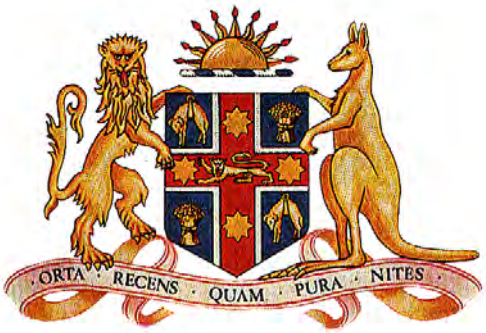

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GOVERNMENT NOTICES

Miscellaneous Instruments

ENVIRONMENTAL PLANNING AND ASSESSMENT REGULATION 2000

AS AMENDED BY THE ENVIRONMENTAL PLANNING AND ASSESSMENT AMENDMENT (SCHOOLS) REGULATION 2017

NSW Code of Practice for Part 5 Activities for Registered Non-Government Schools

The Code of Practice for Environmental Assessment regulates how environmental assessment is to be undertaken for developments that are permitted without consent by the Education SEPP. The Code sets out specific requirements for assessment of environmental impacts, community consultation and record keeping.

NSW Code of Practice for Part 5 activities

For registered non-government schools

August 2017

August 2017

Disclaimer

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1. Introduction

1.1 Background

Between 2010 and 2015, the NSW school student population grew by 5.4% and the average enrolment per school grew by 5.9%[1]. Non-government schools now make up over 30 percent of the sector. The NSW Department of Education anticipates demand for educational facilities will continue to grow significantly over the next 20 years. To meet this demand, both government and non-government schools will need to expand their facilities to meet future student numbers.

Government schools can currently undertake certain routine or minor development in connection with an existing educational establishment without needing development consent from council under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Before commencing works, the school (known as the 'determining authority') must undertake an assessment under Part 5 of the EP&A Act to determine whether there will be any potential impacts on the environment caused by the works.

The NSW Government has decided to broaden these provisions to apply to non-government schools (as defined under the *Education Act 1990* (NSW)). Planning legislation has been amended and a new *State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017* (Education SEPP) has been made. These amendments recognise registered non-government schools as 'public authorities' and 'determining authorities' under Part 5 of the EP&A Act for the purposes of assessing and carrying out development without consent under the Education SEPP so that they can assess and carry out this type of school development in the same way as government schools.

This will provide more equitable planning rules for government and non-government schools and assist in the appropriate assessment and efficient construction, operation and maintenance of the education infrastructure required to meet NSW's growing population needs.

1.2 Purpose of the Code

Registered non-government schools (RNS) will be able to undertake certain types of school development without obtaining council consent, but will be required (like other public authorities) to undertake an environmental assessment under Part 5 of the EP&A Act before carrying out the activity. Those school developments are listed in section 2.2 of this Code.

The purpose of this Code is to ensure that the environmental assessment of these school developments is undertaken appropriately, and leads to good on-ground outcomes.

By following this Code, RNSs will:

- Classify their activities into the right assessment category
- Assess their activities in an appropriate level of detail, including community consultation
- Document the assessment process accurately and transparently
- Determine the assessment in a clear, practical and enforceable way and

[1] Australian Bureau of Statistics Catalogue 4221.0

- Implement the activity with the best possible measures in place to protect the environment and the community.

The Code has been developed in consultation with the peak non-government education bodies and relevant NSW Government Agencies.

1.3 Legal status of the Code

This Code is an approved Code under a clause (clause 244N) of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) and will take effect upon gazettal or a later date specified in the gazettal notice. It will continue to be in force until it is varied or revoked in accordance with the EP&A Regulation.

Compliance with the Code will be required under the EP&A Regulation by an RNS who intends to undertake any activities identified as 'development without consent' under the Education SEPP. A breach of the mandatory provisions of the Code will be an offence under the EP&A Act. The mandatory provisions of the Code are outlined in section 6 (Compliance).

The requirement for the RNS to comply with this Code also applies to any works to be done on their behalf under the Education SEPP (e.g. by a contractor or subcontractor).

Refer to Appendix A for definitions.

2. School developments

2.1 Approval pathways

There are a number of planning approval pathways for development associated with existing and new schools. This includes development permitted with consent that requires a development application or State significant development application and complying development that will require a complying development certificate. Other minor developments are classified as exempt development and do not require any development consent.

The provisions of this Code apply only to development that is permitted without consent as specified in the Education SEPP.

If a public authority proposes to undertake an activity that is classified as 'development without consent' in an EPI, they do not need to obtain development consent under Part 4 of the Act, but they will need to assess the environmental impacts of the activity under Part 5 of the Act (as a 'determining authority'). The Education SEPP outlines certain school developments that may be undertaken by public authorities (such as a Government School) without development consent.

Registered non-Government schools (RNSs) are prescribed to be 'public authorities' under Part 5 of the EP&A Act only for the purposes of assessing and carrying out development without consent under clause 36 of the Education SEPP, and therefore can also undertake 'development without consent' for this type of development. They are also prescribed to be 'determining authorities' for these purposes and therefore are subject to the environmental assessment requirements of Part 5 of the EP&A Act like other public authorities.

RNSs must follow the assessment process outlined in Section 3 of this Code before carrying out school development proposals that are identified as 'development without consent' in the Education SEPP.

2.2 Part 5 schools development

Clause 36 of the Education SEPP sets out a range of activities that can be undertaken by Government schools and RNSs under the 'development without consent' pathway (also known as the 'Part 5' pathway).

Note. The following provisions are set out in Education SEPP:

1. Development for any of the following purposes may be carried out by or on behalf of a public authority without consent on land within the boundaries of an existing school:

   (a) construction, operation or maintenance, more than five metres from any property boundary with land in a residential zone and more than one metre from any property boundary with land in any other zone, of:

   (i) a library or an administration building that is not more than one storey high, or

   (ii) a portable classroom (including a modular or prefabricated classroom) that is not more than one storey high, or

   (iii) a permanent classroom that is not more than one storey high to replace an existing portable classroom and that is used for substantially the same purpose as the portable classroom, or

(iv) a kiosk, cafeteria or bookshop for students and staff that is not more than one storey high, or

(v) a car park that is not more than one storey high,

(b) minor alterations or additions, such as:

(i) internal fitouts, or

(ii) alterations or additions to address work health and safety requirements or to provide access for people with a disability, or

(iii) alterations or additions to the external facade of a building that do not increase the building envelope (for example, porticos, balcony enclosures or covered walkways),

(c) restoration, replacement or repair of damaged facilities,

(d) security measures, including fencing, lighting and security cameras.

2. However, subclause (1) applies only to development that:

(a) does not require an alteration of transport or traffic arrangements (for example, a new vehicular access point to the school or a change in location of an existing vehicular access point to the school), or

(b) in the case of development referred to in subclause (1) (a)—does not allow for an increase in:

(i) the number of students the school can accommodate, or

(ii) the number of staff employed at the school,

that is greater than 10% (compared with the average of each of those numbers for the 12-month period immediately before the commencement of the development).

3. Nothing in this clause authorises the carrying out of development in contravention of any existing condition of a development consent (other than a comply development certificate) that applies to any part of the school, relating to hours of operation, noise, car parking, vehicular movement, traffic generation, loading, waste management, landscaping or student or staff numbers.

4. A reference in this clause to development for a purpose referred to in subclause (1) (a), (b) or (c) includes a reference to development for the purpose of construction works if that development is in connection with the purpose referred to in subclause (1) (a), (b) or (c).

