscape, particularly impacts on any threatened species, populations, endangered ecological communities (EECs), and/or critical habitat, and any relevant recovery plan, with particular regard for relevant EECs or threatened species, where known (bearing in mind DECC's letter dated 30 September 2008, attached, particularly its comments in relation to Attachment A and the proposed development envelope). Surveys should target the <i>Triplarina nowraensis</i> species and the assessment should demonstrate that the proposal will have minimal impact on this species. Provide measures for the conservation of flora and fauna, habitats and communities, where relevant, including the provision of adequate vegetated buffers, particularly on the eastern side, bordering the Flat Rock Creek gully.</p> <p>9.2 Address the potential bio-certification of the Draft Shoalhaven LEP 2013. Any native vegetation proposed to be removed within the area identified in DECC's submission dated 30 September 2008 (attached), needs to be offset in accordance with the principles of "maintain or improve environmental outcomes" in DECC's Draft Guidelines.</p> <p>9.3 Resolve the provision of arterial road access for the proposal and any impacts on threatened species assessed, using the "avoid, mitigate, offset framework in DECC's Draft Guidelines.</p>	<p>An Environmental Flora and Fauna Assessment (Annexure 3) has been prepared by SLR and this has addressed flora and fauna issues. This is further discussed in Section 5.6 of this EA.</p> <p>The assessment by SLR has been undertaken in accordance with the relevant guidelines.</p> <p>The assessment found the proposal will unlikely have a significantly impact provided recommended mitigation measures are implemented. The most significant conservation measure relates to the development of less significant, disturbed lands, and the preservation of the most significant vegetation within land to be dedicated for conservation purposes.</p> <p>The Environmental Flora and Fauna Assessment (Annexure 3) prepared by SLR addresses bio-certification of the Draft Shoalhaven LEP 2013. This is further discussed in Section 5.6 of this EA. The preparation of Draft Shoalhaven LEP did not result in its bio-certification however notwithstanding this, the assessment of SLR concluded that the proposal will unlikely have a significantly impact provided recommended mitigation measures are implemented.</p> <p>This matter is addressed in SLR Report (Annexure 3). It is noted by SLR that the proposal for a arterial road access is no longer relevant with suitable access already physically constructed.</p>

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Key Issues	Comments
<p>9.4 Outline measures for the conservation of existing wildlife corridor values and/or connective importance of any vegetation on the subject land. Address the conservation and enhancement of the remnant line of trees running east-west across the centre of the property by the provision of a wildlife corridor from the creek to the forest. Investigate opportunities to conserve or enhance local and regional corridors and important habitats, such as creek lines, in the design of the proposal.</p>	<p>The Environmental Flora and Fauna Assessment (Annexure 3) prepared by SLR addresses the provision of habitat corridors in the locality. According to SLR, <i>“the proposed development will not impinge upon any relevant existing corridors within the subject land itself, or in the immediate vicinity”</i>. This is further discussed in Section 5.6 of this EA.</p>
<p>9.5 Describe all aquatic environments (watercourses, wetlands) located on or adjacent to the site and their regional significance.</p>	<p>The Environmental Flora and Fauna Assessment (Annexure 3) prepared by SLR includes a description of aquatic environments located on and adjacent to the site and which are limited to farm dams and modest intermittent watercourses. This is further discussed in Section 5.6 of the EA.</p>
<p>9.6 Predict impacts upon aquatic environments on or adjacent to the site (both temporary and permanent). Predict any temporary and permanent impacts upon water quality and aquatic threatened species, populations and ecological communities listed under the <i>Fisheries Management Act 1994 (NSW)</i>.</p>	<p>The Environmental Flora and Fauna Assessment (Annexure 3) prepared by SLR considers impacts on aquatic environments and this is further discussed in Section 5.6 of the EA. SLR conclude that no significant impacts will result from the proposal.</p>
<p>9.7 Address measures and safeguards to protect adjacent aquatic habitats, including SEPP 14 wetlands and riparian habitats; and provide full details and widths of proposed riparian buffer zones for Flat Rock Creek.</p>	<p>The Environmental Flora and Fauna Assessment (Annexure 3) prepared by SLR and the Water Cycle Management Report prepared by Storm Consulting (Annexure 7) and the Hydrogeological Assessment prepared by Martens Consulting Engineers (Annexure F of the Storm Report) addresses measures and safeguards associated with the protection of aquatic habitats. In particular, the proposal is to include the following mitigation measures:</p> <ul style="list-style-type: none"> the design and the subsequent management of stormwater control features, both during construction activities and following completion and occupation of the land, to limit the potential discharge of contaminants and to maintain existing hydrologic regimes within the Conservation Area. These features will be constructed and managed according to current 'best practice' principles, and as outlined in the Water Cycle Management Report of Storm Consulting (2012);

