| *Provision* | *Comment* |
|---|---|
| *Environment Sustainability Goals* | |
| *Land*<br>1. *Ensure that development integrates the principles of ESD and is compatible with identified land use constraints.*<br>2. *Prevent, control and repair land degradation in the Kempsey Shire.*<br>3. *Minimise the generation of waste in the shire and implement further recycling activities.* | Through this development, SEPP 14 No. 436 will be rehabilitated and significantly improved from its current state.<br>Throughout construction of the development, waste will be kept to a minimum. Visitors to the cabins will be encouraged to recycle their waste where applicable.<br>The development is compatible with ESD principles. |
| *Water*<br>1. *Create a Total Catchment Management (TCM) aware, involved and practicing community.*<br>2. *Promote and encourage the responsible use and consumption of water.*<br>3. *Ensure the water quality within the waterways of our Shire sustains natural ecosystems.* | The tourist cabins will have water efficient fittings and will be encouraged to conserve water where possible.<br>The design of the development ensures that water quality in the nearby SEPP 14 Coastal Wetland will not be affected. |
| *Atmosphere*<br>1. *Improve the air quality of the Kempsey Shire.*<br>2. *Reduce the amount of greenhouse gases emitted from the Shire.*<br>3. *Ensure compliance with national and international laws and conventions prohibiting the use of ozone depleting substances.* | This development will not be a high emitter of atmospheric pollution. Guests to the tourist cabins will be able to walk to the beach, shops and restaurants, or alternatively drive a short distance. |
| *Biodiversity*<br>1. *Conserve and enhance the integrity and diversity of the indigenous flora and fauna, and their ecosystems.*<br>2. *Manage, control and reduce the presence of and adverse impacts of introduced weed species and feral and domesticated animals.* | Through this development, SEPP 14 No. 436 will be rehabilitated and significantly improved from its current state. Rehabilitation will include restoration of tidal ingress into the wetland, weed control, enhance planting and a five year maintenance and monitoring program. Rehabilitation of wetland vegetation will enhance its habitat value for native fauna. |
| *Social Sustainability Goals* | |
| *Health, Safety and Well-being*<br>1. *Promote and develop strategies that provide health services to all demographics of the shire.*<br>2. *Foster community and civic pride and return to the community a sense of safety, lessen vandalism and theft, and create an environment valuable to our health and well-being.*<br>3. *Have appropriate emergency plans in place to minimise and manage the risks posed to human life and property in the event of major natural disasters and climate change.* | The inclusion of the proposed nine tourist cabins will not increase the burden of health service providers in South West Rocks to an unacceptable extent.<br>The site is particularly susceptible to flood and bushfire natural disasters. A Flood Emergency Plan has been prepared for the cabins and is attached at **Appendix F**.<br>A Bushfire Hazard Assessment has been prepared for the cabins and is attached at **Appendix E**. The bushfire assessment requires appropriate bushfire protection measures for the cabins including:<br>▪ asset protection zones,<br>▪ bushfire construction levels;<br>▪ landscaping; and<br>▪ a bushfire emergency and evacuation plan. |

| *Provision* | *Comment* |
|---|---|
| *Culture and Heritage*<br>*1. Foster a vibrant, secure and inclusive culture in which equality, individual creativity, understanding, respect and diversity flourish.*<br>*2. Aspire to be the model community for coastal indigenous communities so both participate fully in mainstream society and hand down traditional cultural attributes.*<br>*3. Identify, protect and enhance all significant heritage sites, while promoting local heritage events and festivals to celebrate the diverse history of the Shire.* | The development does not contain any items of Aboriginal or European cultural heritage. The inclusion of the proposed tourist cabins will improve the vibrancy of South West Rocks. |
| *Open Space, Recreation & Sport*<br>*1. Provide and maintain a diverse range of open spaces and reserves in the Shire.*<br>*2. Provide and promote a variety of recreational facilities and activities to the residents of the Shire.*<br>*3. Promote the benefits of sport to the residents of the Shire and continue to attract major sporting events on an annual basis.* | The development of this site will not remove a valuable recreation area from South West Rocks. Guests staying at the cabins will be provided with ample access to open space, recreation and sporting opportunities. |
| *Social Infrastructure*<br>*1. Plan, develop and maintain safe and cost effective transportation infrastructure, including enhanced public transport options, that meets the needs of the community.*<br>*2. Provide clean, fresh potable water and treatment of wastewater to acceptable standards to the current and future residents of the Shire.*<br>*3. Provide high quality educational facilities to all members of the community.*<br>4. *Maintain a network of community halls and libraries throughout the Shire.* | Guests will be provided will sufficient access to social infrastructure, including utilities. |

| Provision | Comment |
|---|---|
| *Economic Sustainability Goals* | |
| *Business and Industry*<br>1. *Promote Kempsey as the principal town in the Shire, an icon and centre of excellence for high quality goods, services and facilities, upholding ESD principles and offering educational and employment opportunities, in particular, that add to the distinctive character of the region.*<br>2. *Create a healthy and vibrant business environment that is competitive and encourages innovation and sustainability.*<br>3. *Establish a world-class eco-tourism industry that promotes and sustains the natural beauty of the Shire's coastal regions, National Parks and State Recreation Areas.*<br>4. *Encourage the development of renewable energy based industry in the Shire.*<br>5. *Encourage knowledge based, skilful and innovative enterprise that has national and / or international significance.* | This development will not detract from Kempsey as the principal town in the Shire.<br>The increase in tourist accommodation will have positive impacts for local businesses. |
| *Employment, Income & Training*<br>1. *Foster an economy with high levels of employment and increased capacity to pay higher wages.*<br>2. *Foster an economy that provides a variety of employment & training opportunities.* | Through this development, some new employment opportunities will be created. It is not expected that these will be high wage earning positions. |
| *Development*<br>1. *Ensure development takes place at a sustainable rate and is relevant to the Shire's capacity to service that development.*<br>2. *Encourage and promote development that uses best practice energy and water saving designs.*<br>3. *Ensure the visual amenity of the Shire is preserved or enhanced by encouraging visual coherence, diversity and attractiveness of development, which complement the natural beauty of the Shire.* | The proposed development is small and is considered commensurate with the desired slow and sustainable rate of growth.<br>Best practice water and energy saving fittings and fixtures will be provided in each of the nine cabins.<br>The design of the cabins is in keeping with the vernacular of a small coastal town and is attractive. Landscaping of the site will improve the attractiveness of the development. |

### 5.9.2 Kempsey Shire Council's Flood Risk Management Policy

The objectives of the Flood Risk Management Policy are:

- *to ensure that new development in flood prone lands is compatible with the degree of flood hazard and that adequate flood risk management measures are incorporated in the design of the development thereby minimising the possibility of loss of life and damage to property;*
- *to encourage the re-development of existing flood prone lands in a manner that will minimise the chance of loss of life and damage to property by future flooding;*
- *to prevent the creation of any "new area" of urban development on flood prone lands;*
- *to prevent any extension of existing urban zoned areas into flood prone lands; and*
- *to seek the eventual clearance of the Kempsey Local Floodway Number 1 and its re-development for recreational, agricultural and limited commercial uses which will only have a minimal effect on the free flow of floodwaters and minimal risk of causing loss of life or damage to property; e.g. sporting fields; picnic grounds; nurseries' recreational facilities with minimal permanent buildings and no residential quarters.*

The site is subject to flooding. Council's Flood Risk Management Policy accordingly applies to the proposal. The policy sets out requirements for development of flood prone land. Flooding and the implications of the provisions of this policy in regard to the site are discussed in **Section 6.3**.

### 5.9.3 Macleay River Estuary Process Study 2009

The Macleay River Estuary Processes Study (WMA, 2009) defines baseline conditions for the various estuarine processes and examines the interactions between the processes and human use of the estuary. The purpose of the processes study is to provide a sound understanding of the estuary processes and issues to inform the development of management strategies in the preparation of the Estuary Management Study.

The Macleay River Estuary Management Study (EMS) has been recently completed by GeoLINK in association with GECO Environmental and Aquatic Science and Management (GeoLINK *et al*, 2010). The EMS identifies estuary values, uses, issues, management objectives and an initial set of management strategies with the aim of improving the health of the estuary and providing for the various uses of the estuary such as boating and fishing.

The main issues identified in the EMS that are relevant to this environmental assessment include:

- The health of floodplain wetlands which are intrinsically connected to estuarine ecology and health but have been significantly altered in the Macleay estuary due to land clearing, drainage and flood mitigation works;
- Acid sulfate soils – the entire floodplain is underlain by estuarine soils that include acid sulfate soils. Exposure of acid sulfate soils which has led to water quality issues, reduction in agricultural productivity, and loss of estuarine habitat;
- Sedimentation and dredging particularly in relation to boating navigation of waterways in the estuary;
- Tourism to identify opportunities in respect to the range of estuary values and uses;
- Protection of ecological habitats and wildlife such as remaining rainforest pockets, wetlands, black cod and migratory shorebirds; and
- Climate change impacts on the estuary particularly in regard to sea level rise.

The EMS developed a range of management objectives to address the estuary issues and values. The management objectives directly relevant to this environmental assessment include:

- Acknowledge sea level rise and climate change within the landuse planning framework;
- Improved export water quality from floodplain wetland areas;
- Pursue active water management of floodgates in non-flood periods;
- Conservation of representative areas of floodplain wetlands;
- Plan for appropriate landuse of floodplain and backswamps susceptible to sea level rise;
- Improved water retention in floodplain wetlands;
- Utilise best-practice erosion control, riparian management techniques and flood mitigation works;
- Reconnect the built form and public domain of riverside townships with the Macleay River;
- Protect and manage important habitat areas;
- Preparation of a strategic plan for the future management of floodplain wetlands;
- Reduce the sediment load from diffuse sources and erosion;
- Protect and manage migratory and threatened birds (particularly shorebirds);
- Minimise sediment loads that impact upon estuarine habitat and reduce water quality.

The following elements of the proposed development compliment the above EMS management objectives:

- rehabilitation, protection and management of SEPP 14 Wetland on the subject site including restoring tidal flows (**Section 4.6** in this report) address the objectives relating to: improved management of floodplain wetlands; active water management of floodgates; management of acid sulfate soils; improved water retention and improved export water quality from floodplain wetland areas; and protection of important habitat areas;
- the proposed stormwater management plan including a constructed wetland (**Section 4.6** in this report) address issues associated with best-practice erosion control and minimising sediment loads that impact upon estuarine habitat and reduce water quality;
- the proposed works including the constructed wetland have been designed to avoid acid sulfate soil issues (**Section 6.7** in this report);
- the focus of the Riverside Tourist Cabins is on the Macleay River with the orientation of the decks and living spaces of the cabins (Living/Dining/Kitchen rooms) creating a more active riverfront domain along New Entrance Road. This compliments the EMS objective of reconnecting the built form and public domain of riverside townships with the Macleay River;
- the cabins, access road and site fill levels have been designed to address flooding issues and future sea level rise (**Section 6.3** in this report).

### 5.9.4 Northern Rivers Catchment Action Plan

The Northern Rivers Catchment Action Plan (CAP) is a statutory, but non-regulatory plan, which is the central mechanism to prioritise and deliver natural resource management investments and outcomes to the catchment community of the Northern Rivers region. It does this by:

- identifying and providing the long term direction to address natural resource management issues that adversely impact on the catchment and future sustainable development of the region;
- establishing a clear direction for community funded investments to repair and rehabilitate natural resources in the catchment that are under stress; and
- managing incentive programs maximising environmental outcomes.

Of particular relevance to this project is the land use planning theme contained within the CAP. In this regard, the CAP has outlined management targets to ensure the objectives of the CAP in relation to land use planning are achieved. These management targets relate to:

- Aboriginal cultural integration;
- conservation of key environmental assets and rural production areas;
- minimising land use conflict; and
- natural resource integration.

The objectives of the Northern Rivers CAP are of particular relevance to this Project for the following reasons:

- the site contains a SEPP 14 Wetland which has significant ecological and biodiversity value ot the local and regional community;
- the site is adjacent to the McLeay River Estuary;
- the site contains visually significant attributes;
- the site is in proximity to items of Aboriginal Cultural Heritage Significance; and

The purpose of this Environmental Assessment is to assess the impacts of the proposed Tourist Cabins, including the natural resource and environmental assets that exist within and external to the site. This assessment is undertaken in **Section 6.** The project also seeks to improve the ecological and biodiversity value of the site by implementing significant improvements to the SEPP 14 Wetland that exists within the site by reintroducing tidal flow under a strict management regime. This regime is documented in a Wetland Management Plan which is attached as **Appendix C**. It is considered that the findings and commitments of this Environmental Assessment demonstrate that the Project is consistent with the relevant management targets set by the Northern Rivers CAP.

## 5.10 Environment Protection and Biodiversity Conservation Act 1999

According to the EPBC Act, an action would require approval from the Australian Government Environment Minister (the Minister) if the action has, would have, or is likely to have, a significant impact on a matter of national significance (DEH 2006). DEH (2006) provides a number of significant impact criteria guidelines to assess whether a proposed activity is likely to have a significant impact on a matter of national significance, and consequently whether or not to submit a referral to the Australian Government Department of Environment, Water, Heritage and the Arts (DEWHA).

Under the environmental assessment provisions of the EPBC Act, the following Matters of National Environmental Significance (MNES) are required to be considered to assist in determining whether the proposal should be referred to the Australian Government Department of the Environment, Water, Heritage and the Arts (DEWHA).

An assessment of the proposal with regards to MNES is provided in **Table 5.7** below. This assessment was undertaken with reference to an online search using the DEWHA's Protected Matters Search Tool with a buffer area of 10 km around the site.