Figure 1. Extract from Education SEPP outlining Development Permitted Without Consent (Part 5 Development)

3. Assessment of School Development

3.1 Introduction

RNSs are prescribed as determining authorities for the purposes of section 111A of the EP&A Act and the definition of "public authority" under section 4(1) of that Act through clause 277(5) of the EP&A Regulation. This allows an RNS to be a Part 5 determining authority for development within the boundaries of an existing school that is permitted without consent under clause 32 of the Education SEPP.

When assessing a Part 5 activity, an RNS must:

- fulfil its duty under section 111 of the EP&A Act; and
- address the environmental factors listed in clause 228(2) of the EP&A Regulation (refer Figure 2).

Note. The following text is an extract from the EP&A Act and EP&A Regulation:

Section 111(1) of the EP&A Act

For the purpose of attaining the objects of this Act relating to the protection and enhancement of the environment, a determining authority in its consideration of an activity shall, notwithstanding any other provisions of this Act or the provisions of any other Act or of any instrument made under this or any other Act, examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

Clause 228(2) of the EP&A Regulation

[The following factors are listed under clause 228(2) of the EP&A Regulation]

a. any environmental impact on a community,

b. any transformation of a locality,

c. any environmental impact on the ecosystems of the locality,

d. any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality,

e. any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations,

f. any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act* (1974),

g. any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air,

h. any long-term effects on the environment,

i. any degradation of the quality of the environment,

j. any risk to the safety of the environment,

k. any reduction in the range of beneficial uses of the environment,

l. any pollution of the environment,

m. any environmental problems associated with the disposal of waste,

n. any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply,

o. any cumulative environmental effect with other existing or likely future activities,

p. any impact on coastal processes and coastal hazards, including those under projected climate change conditions.

Figure 2. Extracts from the EP&A Act and EP&A Regulation

Appendix B provides a list of potential triggers that may assist the RNS in identifying whether particular investigations are required as part of its review of the environmental factors listed above (e.g. if working in or near certain sensitive or significant environments).

Appendix C includes a list of planning principles for schools outlined in the Education SEPP that can be considered by a school when carrying out development under this Code. The principles identify specific features of well-designed school buildings and grounds, and measures to minimise any adverse impacts on the surrounding locality and environment. The RNS can use the planning principles as a reference tool when assessing environmental factors related to the school development, such as impacts on a community, transformation of a locality, aesthetic values of a locality, and other effects on a locality, place or building (such as those of architectural, cultural, historical or social significance). The planning principles also provide some guidance on what mitigation measures might be appropriate for school developments.

This Code provides a five-stage assessment process for RNSs (Figure 3):

- Stage 1 – Classification
- Stage 2 – Assessment
- Stage 3 – Documentation
- Stage 4 – Determination
- Stage 5 – Implementation

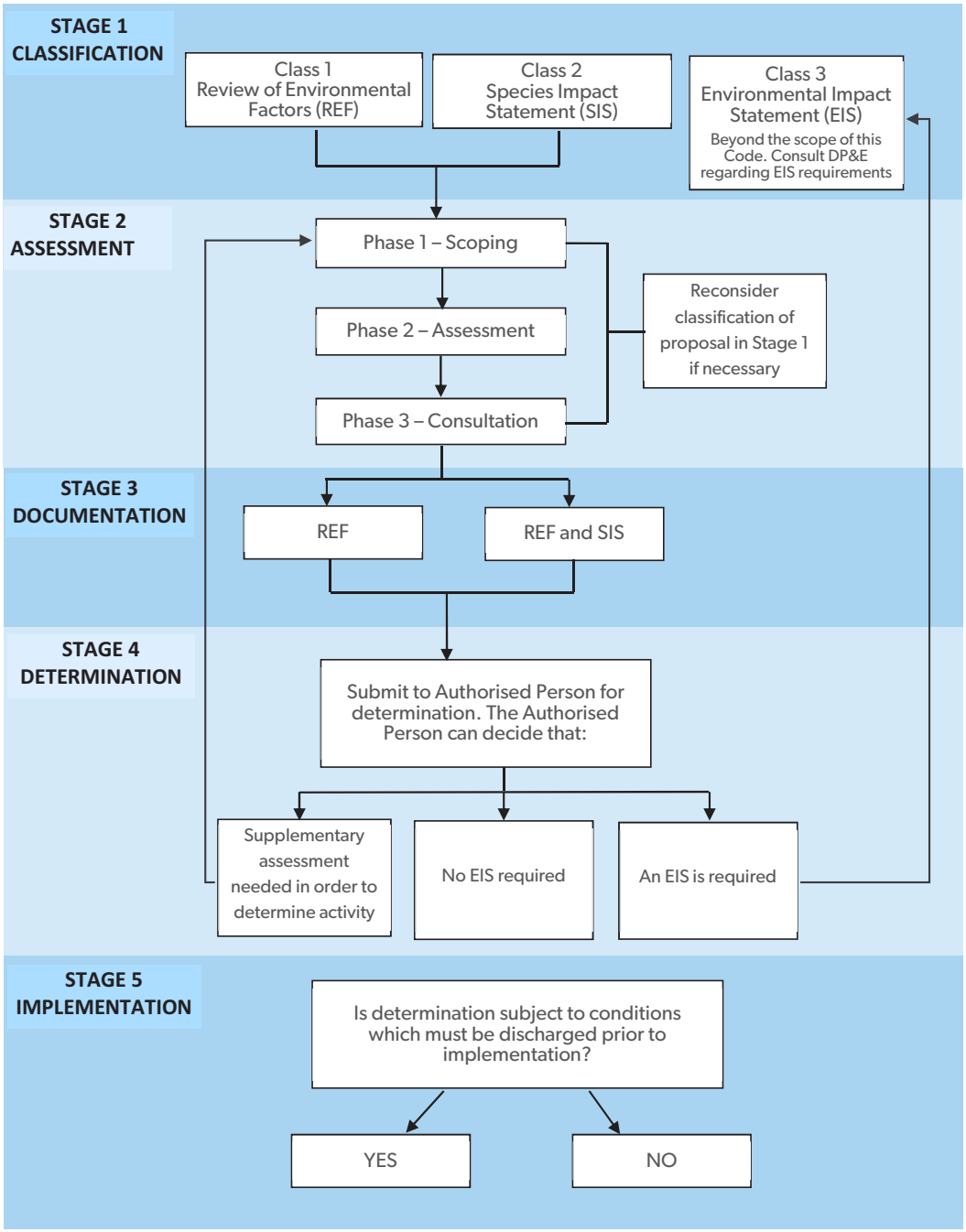

Figure 3. Five stage assessment process for Part 5 determination

3.2 Stage 1: Classification

This Code covers activities that fall under Part 5 of the EP&A Act. It does not cover works that:

- do not amount to 'Development' or an 'Activity' under the EP&A Act
- are exempted activties under section 110E of the EP&A Act, or
- are subject to another part of the EP&A Act, such as:
    - works under existing development consents
    - exempt or complying development under sections 76 and 76A(2)(b) respectively or
    - development that requires consent under Part 4.

If a work falls within one of these categories, the RNS should review the relevant Environmental Planning Instrument (EPI), such as the Council's Local Environmental Plan and (where applicable) consult the relevant consent authority to determine the next steps.

The object of Stage 1 is to classify the proposed activity into one of the following three classes (described in sections 3.2.1 - 3.2.3 of this Code):

1. A Review of Environmental Factors (REF) is required for the proposed activity
2. Species Impact Statement (SIS) is also required for the proposed activity
3. Environmental Impact Statement (EIS) is required for the proposed activity

The classes generally represent increasing levels of potential environmental impact associated with the proposed activity. The degree of assessment and consultation required corresponds to the potential level of impact.