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Key Issues	Comments
9.7 <i>continued</i>	<ul style="list-style-type: none">the implementation of 'Water Sensitive Urban Design' principles, including the capture and re-use of stormwater runoff, the treatment of water to be discharged from the development, and the avoidance of the use of potable water for other purposes; anddetailed design of the peripheral bioretention swale and detention basin system to maintain soil moisture and groundwater regimes, and to provide supplementary habitat for native biota (particularly in the peripheral bioretention swale and detention basin system on the eastern side of the proposal).
10. NOISE	
10.1 Address potential noise impacts (existing and proposed) on the development, in particular, from road traffic and aircraft noise, and noise from the proposed Bamarang Power Station Stage 2 (MP08_0021). Address appropriate mitigation measures to ameliorate any identified noise impacts.	Noise issues having regard to road traffic, aircraft and the Bamarang Power Station are addressed in Section 5.7 of this EA. No noise impacts are expected due to the distance the site is from noise generating activities. Traffic generation is within RTA limits of acceptability. Mitigation of noise is therefore not required.
11. AVIATION/DEFENCE	
11.1 Address potential impacts of the proposal on the operations of HMAS Albatross, and consider flight path impacts from military aircraft operations on the proposal.	Impacts on the operations of HMAS Albatross are addressed in Section 5.8 of this EA. In this regard, no impacts are anticipated as the site is well clear of HMAS Albatross, and no development at a height to impact aircraft is proposed.

9.0 CONCLUSION

This report provides an Environmental Assessment in relation to a Part 3A Major Project Application for a residential subdivision at Mundamia within the City of Shoalhaven on the south coast of NSW.

The Mundamia area has been specifically identified by Shoalhaven City Council as an area suitable for residential development in order to meet the expected population growth over the next 20 to 30 year period and followed an extensive consultation phase with the community and relevant government agencies.

The proposed subdivision provides for the development of 312 residential allotments and various public reserve allotments for recreation and conservation purposes. The development supports the aims of SCC to provide for urban expansion of the Nowra urban area in a planned manner, considerate of relevant ecological and social impacts, that supports the essential and social infrastructure invested in this locality.

The proposed subdivision layout and accompanying reports are the result of extensive assessment undertaken on behalf of our clients, Twynam Mundamia Pty Ltd, and Shoalhaven City Council over a number of years. The proposed development is consistent with the ecological constraints applicable to the site.

This Environmental Assessment considers the issues raised by the Director-General of the Department of Planning in the Environmental Assessment Requirements, issued October 2010 and has properly addressed the requirements.

In preparing this environmental assessment, separate reports have been prepared addressing Aboriginal Heritage Impacts, Traffic and Transport Impacts, Ecological Flora and Fauna, Bushfire, Water Cycle Management, Site Contamination, Geotechnical Constraints and Acid Sulfate Soils, and these have been considered in this Environmental Assessment.

Key mitigation measures of this development include an appropriate subdivision design which will ensure that the development has a distinctive character, retention and conservation of ecologically sensitive areas, use of best practice stormwater management and consideration of natural hazards.

Support for the development is recommended subject to implementation of those matters outlined in the statement of commitments.