**Table 5.7 EP&BC Act Assessment**

| | *Factor* | *Impact* |
|---|---|---|
| **a** | **Any Environmental Impact on a World Heritage Property?** | |
| | No World Heritage Properties were listed by the Protected Matters Search Tool within 10 km of the site. Consequently the proposed development is not likely to have a significant impact on any World Heritage Property. | Nil |
| **b** | **Any Environmental Impact on National Heritage Places?** | |
| | No National Heritage Places were listed by the Protected Matters Search Tool within 10 km of the site. Consequently the proposed development is not likely to have a significant impact on any National Heritage Places. | Nil |
| **c** | **Any Environmental Impact on Wetlands of International Importance?** | |
| | No Wetlands of International Significance (Ramsar Sites) were listed by the Protected Matters Search Tool within 10 km of the site. Consequently the proposed development is not likely to have a significant impact on any Wetlands of International Significance. | Nil |
| **d** | **Any Environmental Impact on Commonwealth Listed Threatened Species or Ecological Communities?** | |
| | No EEC listed under the EPBC Act occurs on or directly adjacent to the site.<br><br>A total of 20 threatened species listed by the EPBC Act, comprising 7 flora and 13 fauna species, were identified by the Protected Matters Search Tool as '*species or species habitat likely to occur'* within a 10 km radius of the site. The Grey-headed Flying-fox was the only threatened species recorded or considered a potential occurrence on the site. An assessment of significance in accordance with the Administrative Guidelines of Significance for EPBC listed species concluded that the proposal is unlikely to result in a significant impact on this species (refer to **Appendix D**).<br><br>Overall the proposal is not considered likely to result in a significant impact on any EPBC Act listed threatened species or ecological communities. | Negligible. |

| | *Factor* | *Impact* |
|---|---|---|
| **e** | **Any Environmental Impact on Commonwealth Listed Migratory Species?** | |
| | A total of 18 listed migratory species were identified by the Protected Matters Search Tool, as '*species or species habitat likely to occur'* within the defined search area. The potential impact of the proposal on the migratory species considered to potentially occur within the study area has been assessed under the Administrative Guidelines (refer to **Appendix D**) for significant impact. The assessment concluded that the proposal is unlikely to result in a significant impact on any listed migratory species. | Negligible. |
| **f** | **Does Any Part of the Proposal Involve a Nuclear Action?** | |
| | The proposal does not involve a nuclear action. | Nil |
| **g** | **Any Environmental Impact on a Commonwealth Marine Area?** | |
| | No Commonwealth Marine Areas were listed by the Protected Matters Search Tool within 10 km of the site. Consequently the proposed development is not likely to have a significant impact on any Commonwealth Marine Areas. | Nil |
| **h** | **Any Environmental Impact on Commonwealth Land?** | Nil |
| | The Proposal is not in proximity to any Commonwealth Land, and therefore would have no impact on such lands. | |
| **i** | **Any Environmental Impact to the Great Barrier Reef Marine Park** | |
| | The study area is not located in proximity to any parts of the Great Barrier Reef Marine Park and therefore would have no impact on this protected matter. | Nil |

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# Environmental Impact Assessment

## 6.1 Ecology

A detailed flora and fauna assessment has been carried out by James Warren and Associates Pty Ltd ecological consultants, with the resultant report contained in full as **Appendix D** to this report. This section summarises the main elements of the report.

The scope for the Ecological Assessment is as follows:

- mapping and ground truthing vegetation units and determining their conservation status with reference to the Comprehensive Regional Assessment completed for NSW Forest and Non-forest ecosystems as part of the Regional Forestry Agreement (RFA) process (CRA Unit 1999);
- searching for and recording Threatened (TSC Act 1995), ROTAP (Briggs & Leigh 1996) and regionally significant plant species (Sheringham & Westaway 1995), and assessing the occurrence of Endangered Ecological Communities (EECs);
- determining the suite of Threatened fauna (TSC Act 1995) that occurs in the locality and assessing their potential occurrence in the Study area;
- assessing habitat provided by the site in relation to adjacent habitat and making an assessment of the corridor value of the site; and
- addressing statutory requirements including Part 3A of the Environmental Planning & Assessment Act (1979) (EPA Act), the Commonwealth Environment Protection and Biodiversity Act 1999 (EPBC Act) and the Fisheries Management and Amendment Act (1997).

### 6.1.1 Flora and Fauna Assessment

Detailed flora and fauna assessments were undertaken for the site. The flora assessment recorded five vegetation communities and two EECs, Coastal Saltmarsh and Swamp Oak Floodplain Forest. The fauna assessment recorded 68 fauna species (6 amphibians, 4 reptiles, 46 birds and 12 mammals) and no threatened fauna species. Five threatened fauna species were considered either likely to occur or a possible occurrence on the subject site over time.

#### *6.1.1.1 Potential Impacts*

Potential direct impacts to vegetation are low, as there will be no significant loss of native vegetation on the site. A small area of Coastal Saltmarsh (EEC) occurs in the area proposed for the constructed stormwater wetland, however the report stated that it is highly degraded and excluded from the mapping of SEPP 14 Wetland. Potential indirect impacts to vegetation could arise from stormwater runoff.
Potential impacts to fauna are low. A population of Eastern Grey Kangaroos occurs in the area, however this is not a threatened species and the development is unlikely to have a major impact on the survival of this population. Human interaction is discouraged and the ecological assessment further recommends educational signage to this end.

Potential impacts to possible occurrences of threatened fauna species may include:

- increased light, noise and activity may cause reclusive species to move away from habitat edges;
- alteration of hydrology;
- contamination or reduction of water quality drainage lines due to runoff from the chemicals or debris; and
- introduction of weed species into core habitat areas.

#### *6.1.1.2 Avoidance of Impacts*

The layout of the proposed development has been designed to avoid areas of significant vegetation, and occurs within an area of grassland, with scattered trees. This area does not contain any areas of significant native vegetation, nor represent significant habitat for native fauna species.

#### *6.1.1.3 Mitigation*

The Wetland Management Plan (WMP) provides details of mitigation measures to protect, enhance and manage the SEPP 14 Wetland area. These measures include construction of a freshwater wetland which will provide treatment to stormwater from the development and provide a buffer from the development to the SEPP 14 Wetland. Tidal flows into the SEPP 14 Wetland will be reinstated, weed management and additional planting will provide further protection and enhancement of the SEPP 14 Wetland area. By improving vegetation, the values of the area as habitat for native fauna (including potential occurrences of threatened species) and will also be improved.

#### *6.1.1.4 Endangered Ecological Communities*

There will be no direct loss of vegetation with the EECs, with the exception of a small area of highly degraded Coastal Saltmarsh within the proposed constructed wetland. Indirect impacts on EECs may occur during construction and operation phases. This may occur as a result of reintroduction of tidal flows into the SEPP 14 Wetland. The current vegetation patterns reflect the restriction of tidal flows into the SEPP 14 Wetland that was created by construction of a road adjacent to the northern lot boundary. Less salt tolerant species have become more widespread. A return to more natural tidal ingress will result in a likely retreat of less salt tolerant species and expansion of more salt tolerant species.

### 6.1.2 Wildlife Habitats and Corridors

The site was assessed for the conservation of existing wildlife corridor values and / or connective importance of any vegetation on the subject land. The ecological assessment states that no part of the proposed site is identified as National Parks and Wildlife Key Habitats and Corridors. A regional corridor occurs adjacent to the northern boundary of the lot, the South West Rocks - Macleay Arm Corridor.

The proposed development will have no direct impact on the effectiveness of the corridor. Mitigation measures outlined in the WMP provide positive impacts to this area.

### 6.1.3 Protection and Management of Riparian and Aquatic habitats

#### *6.1.3.1 Potential Impacts*

Direct impacts to the SEPP 14 Wetland and EECs that occur on the site are low as the development occurs on disturbed land outside the SEPP 14 boundary. Indirect impacts may occur from:

- increased light, noise and activity may disturb fauna within the wetland;
- fuel reduction activities in the bushfire Asset Protection Zone (APZ);
- pollution as a result of untreated stormwater runoff; and
- uncontrolled human access causing trampling.

#### *6.1.3.2 Avoidance of Impacts*

The proposed development is located outside the SEPP 14 Wetland and in a highly disturbed area.

#### *6.1.3.3 Mitigation*

Mitigation measures outlined to provide protection and management of riparian and aquatic habitats include:

- vegetation rehabilitation in the area between the cabins and the SEPP 14 Wetland, including weed control;

- planting within the buffer between the cabins and the SEPP 14 Wetland to ensure compliance with both the bushfire APZ requirements and provision of a vegetated buffer to the EECs and SEPP 14 Wetland;
- a Stormwater Management Plan, including construction of a wetland (outside of the SEPP 14 Wetland boundary) to provided treatment and improve quality of stormwater runoff from the development into the SEPP 14 Wetland; and
- the physical barrier created by the stormwater wetland between the development and SEPP 14 Wetland, fauna friendly fencing (such as bollards) and signage stating the area is an environmental protection area, and warning people to keep out.

In addition, reinstatement of tidal ingress into the SEPP 14 Wetlands at the northern boundary of the lot will enable restoration of the area to its former condition.

### 6.1.4 SEPP 14 Wetland No. 436

The boundary of the SEPP 14 Wetland was surveyed and ground-truthed by the Department of Planning. **Illustration 4.3** outlines the re-surveyed SEPP 14 Wetland boundary. The proposed stormwater wetland will provide a sufficient buffer to the SEPP 14 Wetland.

### 6.1.5 Native Vegetation Act

The Ecological Assessment addresses the objectives of the Native Vegetation Act, and provides the following responses:

- the proposed development has measures included to manage the native vegetation on the site;
- there will be no broad scale clearing for the proposed development;
- the proposed development will protect native vegetation of high conservation value having regard to its contribution to such matters as water quality, biodiversity, or the prevention of salinity or land degradation. All the vegetation representative of EECs and within the SEPP14 Wetland on the subject site will be retained;
- all the retained vegetation on site will be the subject of a WMP. The objectives of the WMP will be to protect, enhanced and manage the EECs and the SEPP14 Wetland on the subject site; and
- areas included in the WMP will be revegetated and rehabilitated with appropriate native vegetation. However, natural regeneration will be encouraged as a priority.

### 6.1.6 SEPP 44 Koala Habitat

The Ecological Assessment identified that the site does not contain core Koala habitat as areas of native vegetation do not contain trees of types listed in Schedule 2 constituting at least 15% of the total number of trees. Therefore there is no requirement for a Plan of Management for core Koala habitat.

### 6.1.7 Commonwealth Environment Protection and Biodiversity Conservation Act

There are no declared World Heritage Areas or Ramsar Wetlands in the Locality, Study area or Subject site. No Commonwealth Threatened flora species were recorded on the Subject site. No Commonwealth Threatened fauna species were recorded on the Subject site. No ecological community currently listed in the EPBC Act (1999) occurs in the study area.

Listed migratory species in NSW are considered predominantly in the Japan-Australia Migratory Bird Agreement (JAMBA) and China-Australia Migratory Bird Agreement (CAMBA). No migratory species as listed within schedules of the EPBC Act (1999) were recorded on site, however the Little Tern Stema albifrons is considered a possible occurrence on site.

It is considered that although the Little tern is likely to occur occasionally in the study area, no area of important habitat occurs in the Study area and thus there will be no negative impacts on this species. Based on the assessment provided above, Referral to the Commonwealth DEWHA is not required. The

proposed action is unlikely to result in a significant impact on any matter of National Environmental Significance (NES).

## 6.2 Bushfire

Kempsey Shire Council's (KSC) bushfire prone land mapping indicates that the site is located on bushfire prone land, and therefore GeoLINK have prepared a bushfire hazard assessment for the proposed development which is attached as **Appendix E**.

As the proposed tourist cabins development will be assessed under Part 3A of the EP&A Act therefore a Bushfire Safety Authority (required for 'Special Fire Protection Purpose' - SFPP developments) under Section 100B of the *Rural Fires Act 1997* is not required. The NSW Department of Planning will determine the application in consultation with the NSW Rural Fire Service.

### 6.2.1 Assessment of Bushfire Hazard

An assessment has therefore been undertaken (in accordance with the procedure set out in Appendix 2 *Planning for Bushfire Protection 2006 - PBP)* to determine appropriate bushfire hazard protection measures for the proposed development.

The assessment contained in this report has been prepared with regard to:

- *Planning for Bushfire Protection (PBP) 2006*
- *Addendum: Appendix 3 Planning for Bushfire Protection (2010);*
- *Environmental Planning and Assessment Act 1979*;
- *Rural Fires Act 1997*;
- *Rural Fires and Environmental Assessment Legislation Amendment Act 2002*; and
- *Australian Standard 3959-2009 Construction of Buildings in Bushfire Prone Areas*.

The bushfire hazard assessment serves to determine the bushfire threat to the proposed development and identify precautions required to improve the chances of building survival in the event of a bushfire.

Vegetation was assessed in terms of potential fire hazard using the formation classes provided within Table A2.1 of PBP 2006. The effective slopes under hazard vegetation that is likely to affect bushfire behaviour were assessed.

The main bushfire hazards are the forested wetland vegetation located east of the proposed site. The effective slope was determined to be 0.5 degrees from site survey.

Asset Protection Zones of 44 m to the east of the proposed cabins, and 10 m to the north of the proposed cabins are required. APZs can be located wholly within the property boundary. APZs for the four northern most cabins cannot be achieved due to their separation distance from the SEPP 14 Coastal Wetland.

Reduced APZs for the four northern most cabins can comply with performance criteria and intent of the measures by having exits from the buildings facing away from the hazard vegetation, and exposure to radiant heat levels at the entry and exit below 10 kW/m$^2$, satisfying the radiant heat exposure criteria for occupants and emergency service workers.

### 6.2.2 Safeguards and Mitigation Measures

The bushfire assessment recommended the following conditions be adopted for the proposed development:

- APZs of 44 m to the east be established and maintained for the five southern most cabins, as outlined in **Section 4.1** and **Table 4.1,** and according to PBP;
- APZs be established and maintained for the four northern most cabins to the SEPP 14 Coastal Wetland and according to PBP;
- APZs of 10 m to the north of the proposed cabins be established and maintained for the northern most cabin;
- landscaping and general property maintenance should comply with Appendix 5 of PBP 2006;
- a specific bushfire construction level of BAL-29 for the eastern façade and BAL-19 for all other façades for cabins 1 to 4;
- a specific bushfire construction level of BAL-19 for the eastern façade and BAL-12.5 for all other façades of cabins 6 and 8;
- a specific bushfire construction level of BAL-12.5 for all façades of cabins 5, 7 and 9; and
- an emergency and evacuation plan be prepared for the cabins for the purposes of bushfire protection in accordance with *A guide to Developing a Bushfire Evacuation Plan* (RFS 2004).

### 6.2.3 Conclusion

The report concluded that adequate and appropriate bushfire hazard protection measures are available, and can be implemented on the site to facilitate the proposed cabins. The proposal conforms to the standards, specific objectives and performance criteria set out in Planning for Bushfire Protection 2006.

## 6.3 Flooding

WMAwater (2010) prepared a flood study for the site which addressed:

- design flood levels and flood hazard at the site;
- flood impacts of the proposed development;
- potential implications of sea level rise and/or increases in rainfall intensity;
- flood evacuation considerations; and
- appropriate fill levels for the site based on consideration of flood risk and impacts.

The essential findings of the study are:

- the minimum habitable floor levels of the cabins is 3.25 m AHD (equivalent to the 1% AEP flood level under the 2050 climate change scenario plus 0.5 m freeboard);
- the minimum fill level for the site is 1.9 m AHD which will avoid nuisance flooding from the existing 10% AEP flood level and from high spring tide water levels; and
- the access road (the flood egress route) within the site to Marlin Drive needs to grade upwards continuously without low-points. The road should be initially filled to a minimum level of 1.9 m AHD at the northern end of the site, with a consistent rising grade of at least 0.3% from north to south to provide evacuation to the high ground at Marlin Drive.