The proposal is to be considered in its entirety, including potential ancillary impacts. An RNS should be open to re-visiting the classification at a later stage in the process if warranted.

If it is not obvious which class applies, consult section 3.3 of this Code to see what further investigations may be required. Section 3.3 also provides guidance about triggers that may move a proposed activity from one class to another.

Figure 1 depicts the five stages of the assessment and determination process and how the Code does or does not regulate Classes 1-3.

3.2.1 Class 1: Review of Environmental Factors

Class 1 works are school development (outlined in the Education SEPP as development permitted without consent) with relatively minor environmental impacts. These Part 5 activities can be broadly categorised into two key types:

- Minor School Development Works
- Other School Development Works

A review of environmental factors (REF) is a document prepared by or on behalf of a proponent that addresses and documents the proponent's consideration of all the factors listed at section 228 of the EP&A Regulation. As outlined, in section 3.4, an RNS must prepare a REF for all Class 1 development. The level of assessment in the REF should reflect the level of environmental impact resulting from the proposed works. For example, minor Part 5 works such as internal building works or routine maintenance will not require the same amount of assessment as other school development, but will still require an REF.

An outline of these categories is detailed in Figure 4 below:

Minor School Development works

Minor School works include minor alterations to school buildings and structures; internal works; fitouts; accessibility works; restoration, replacement and repair works; and security measures such as fencing. These works still require an REF, however, require a less detailed assessment given the likely minimal environmental impact. Due to their minor nature, these works will not require the same level of consultation than other school development works.

Minor Class 1 works require RNSs to place the REF on their website to make the proposal and relevant parts of the assessment publicly available.

Other School Development works

Other School works include construction, operation or maintenance of school buildings and additions to existing buildings, particularly those that are close to residential boundaries, located within bushfire zones or affecting heritage items.

It is likely that the REF for these developments will require more detailed assessment than for minor developments to determine the likely impacts of the activity and whether suitable conditions are proposed to mitigate any impacts on the environment or surrounding locality.

These works will require consultation as set out in Section 3.3.3 of the Code.

Figure 4. Class 1 Works

Each of the factors listed in clause 228 of the EP&A Regulation must also be taken into account, however, the level of detail required in the REF can vary depending on the extent or complexity of the impacts, the nature of the site and the level of community interest in the activity.

It is intended that the bulk of Part 5 activities for schools will be Class 1 activities and will require a REF. This Code provides requirements for the process and content of a REF (refer to Section 3.4).

3.2.2 Class 2: Species Impact Statement

This Code only applies to Part 5 activities under section 111 of the EP&A Act. It is not applicable to any additional assessment requirements that may be required in relation to an SIS required under section 112 of the EP&A Act. However, section 5A of the EP&A Act requires certain factors to be taken into account when deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities or their habitats.

If it is determined that there may be a significant effect, a SIS will be required which is a separate document to the REF, that specifically addresses the impacts of the activity on threatened species, populations and ecological communities. Before preparing a SIS, the proponent must first seek the requirements of the Chief Executive Office of the Office of Environment and Heritage.

A REF must still be prepared for a Class 2 activity to consider and address all other environmental impacts, in addition to the SIS which will focus on the impacts on species and habitats.

Note.

Under section 112 of the EP&A Act the RNS must prepare a SIS if the proposed activity is likely to significantly affect the environment and the scope of this likely impact arises exclusively from:

- the activity being on land that is, or is part of Critical Habitat; or

- is likely to significantly affect a Threatened Species, Population or Ecological Community or their Habitats, (including those in connection with fish and marine vegetation).

Division 2 of Part 6 of the *Threatened Species Conservation Act 1995* lists the form and content required for SISs (or Part 7A of the *Fisheries Management Act 1994* for SISs involving marine vegetation and fish). The RNS is the determining authority for a Class 2 activity. However, the concurrence of the CEO of the Office of Environment and Heritage or, in connection with fish or marine vegetation, the Secretary of the Department of Industry, Skills and Regional Development is required for the SIS under section 112C of the EP&A Act.

Amongst other things, the RNS must comply with the public consultation requirements under section 113 of the EP&A Act.

3.2.3 Class 3: Environmental Impact Statement

This Code applies to Part 5 activities that do not require an EIS or development that is classified as State significant infrastructure (SSI).

Note.

Section 112 of the EP&A Act requires a determining authority (such as an RNS) to prepare an EIS if the proposed activity "is likely to significantly affect the environment". If the RNS forms the opinion that the environmental impacts of the proposed activitiy are significant that an EIS is required, then the proposal is no longer subject to Part 5 and is instead classified as SSI under Item 1 of Schedule 3 of *State Environmental Planning Policy (State and Regional Development) 2011.*

The Minister for Planning (or delegate) is the approval authority for SSI. Part 5.1 of the EP&A Act sets out the assessment process for SSI.

It is anticipated that most development undertaken for the purposes of schools will not be of a scale or level of impact that would require the preparation of an EIS. However, it is still the responsibility of RNS to follow and document the process outlined in this Code to form the opinion that an EIS is not required.

Please consult DP&E for advice on assessment procedures for activities requiring an EIS or for SSI development. Further information regarding SSI lodgement and assessment processes can be found on the DP&E website.

3.3 Stage 2: Assessment

The object of Stage 2 is for the RNS to assess the nature, scale and extent of the proposed activity's impact on the environment. There are three phases to this assessment, which are often interrelated or simultaneous:

1. Scoping
2. Assessment
3. Consultation.

3.3.1 Phase 1 – Scoping

In this phase, the RNS should:

- describe the proposed activity, including its geographic location, current land use, landowners, neighbours and environmental characteristics
- justify the need for the proposed activity
- begin to gather information on potential environmental factors relevant to the development (Appendices B and C may be useful reference tools to assist in identifying relevant factors)
- consider the need for early community consultation and the resources required to conduct the environmental impact assessment.

Consideration of recent similar projects may be useful. The RNS should also be prepared to reconsider the classification of the proposal from Stage 1 if necessary.

This stage should inform whether the potential environmental impacts of the proposal can be reasonably classified as minor or more significant and, consequently, the level of assessment required for the proposal.

3.3.2 Phase 2 – Assessment

In this phase, the RNS should:

- draw together the necessary data, resources and expertise required to conduct a rigorous and structured assessment of the activity's environmental impacts
- confirm the appropriate assessment and approvals process (i.e. whether the Activity falls within Class 1, 2 or 3 under this Code)
- confirm any other licences or approvals (State or Commonwealth) that are required (see Appendix B for guidance on legislative triggers)
- provide an adequate assessment of the extent and nature of all environmental and community impacts associated with the proposed activity, using best available information
- identify mitigation measures or conditions to address any identified impacts
- provide evidence that the assessment has been prepared by a person suitably qualified in environmental impact assessment.

The identification and analysis of an activity's likely environmental impacts is the key goal of this phase.

The RNS should be prepared to reconsider the classification of the proposal from Stage 1 if necessary. For example, the assessment may conclude that the proposal will have a significant environmental impact and therefore require an EIS and assessment under Part 5.1 of the EP&A Act.

Note.

Section 111 of the EP&A Act requires a determining authority (such as an RNS) in considering an activity, to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

A failure to undertake an assessment of the proposed activity in accordance with section 111 of the EP&A Act could potentially be a breach of section 125 of the EP&A Act.

3.3.3 Phase 3 – Mandatory consultation

The level of consultation undertaken by the RNS should reflect the level of potential environmental impact, including impacts on surrounding properties and the community, and the anticipated level of community interest in a particular development proposal.

It is a mandatory requirement under this Code for the RNS to make the REF available on its website for Class 1 Minor School Development Works.

For all Class 1 Other School Development Works, it is a mandatory requirement for the RNS to:

- Write (by letter or email) to:
    - the Government agencies the RNS considers relevant
    - the local council of the area within which the school is located
    - all neighbours the RNS considers relevant, to:
        - describe the proposed activity, including its location
        - describe the environmental impacts the RNS reasonably considers the proposed activity may have
        - invite submissions to the RNS on the proposed activity within no less than 21 business days of the date of the correspondence and
        - provide the contact details of the RNS's nominated representative to receive submissions in writing
- Consider all submissions received during the 21 business days stipulated in the correspondence, including an assessment of the issues raised and how they have been addressed in the assessment of the proposed activity.
- Keep written records of all consultation undertaken pursuant to this Code:
    - for five years after the consultation took place
    - in a way that the records can be produced to a third party within 21 business days and
    - to a standard where a reasonable person could understand the essential nature of the consultation without extrinsic material.

This Code regulates only those public consultation obligations of an RNS which relate to assessments as a Part 5 Determining Authority for development in connection with an existing school that is permitted without consent under clause 32 of the Education SEPP.

Note.

The Education SEPP requires that a RNS consult with councils and other public authorities in relation to certain school development undertaken without consent under the Education SEPP (Division 1, Part 2 of the SEPP). These consultation requirements are intended to address matters such as impacts on council infrastructure and services, impacts on heritage, development on flood liable land, and development in or near certain government land or sensitive areas. The SEPP also includes a requirement to notify council and occupiers of adjoining land before carrying out works that are permitted as development without consent (clause 33).

Nothing in this Code limits any public consultation obligations arising from other aspects of an RNS's business or that may arise under the EP&A Act and regulations or any other Act or regulations.

3.4 Stage 3: Documentation

The object of Stage 3 is for the RNS to prepare a REF that enables the person determining the assessment (see Stage 4) to discharge the RNS's duty to comply with this Code.

As a general rule, Part 5 assessment follows a risk based approach, requiring a more detailed assessment to be made for activities that:

- are expected to have complex environmental issues
- affect a large number of people
- have a number of likely environmental impacts or a single significant impact, and/or
- have environmental impacts that are medium to high risk.

This Code is not intended to prescribe the structure of a REF, but rather to provide minimum standards that will satisfy the purpose of the Code.

3.4.1 Mandatory assessment documentation

It is a mandatory requirement under this Code that a REF document be prepared outlining the assessment of all Class 1 development (see section 3.2.1) and the REF must include the following elements:

Proposed activity	The REF must clearly describe the proposed activity, including its nature and purpose and the sites where it is to take place. All aspects of the proposed activity should be described in sufficient detail to demonstrate the Activity's potential for impacts on the environment.
Certification	The REF must contain a statement signed and dated by the person with principal responsibility for preparing the REF (being an employee or agent of the RNS) that *"I certify that I have prepared the contents of this REF and, to the best of my knowledge, it is in accordance with the Code approved under clause 244N of the Environmental Planning and Assessment Regulation 2000, and the information it contains is neither false nor misleading".*
Proponent, determining authorities and any required approvals	The REF must identify the proponent and all determining authorities and required approvals for the activity.
Environment of the activity	The REF must include a description of the environment of the site and the surrounding area, with a focus on aspects of the environment that are of particularly high value, sensitive to impacts of the type the activity will have, or of importance to the community. The REF must identify and describe any Threatened Species, Populations and Ecological Communities that are likely to occur in the area affected by the activity.
Impacts of the activity	The assessment of the potential impacts of the activity is the most important part of a REF. The REF must document likely direct and indirect environmental impacts for all phases of the activity and describe their extent, size, scope, intensity and duration. As a minimum, the REF must document consideration of each of the factors listed in clause 228(2) of the EP&A Regulation and document consideration of each of the factors listed in section 5A of the EP&A Act in relation to any Threatened Species, Populations and Ecological Communities (including fish and marine vegetation), and their Habitats.

	This section must also detail the sources and data the RNS relied on when preparing the REF.
Mitigating measures that will apply to the Activity	In the development of the REF, an RNS may conclude that the activity should be modified or adapted so that certain measures designed to mitigate the environmental impacts of the Activity are observed. These mitigating measures or conditions must be documented in the REF.
Summary of impacts	The REF must include a section that summarises the impacts of the activity and the proposed mitigation measures.
Consultation	The REF must record the consultation undertaken for the purposes of preparing the REF in accordance with Section 3.3.3 of this Code.
Conclusions (whether an EIS and/or a SIS is required)	The REF must describe: (1) whether the activity is likely to significantly affect the environment, in which case an EIS is required; and (2) whether the Activity is likely to significantly affect Threatened Species, Populations, Ecological Communities or their Habitats, in which case a SIS is required.
	The REF must describe the reasons for these conclusions and may reference the more detailed impact assessments in the body of the REF in support. In instances where the REF has been prepared by a third party it is important to note that irrespective of the conclusion of the REF, an RNS is ultimately responsible for deciding whether a proposed activity is likely to significantly affect the environment.
	As noted in Section 3.2, if the RNS forms the opinion that an EIS is required, then the proposal is no longer subject to Part 5 and is instead classified as SSI, which requires the approval of the Minister for Planning and Environment.
	Where it is unclear whether the proposed activity is likely to significantly affect the environment, preparing a REF can assist in determining whether an EIS and/or a SIS should be prepared. In this sense, a REF can be a precursor to an EIS, or a precursor and adjunct to a supplementary REF and SIS.
	Where it is clear that the proposed activity is not likely to significantly affect the environment, or where the RNS decides on the basis of the contents of a REF that a proposed activity is not likely to significantly affect the environment, the REF serves as the primary document showing that the RNS has examined and taken into account the activity's environmental impacts.

Figure 5. Elements of an REF

It is a mandatory requirement under this Code that the REF document is made available on the RNS's website prior to the commencement of the activity.

3.5 Stage 4: Determination

The object of Stage 4 is for a person authorised by the RNS to discharge the RNS's duty to comply with this Code and produce a Decision Statement.

An authorised person is an individual authorised by the RNS to determine the proposal, and cannot be the same person who conducted the assessment. Their determination is to be based on the assessment and evaluation conducted by the RNS in Stage 2.

During Stage 3 the RNS should document the steps it took throughout the assessment process, and must produce a final REF document. In Stage 4, these documents form the evidentiary basis of a determination.

In considering a REF, the authorised person may decide on behalf of the RNS:

- that no EIS or SIS is required to be prepared. Such a decision may be conditional or unconditional. If the decision is conditional, the conditions must be recorded in the Decision Statement. If a decision of this type is made, the activity may proceed in accordance with the decision
- that either an EIS or a SIS or both is or are required. If an EIS is required, the proposed activity cannot be assessed under this Code as it becomes SSI which requires the approval of the Minister for Planning and Environment, or
- that there is insufficient information contained in the REF for the authorised person to discharge the duty under section 111 of the EP&A Act such that a supplement to the REF should be prepared.

The determination should occur after the assessment and evaluation phase and after any consultation required to inform the determination has been conducted. This does not limit ongoing community consultation and communication that may be required throughout Stage 5 (implementation).

3.5.1 Mandatory determination documentation

It is a mandatory requirement under this Code that the determination of the activity (Stage 4 of the process) be documented in a written statement (the Decision Statement) signed by the authorised person on behalf of the RNS. The Decision Statement must:

- state the decision
- expressly state if it is a conditional decision
- state the conditions (if any) and the reasons for these conditions and
- be made available on the RNS's website prior to the commencement of the activity.