The background to the above findings is described in the following sub-sections.

### 6.3.1 Modelling

The flood study utilised comprehensive hydrographic survey of the Macleay River from a previous assessment and detailed survey for the site which were combined into a Digital Elevation Model of the site and surrounding area. WMAwater established a localised 2D hydraulic model of existing conditions covering the subject site and surrounding areas, including the Macleay River and nearby wetlands. The model of existing conditions was then adjusted to reflect the proposed development.

Flooding at the site is governed by two primary flow mechanisms:

- inundation from the Macleay River when catchment runoff exceeds the capacity of the main river channel, and
- elevated ocean water levels due to storms and tidal variation, due to the proximity of the site to the river mouth and South West Rocks Creek.

Therefore two scenarios were considered:

- the 1% AEP (1 in 100 year) flood flow in the Macleay River in conjunction with the 5% AEP (1 in 20 year) ocean level; and
- the 1% AEP ocean level in conjunction with the 5% AEP flood flow in the Macleay River.

### 6.3.2 Climate Change Considerations

Sea level rise considerations are based on recent NSW Government guidelines. Sea level rise benchmarks of 0.4 m rise by 2050 and 0.9 m rise by 2100 were adopted. Due to the site elevation being relatively low (less than 4 m AHD), other considerations include:

- the flood study should utilise the 2100 sea level rise benchmark of 0.9 m when determining design flood levels at the site;
- any sea level rise must not be accounted for in the 0.5 m freeboard; and
- a conservative and quick estimate of the sea level rise impacted 1% AEP flood level is to add the sea level rise benchmark (0.9 m) to the "existing" 1% AEP flood level.

To account for increased rainfall intensities arising from climate change, an increase of 10% was applied to the peak flood flow in the Macleay River.

### 6.3.3 Design Flood Levels

The critical 1% AEP design flood scenario for the site was found to be the 1% AEP ocean level in conjunction with the 5% AEP flood flow in the Macleay River. Peak flood levels are shown in **Table 6.1**.

**Table 6.1 Design Peak Flood Levels**

| *Event Probability* | *Existing Design Peak Flood Level (m AHD)* | *2050 Projected Peak Flood Level (m AHD)* | *2100 Projected Peak Flood Level (m AHD)* |
|---|---|---|---|
| 10% AEP | 1.90 | 2.30 | 2.80 |
| 5% AEP | 2.10 | 2.50 | 3.00 |
| 2% AEP | 2.25 | 2.65 | 3.15 |
| 1% AEP | 2.35 | 2.75 | 3.25 |
| PMF (Probable Maximum Flood) | 4.0* | ** | ** |

Source: *WMAwater (2010)*

Notes: * The PMF level is an estimate only, based on the approximate level of surrounding dune systems which would be overtopped and provide additional flowpaths during the PMF event

** PMF levels under climate change scenarios are not estimated, since it is unknown how the dune system will respond to the projected changes.

### 6.3.4 Habitable Floor Levels

Assuming an expected design life for the cabins of 50 years, the habitable floor levels of the cabins is equivalent to the 1% AEP flood level under the 2050 climate change scenario plus 0.5 m freeboard. This equates to a minimum habitable floor level of 3.25 m AHD. By the year 2050, the cabins should be raised

to the projected 2100 1% AEP flood level plus 0.5 m freeboard as part of an adaptive management strategy. The raised level should be based on updated sea level rise predictions at the time of review.

### 6.3.5 Site Fill Levels and Flood Evacuation Considerations

The fill level for the site is governed by flood evacuation considerations. For the purposes of flood evacuation it is desirable to have a clear unambiguous egress route to high ground at Marlin Drive, and the route should grade upwards continuously without low-points. This will reduce the likelihood of occupants being cut-off by rising floodwaters.

It is also desirable that the site should have sufficient elevation to avoid nuisance flooding. For example, a filled level of 1.9 m AHD will give protection from the estimated existing 10% AEP flood level. Sea level rise associated with climate change will also present a real risk of nuisance flooding due to spring tides, with a high spring tide water level (approximately once a year) of around 1.5 m AHD in 2050 and 2.0 m AHD by 2100.

Based on the above considerations, it is recommended that the filled level of the site is a minimum level of 1.9 m AHD. The access/evacuation routes through the site should also be initially filled to a minimum level of 1.9 m AHD at the northern end of the site, with a consistent rising grade of at least 0.3% from north to south to provide evacuation to the high ground at Marlin Drive.

An adaptive management strategy is recommended in regard to future rising of the fill levels and access/evacuation route levels. By the year 2050, the fill levels should be raised by the same height as the predicted sea level rise over the period from the year 2050 to 2100. This should be based on updated sea level rise predictions at the time of review.

### 6.3.6 Flood Emergency Plan

A detailed Flood Emergency Plan for the site has been prepared by WMA Water and is provided as an attachment to the Flood Assessment attached at **Appendix F**. An additional action for the Flood Emergency Plan for the "Respond – Flood Very Likely" phase is placement of cabin waste bins on the decks of each cabin which places the bins above the 1 in 100 year flood level. Relocation of the bins to the normal location will be included as an action in the "Recover – After The Flood" phase of the Flood Emergency Plan. The responsibility for the maintenance and operation of the Emergency Plan are the responsibility of the site owner/operator.

### 6.3.7 Flood Impact of Proposed Development

The hydraulic impacts of the proposed development were assessed by comparing modelling results for existing conditions and the proposed development conditions. The proposed development conditions included filling the site. Results from the hydraulic modelling indicate the proposed development is unlikely to have a significant impact on peak flood levels (less than 0.01 m for the range of events modelled). The position of the site adjacent to the high ground to the south is such that the fill does not significantly impede the existing flood flow paths. The removal of temporary floodplain storage is not considered to be significant, since the flood volumes associated with both ocean and river flooding are orders of magnitude larger than the fill volume.

### 6.3.8 Flood Impact of Restoring Tidal Flows to the SEPP 14 Wetland on the Site

Restoring tidal flows to the site is unlikely to significantly affect flood behaviour at the site. The existing 375 mm pipe is too small to have any noticable effect on floods from the Macleay River or storm surge. Therefore the proposed removal of the existing floodgate on the 375 mm pipe would not have any noticable effect on flood levels for the site or elsewhere.

Installation of a 900 mm culvert pipe beneath Government Road would also not alter the results or outcomes of above flood assessment for the site due to the limited flow capacity of the pipe in comparison to flood flows from the Macleay River. The potential future removal of the automatic tide floodgate from

the 900 mm culvert pipe would increase the connectivity of the site with Back Creek to the north of Government Road and also slightly improve drainage of local runoff occurring from the steep catchment surrounding the subject site. This increased capacity might result in some increases in velocity and scour potential in the immediate vicinity of the pipe outlet, but such effects are adequately mitigated by suitable detail design of the culvert including scour protection.

## 6.4 Water Quality

### 6.4.1 Restoring Tidal Flows to the SEPP 14 Wetland in the Site

#### *6.4.1.1 Potential Impacts*

Due to the past blocking of tidal flows to the wetland area in the site, the watertable will have been lowered which has potentially exposed shallow actual acid sulfate soil (ASS) horizons resulting in oxidation of sulphides within the soils and generation of sulphuric acid and acid leachate. The soils would then referred to as actual ASS (AASS). The generated sulphuric acid would be stored as acid pools within the soils and potentially on the soil surface.

Restoring tidal flows to the SEPP 14 wetland area in the site has the potential to export acidic water and other products of ASS oxidation into Back Creek. This could occur due to tidal water infiltrating into shallow actual acid sulfate soil horizons and draining out these products as tidal waters recede. The potential for this impact is dependent on the soils having a high saturated hydraulic conductivity and the presence of actual acid sulfate soils within the area of inundation. If AASS are present it is anticipated this impact is currently occurring during significant rainfall events via stormwater inflows to the wetland infiltrating into the shallow actual acid sulfate soil horizons and draining out these products as the stormwater flows discharge to Back Creek via the culvert beneath Government Road.

The potential export of acidic water and other products of ASS oxidation via tidal flows would occur in the areas that experience tidal fluctuations around the fringe of the permanent inundation area. The modelling detailed in **Appendix O** indicates that the tidal fluctuations in the site generally occur between 0.3 and 0.4 m AHD for initial tidal flow restoration.

Preliminary research included a search of the NSW DPI fish kill database, a review of the Back Creek South West Rocks Sustainability Assessment Report (SWRSAR), and a discussion with Mr Matthew Birch, a contributor of the Coastal Lake Assessment and Management (CLAM) for Back Creek. The research indicated that there are no records of fish kills occurring in Back Creek. Export of acidic water and other ASS byproducts were not considered a significant issue in the CLAM for Back Creek and the SWRSAR. However it is understood that the wetland area above the floodgates may have contained acid scalds. It is considered that restoring tidal flows in the wetland would have less capacity to export acid water and leachates when compared to storm events.

Restoring tidal flows to the SEPP 14 wetland area in the site also has the potential to provide beneficial water quality impacts by providing some buffering of acidic water exiting the site during significant stormwater events.

#### *6.4.1.2 Mitigation Measures*

To confirm that there is no significant export of acidic water and other ASS byproducts, particularly in the initial stages of tidal restoration, the following water quality monitoring is proposed:

- Water quality monitoring within the wetland at the upstream end of the Government Road culvert, and at the New Entrance Road culvert, Back Creek (monitoring to be undertaken on the outgoing tide):
  - before the restoration of tidal flows to provide baseline levels (to be undertaken weekly over two weeks):
  - during the initial inundation (to be undertaken weekly for a minimum period of six weeks);

- at each significant increase in tidal exchange capacity (at the commencement of Stage 2 and Stage 3) to be undertaken weekly for a minimum period of six weeks.

### 6.4.2 Stormwater Management

The potential impact of stormwater runoff on the adjacent SEPP 14 wetland has been assessed in respect to water quality impacts using the MUSIC Version 4.0 program (eWater Limited, 2009). The modelling results indicate the water quality discharged to the SEPP 14 wetland will be significantly improved in comparison the current runoff from the site as a result of the proposed stormwater treatment train.

#### *6.4.2.1 Consideration of Adjoining Tavern*

Stormwater management for the adjoining "The Riverside" Tavern was considered to determine if it needs incorporating into the stormwater management system for the subject site. All roofwater and carpark runoff from the tavern site is directed to the south-east corner of the site to a CDS® type gross pollutant trap and oil skimmer. The treated stormwater is discharged from the treatment system via a pipe and headwall in the south-east corner of the site. The discharge pipe has an invert level of approximately 0.5 m AHD. The system is shown in **Illustration 4.4**. Data on the CDS® gross pollutant trap and oil skimmer pollutant removal efficiencies are shown in **Table 6.2**. Additional treatment would be provided via the informal swale system downstream of the treatment outlet prior to the flows entering the SEPP 14 wetland. Based on the pollutant removal efficiencies shown in **Table 6.2** the existing treatment system for the tavern site is considered adequate. Therefore no additional measures are considered necessary for the tavern site and it is not considered necessary to incorporate the tavern stormwater into the stormwater management system for the subject site.

**Table 6.2 CDS® Gross Pollutant Trap – Capture Performance Summary**

| *Pollutant / Items* | *Removal Efficiency* | *Independent Reference Source* |
|---|---|---|
| Suspended Solids (TSS) | 70 % | CRCCH Report 99/2 Feb 1999 |
| Total Phosphorous (TP) | 30 % | CRCCH Report 99/2 Feb 1999 |
| Total Nitrogen (TN) | 0 % | Scattered results |
| Gross Pollutants (>5mm) | 98 % | CRCCH Report 98/3 Apr 1998 |
| Sediments >0.215mm | 95 % | Portland State Uni, Oregon Oct 02 |
| Fine sediment > 75 microns | 90 % | Louisiana State University 2004 |
| Heavy Metals | 80 % | Louisiana State University 2004 |
| Hydrocarbons, Oils & Grease | 82-94 % | UCLA Report 1998 |

Source: Rocla, 2010.

#### *6.4.2.2 MUSIC Modelling of Stormwater Treatment*

A conceptual stormwater treatment model was developed using the MUSIC software in order to quantify the pollutant removal provided by the proposed stormwater strategy. The conceptual layout is shown in **Plate 6.1**. Details of the treatment systems are summarised in **Appendix G**.

The following design criteria have been adopted with regard to stormwater treatment:

- Council's general stormwater management objectives (refer to results in **Table 6.3**); and
- improve current water quality discharges to the SEPP 14 Wetland (refer to results in **Table 6.3**).

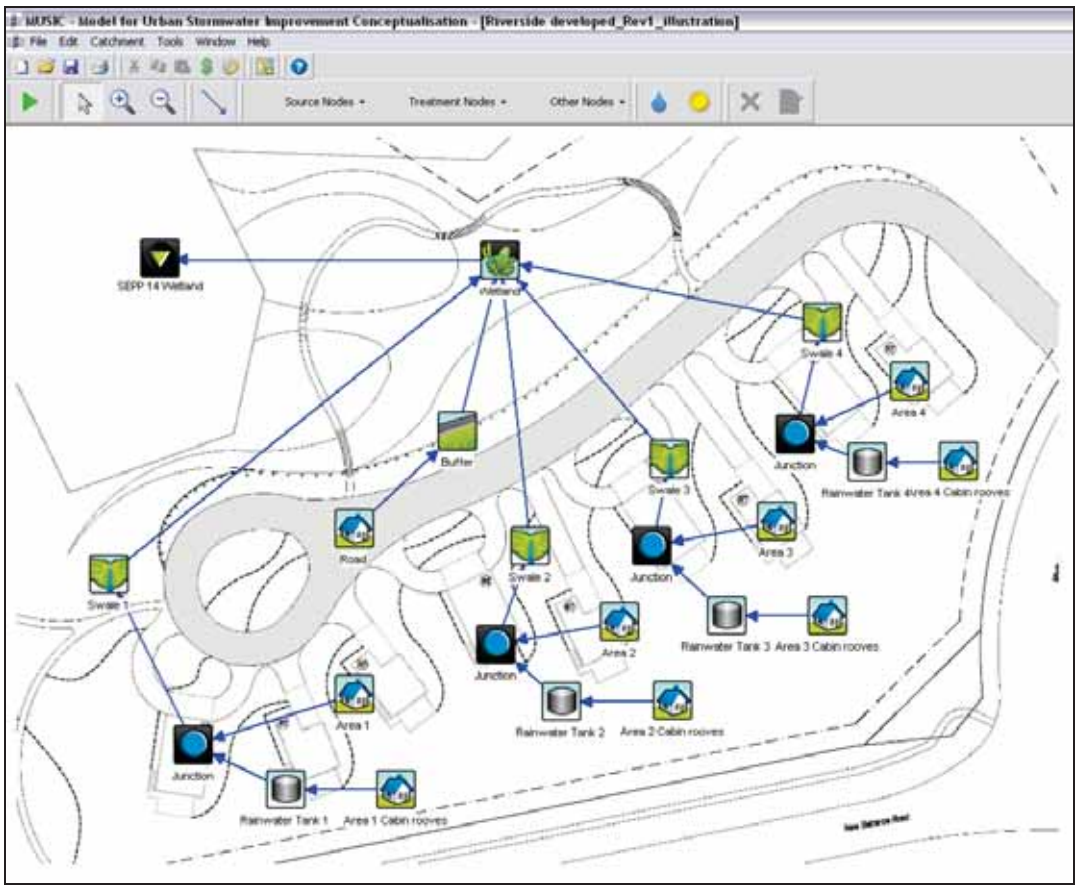


**Plate 6.1 MUSIC Conceptual Layout of Stormwater Management Strategy**

The predicted pollutant load reductions shown in **Table 6.2** and **Table 6.3** satisfy Council's objectives for suspended solids and nutrients and significantly improve the current water quality discharges to the SEPP 14 Wetland. It is not possible to quantify the treatment effectiveness for the other pollutants listed in council's objectives (litter, coarse sediment, oil and grease) because the MUSIC software, which is the industry-standard software, does not have the capability to assess these additional pollutants. Despite this, a stormwater treatment strategy that meets the adopted stormwater quality management objectives for TSS, TP and TN, will, by default, be capable of removing significant proportions of litter, coarse sediment, oil and grease. So, although a quantitative assessment of the level of treatment provided for these additional pollutants cannot be undertaken, the proposed stormwater treatment strategy should be capable of meeting the relevant objectives.

**Table 6.3 Stormwater Pollutant Load Reductions**

| *Pollutant* | *Post-Development Load – without treatment (kg/yr)* | *Post-Development Load – with treatment (kg/yr)* | *Load Reduction (%)* | *Council Objectives[1] (%)* |
|---|---|---|---|---|
| Total suspended solids | 1,990 | 146 | 93 | 50 - 80[2] |
| Total Phosphorus | 3.6 | 0.7 | 81 | 45 |
| Total Nitrogen | 16.2 | 8.3 | 49 | 45 |

Notes: 1. Post-Construction phase objectives – refer to **Section 4.9.3**;
2. 50% for fine particles (0.1 mm or less) and 80% for coarse particles (0.5 mm or less)

**Table 6.4 Stormwater Pollutant Loads – Existing Versus Proposed Development**

| *Pollutant* | *Pre-Development Load (kg/yr)* | *Post-Development Load – with treatment (kg/yr)* | *Load Reduction (%)* |
|---|---|---|---|
| Total suspended solids | 1,370 | 146 | 89 |
| Total Phosphorus | 2.9 | 0.7 | 76 |
| Total Nitrogen | 13.9 | 8.3 | 40 |

The modelling assumes the rainwater tanks will have a volume of approximately 3 kL per cabin. This size has been selected based on guidelines for small residential dwellings in WSUD Deemed to Comply Solutions for SE Queensland (Water By Design, 2009b).

#### *6.4.2.3 Water Balance for Development Area*

The MUSIC model described in the previous section was also used to assess the overall water balance for the site. The model includes ten years worth of climate data and is considered to be an appropriate tool for assessing the water balance.

The simulation of rainfall – runoff processes within the model is based on data entered for a range of soil properties. It is noted that limited soil data is available for the existing site, as such, it has been necessary to make a range of assumptions and adopt representative values for numerous parameters. These assumptions are based on contemporary guidelines for MUSIC (Water by Design, 2009c). The implication is that the results have a significant degree of uncertainty.

The average annual rainfall for the ten year period simulated by the MUSIC model is 1644 mm. This equates to approximately 15.6 ML/yr over the proposed development area. The MUSIC modelling results indicate that in the pre-development situation, 40 % of this volume leaves the site as surface runoff, with the remainder either infiltrating through the soil profile to recharge the groundwater or being 'lost' via evapotranspiration. If the site was developed in accordance with the current layout plan, but no water management measures were implemented (i.e. an 'unmitigated' scenario), the proportion of surface runoff would increase to 50 %. By incorporating the water management measures proposed in the current strategy, the proportion of surface runoff would reduce to 38 %, which is more reflective of the pre-developed scenario and is considered a satisfactory result in terms of having negligible impacts on the water cycle.

The annual flow volumes calculated by MUSIC for the pre-development and post-development scenarios are:

- Existing (undeveloped) condition: 6.5 ML/year annual runoff volume;
- Developed condition with no water management measures: 7.8 ML/year annual runoff volume;
- Developed condition with the water management measures: 5.9 ML/year annual runoff volume;

In respect to future annual runoff volumes taking into account impacts from climate change such as increased rainfall intensities, the above figures would increase by approximately 10%. Therefore, there is still no significant impact of the development on the water cycle in respect to future flows under climate change.

#### *6.4.2.4 Peak Flow Rates*

The objective for stormwater flows is to ensure no increase in peak flow rates from the site as a result of the development. An increase in peak flow rates results from the increase in impervious area associated with the roads and cabins and potentially from construction of the drainage system which can facilitate

more efficient (faster) carriage of flows. To mitigate this impact detention storage is provided in the constructed wetland to provide sufficient temporary storage to 'hold back' flow rates to pre-development conditions.

The estimate of detention volume requirements are based on hand calculations of peak flow rates for existing conditions and post-development conditions for 1, 2, 5, 10, 20, 50 and 100 year average recurrence intervals (ARI) events. The detention volumes shown in **Table 6.4** are the volumes required to detain flow rates for the various ARI events for both the present and for the year 2100. The maximum volume requirement is 91 m³. The detention volume provided in the construction wetland is in excess of 100 m³. In addition, rainwater tanks at each cabin will provide additional detention. Therefore the provision of more than adequate detention volume will ensure there will be no increase in peak flow rates from the site as a result of the development.

**Table 6.5 Stormwater Flow Rates and Detention Requirements**

| *Storm Event Average Recurrence Interval (years)* | *Pre-Development Peak Flow Rate ($m^3/s$)* | *Post-Development Peak Flow Rate ($m^3/s$)* | *Detention Volume Requirement ($m^3$)* |
|---|---|---|---|
| ***Present Situation*** | | | |
| 1 | 0.54 | 0.61 | 21 |
| 2 | 0.73 | 0.83 | 29 |
| 5 | 1.02 | 1.16 | 41 |
| 10 | 1.20 | 1.36 | 48 |
| 20 | 1.43 | 1.62 | 57 |
| 50 | 1.82 | 2.06 | 72 |
| 100 | 2.09 | 2.37 | 83 |
| ***Year 2100 **** | | | |
| 1 | 0.59 | 0.67 | 24 |
| 2 | 0.80 | 0.91 | 32 |
| 5 | 1.12 | 1.27 | 45 |
| 10 | 1.32 | 1.49 | 52 |
| 20 | 1.57 | 1.78 | 63 |
| 50 | 2.00 | 2.26 | 79 |
| 100 | 2.30 | 2.60 | 91 |

Note: * the figures for flow rates for the year 2100 have been estimated by increasing the 'present situation' flow rates by 10% to account for potential increased rainfall intensities associated with climate change similar to the climate change considerations for flooding (refer to Section 6.3.2)

#### *6.4.2.5 Erosion and Sediment Control*

The proposed constructed wetland will be used as a sediment retention basin during the construction phase. Flows from the majority of the site will be directed to the basin. The location of the basin will facilitate interception of any sediment to the SEPP 14 Wetland. The large size of the sediment retention basin will adequately cater for settlement of the sandy soils of the site. The western fringe of the site may flow to New Entrance Road. Sediment control fences will be erected along this boundary to prevent any sediment loss to the road drainage system. The erosion and sediment control plan for the development is shown on Drawing 1291/004 in **Appendix B**.

### 6.4.3 Groundwater

#### *6.4.3.1 Existing Groundwater Levels*

The watertable level at the site was approximately 1.3m below ground level in all three boreholes at the time of the geotechnical investigation by Australian Soil and Concrete Testing Pty Ltd in October 2009.

This equates to a watertable level of approximately -0.3 to -0.5 m AHD based on surface levels of approximately 0.8 to 1.0 m AHD at the location of the tests.

#### *6.4.3.2 Potential Impacts*

The main area of excavation on the site is the proposed constructed wetland. The depth of excavation associated with the wetland is approximately 0.4 m down to a level of approximately 0.3 m AHD. This level is approximately 0.6 to 0.8 m above the level of the groundwater as indicated by geotechnical testing. Therefore there will be no impacts associated with construction.

There will be some infiltration from the constructed wetland to the groundwater. This will be following treatment in the swale system and constructed wetland. Therefore there will be no significant water quality issues. The amount of infiltration will be similar to existing conditions, therefore there will be no significant groundwater mounding as a result of the development.

## 6.5 Coastal Hazard Management and Mitigation

### 6.5.1 Coastal Process

Due to the site being located approximately 2 km from the coastline, coastal processes will only impact on the site in relation to elevated ocean water levels (due to storms and tidal variation) impacting on flood levels. This is discussed below.

### 6.5.2 Climate Change and Sea Level Rise

Climate change and sea level rise considerations have been included in the flood modelling for the site (refer to **Section 6.3**). The recent NSW Government sea level rise benchmarks of 0.4 m rise by 2050 and 0.9 m rise by 2100 were adopted in flood modelling. To account for increased rainfall intensities arising from climate change, an increase of 10% was applied to the peak flood flow in the Macleay River.
The minimum habitable floor levels of the cabins are based on the 1% AEP flood level under the 2050 climate change scenario plus 0.5 m freeboard. It is recommended the cabins be raised by the year 2050 to the 1% AEP flood level under the 2100 climate change scenario plus 0.5 m freeboard as part of an adaptive management strategy. The raised level should be based on updated sea level rise predictions at the time of review.

The fill level for the site is governed by flood evacuation considerations and avoidance of nuisance flooding. An adaptive management strategy is recommended in regard to future rising of the fill levels and access/evacuation route levels. By the year 2050, the fill levels should be raised by the same height as the predicted sea level rise over the period from the year 2050 to 2100. This should be based on updated sea level rise predictions at the time of review. Refer to **Section 6.3** for further details.

## 6.6 Geotechnical

Australian Soil and Concrete Testing Pty Ltd (ASCT) were engaged to prepare a Geotechnical Site Investigation for the proposed site in October 2009. The report is attached at **Appendix H**.

### 6.6.1 Assessment of Subsurface

The analysis included dynamic cone penetrometers and augured boreholes in subgrade soil at three locations across the proposed building envelope.

ASCT reported the following results:

- the site was classified as Silty Sand / Sandy silt: SM/ML – natural, Class S, Slightly Reactive, in accordance with the guidelines of AS2870 Residential Slabs and Footings – Construction;

- the dynamic cone penetrometer tests in the sub-grade indicate the bearing capacity to be 100 kPa allowable bearing from 300 mm below the ground surface; and
- the Potential Hazard Classification was assessed in accordance with Appendix E, Table 1 of AS1726 Geotechnical Site Investigations, and was found to be Class C, Minor Hazard.

The report also advised that due to poor to fair drainage on the site, some form of drainage should be maintained at all times including the building construction period, and should be directed to Council approved stormwater drainage. This issue is further detailed in **Sections 6.3** and **6.4** of this report.

The report concluded that the subgrade consists of slightly reactive sandy silt, silty sand - natural that has adequate bearing capacity from 300 mm below ground surface for the proposed tourist cabin development. The site was assessed as being stable and will not be affected by landslide or subsidence when the tourist cabins are constructed.

## 6.7 Soils

### 6.7.1 Contamination

The site has been assessed to determine the likelihood of contamination from past practices, identify the likely nature of any potential contamination, provide recommendations for further sampling if necessary, and options for remediation if required.

#### *6.7.1.1 Site Condition and History*

The property consists of a cleared and maintained grassed open area and a SEPP 14 Wetland, which contains a mix of mangrove forest, mudflats / scalds, swamp oak, swamp forest, salt marsh, and some former pasture. The site has an elevation of approximately 1m to 4m AHD, is low lying, flat to gently sloping at less than 1% gradient. There are no visible signs of erosion, or plant stress on the proposed development site.

Site history was obtained from review of aerial photographs, searching the DECC Contaminated Land database, DPI Cattle Dip Locator Database, review of land title dealings, discussion with a long term resident of South West Rocks and review of previous studies.

Discussion with Peter Hadlow, a long term resident of South West Rocks, indicated that the tavern complex was developed in 2002. Prior to that and since the early 1900s, the land was cleared, drained and used for agriculture.

The main chemicals of concern are fuels and oils, heavy metals, herbicides and pesticides. No specific areas of concern were identified.

#### *6.7.1.2 Previous Studies*

A Preliminary Phase 1 Environmental Site Assessment was prepared by Martens and Associates for this parcel of land in June 2004. The assessment was conducted according to EPA guidelines and tested for the identified chemicals of concern. Laboratory analysis was completed for soil samples collected from an area north of the existing tavern.

Their soil sampling analysis results indicated that levels of all contaminants tested for were below the laboratory's practical quantitation limit (PQL). All results were within the NSW EPA health based investigation levels for residential sites, and below the provisional phytotoxicity-based investigation levels.

Martens and Associates stated that the site was considered suitable for the proposed tourist park development, and no further analysis or investigation were considered necessary.

#### *6.7.1.3 Contamination Assessment*

Australian Soil and Concrete Testing Pty Ltd (ASCT) were engaged to conduct sampling and analysis of the site of this proposal in November 2009, and the report is attached as **Appendix I**. The analysis was conducted in accordance with the following guidelines:

- Contaminated Sites – Draft Guidelines for the NSW Site Auditor Scheme (NSW EPA);
- Guidelines for Consultants Reporting on Contaminated Sites (NSW EPA);
- Managing Land Contamination Planning Guidelines (Department of Urban Affairs and Planning);
- Contaminated Sites – Sampling Design Guidelines (NSW EPA);
- Contaminated Sites – Guidelines for Assessing Service Station Sites (NSW EPA); and
- Australian Standard AS 4482.1 (2005) Guide to the investigation and sampling of sites with potential contaminated soil. Part 1: Non-volatile and semi-volatile compounds.

The assessment included:

- soil sampling at twelve locations across the site at a depth of 0.2m;
- three composite samples were created;
- the samples sent to Australian Laboratory Services in Brisbane for analysis; and
- analytes included metals, organochlorines (OCs), organophosphates (OPs), polynuclear aromatic hyrocarbons (PAH), polychlorinated biphenyls (PCB) and total petroleum hydrcarbons (TPH).