3.5.2 Notification of determination

In addition to placing the REF and Decision Statement on the RNS's website, the RNS should notify the council and adjoining neighbours of its intention to proceed with the development proposal.

The RNS should also consider whether it is appropriate and feasible to write to each organisation/person who made a submission during the consultation phase (see Section 3.3.3) to state:

- when the RNS expects to commence the activity and
- how the organisation/person can obtain a copy of the REF, Decision Statement and related documentation.

3.6 Stage 5: Implementation

The object of Stage 5 is to ensure that the RNS implements the activity only after a determination in accordance with Part 5 of the EP&A Act and any conditions of that determination.

3.6.1 Other approvals required

This Code operates under the EP&A Act and applies to development that does not require a planning approval. Approvals and permits may also be required under other State legislation, such as the Local Government Act 1993, the Heritage Act 1977 or the Roads Act 1993, or under any relevant Commonwealth legislation. Nothing in this Code allows an RNS to undertake an activity without first obtaining all licences and approvals required under any other legislation.

3.6.2 Certification of building works

It is a requirement of the EP&A Act that all works carried out by RNSs under the Code must also be undertaken in accordance with any relevant provisions of the National Construction Code (NCC) (previously known as the Building Code of Australia). Section 109R(2) requires that building work cannot be commenced unless it has been certified by or on behalf of the RNS that the works comply with the technical provisions of the State's building laws. There are no specific requirements as to the type of certifier that may grant certification under section 109R(2), however it is recommended that an appropriately qualified person provide the certification of the building works.

3.6.3 Management plans

An RNS should document how environmental impacts will be managed during and after implementation and how any relevant provisions of the NCC will be complied with. The documentation allows the RNS to ensure that the following are observed during and after implementation:

- measures adopted during Stage 3 to mitigate environmental impacts
- conditions of the determination made during Stage 4
- building requirements of the NCC.

The degree of detail required for the implementation documentation will depend on the scope of the activity and the nature of its impacts. For example, the RNS may choose to prepare a Construction Environmental Management Plan (CEMP) or appoint an Environmental Management Representative (EMR) to monitor the implementation. A CEMP describes how construction works will be managed at the site including what actions are required to implement mitigation measures, erosion and sediment control measures that may be required, access routes for construction vehicles, site entry and exit points and the like. An EMR is a suitably qualified person who monitors the works to ensure compliance with relevant legislation, and manage day to day issues related to environmental management onsite including any unexpected issues that may arise during construction that were not previously identified. Implementing a CEMP and appointing an EMR is industry best practice for management of construction sites, and is particularly recommended for larger and more complex projects.

If conditions apply to an activity, the RNS should record how those conditions were met during implementation. If any conditions were not met, the RNS should document the reasons for not complying.

If any organisation/person requested in their submission during the consultation phase (see Section 3.3.3) to be notified of the completion of construction, the RNS should notify them in writing within 21 business days of the construction being completed.

4. Changes to a proposal

Sometimes a proposed activity may need to be altered or modified to respond to new information, issues raised by stakeholders, or some other consideration.

4.1 Prior to determination

If a proposed activity is altered or modified before Stage 4 (determination) and the RNS reasonably believes that the changes to the proposal would increase the environmental impacts of the activity, the RNS should repeat stages 1-3 of the assessment.

Only the aspects of the activity which are proposed to be changed in a material way are required to be the subject of further assessment and consultation.

The RNS should be prepared to reconsider the classification of the proposal from Stage 1 if necessary. If the classification remains the same, the RNS may produce an addendum to the REF or a new REF.

4.2 After determination

A determination made under this Code can be altered by an authorised person via the issue of a further Decision Statement.

If the proposed change to the activity would have increased environmental impacts compared to the activity the subject of the original Decision Statement, the RNS should repeat stages 2 and 3 of the assessment before issuing a further Decision Statement. Only the aspects of the activity which are proposed to be altered or modified in a material way are required to be the subject of further assessment and consultation.

A Decision Statement altering a determination should state the reasons for the change and any conditions required as a result of those changes.

5. Record keeping

Government schools are subject to the *Government Information (Public Access) Act 2009* (GIPA Act) which requires them to either proactively release and/or provide access to documents related to their functions.

As RNSs operate under private management, an RNS is not subject to the GIPA Act. However, an RNS's new role as a determining authority for certain school development under Part 5 of the EP&A Act and its delivery of an essential service to NSW means there is an ongoing public interest in the public having access to an RNS's Part 5 assessment documents.

5.1 Mandatory record keeping requirements

It is a mandatory requirement under this Code for an RNS to keep the following documents:

- if a determination has been made, the REF and other documents that form part of the REF, excluding:
    - a draft version of the REF
    - a version of the REF never submitted to the authorised person
    - REFs where a determination has been made that the activity cannot proceed, or requires an SIS or EIS.
- if a determination has not been made, the most current version of a REF
- all Decision Statements issued by an authorised person
- all records of consultation undertaken by an RNS for an assessment
- all implementation documents produced for an activity, including documents identifying how conditions of a determination were met and how NCC compliance has been achieved.

It is a mandatory requirement under this Code for an RNS to:

- make REFs and Decision Statements publicly available on the RNS's website prior to the commencement of the activity, and ensure they remain publicly available on the website for five years from the date of the Decision Statement
- keep REFs for which a determination has not been made for five years from creation or until they are replaced by a new version
- keep records of consultation for five years after the consultation occurred
- keep implementation documents for five years after implementation has been completed.

5.2 Mandatory public access to records

Any member of the public may apply to an RNS for access to any documents required to be kept under section 5.1.

It is a mandatory requirement under this Code for the RNS to provide the applicant with a copy of the document/s sought by the application within 21 business days, except in the following circumstances:

- the application is not a valid application because it does not meet the following requirements:
    - it must be in writing sent to or lodged at an office of the RNS
    - it must clearly indicate that it is an application under this Code

- it must be accompanied by payment of $30 as an application fee
- it must state a postal address as the address for correspondence in connection with the application
- it must include such information as is reasonably necessary to enable the document/s applied for to be identified.

- the application seeks a document other than a document which the RNS to which the application is addressed is required to retain under this Code, or a document which, to the best of the RNS's knowledge after making reasonable attempts to investigate the matter, does not exist.
- the application seeks a document to which Schedule 1 of the GIPA Act would apply, if the RNS in question was subject to that Act.
- the RNS has written to the applicant within 21 business days of receiving the application to advise that the RNS expects that the application will take more than one hour to process, and that the RNS has decided to impose a processing fee on the applicant based on a reasonable estimate of how long it will take for the RNS to process the application. In such a case:
  - the RNS is only obliged to provide the applicant with the applied for document/s if the applicant pays the imposed processing fee within 20 business days of the RNS giving notice in writing of the imposition of the processing fee. If the applicant pays the imposed processing fee, the RNS must produce the applied for document/s within 20 business days of payment, and
  - the correspondence advising the applicant of the imposition of a processing fee must contain an explanation as to how the processing fee has been calculated including an estimate of how the RNS employee who processes the request will spend his or her time in processing the request, and
  - a processing fee imposed by an RNS is not to exceed $30 for each employee-hour or part thereof required to process the application beyond the first hour.
- the RNS believes on reasonable grounds that the application is frivolous or vexatious, or
- the RNS is unable to contact the applicant.

It is a breach of this Code for the RNS to cease to retain a document which is sought by a member of the public in accordance with this Code after the RNS receives the application seeking that document.