Results were compared to Health Based Investigation Levels (HBIL) for residential development, from the NSW EPA document Guidelines for the NSW Site Auditor Scheme. Results of laboratory analysis were below the relevant HBILs for residential development. The ASCT report concluded that no further soil contamination assessment would be required at the site.

The likelihood of contamination on the site is low, and no remedial measures for the site are considered necessary. The soil contaminant levels are not considered to be a significant risk to public health or the environment, or prohibitive to future residential development of the site.

### 6.7.2 Acid Sulfate Soils

An acid sulfate soils (ASS) assessment was prepared to guide on ground works to ensure that appropriate measures are implemented to minimise the impacts of the proposed works on the environment in regard to ASS.

#### *6.7.2.1 Potential Impacts*

Excavations for the works have the potential to impact on ASS. However, the cabins, internal paths and roadways will be constructed on the filled portion of the site. The depth of the fill is at least 1 m. The depth of excavation for the cabins, internal paths and roadways are expected to be 1 m depth, therefore they will not intercept existing soil horizons and will not impact ASS. Potential impacts to ASS are therefore restricted to excavation into the existing soil horizons associated with:

- laying of pathways outside the filled area;
- sewerage and water services outside the filled area; and
- construction of the stormwater wetland.

Restoring tidal flows to the SEPP 14 wetland area in the site will have a beneficial impact on ASS by increasing the watertable height around the area of tidal inundation and therefore prevent oxidization of any Potential Acid Sulfate Soil (PASS) materials in this area. There will be some potential negative impacts in regard to export of acidic water and other products of acid sulfate soil oxidation into Back Creek. This could occur due to tidal water infiltrating into shallow actual ASS horizons and draining out these products as tidal waters recede. This latter issue is addressed in **Section 6.4 – Water Quality**.

### *6.7.2.2 Acid Sulfate Soil Assessment*

**Site Conditions**

Conditions present at or near the site indicating potential or actual acid sulfate soils include:

- the site's location on a low lying alluvial plain between to the Macleay River and a wetland; and
- vegetation including casuarinas, sedges and rushes.

**Plate 6.2 Vegetation on the site: Casuarina and sedges**

**Plate 6.3 Vegetation on the site: rushes and sedges**

Review of the Acid Sulfate Soil Risk Map indicates that the study area is situated within soils that have a high probability of ASS occurrence at or near the ground surface. The study area is situated on an alluvial levee, with an approximate elevation of 1-2 m AHD. ASS material is estimated to be between 1 and 3 m of ground surface with a severe environmental risk if ASS materials are disturbed by activities such as shallow drainage, excavation or clearing.

**Previous Studies**

Martens and Associates prepared an ASS for Lot 4 DP 1022342 New Entrance Road, South West Rocks NSW, in June 2004. The report was prepared for Shannon Pacific Pty Ltd for the purposes of assessing the presence and extent of ASS and developing an ASS Management Plan to minimise the impact on ASS of a proposed tourist caravan park development. Boreholes were located north of the existing tavern, and not specifically within the proposed site.

The report included an analysis of the geomorphic site setting; a review of the ASS risk maps; and soil sampling and laboratory analysis. Samples were tested for peroxide oxidisable sulphur ($S_{POS}$) and total potential acidity (TPA) to determine if the soil is Actual Acid Sulfate Soil (AASS) or Potential Acid Sulfate Soil (PASS). Results showed that the site contains PASS extensively to a depth of 3 m.

**Soil Testing**

Australian Soil and Concrete Testing Pty Ltd (ASCT) were engaged to conduct sampling and analysis of the site of this proposal in November 2009. The report is attached at **Appendix J**. The analysis included:

- soil sampling at three locations across the site;
- collection of four samples at each location at depths of 0.5 m, 1.0 m, 1.5 m and 2.0 m , (total of 12 samples);
- field screening of the 12 samples for field pH ($pH_f$) and field peroxide ($pH_{fox}$); and
- laboratory analysis of three samples for % chromium reducible sulfur ($\%S_{CR}$), total actual acidity (TAA), net acidity and liming rates.

Laboratory analysis results indicate that surface soils to a depth of 1.0 m are acid soils. These soils are not considered to be ASS. They have a reduced inorganic sulfur content below ASSMAC action criteria. Acid soils do not generally have the ability to generate additional acid when exposed to air and they therefore do not have the environmental risks that are associated with ASS. Treating naturally acidic soils has the potential to cause damage to naturally acidic environments that support ecologies adapted to acidic conditions (Sullivan, 2009). It is not recommended to lime acidic soils despite the liming rate provided by ASCT for the site.

Results also indicate that soils between 1 and 2 m below ground surface contain AASS and PASS. An Acid Sulfate Soil Management Plan (ASSMP) is therefore required.

Recommended liming rates for excavated soil are outlined in **Table 6.6**.

**Table 6.6 Summary of Results and Liming Rates**

| *Soil Type* | *Soil Colour* | *Depth (m below ground surface)* | *Indicated Result* | *Liming Rates (kg $CACO_3$ / t)* |
|---|---|---|---|---|
| Sandy clayey silt | Brown | 0.0-0.5 m | Acid soil | Not recommended |
| Silty sand | Brown | 0.5-1.0 m | Acid soil | Not recommended |
| Sand | Dark grey | 1.0-2.0 m | AASS / PASS | 30.1 |

*6.7.2.3 Conclusion*

The depth of excavations into the natural soil profile for the proposed works is not expected to exceed 1 m. Results indicate that AASS and PASS occur at depths of greater than 1 m below the natural ground surface. It is therefore considered unlikely that ASS will be exposed or disturbed during construction of the cabins and their associated infrastructure. In addition, the works will be short term, with reburial of trenches for laying of services to occur within 24 hours. It is also considered unlikely that there will be any impact to groundwater. The constructed wetland is shallow and will involve disturbance to a depth of 0.4 m below natural ground surface.

Mitigation measures are recommended for any works that will impact more than 1 m below the natural ground surface. The mitigation measures for such works, an Acid Sulfate Soil Management Plan, Australian Soils and Concrete Testing ASS report and a field guide for identification of acid sulfate soils is attached at **Appendix J**.

Restoring tidal flows to the SEPP 14 wetland area in the site will have a beneficial impact on ASS by increasing the watertable height around the area of tidal inundation and therefore prevent oxidization of any Potential Acid Sulfate Soil (PASS) materials in this area.

## 6.8 Traffic and Access

### 6.8.1 Access

A single access to the cabins is provided off Marlin Street with a turning head at the end for circling vehicles. Access off Marlin Street as opposed to New Entrance Road avoids directly impacting on public access along the river foreshore.

The internal access road will be an 11 metre wide road constructed of asphalt connecting to gravel driveways for access to cabins. Four of the cabins have double access forward drive in/drive out access

and five have traditional single access. Located on the eastern side of the access road is a gravel verge for additional car and trailer parking.

A gravel path from the rear of the cabins to the tavern and through the wetland area would be constructed. This would allow a pedestrian connection enhancing passive recreational opportunities and enable visitors to interpret and interact with the wetland environment.

As a general principle the area of hard surface has been minimized in order to maintain the existing drainage patterns within the land. The roadway will be sealed and constructed to shed water to their edges and into open shallow grassed swale drains. All road edges will be adjoined by grassed and landscaped areas and actions that tend to concentrate flows will be avoided. Areas that are dedicated for visitor parking and are sealed will also be drained to open swales.

The pathways in the development will generally be 1.2m wide and have compacted gravel surfaces.

### 6.8.2 Traffic

Access to the site from the township of South West Rocks is via Gordon Young Drive and either Ocean Street or Gilbert Cory Street which both link to Marlin Drive. Marlin Drive is a 13 metre wide local distributor which has been designed to cater for in excess of 3000 vehicles per day. Gilbert Cory Street is currently only 6 m wide and partially formed but will be upgraded to service future development on its eastern side. Ocean Street is an 11 m wide collector road and can cater for 1000 to 3000 vehicles per day (Integrated Site Design, 2006).

A traffic survey conducted in 2000 (cited in Integrated Site Design, 2006:35) estimated that a total of 98 vehicle trips could be expected to utilise Marlin Drive within each peak hour during weekdays. It was also estimated Riverside Tavern would generate approximately 14 to 15 vehicle trips per hour during the peak period of 7 - 10 pm on Friday and Saturday nights but negligible traffic during other times (Integrated Site Design, 2006:35). There has been no significant development in the locality since 2000 so it is not considered that the above estimates would have increased significantly since that time,, however if it is conservatively estimated the numbers increase by 50% then the resulting total number of vehicle trips that could be expected to utilise Marlin Drive is approximately 150 within each peak hour during weekdays. The proposed nine cabins will generate three to four vehicle trips per hour during evening peak hour and 27 vehicle trips per day based on allowances for motels (0.4 peak hour trips per unit and 3 daily trips per unit) listed in RTA's Guide to Traffic Generating Developments (RTA, 2002). These numbers are negligible in reference to the capacity of Marlin Drive and existing peak vehicle trip estimates. Therefore, the existing road network has sufficient capacity to cater for the small increase in traffic movements associated with the development.

## 6.9 Heritage and Archaeology

### 6.9.1 Indigenous Heritage

Suzanne R Hudson Consulting was engaged to prepare an indigenous archaeological assessment of the site. The full assessment and report can be found at **Appendix K**. The objective of the assessment was to determine whether the site has significance to Aboriginal cultural heritage and to identify appropriate measures to preserve significance.

The assessment methodology included:

- review of the archaeological literature and National Parks and Wildlife Service site records for the area;
- assess the cultural significance of the land situated in the assessment area;
- liaison and consultation with local Indigenous communities to determine their interest in the survey area and for their assessment of the Indigenous significance of any sites identified in the study area;

- assessment of the Indigenous, historic, scientific, aesthetic, and public significance of any sites identified in the survey area;
- advice on preferred management options for any sites and associated artefacts found during the survey through the community people working on-site;
- investigate the site to ascertain if there are any relics, sites or cultural remains present on the land;
- preparation of a report describing relics that were located; and
- recommendations for the management of any artefactual material and/or sites that maybe located within individual areas.

A search of the Aboriginal Heritage Information Management System (AHIMS) database indicated 12 sites are located within the vicinity of the proposal. Two sites that are located within the property boundary were unable to be located during the site investigation due to grass coverage. They are however located outside the area of the proposed development.

The site investigation included recording the area using a global position system Magellan Triton 400 hand-held device. Transects within the development site were examined for evidence of Aboriginal occupation, this was undertaken on foot and each bare area along sides of the road and around trees were examined.

The assessment states that the "*Aboriginal community are generally in favour of development, as it brings revenue to the area*", and concludes that the development is not constrained from an archaeological perspective, due to no sites of significance being found during the survey.

Stakeholder interests were represented by Elizabeth Holden (registered stakeholder) who accompanied Suzanne Hudson during the site inspection and upon review of the Archaeological assessment report Elizabeth Holden provided correspondence indicating that she had no further comment to make in regard to the proposal. This correspondence can be found attached within the full Indigenous Archaeological Assessment found at **Appendix K**.

### 6.9.2 Safeguards and Mitigation Measures

The assessment makes the following recommendations:

- the wetland, trees associated with the wetland and the run-off into the creek and into the river should not contain sediments that might contaminate the flathead breeding grounds opposite the Riverview Tavern; and
- if any Aboriginal sites are found during excavation, it is essential that all works cease until the area has been inspected by members of the local Aboriginal community and an archaeologist.

### 6.9.3 Non-Indigenous Heritage

The site has been assessed for non-Indigenous heritage. The site of the proposed cabins is currently vacant, cleared and maintained as a grassy open area.

A check of the Kempsey Local Environmental Plan (KLEP) indicates that there are eight heritage items in the South West Rocks area.

The heritage items listed under KLEP are all located in the main town area of South West Rocks, approximately 1.5 km east of the proposed development, and are as follows:

- School of Arts, Gregory Street, South West Rocks (Lots 235 and 269, DP 754396);
- Pacific Guest House, 21–23 Livingstone Street, South West Rocks, (Lot 22, DP 733618);
- Entrance gates, Livingstone Street, South West Rocks, (Lot 7041, DP 1120754);
- Three residences, Memorial Avenue, South West Rocks, (Pt Lot 1, DP 245033 and Lot 1, DP 391779);

- Monument stones, Memorial Avenue, South West Rocks, Road reserve;
- Pilot station group, 3–9 Ocean Drive, South West Rocks (Lot 286, DP 754396 and Lots 373–375, DP 822657);
- Flagstaff, Ocean Drive, South West Rocks, (Lot 284, DP 758919); and
- Monument, Point Briner, Horseshoe Reserve, South West Rocks, (Lot 7041, DP 1120754).

Searches were conducted of the Australian Heritage Council database (including the World Heritage List, the National Heritage List, the Commonwealth Heritage list and the Register of the National Estate), the State Heritage Register, and the State Heritage Inventory (refer to **Appendix M**).

No items of heritage were identified within the site. It is unlikely that the proposed development will a significant impact on any items of European heritage.

### 6.9.4 Safeguards and Mitigation Measures

Safeguards to be implemented to mitigate to prevent any impacts on non- Aboriginal heritage are:

- if archaeological remains are uncovered during the works, all works must cease in the vicinity of the material/find and an archaeologist and the Project Manager are to be contacted immediately; and
- if any items defined as relics under the NSW Heritage Act 1977 are uncovered during the works, all works must cease in the vicinity of the find and an archaeologist and the Project manager are to be contacted immediately.

## 6.10 Noise

Potential noise impacts on the development could arise from:

- traffic on New Entrance Road and Marlin Street;
- pumping noise from the proposed on-site sewage pumping system that will be located between the buildings and New Entrance Road (refer to **Illustration 4.5**); and
- noise generated from the existing Tavern.

### 6.10.1 Traffic Noise

The traffic movements along New Entrance Road and Marlin Street are relatively low with approximately 100 to 120 vehicle trips per hour during the peak periods (refer to **Section 6.8**). Riverside Tavern would generate approximately 14 to 15 vehicle trips per hour during the peak period of 7-10 pm on Friday and Saturday nights. This volume is not considered significant in respect to traffic noise. Therefore, in consideration of the relatively low traffic volumes and the cabin design locating the more noise-sensitive areas furthest from the road noise source, no additional noise mitigation measures are considered necessary. In addition to this the proposed cabins are located between 20 and 40 m from any road. The building layouts have been designed with the more noise-sensitive areas (bedrooms) located at the 'back' of the cabins furthest from the road.