It is a mandatory requirement under this Code for an RNS to respond to a request for access to a document within 21 business days of the application being made by:

- providing a copy of the applied for document/s to the applicant by any reasonable means
- writing to the applicant to impose a processing fee or
- writing to the applicant to decline to provide the applied for document/s, briefly explaining why it has declined.

The RNS is deemed to have declined access to a document or documents if it fails to respond to a request for access in a manner required by this Code within 21 business days of an application for access being made.

A person who is dissatisfied with the RNS's decision to decline access can request DP&E to direct the RNS to provide access.

The request to DP&E must:

- be in writing addressed to DP&E
- attach:
  - the original application to the RNS and

- any response from the RNS, and
- contain such further information as is necessary for DP&E to understand the reasons why the person applying for the direction considers that DP&E should make the direction.

DP&E may direct the RNS to provide any person with a copy of a document. Such a direction must be in writing, and must also be sent to the person who applied for the direction. It is a breach of this Code for an RNS to fail to comply with the direction.

6. Compliance with this Code

6.1 Compliance with Code and EP&A Act

Compliance with the mandatory requirements of this Code is required under the EP&A Regulation. A breach of a mandatory requirement will therefore be an offence under section 125(2) of the EP&A Act.

The mandatory requirements of this Code are:

- Consultation requirements under section 3.3.3
- REF documentation requirements under section 3.4.1
- Determination documentation requirements under section 3.5.1
- Record keeping requirements under section 5.1.1
- Public access to records requirements under section 5.1.2
- Reporting procedures outlined in section 6.2 below
- Audit obligations outlined in section 6.3.1 below

It will therefore be an offence under the section 125(2) of the EP&A Act to breach or otherwise fail to address these mandatory requirements under this Code.

DP&E will be responsible for monitoring and enforcing compliance with this Code.

Note.

In addition to the mandatory requirements under this Code, under the EP&A Act RNSs must comply with the relevant provisions of the National Construction Code (previously Building Code of Australia) when undertaking school developments.

Any person can commence proceedings against an RNS under sections 123 and 125 of the EP&A Act for a failure to exercise their duty under section 111 of the Act to consider environmental impacts before undertaking an activity or for non-compliance with the Code as required by clause 244N(2) of the EP&A Regulation.

6.2 Procedures for reporting breaches

It is a mandatory requirement under this Code for an RNS to report a breach of the mandatory requirements of this Code to DP&E in accordance with following procedures:

- the RNS must report a breach in writing as soon as reasonably practicable after the RNS becomes aware of the breach
- written reports must record:
    - the nature of the breach
    - the RNS's explanation for the breach and
    - a description of measures implemented to avoid a recurrence of the breach.
- serious breaches must first be reported by telephone, followed by a more detailed written report unless otherwise agreed by DP&E. A serious breach includes a breach which has, or is likely to have, a material adverse impact on the environment.

6.3 DP&E Auditing

The Secretary of DP&E may audit an RNS's compliance with this Code by either:

- conducting an audit itself or
- requiring an RNS to nominate a suitably qualified person who will conduct the audit and provide a report to DP&E at the RNS's expense.

6.3.1 Audit obligations of RNS

The following obligations of an RNS are a mandatory requirement under this Code:

- if instructed by the Secretary of DP&E, the RNS is to nominate a suitably qualified person who will conduct the audit and provide an audit report to DP&E. The RNS must first seek DP&E's approval of the auditor nominated by the RNS, before the audit commences.
- the RNS must cover the costs of the audit, including the expenses of the auditor (if nominated by the RNS).
- the RNS must cooperate fully with an auditor, whether the auditor has been nominated by the RNS or DP&E. This mandatory requirement to cooperate includes a duty to facilitate access to premises, to provide access to documents requested by an auditor, and to make personnel available for interview by an auditor. This includes access to all documents listed under section 5 (Record keeping) of this Code.

7. Appendices

7.1 Appendix A: Definitions

In this Code, except in so far as the context or subject-matter otherwise indicates or requires:

Activity has the same meaning as that prescribed by section 110(1) of the EP&A Act.

Construction Environmental Managament Plan (CEMP) means a document that outlines how activities undertaken during the construction phase of development will be managed to avoid or mitigate negative environmental impacts on site and how those environmental management requirements will be implemented.

Code means the NSW Code of Practice for Approved Education Providers, approved under clause 224N of the EP&A Regulation as in force from time to time.

Decision Statement means a document which formally records a determination made by an authorised person on behalf of an RNS during Stage 4 of the EIA process required under this Code.

Determining Authority has the same meaning as that prescribed by section 110(1) of the EP&A Act.

Development has the same meaning as under the EP&A Act.

DISRD means the Department of Industry, Skills, and Regional Development.

DP&E means the Department of Planning and Environment.

Education Act means the *Education Act 1990*.

Education SEPP means the *State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017*.

EIS means Environmental Impact Statement.

Environmental Management Representative (EMR) is a suitably qualified person appointed by the proponent of the development who monitors the works to ensure compliance with relevant legislation, and manage day to day issues related to environmental management onsite including any unexpected issues that may arise during construction that were not previously identified.

EPI means Environmental Planning Instrument and has the same meaning as under the EP&A Act.

EP&A Act means the *Environmental Planning & Assessment Act 1979*.

EP&A Regulation means the *Environmental Planning and Assessment Regulation (2000)*.

GIPA Act means *Government Information (Public Access) Act 2009*.

Government Agency means:

- a public authority constituted by or under an Act
- a government Department
- a statutory body representing the Crown
- a statutory State owned corporation (and its subsidiaries) within the meaning of the *State Owned Corporations Act 1989*

- a person, not being an RNS, prescribed by the EP&A Regulation for the purposes of the definition of "public authority" under the EP&A Act.

Habitat and Critical Habitat have the same meaning as under the EP&A Act.

Minister has the same meaning as under the EP&A Act.

NDA means Nominated Determining Authority, a determining authority nominated by the Minister in accordance with section 110A of the EP&A Act.

NCC means National Construction Code, previously known as the Building Code of Australia (BCA).

NSW means New South Wales.

OEH means the NSW Office of Environment and Heritage.

REF means a Review of Environmental Factors and, depending on context, can refer to a type of documentation of an EIA process, or the process itself.

RNS means a Registered non-government School within the meaning of the *Education Act 1990* other than one to which a current certificate of exemption applies under that Act.

Secretary, where that term is used in section 2.3.6 of this Code, has the same meaning as under the EP&A Act.

SIS means Species Impact Statement has the same meaning as under the *Threatened Species Conservation Act 1995*.

SSI means State Significant Infrastructure and has the same meaning as under the EP&A Act.

Threatened Species, Populations and Ecological Communities and related terms have the same meaning as under the EP&A Act.

7.2 Appendix B: Legislative and Environmental Triggers

In discharging its duty as a Determining Authority under section 111 of the EP&A Act an RNS must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the activity in question.

This Appendix contains a list of potential triggers which, if relevant to a particular case, may require that an RNS carries out particular investigations and assessment to discharge the duty under section 111.

This list may also be helpful to RNSs in determining whether an Activity is regulated by other State or Commonwealth legislation.

This list is non-exhaustive and is intended as a guide only.