### 6.10.2 Sewage Pumping Noise

Details provided on a manufacturer's website indicate that noise measurements taken 1 metre above the lid of a pumping unit during pump operation recorded a noise level of 55 dBA (Mono Pumps Australia, 2010). This level would be reduced with distance to the proposed building and the existing tavern. The nearest building to the pumping units (approximately 7 m distance) would experience a noise level of approximately 40 dBA or less allowing for noise attenuation with distance. This reduced level does not exceed noise amenity levels for suburban areas. In addition to this the building layouts have been designed with the more noise-sensitive areas (bedrooms) located at the 'back' of the cabins furthest from the sewage pumping noise sources.

### 6.10.3 Tavern Noise

Noise generated from the tavern has the potential to impact on the tourist cabins. The nearest cabin is located approximately 28 metres from the Tavern which has been operating since 2001 without any major noise complaints. The Tavern currently operates pursuant to its liquor licence which also has controls established to minimise noise disturbance to nearby residents to ensure the current amenity is maintained. The Tavern operating hours are 10am to 12 midnight - Monday to Saturday and 10am to 10pm Sunday.

Noise from outdoor entertainment (from the deck) has the potential to impact on the tourist cabins. The potential for this noise to impact the tourists cabins is considered to be low given the following measures are in place:

- only occurs six times a year during summer;
- is non amplified (acoustic);
- has only single or duo musicians at any one time; and
- only occurs between 2pm and 5pm.

Indoor entertainment occurs between 8pm and 11pm Friday and Saturday. The Tavern doors and windows are closed and security guards are in place to ensure, inter alia, that patrons do not make undue noise whilst outside and to ensure the doors remain closed during entertainment.

All Tavern entertainment and operation is consistent with the Liquor Licence (LL Number: 110545) which requires:
*"The LA10 noise level emitted from the licensed premises shall not exceed the background noise level in an Octave Band Centre Frequency (31.5Hz - 8kHz inclusive) by more than 5dB between 7:00 am and 12:00 midnight at the boundary of any affected residence.*

*The LA10 noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5Hz - 8kHz inclusive) between 12:00 midnight and 7:00 am at the boundary of any affected residence.*

*Notwithstanding compliance with the above, the noise from the licensed premises shall not be audible within any habitable room in any residential premises between the hours of 12:00 midnight and 7:00 am. The behaviour of patrons is to be monitored by the licensee; that is the licensee should take reasonable action to ensure that patrons do not create a noise nuisance.*

*An automatic sound limiting system shall be installed and maintained in an operating condition at all times in the hotel which limits the generated sound level, in particular the low frequency. The generated noise level shall be limited to not greater than 105 dB, pre-midnight, in the 125Hz Octave Band when measured at 1m from the inside of walls to the exterior.*
*All windows and doors within the premises are to remain closed during the provision of entertainment save for necessary entry and exit from the premises.*

*Access to the hotel building during entertainment must be provided through noise traps to the double doors on the eastern and north western walls of the Fisherman's Bar. The noise traps are to comprise a small room separating the interior of the hotel from the exterior of the hotel. Doors on the noise traps must be hung with minimum gaps, be self closing and not held in an open position.*

*An announcement is to be made upon the cessation of entertainment to the effect that patrons should leave the premises and the vicinity quickly and quietly to avoid disturbance of the neighbourhood.*

*On evenings when entertainment is provided, at least two (2) licensed uniformed security personnel are to be engaged by the licensee on the premises to ensure that no unruly behaviour occurs within the premises and immediate surrounds such as the car park area and the area fronting the Macleay River.*

*Such security are to be engaged at least one (1) hour before entertainment commences and remain until closure of the premises at which time they are to patrol the area to ensure patrons of the premises do not loiter or linger in the area or cause nuisance annoyance to the neighbourhood until the last patron has left the vicinity of the premises."*

The riverside cabins are to be established for tourist accommodation with the closest being located 28 metres from the Tavern. Given the infrequent potential for noise, the mitigation measures addressed above and the transient nature of guests it is considered unlikely that guests would be impacted by noise from the Tavern.

It should also be noted that the Licences of the Tavern will be responsible for the management, operation and administration of the proposed tourist cabins. The licensee will be the first point of contact for all noise and other complaints from occupants of the cabins. The licensee will be required to ensure no breaches of noise conditions of the existing liquor licence and existing development consent.

A noise assessment has been undertaken and is attached at **Appendix Q**. The purpose of the report is to assess the potential impacts of the Riverside Tavern operations on the acoustic amenity of the proposed tourist cabins and propose any necessary mitigation measures. Specific objectives of this acoustic assessment are to:

- determine project-specific noise level criteria for the subject site for intrusive and amenity;
- determine existing background and ambient noise levels at the subject site;
- determine existing noise levels at the subject site for day, evening and night time periods;
- compare noise levels with the project-specific noise levels and assess the impacts;
- determine feasible and reasonable noise mitigation measures for the subject site to mitigate impacts from Riverside Tavern.

This assessment was undertaken in accordance with the following guidelines and documents:

- NSW Industrial Noise Policy;
- AS 1055.1-1997 Acoustics - Description and measurement of environmental noise - General procedures
- AS 1055.2-1997 Acoustics - Description and measurement of environmental noise - Application to specific situations;
- AS 1055.3-1997 Acoustics - Description and measurement of environmental noise - Acquisition of data pertinent to land use; and
- AS/NZS 2107:2000 Acoustics - Recommended design sound levels and reverberation times for building interiors.

Data indicates that there is no significant noise from the tavern when compared to other background noise from traffic, a significant proportion of which is associated with the nearby boat ramp. Noise levels at the site of the proposed cabins are considered satisfactory and no additional mitigation measures are required.

## 6.11 Odour

Potential odour impacts on the development and adjoining land would arise from the proposed on-site sewage pumping system that will be located between the buildings and New Entrance Road (refer to **Illustration 4.5**).

Sewage will emit odour when it becomes septic after approximately 24 hours. At least four cabins are connected to each pumping system. If at least one of the cabins is occupied there would be sufficient

inflow to ensure the contents are pumped each day thereby avoiding septicity and potential odour issues. If all connected cabins are unoccupied for a number of days, any odours arising from the septic sewage remaining in the pump stations will be displaced through the breathers as fresh sewage enters. However, after one cycle it will be eliminated and no odour will remain (Mono Pumps Australia, 2010). In the event that odour complaints are received, water could be discharged into the pump stations from one of the cabins until the pump is initiated thereby removing the septic sewage.

## 6.12 Infrastructure Provision

### 6.12.1 Water

The proposed water supply for the development is from two sources: rainwater tanks at each cabin and connection to the Macleay Water reticulation system. The rainwater tanks will be used for laundry and toilet flushing which will significantly reduce demand on the reticulated supply water when rainwater is available.

The demand on the Macleay Water reticulation system has been estimated assuming a worst case scenario of no rainwater supply for laundry and toilet flushing. The peak water demand from the proposed nine cabins is estimated to be 0.66 L/s based on a peak instantaneous demand of 0.15 L/s/tenement (from D11.05 in Council's Development Design Specification D11 – Water Reticulation) and 4.4 equivalent tenements (ET's). The 4.4 ET's is based on 5 x 1 bedroom cabins each with a 0.4 ET loading and 4 x 2 bedroom cabins each with a 0.6 ET loading (based on NSW Water Directorate Section 64 Determinations of ETs Guidelines – Water Directorate, 2005). A peak instantaneous demand of 0.66 L/s is not considered significant in respect to additional demand on the existing services.

### 6.12.2 Sewer

Two small package pump stations are proposed to service the nine cabins. The package pump stations will be connected to the existing private rising main from the Riverside Tavern pump station. Pumping from the two package pump stations would be timer controlled to pump at off-peak times (11pm to 5am) to avoid any increase in peak flows at the downstream pump station.

The nine cabins equate to a total equivalent tenement (ET) loading of 5.5 ET's based on 5 x 1 bedroom cabins each with a 0.5 ET loading and 4 x 2 bedroom cabins each with a 0.75 ET loading (based on NSW Water Directorate Section 64 Determinations of ETs Guidelines – Water Directorate, 2005). The maximum number of ET's discharging to an individual package pump stations is 3.0 ET (3 x 1 bedroom cabin and 2 x 2 bedroom cabins). Sufficient storage is provided in the package pump stations to cater for one day's flow from 3.0 ET's. The storage capacity of each package pump station is 2,200 litres. The storage capacity required for 3.0 ET's is 2,140 litres based on 0.011L/s per ET (Public Works average daily flow allowance) over 18 hours (non-pumping period from 5am to 11pm).

The use of timer controls for pumping from the package pump stations will enable the flows to be pumped into the private rising main from the Riverside Tavern pump station to avoid peak pumping periods from the Tavern. Pumping at off-peak times will also ensure there is no additional peak loading on the Macleay Water sewerage system. A high-level float switch would initiate pumping to ensure overflows do not occur in the event the storage capacity is exceeded during the normal non-pumping period (between 5am and 11pm).

### 6.12.3 Electricity

Jason Dowling, Project Manager for Country Energy, advised on 30 July 2009 that the proposed tourist cabins are on the same lot as the Riverside Tavern, and therefore the cabins would be supplied by the same electricity supply. The tavern is supplied by the sub-station to the north of the tavern.

### 6.12.4 Telecommunications

Harold Strahan, Capacity Planner for Telstra advised on 24 July 2009 that Telstra has communication infrastructure along New Entrance Road to Riverside Tavern. This infrastructure may be used to accommodate the development.

### 6.12.5 Existing Onsite Infrastructure and Easements

The following infrastructure/easements currently exist on the site:

- a water control device on the north eastern boundary of the site which currently drains the site to the estuary to the north (refer **Illustration 2.4**);
- an easement to drain water (refer **Illustration 4.4)**; and
- Riverside Tavern including, car park and private sewage pump station and associated infrastructure (refer **Illustration 2.4**).

### 6.12.6 Developer Contributions

The proposed tourist cabins at New Entrance Road would attract the contributions as outlined in **Table 6.7**, based on current contributions plan and financial year. The project consists of 5 x 1 bedroom cabins and 4 x 2 bedroom cabins.

**Table 6.7 Estimated Developer Contributions**

| *Contribution* | *Per 1 Bedroom Cabin* | *Per 2 Bedroom Cabin* | *Total 5 x 1 bedroom & 4 x 2 bedroom cabins* |
|---|---|---|---|
| Section 94 South West Rocks | $1,953 | $2,232 | $18,693 |
| Section 94 Plan Administration | $117 | $134 | $1,121 |
| Section 64 Water | $3,258 | $3,258 | $29,322 |
| Section 64 Sewer | $2,749 | $2,749 | $24,741 |
| | | **Total** | **$73,877** |

## 6.13 Visual Impact

A visual assessment of the site was undertaken to determine the likely impacts to the visual attributes of the site resulting from the proposed tourist cabin development. The report is attached in full at **Appendix L**. The assessment also identifies the measures that are proposed to mitigate these impacts and how these will result in the enhancement of the landscape setting as a whole.

### 6.13.1 Site Context and Existing Landscape Character

The site is primarily covered in grass that is actively managed by slashing. It forms part of a riparian estuary environment consisting of a range of vegetation communities including swamp oak forest which dominates the immediate vicinity of the site. Many of the natural features throughout this area have been disturbed either by removal, modification or fragmentation of the original vegetation. Areas of cleared vegetation now support a ground cover of grasses, sedges or weed growth interspersed with remnant native trees. Large areas of native vegetation also remain intact to the north and east of the site which incorporate a SEPP 14 Wetland Community. This vegetation forms a significant buffer to suburban development further east.

The Riverside Tavern is an established and relatively isolated built element that separates the two parts of the development site along New Entrance Road. The tavern has a well maintained landscaped frontage

and a large paved carpark at its rear which is surrounded by screen planting. Residential development of detached housing covers rising land to the east and south of the site while the wide open expanse of the Macleay River creates a dominant and highly attractive visual and recreation focus to the west.

A number of structures have been installed along the river foreshore immediately adjacent to the site including pontoons and moorings associated with the coastal patrol. A boat shed, moorings and a number of community amenities are also located some 500 metres further south along the foreshore.

The combination of the riverside location, the surrounding predominantly natural landscape and availability of elevated panoramic views across the Macleay River produce an overall setting of high scenic quality.

### 6.13.2 Visual Catchment

The visual catchment of the site, due to its flat, low lying terrain, is restricted to a local setting which extends to nearby rising topography and the surrounding swamp oak forest. Downward views onto the site are available from houses and vantage points on the upper slopes of residential areas to the southeast of the site. From here, views of the site tend to be interrupted by intervening vegetation and buildings and form only a small, insignificant component of a panoramic outlook that encompasses the Macleay River system and extends to the distant north-western to south-western horizons.

A number of lower level houses along the western end of Marlin Drive have views that extend across the site to the river in the distance. These views rely on the retention of the open grass cover across the site and an absence of obstruction, including trees, to enable a visual corridor to be maintained.

Views of the site from all other residential areas across the hillside are constrained by the intervening swamp forest vegetation and lower level houses.

The most significant and direct views into the site are available in close proximity from the surrounding streets, the river and its edge. The site is particularly exposed to elevated private land immediately south of the Marlin Drive / New Entrance Road junction. The lack of vegetation within the site and along the adjoining riverfront contributes to this high level of exposure. Views become less significant over distance, however, due to the low, flat terrain and the resultant low angle of view.

### 6.13.3 Visual Impact of Proposed Development

Potential adverse visual impact of proposed future site development may be experienced from areas identified within the visual catchment described above. It is anticipated that this may occur because:

- development will adversely affect the existing open green character of the site. Of particular concern may be the intrusive impact of built form;
- distant views across the existing open landscape toward the river or wetland areas will be impeded by development on the site;
- increased people and car movement will change the existing quiet, passive character of the river edge setting;
- site development will appear to be a further encroachment into a predominantly natural environment and will introduce further physical impacts to the detriment of natural values; and
- significant, though temporary visual impact will occur during and following development construction until proposed new vegetation matures and achieves desired effect.

Sketches and photomontages of the proposed development in its proposed finished form, with the inclusion of landscaping and mature vegetation have been prepared and are provided in **Appendix B.** These illustrations have been prepared to portray the anticipated character of the development in its final form and help to demonstrate the level of visual impact that would be experienced by nearby residents located to the southeast and also users of recreational areas such as those along the Macleay River and its foreshore as identified in the visual catchment above.

The sketches and photomontages show that a significant change to the site's form, texture and character would occur. This change is due to the fact that the site is currently vacant and consists of maintained grassland. However, although the above visual impacts may be experienced by residents and those using the surrounding recreational areas in the locality, the development will blend into the context of the area as landscaping and vegetation would screen and filter it from direct views and soften visual intrusion. The development and associated landscape vegetation would strike a balance between built form and the natural environment, supporting a continued pleasant outlook for both nearby residents and recreational uses of the Macleay River and its foreshore in the long term. It is also considered that the proposed development is anticipated infill development given that the vacant site exists between existing residential development and the South West Rock Tavern.