- Principles of Ecological Sustainable Development
- Proximity to items of national environmental significance
- Precautionary Principle
- Potentially effects on threatened species, populations or ecological communities, or their habitates, including fish and marine vegetation
- Working near marine vegetation (mangroves, seagrass beds, etc.) or dredging a water body
- Impacting State, Local or section 170 register (Non-Aboriginal) heritage
- Potential impacts on Aboriginal cultural heritage including Aboriginal objects or Aboriginal plances declared under the *National Parks and Wildlife Act 1974*, a Potential Aboriginal Deposit (PAD) or native title
- Working near protected wetlands and rainforests
- Working within a drinking water catchment area
- Working within State forests/area subject to forest agreement
- Altering ground water, water bodies, etc
- Discharging to stormwater or sewer
- Siting oil filled equipment within 40m of a sensitive area or within 5m upstream of a drain
- Working within areas with potential or actual contaminated land
- Impacting hollow bearing trees
- Impacting high value Habitat
- Koala Habitat
- Clearing native vegetation
- Electric and Magnetic Fields (EMF) and Prudent Avoidance
- Bushfire risk and vegetation management.

7.3 Appendix C: Education SEPP Planning Principles

Creating and maintaining safe, functional and well- designed schools is the responsibility of all RNSs. This Code provides the following seven planning principles to guide RNSs in their assessment of new school development proposals:

- context
- built form
- adaptive learning spaces
- sustainability
- landscape
- amenity
- health and safety.

RNSs will need to demonstrate that they have considered these principles in their REF assessment and that school development approved under this Code is consistent with the Planning Principles as detailed below.

Principle 1—context, built form and landscape

Schools should be designed to respond to and enhance the positive qualities of their setting, landscape and heritage, including Aboriginal cultural heritage. The design and spatial organisation of buildings and the spaces between them should be informed by site conditions such as topography, orientation and climate.

Landscape should be integrated into the design of school developments to enhance on-site amenity, contribute to the streetscape and mitigate negative impacts on neighbouring sites.

School buildings and their grounds on land that is identified in or under a local environmental plan as a scenic protection area should be designed to recognise and protect the special visual qualities and natural environment of the area, and located and designed to minimise the development's visual impact on those qualities and that natural environment.

Principle 2—sustainable, efficient and durable

Good design combines positive environmental, social and economic outcomes. Schools and school buildings should be designed to minimise the consumption of energy, water and natural resources and reduce waste and encourage recycling.

Schools should be designed to be durable, resilient and adaptable, enabling them to evolve over time to meet future requirements.

Principle 3—accessible and inclusive

School buildings and their grounds should provide good wayfinding and be welcoming, accessible and inclusive to people with differing needs and capabilities. Schools should actively seek opportunities for their facilities to be shared with the community and cater for activities outside of school hours.

Principle 4—health and safety

Good school development optimises health, safety and security within its boundaries and the surrounding public domain, and balances this with the need to create a welcoming and accessible environment.

Principle 5—amenity

Schools should provide pleasant and engaging spaces that are accessible for a wide range of educational, informal and community activities, while also considering the amenity of adjacent development and the local neighbourhood.

Schools should include appropriate, efficient, stage and age appropriate indoor and outdoor learning and play spaces, access to sunlight, natural ventilation, outlook, visual and acoustic privacy, storage and service areas.

Principle 6—whole of life, flexible and adaptive

School design should consider future needs and take a whole-of-life-cycle approach underpinned by site wide strategic and spatial planning. Good design for schools should deliver high environmental performance, ease of adaptation and maximise multi-use facilities.

Principle 7—aesthetics

School buildings and their landscape setting should be aesthetically pleasing by achieving a built form that has good proportions and a balanced composition of elements. Schools should respond to positive elements from the site and surrounding neighbourhood and have a positive impact on the quality and character of a neighbourhood.

The built form should respond to the existing or desired future context, particularly, positive elements from the site and surrounding neighbourhood, and have a positive impact on the quality and sense of identity of the neighbourhood.

STATE ENVIRONMENTAL PLANNING POLICY (EDUCATIONAL ESTABLISHMENTS AND CHILD CARE FACILITIES) 2017

Child Care Planning Guideline – August 2017

This Guideline seeks to provide a consistent state-wide planning and design framework for preparing and considering development applications for centre-based child care facilities. It informs state and local government, industry and the community about how good design can maximise the safety, health and overall care of young children. It aims to deliver attractive buildings that are sympathetic to the streetscape and appropriate for the settings while minimising any adverse impacts on surrounding areas. It will help achieve a high level of design that is practical and aligned with National Regulations on early education and care services.

Child Care Planning Guideline

Delivering quality child care for NSW

August 2017

NSW GOVERNMENT Planning & Environment

August 2017

Cover: East Sydney Early Learning Centre designed by Andrew Burges Architects in association with the City of Sydney. Photography by Peter Bennetts.

Minister's Foreword

New South Wales' population is growing, as more people choose to live here and grow their families here. It's a reflection of the strength of our economy, the jobs being delivered and the enviable lifestyle our state has to offer.

This population growth, particularly in families, is also driving strong demand for child care. NSW currently has about 1.35 million children under 12 years of age and by 2036 that number will increase by more than 250,000 with a projected demand for 2,700 more long day care centres. The NSW Government is taking proactive steps in planning for our growing population's future.

The community has told us it wants more affordable and flexible quality child care that is closer to home and jobs. To achieve this our planning system needs to have clear regulations and guidelines.

The proposed changes to the planning laws relating to child care facilities and this Guideline will streamline planning approvals to deliver more affordable quality child care services in locations where families need them most.

Early childhood education is important to families, communities and our future. It helps parents gain employment, which benefits their quality of life and our economy and encourages healthy child development.

Child care facilities must provide a safe environment where every child has the opportunity to explore, interact and learn. They should include areas that embrace the natural environment while providing shady areas for learning and play. Designing facilities with staff in mind will deliver functional spaces and better supervision of children.

This Guideline will assist the industry to deliver early childhood education facilities that are of the highest standard.

The policy and this Guideline will align NSW planning controls with the National Quality Framework for early education and care, creating more certainty for developers and operators seeking service approval. NSW is the first state to achieve this outcome.

The NSW Government has worked closely with the industry, councils and stakeholders in the development of our new policy and this Guideline. On behalf of the NSW Government, I would like to thank all of those involved.

The Hon. Anthony Roberts MP
Minister for Planning

Contents

1. Introduction

This Guideline establishes the assessment framework to deliver consistent planning outcomes and design quality for centre-based child care facilities in NSW

Introduction

1.1 About this Guideline

State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017 (the SEPP) determines that a consent authority must take into consideration this Guideline when assessing a development application (DA) for a centre-based child care facility ('child care facility').

It also determines this Guideline will take precedence over a Development Control Plan (DCP), with some exceptions, where the two overlap in relation to a child care facility.

This Guideline informs state and local government, industry and the community about how good design can maximise the safety, health and overall care of young children. At the same time, it aims to deliver attractive buildings that are sympathetic to the streetscape and appropriate for the setting while minimising any adverse impacts on surrounding areas. It will help achieve a high level of design that is practical and aligned with the National Quality Framework.

The Guideline will provide a consistent statewide planning and design framework for preparing and considering DAs for child care facilities.

1.2 Who is the Guideline for?

The Guideline is to assist and inform:

- developers, builders, child care providers and other professionals when preparing DAs for child care facilities
- planning professionals in state and local government when assessing development proposals by ensuring they know what defines a quality and compliant child care facility that can achieve subsequent service approval
- the wider community about planning and design considerations for the delivery of quality child care facilities.

1.3 What are the planning objectives?

The planning objectives of this Guideline are to:

- promote high quality planning and design of child care facilities in accordance with the physical requirements of the National Regulations
- ensure that child care facilities are compatible with the existing streetscape, context and neighbouring land uses
- minimise any adverse impacts of development on adjoining properties and the neighbourhood, including the natural and built environment
- deliver greater certainty to applicants, operators and the community by embedding the physical requirements for service approval into the planning requirements for child care facilities.