Despite the obstruction of river views for lower residential areas located southeast of the site and visual changes experienced from the recreational outlooks of the river and its foreshore, the development is not considered to be out of character with the locality which it is comprised of interweaving vegetation amongst residential housing. The development of the cabins along with landscape plantings would generally be a continuation of the area's existing visual character. That is: low density urban development within a high quality natural and scenic setting. However the urban bulk and form of the development would be lower in scale and more suited to the immediate surrounding environment compared to that of nearby residential development, supporting its appropriateness for the area and consideration of existing visual amenity.

### 6.13.4 Overshadowing Impacts

It is important to address potential impacts specific to the amenity of the Macleay Rivier foreshore and overshadowing of public areas. With regard to the proposed development, it is considered that there is no potential for the proposed development to overshadow the public area along the Macleay River as the cabins are located to the east of the reserve, behind New Entrance Road. The buildings proposed to be built are also set back a minimum of 20 metres from the foreshore area with New Entrance Road between the site and the foreshore. This makes it impossible for the development to overshadow the public foreshore area.

In addition, the cabins would not overshadow one another within the development itself as:

- all the cabins having the same floor level;
- setback distances between cabins ranging from 6 metres to 10 metres; and
- each of the cabins are to be staggered.

For the above reasons it is considered that there will be no overshadowing impacts to any public area (such as the river foreshore) or to any of the cabins within the development itself. As overshadowing impacts will not affect the river foreshore/ reserve area or any adjacent property it was not considered necessary to prepare specific shadow diagrams for the development.

### 6.13.5 Safeguards and Mitigation Measures

The proposed development includes nine modest scaled one and two bedroom single storey tourist cabins along the New Entrance Road and Marlin Drive frontages of the site (refer to **Illustration 2.1**). A driveway will provide vehicle access to the rear of the cabins from adjoining streets.

Concerns for the visual impact of the cabins and associated infrastructure have been well considered in the layout and design of the structures and landscape setting as a whole. The key features that underpin the design and their likely benefit to the site and surrounding area are described as follows:

- cabins will have a light-weight, contemporary appearance incorporating pitched metal roofs and timber cladding to generate an easy going holiday ambience that will complement the visual character of the surrounding natural landscape. The cabins will be elevated to satisfy council's minimum flood

level requirements creating an open undercroft that will accentuate the buildings as floating objects on the landscape. This sense of openness will be further enhanced by the use of timber handrails with wire ballustrades, louvre windows, wide eves and a large covered veranda along the cabin front that will cast deep shadows into the building facades;

- cabin footprints will occupy only a small proportion of the overall site with the vast majority of the area retained for open space. Cabins will have a narrow frontage to the street and each structure will be approximately 10 metres apart providing optimal scope for extensive new planting. Cabins will have alternating set backs to minimise the visual prominence of building facades to the street;
- proposed new vegetation will incorporate a dominance of locally indigenous native plants to ensure that the existing landscape character prevails. Planting of casuarinas in particular will envelope the site and integrate it with the surrounding remnant forest;
- planting of trees and shrubs will be strategically located around cabins to create a dominant canopy above roof lines that will help disguise and visually absorb the structures. Planting will also create private spaces between cabins, screen unwanted views and provide shelter to the front verandas from undesirable south-western summer sun;
- surface drainage will be facilitated by open swales to provide opportunity for passive treatment through a bioretention system prior to discharging into the natural wetland area further east. The most significant swale will align with the southern access road and adjoining parking areas to prevent undesirable vehicle access into the wetland area further east; and
- the existing undeveloped area east of the swale will be rehabilitated to restore the natural values of the original wetland environment. New tree planting within this area will incorporate buffer zones and clearances between canopies as required satisfying bushfire regulations.

### 6.13.6 Conclusions

Under the design proposals outlined in this report, it is clear that the existing visual character of the site and therefore the views of it from surrounding areas will change as a result of the development. While there will be no loss of views from public places, a handful of residents on the lower slopes of the adjoining residential area may experience some loss of visual access across the site to the river beyond.

It is considered inevitable, however, that any change to the existing open landscape will have some level of impact in this regard.

The proposed tourist cabin development is small in scale and will represent only a relatively minor intervention on the site. More significantly, however, it will provide an opportunity to re-establish the native vegetation cover as a dominant landscape element. Once established, this new planting will screen the new cabins from public view and create a natural, heavily vegetated setting that will form an integral part of the surrounding swamp forest vegetation. Other design features such as the bioretention swale will also complement and protect the existing sensitive wetland environment adjacent to the site. This will be significantly more desirable than the existing maintained grassland that has minimal visual or environmental benefit. The new planting will, therefore, greatly enhance the visual amenity of the area as a whole.

The development does not have the potential to impose overshadowing impacts upon public areas or the river foreshore. Cabins within the development would also be free from overshadowing impacts.

Despite any type of development contributing to the level of relative cumulative impacts in an area, it is considered, due to the scale, design and landscape plantings of the proposal, that this development would only marginally contribute to the overall cumulative visual amenity impacts of the locality and surrounding environment. The installation of cabins is considered to be highly complementary with the existing low key recreational use of the river foreshore. The small increase in people enjoying the facilities and riverside experience will have a positive influence on the character and ambience of this setting.

These conclusions are substantiated by the sketches and photomontages presented in **Appendix B** which portray the development in its final proposed form. These illustrations show that the site would experience considerable modification to its current state and that of the outlook of lower residential and recreational areas. However it is also demonstrated that, despite some residential views being impeded and recreational views being altered, the visual modification of the locality would not be inappropriate for the character or context of the setting. The built form would not be intrusive and the surrounding vegetation would screen/filter the development, softening its impact and subsequently complement the surrounding natural environment and recreational uses without inappropriately contributing to cumulative visual amenity impacts.

## 6.14 Access for People with Disabilities

### 6.14.1 Introduction

All nine cabins will be raised up from the finished ground level by approximately 1.7 metres to allow freedom from potential flooding and to provide an allowance for the potential impacts of climate change. This height will make it very difficult to provide access for people with disabilities to all nine cabins due the costs associated with providing ramps and or lifts to individual cabins. It is therefore proposed to construct one of the two bedroom cabins so that it has access and facilities in accordance with BCA.

### 6.14.2 Applicable Legislation

**DCP No. 24 - Access and Mobility**

Council's DCP No. 24 - Access and Mobility provides development standards for developers and builders on the provision of access for all people. This DCP was adopted in March 1997 and has not been amended since that time. The DCP contains no provisions for exemptions for providing access or facilities for people with disabilities.

**The Disability Discrimination Act (1992)**

The Disability Discrimination Act (1992) (DDA) makes it unlawful for individuals or organisations to discriminate against people with disabilities. There are particular sections of the Act, which apply to access to premises. The relevant details from the sections are as follows:

Section 23

1. It is unlawful for a person to discriminate against another person on the ground of the other person's disability or a disability of any of that other person's associates:
   (a) by refusing to allow the other person access to, or the use of, any premises that the public or a section of the public is entitled or allowed to enter or use (whether for payment or not); or
   (b) in the terms or conditions on which the first-mentioned person is prepared to allow the other person access to, or the use of, any such premises; or
   (c) in relation to the provision of means of access to such premises; or
   (d) by refusing to allow the other person the use of any facilities in such premises that the public or a section of the public is entitled or allowed to use (whether for payment or not); or
   (e) in the terms or conditions on which the first-mentioned person is prepared to allow the other person the use of any such facilities; or
   (f) by requiring the other person to leave such premises or cease to use such facilities.
2. This section does not render it unlawful to discriminate against a person on the ground of the person's disability in relation to the provision of access to premises if:
   (a) the premises are so designed or constructed as to be inaccessible to a person with a disability; and
   (b) any alteration to the premises to provide such access would impose unjustifiable hardship on the person who would have to provide that access.

The DDA is not specifically about buildings, however it has an effect on buildings in which the design and construction prevents access by people with a disability, as the owners of those buildings are deemed to be discriminating against people on the basis of a disability.

The DDA is philosophical in approach and:

- is complaints based;
- has no construction standards;
- applies to actions of discrimination wherever they occur; and
- can apply retrospectively to both new and existing buildings, wherever the discrimination occurs.

**Building Code of Australia**

In NSW the Environmental Planning and Assessment Act (EP & A Act) contains the legislation applicable to the development of buildings. The EP & A Act applies the Building Code of Australia (BCA) as the technical requirements to be met in:

- new buildings; and
- new building work only.

The proposed cabins would be classified as Class3 buildings which are defined as:
*Class 3:*
*A residential building, other than a building of Class 1 or 2, which is a common place of long term or transient living for a number of unrelated persons, including:*

*(a) a boarding-house, guest house, hostel, lodging-house or backpackers accommodation; or*

*(b) a residential part of a hotel or motel; or*

*(c) a residential part of a school; or*

*(d) accommodation for the aged, children or people with disabilities; or*

*(e) a residential part of a health-care building which accommodates members of staff; or*

*(f) a residential part of a detention centre.*

Section D (Access and Egress), Part D3 (Access for People with Disabilities) BCA requires that for Class 3 buildings, which include 1 to 20 units, access to and within one sole occupancy must be provided (BCA 2010). The development proposes that access to and within one cabin be provided in accordance with the BCA and relevant standards. The most practical way to provide this access would be via a lift.

**Applying the Legislation**

Council's DCP was adopted in March 1997 and has not been amended since that time. The DCP contains a checklist for developments. The proposed development has been assessed against this checklist and the proposed development complies with relevant provisions of the DCP. A copy of the completed checklist is attached as **Appendix P**

The BCA has undergone considerable amendment since this time and provides a much more relevant guide to provision of access and facilities for people with disabilities than DCP 24. It is considered that the BCA and associated Standards are the most appropriate specifications for the provision access and facilities for people with disabilities. The proposal will comply with the BCA.

It must also be explained that even though a proposal complies with the BCA it can still be inconsistent and in breach of the DDA. In this instance it is considered that if the proposal was approved, Shannon Pacific P/L would not be discriminating against people with disabilities because it would be providing a cabin specifically designed to cater for people with disabilities. This cabin would have almost identical characteristics as the other eight cabins in terms of views, facilities, amenity, privacy and location to internal and external services.

It is considered that the proposal complies with the relevant provisions of the DCP, the DDA, the BCA and relevant standards. Further demonstration of compliance with the relevant provisions will be documented and provided as part of the application for Construction Certificate.

## 6.15 Cumulative Impacts

The concept of cumulative environmental impacts recognises that human activity and developments can combine and interact with each other to cause aggregate effects and those may be different in nature or extent from the effects of the individual activities. Cumulative impacts include those that the Riverside Tourist Cabins may have on existing land use, structures and facilities already in operation in the vicinity of the subject site, and on other developments also in the planning stage in the vicinity of the subject site.

The cumulative impact of the Riverside Tourist Cabins has been assessed against the known and planned developments occurring in the vicinity of the development. These have been addressed in individual impact assessment analysis in **Sections 6.1 to 6.12**.

In summary, the Riverside Tourist Cabins would have the potential to contribute to the:

- socio-economic affairs of the region through:
  - creating a new tourist facility to accommodate overnights stays;
  - visitors add social and cultural richness to the local community;
  - access is easily available to shops; and
  - low density cabins will have a negligible effect on existing car and pedestrian traffic;
- economic impacts affairs of the region through:
  - development will attract visitors to SWR and contribute the local economy;
  - the cabins are well places and encourage a lifestyle based holiday; and
  - convenient access to boat ramp facilities;
- bio-physical affairs of the region through:
  - introduction of a landscaped wetland buffer;
  - improved management of the wetland; and
  - increase in scenic quality with landscaping and walkways.

Overall, the potential for cumulative impacts from the identified developments and the proposed development are considered to be minimal, the key potential cumulative impacts associated with the multiple developments are considered to be:

- water quality;
- flora and fauna; and
- road traffic and transport;

No other major developments have been identified in the area that may produce cumulative impacts with the proposed Riverside Tourist development. Any future proposed developments would be required to address the cumulative impacts of their developments with the impacts of the other existing and currently proposed developments in the area, and would be considered by the relevant approval authority.

No significant cumulative impacts have been identified, and therefore the potential for cumulative impacts of the Riverside Tourist Cabins with other developments in the area is considered to be low.

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# 7

# Draft Statement of Commitments

**Table 7.1** sets out the key commitments to be undertaken by Shannon Pacific P/L as identified throughout this Environmental Assessment and the supporting reports. These commitments will ensure that the project is carried out in a manner that minimises environmental, social and economic impacts. They also confirm Shannon Pacific's commitment to complying with all legislative requirements.

**Table 7.1 Draft Statement of Commitments**

| *Issue* | *Commitment* | *Actions* | *Timing* | *Responsibility* |
|---|---|---|---|---|
| General | The developer will carry out the development in accordance with this Environmental Assessment, prepared by GeoLINK and dated May 2010; in accordance with plans prepared by Paul Smith Building Design and GeoLINK; and in accordance with the specialist supporting reports. | Any required documentation/plans will be submitted to the relevant approval body for approval prior to issue of any construction certificate demonstrating full compliance with the Part 3A Approval. | Life of project | Proponent |
| Wetland Management | The wetland will be managed in accordance with the Wetland Management Plan (WMP) | Implementation of management measures for Management Area 1 of the WMP (SEPP 14 Wetland) including:<br>▪ restoring tidal flow;<br>▪ weed control;<br>▪ facilitation of natural regeneration;<br>▪ enhancement plantings (Adaptive management); and<br>▪ monitoring and maintenance. | Construction | Proponent |
| | | Implementation of management measures for Management Area 2 of the WMP including:<br>▪ construction of a freshwater wetland for stormwater treatment;<br>▪ buffer planting and landscaping;<br>▪ fencing to restrict access to the SEPP 14 Wetland;<br>▪ educational signage; and<br>▪ monitoring and maintenance. | Construction | Proponent |

| *Issue* | *Commitment* | *Actions* | *Timing* | *Responsibility* |
|---|---|---|---|---|
| | | Implementation of the approved maintenance and monitoring program contained in the WMP including:<br>▪ five years program; and<br>▪ long term monitoring of the vegetation communities within the WMFA to be completed using aerial photography and ground truthing of the vegetation composition. | In accordance with the WMP | Proponent |
| Ecology | Ecology will be managed through management of the wetland, stormwater, and landscaping. | ▪ areas included in the WMP will be revegetated and rehabilitated with appropriate native vegetation in accordance with the WMP;<br>▪ natural regeneration will be encouraged as a priority;<br>▪ vegetation rehabilitation in the area between the cabins and the SEPP 14 wetland, including weed control;<br>▪ planting within the buffer between the cabins and the SEPP 14 Wetland to ensure compliance with both the bushfire APZ requirements, and provision of a vegetated buffer to the EECs and SEPP 14 wetland;<br>▪ implementation of the Stormwater Management Plan, including construction of a wetland (outside of the SEPP 14 Wetland boundary) to provide treatment and improved quality of stormwater runoff from the development into the SEPP 14 Wetland;<br>▪ prevention of trampling caused by humans by restricting access to the SEPP 14 Wetland. The physical barrier created by the stormwater wetland between the development and SEPP 14 Wetland, fauna friendly fencing (such as bollards) and signage stating the area is an environmental protection area, and instructing people to keep out;<br>▪ retention of all the vegetation representative of EECs within the SEPP14 Wetland on the subject site. | In accordance with the WMP | Proponent |

| *Issue* | *Commitment* | *Actions* | *Timing* | *Responsibility* |
|---|---|---|---|---|
| Bushfire | Bushfire hazard will be managed in accordance with the Bushfire Hazard Assessment. | ▪ APZs of 44 m to the east to be established and maintained for the five southern most cabins in accordance with PBP;<br>▪ APZs to be established and maintained for the four northern most cabins to the SEPP 14 Coastal Wetland and in accordance with PBP;<br>▪ APZs of 10 m to the north of the proposed cabins to be established and maintained for the northern most cabin;<br>▪ landscaping and general property maintenance to comply with Appendix 5 of PBP 2006;<br>▪ APZs to be established prior to occupation and at the landscaping stage;<br>▪ a specific bushfire construction level of BAL-29 for the eastern façade and BAL-19 for all other façades for cabins 1 to 4;<br>▪ a specific bushfire construction level of BAL-19 for the eastern façade and BAL-12.5 for all other façades of cabins 6 and 8;<br>▪ a specific bushfire construction level of BAL-12.5 for all façades of cabins 5, 7 and 9; and<br>▪ an emergency and evacuation plan to be prepared for the cabins for the purposes of bushfire protection in accordance with *A guide to Developing a Bushfire Evacuation Plan* (RFS 2004); and<br>▪ the bushfire emergency and evacuation plan to be prepared prior to occupation of the cabins. | Construction<br>*Life of project*<br>*Life of project*<br>*Construction*<br>Prior to Occupation<br>Construction<br>Construction<br>Prior to occupation<br>Prior to occupation | Proponent |
| Flooding | Flood management will be in accordance with the:<br>▪ Flood Assessment; and<br>▪ Flood Emergency Plan. | An adaptive management strategy to be implemented to address potential flooding and climate change impacts. The strategy is to include provision for:<br>▪ habitable floor levels of the cabins to be initially set at equivalent to the 1% AEP flood level under the 2050 climate change scenario plus 0.5 m freeboard; | Construction | Proponent |

| Issue | Commitment | Actions | Timing | Responsibility |
|---|---|---|---|---|
| | | ▪ by the year 2050, the floor level of the cabins should be reviewed in accordance with updated sea level rise predictions at the time of review. Subject to this review the floor level of the cabins should be raised to the projected 2100 1% AEP flood level plus 0.5 m freeboard;<br>▪ the filled level of the site is to be set at a minimum level of 1.9 m AHD;<br>▪ the access/evacuation routes through the site will also be initially filled to a minimum level of 1.9 m AHD at the northern end of the site, with a consistent rising grade of at least 0.3% from north to south to provide evacuation to the high ground at Marlin Drive; and<br>▪ by the year 2050, the fill levels will be raised by the same height as the predicted sea level rise over the period from the year 2050 to 2100. This will be based on updated sea level rise predictions at the time of review.<br>▪ Implementation of the detailed Flood Emergency Plan prepared by WMAwater for the site. | 2050<br>Construction<br>Construction<br>2050<br>Construction | |
| Stormwater Management | Stormwater will be managed in accordance with the Stormwater Management Plan. | ▪ provision of rainwater tanks with a volume of approximately 3 kL at each cabin to capture roof runoff to detain flows and reduce runoff volumes;<br>▪ grassed or vegetated swales to receive overflows from the rainwater tanks and runoff from the road surfaces, gravel areas and other impervious areas;<br>▪ gravel parking areas to promote infiltration / filtering of the road runoff with excess runoff directed to the swales and constructed wetland for further treatment;<br>▪ grassed buffer strips between the entrance road / visitor parking and the constructed wetland to provide some infiltration of stormwater to groundwater and removal of coarse and medium sediment; | Construction<br>Construction<br>Construction<br>Construction | Proponent |

| *Issue* | *Commitment* | *Actions* | *Timing* | *Responsibility* |
|---|---|---|---|---|
| | | ▪ constructed wetland for final treatment of stormwater via enhanced sedimentation, fine filtration and biological uptake processes to remove pollutants, sized to provide high quality treatment suitable for release to the SEPP 14 wetland;<br>▪ the constructed wetland to be used as a sediment retention basin during the construction phase. Flows from the majority of the site will be directed to the basin. The location of the basin will facilitate interception of any sediment to the SEPP 14 wetland; and<br>▪ the western fringe of the site may flow to New Entrance Road. Sediment control fences will be erected along this boundary to prevent any sediment loss to the road drainage system. | Construction<br>Construction<br>Construction | |
| Coastal Hazard | Coastal Hazard will be managed in accordance with recommendations outlined in EA under this issue. | As per Flooding Commitments | | Proponent |
| Geotechnical | | Not applicable | | |
| Acid Sulfate Soil | Acid Sulfate Soil will be managed according to the Acid Sulfate Soil Management Plan, and applies to excavation greater than 1 m below natural ground surface.<br><br>The project will be managed so as to ensure that the development will not cause transference of Acid Sulfate soils into the existing freshwater wetland or SEPP 14 Wetland during and after construction | ▪ excavated ASS material is to be separated from overlaying topsoil and temporarily stockpiled for treatment;<br>▪ treatment should directly follow excavation;<br>▪ the treatment of ASS must be carried out in accordance with standard Occupational Health and Safety Guidelines;<br>▪ when ASS material must be stockpiled temporarily, the stockpile area must be located away from waterways and bunded to prevent any runoff to receiving waters;<br>▪ the following liming and treatment procedure for ASS to be implemented:<br>1 lime the base of the stockpile pad 5 mm thick layer of fine grade-1 agricultural lime;<br>2 spread excavated ASS onto the pad in layers 10 – 30 cm thick; | Construction<br>Construction<br>Construction<br>Construction<br>Construction | Proponent |

| Issue | Commitment | Actions | Timing | Responsibility |
|---|---|---|---|---|
| | | 3 apply lime at a standard rate of:<br>b. 3.0 kg of lime per tonne of soil from within 0.5 m of the ground surface;<br>c. 3.6 kg of lime per tonne of soil from within 1.0 m of the ground surface; and<br>d. 30.1 kg of lime per tonne of soil from between 1 m and 2 m depth below ground surface.<br>Note: 1 bag of lime = 25 kg;<br>Note: Windy conditions should be avoided for safety and efficiency;<br>4 cultivate lime into the ASS layer well, preferably using a rotary hoe. Ensure an even homogenous mix of soil and lime is created before spreading the next soil layer; and<br>5 repeat steps 2 – 4 as required.<br>▪ ASS treated in this way can be used as fill;<br>▪ where service trenches can be refilled within 24 hours, excavated ASS material should be separated from overlying topsoil and temporarily stockpiled;<br>▪ once trenching and laying of services is completed, ASS material should be returned to the trench first followed by the topsoil;<br>▪ where ASS burial cannot be completed within 24 hours, or if there is surplus of ASS material, the liming procedure above should be adopted; and<br>▪ ASS management will be required during construction for any works that involve excavation works and soil disturbance. | Construction<br>Construction<br>Construction<br>Construction<br>Construction | |
| Traffic and Access | Traffic and Access will be managed in accordance with measures outlined in the Environmental Assessment | ▪ internal access road to be 11 metres wide, constructed of asphalt connecting to gravel driveways for access to cabins;<br>▪ four of the cabins have double access forward drive in/drive out access and five have traditional single access; | Construction<br>Construction | Proponent |

| Issue | Commitment | Actions | Timing | Responsibility |
|---|---|---|---|---|
| | | ▪ a gravel path from the rear of the cabins to the tavern and through the wetland area would be constructed; | Construction | |
| | | ▪ The roadway will be sealed and constructed to shed water to their edges and into open shallow grassed swale drains; | Construction | |
| | | ▪ all road edges will be adjoined by grassed and landscaped areas and actions that tend to concentrate flows will be avoided; | Construction | |
| | | ▪ areas that are dedicated for visitor parking and are sealed will also be drained to open swales; and | Construction | |
| | | ▪ the pathways in the development will generally be 1.2 m wide and have compacted gravel surfaces. | Construction | |
| Heritage and Archaeology | Heritage and Archaeology will be managed in accordance with the Archaeological Report and mitigation measures outlined in the Environmental Assessment. | ▪ implementation of a comprehensive stormwater, erosion and sedimentation controls to prevent run-off into wetland, watercourses creeks and river so as not to contaminate the flathead breeding grounds opposite the Riverside Tavern; | Construction | Proponent |
| | | ▪ if any Aboriginal sites are found during excavation, works will cease until the area has been inspected by DECCW, members of the local Aboriginal community and an archaeologist; | Construction | |
| | | ▪ if archaeological remains are uncovered during the works, all works will cease in the vicinity of the material/find and an archaeologist DECCW and the Project Manager will be contacted immediately; and | Construction | |
| | | ▪ if any items defined as relics under the NSW Heritage Act 1977 are uncovered during the works, all works will cease in the vicinity of the find and an archaeologist and the Project manager will be contacted immediately. | Construction | |

| *Issue* | *Commitment* | *Actions* | *Timing* | *Responsibility* |
|---|---|---|---|---|
| Infrastructure Provision | Provision of all essential services to the Cabins in accordance with **Section 6.12**. | ▪ The rainwater tanks shall be used for laundry and toilet flushing which will significantly reduce demand on the reticulated supply water when rainwater is available.<br>▪ Pumping from the two package pump stations shall be timer controlled to pump at off-peak times to avoid any increase in peak flows at the downstream pump station.<br>▪ Use of timer controls for pumping from the package pump stations will enable the flows to be pumped into the private rising main from the Riverside Tavern pump station to avoid peak pumping periods from the Tavern. Pumping at off-peak times will also ensure there is no additional peak loading on the Macleay Water sewerage system.<br>▪ Electricity - the cabins shall be supplied by the same electricity supply as the Riverside Tavern. The tavern is supplied by the sub-station to the north of the tavern. | Life of Project<br>Life of Project<br>Life of Project<br>Life of Project | Proponent |
| Visual Impact | Impacts to visual amenity will be managed in accordance with the Visual Amenity Assessment | ▪ Cains will include the use of timber handrails with wire ballustrades, louvre windows, wide eves and a large covered veranda along the cabin front;<br>▪ cabins will have a narrow frontage to the street and each structure will be approximately 10 metres apart providing optimal scope for extensive new planting. Cabins will have alternating set backs to minimise the visual prominence of building facades to the street;<br>▪ planting of trees and shrubs will be strategically located around cabins to create a dominant canopy above roof lines that will help disguise and visually absorb the structures;<br>▪ planting will also create private spaces between cabins, screen unwanted views and provide shelter to the front verandas from undesirable south-western summer sun; | Construction<br>Construction<br>Construction<br>Construction | Proponent |

| *Issue* | *Commitment* | *Actions* | *Timing* | *Responsibility* |
|---|---|---|---|---|
| | | ▪ surface drainage will be facilitated by open swales to provide opportunity for passive treatment through a bioretention system prior to discharging into the natural wetland area further east;<br>▪ the most significant swale will align with the southern access road and adjoining parking areas to prevent undesirable vehicle access into the wetland area further east;<br>▪ the existing undeveloped area east of the swale will be rehabilitated to restore the natural values of the original wetland environment; and<br>▪ new tree planting within this area will incorporate buffer zones and clearances between canopies as required to satisfy bushfire regulations. | Construction<br>Construction<br>Construction<br>Construction | |
| Equitable Access | To cater and provide people with disabilities by ensuring equitable access and facilities. | Construct one of the two bedroom cabins to provide access and facilities for people with disabilities in accordance with Building Code of Australia and relevant standards and the Disability Discrimination Act 1992. | Construction | Proponent |
| Cumulative Impacts | | Not applicable | | |

# 8

# Conclusion

This Environmental Assessment has been prepared to accompany an application under Part 3A of the Environmental Planning and Assessment Act 1979, in order to address the Director-General's Environmental Assessment Requirements for a Tourist Facility (9 Cabins) on Lot 4 DP 1022342, New Entrance Road South West Rocks.

Shannon Pacific Pty Ltd had also previously lodged an application for a caravan park over part of the land to the north of the site, which was subsequently refused by the Department of Planning, a decision which was later upheld by the Land and Environment Court (Shannon Pacific v Minister for Planning [2007] NSWLEC 669). This proposed development is to the south of the refused Caravan Park site and the existing Riverside Tavern. It is considered that the proposed cabin development has addressed the shortcomings of the previous application, and the concerns expressed by the Department of Planning.

The current application seeks Project Approval for the development of the site, to provide for 9 tourist cabins. This proposal also proposes the rehabilitation of the SEPP 14 wetland that is adjacent to the cabins. This rehabilitation will be in accordance with an approved Wetland Management Plan and will involve:

- re-establishment of a healthy ecosystem within the SEPP 14 Wetland by restoring tidal flow;
- weed control;
- facilitation of natural regeneration;
- enhancement plantings (Adaptive management); and
- monitoring and maintenance.

The proposal will also involve provision of infrastructure to reduce impact from the proposed cabins by:

- implementation of a comprehensive Stormwater Management Plan;
- construction of a Freshwater Wetland;
- buffer planting and landscaping;
- fencing to restricted access to the SEPP 14 Wetland;
- educational signage; and
- monitoring and maintenance.

The Environmental Assessment has addressed in detail all statutory and policy provisions relevant to the development of the site. It has also addressed a range of environmental, social and economic issues that have been identified through the detailed consultation undertaken to inform the site design, as well those identified by the Director-General in relation to the project. Design of the Project Application has been based on the provision of urban design and environmental solutions that address all relevant issues.

It is considered that the proposed development provides for a contemporary low impact tourist development, with minimal on-site and off-site environmental impacts. A range of mitigation and management measures are outlined in this report to ensure that the environment of the site and the surrounding locality is protected and managed.

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# Project Team

The project team members included:

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Simon Williams
**Senior Planner / Senior Associate**

Garry Murray
**Landscape Architect**

Richard Elliot
**Landscape Designer**

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