1.4 Where does this Guideline fit?

The SEPP generally provides that Development Control Plans seeking to regulate development for a child care facility will not apply, except for controls relating to building height, rear and side setbacks and car parking rates. The following table helps different users understand how the Guideline fits with the SEPP, and how they should apply it.

The Guideline will also assist users whose proposals do not require development consent choose appropriate sites and locations, and raise awareness of potential issues and impacts (for example providers seeking to temporarily re-locate after an emergency).

Application of Child Care Planning Guideline

SEPP Provision	***Proponents***	***Consent authorities***	***Regulatory authority:*** *Concurrence / Service Approval*
Guideline as a consideration	Use the Guideline when preparing a development application to ensure once built, the development meets the physical requirements for the subsequent service approval application.	Consider Parts 2, 3 and 4 of the Guideline. Review the National Quality Framework Assessment Checklist.	Assess Concurrence request against relevant sections of Part 4 and the National Quality Framework Assessment Checklist.
Controls in Development Control Plans	The provisions of the Child Care Planning Guideline will generally take precedence over a DCP, other than building height, side and rear setbacks and car parking rates. Where there is no DCP, use all Parts of the Guideline to inform DA preparation.	The provisions of the Child Care Planning Guideline will generally take precedence over a DCP, other than building height, side and rear setbacks and car parking rates. Where there are no DCP provisions consider the development application against the matters in the Guideline.	N/A.
Concurrence	Complete and submit National Quality Framework Assessment Checklist. Prepare DA in accordance with Part 4 of the Guideline and Regulations 107 & 108 of the National Regulations.	Check National Quality Framework Assessment Checklist to assess need for concurrence. Refer to regulatory authority if insufficient unencumbered indoor or outdoor space provided.	Check National Quality Framework Assessment Checklist to review unencumbered space provisions – indoor and outdoor. Advise consent authority of determination regarding concurrence.

2. Design quality principles

This Part outlines the design quality principles

The design quality principles establish the broad design context guide of all new proposals for child care facilities, regardless of whether they are stand alone, part of a mixed-use development, modifications or retrofits of existing buildings or seeking to occupy premises without incurring new building works.

Good design is integral to creating sustainable and liveable communities. There is growing appreciation of the significant role that good design can play in education with increasing evidence that learning outcomes are closely related to the quality of learning environments.

Factors such as air quality, ventilation, natural lighting, thermal comfort and acoustic performance have been shown to have a profound impact on learning, engagement, social interactions and competencies. They also contribute to wellbeing through creating a sense of belonging, self-esteem and confidence.


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Child Care Planning Guideline Delivering quality child care for NSW 5

Design quality principles

Principle 1 - Context

Good design responds and contributes to its context, including the key natural and built features of an area, their relationship and the character they create when combined. It also includes social, economic, health and environmental conditions.

Well-designed child care facilities respond to and enhance the qualities and identity of the area including adjacent sites, streetscapes and neighbourhood.

Well-designed child care facilities take advantage of its context by optimising nearby transport, public facilities and centres, respecting local heritage, and being responsive to the demographic, cultural and socio-economic makeup of the facility users and surrounding communities.

Principle 3 - Adaptive learning spaces

Good facility design delivers high quality learning spaces and achieves a high level of amenity for children and staff, resulting in buildings and associated infrastructure that are fit-for-purpose, enjoyable and easy to use. This is achieved through site layout, building design, and learning spaces fit-out.

Good design achieves a mix of inclusive learning spaces to cater for all students and different modes of learning. This includes appropriately designed physical spaces offering a variety of settings, technology and opportunities for interaction.

Principle 2 - Built form

Good design achieves a scale, bulk and height appropriate to the existing or desired future character of the surrounding area.

Good design achieves an appropriate built form for a site and the building's purpose in terms of building alignments, proportions, building type, articulation and the manipulation of building elements. Good design also uses a variety of materials, colours and textures.

Appropriate built form defines the public domain, contributes to the character of streetscapes and parks, including their views and vistas, and provides internal amenity and outlook.

Contemporary facility design can be distinctive and unique to support innovative approaches to teaching and learning, while still achieving a visual appearance that is aesthetically pleasing, complements the surrounding areas, and contributes positively to the public realm.

Principle 4- Sustainability

Sustainable design combines positive environmental, social and economic outcomes.

This includes use of natural cross ventilation, sunlight and passive thermal design for ventilation, heating and cooling reducing reliance on technology and operation costs. Other elements include recycling and re-use of materials and waste, use of sustainable materials and deep soil zones for groundwater recharge and vegetation.

Well-designed facilities are durable and embed resource efficiency into building and site design, resulting in less energy and water consumption, less generation of waste and air emissions and reduced operational costs.

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Principle 5 - Landscape

Landscape and buildings should operate as an integrated and sustainable system, resulting in attractive developments with good amenity. A contextual fit of well-designed developments is achieved by contributing to the landscape character of the streetscape and neighbourhood.

Well-designed landscapes make outdoor spaces assets for learning. This includes designing for diversity in function and use, age-appropriateness and amenity.

Good landscape design enhances the development's environmental performance by retaining positive natural features which contribute to the local context, co-ordinating water and soil management, solar access, micro-climate, tree canopy, habitat values and preserving green networks.

Principle 6 - Amenity

Good design positively influences internal and external amenity for children, staff and neighbours. Achieving good amenity contributes to positive learning environments and the well-being of students and staff.

Good amenity combines appropriate and efficient indoor and outdoor learning spaces, access to sunlight, natural ventilation, outlook, visual and acoustic privacy, storage, service areas and ease of access for all age groups and degrees of mobility.

Well-designed child care facilities provide comfortable, diverse and attractive spaces to learn, play and socialise.

Principle 7 - Safety

Well-designed child care facilities optimise the use of the built and natural environment for learning and play, while utilising equipment, vegetation and landscaping that has a low health and safety risk, and can be checked and maintained efficiently and appropriately.

Good child care facility design balances safety and security with the need to create a welcoming and accessible environment. It provides for quality public and private spaces that are inviting, clearly defined and allow controlled access for members of the community. Well-designed child care facilities incorporate passive surveillance and Crime Prevention Through Environmental Design (CPTED).

3. Matters for consideration

This Part covers matters for consideration

The considerations give guidance to applicants on how to design a high-quality proposal that takes account of its surroundings and any potential environmental impacts the development may cause and to be mindful of potential impacts that may arise from existing uses and conditions within a locality.

The matters support the design principles and must be considered by the consent authority when assessing a DA for a child care facility. Child care facilities can be developed in a broad range of locations and need to be flexible in how they respond to the requirements and challenges this brings.

3

3.1 Site selection and location

Not all sites will be suitable for child care facilities. This Guideline aims to help proponents choose a suitable site for a new service or facility. The most important question for each applicant is: Is the neighbourhood a good "fit" for the proposal?

The location and physical context of a child care facility should be safe and healthy for children. There are several environmental hazards to be aware of when locating a new proposal, for example, bush fire and flood prone land, and contaminated land. In addition, local councils may identify areas of significant hazard in their planning instruments and policies.

Child care facilities should also be compatible with the surrounding land uses. The predominant issues will vary depending on the location and setting of the site, the type of development being proposed, and the type of surrounding land use.

Issues will differ depending on how urbanised or how rural the area is. While matters such as fire safety and evacuation may be a priority in a high rise building in metropolitan areas, impact on residential amenity may be more significant in suburban areas, and potential impacts from agricultural activities such as aerial spraying or odours may be more important in rural areas.

Considerations

Objective: To ensure that appropriate zone considerations are assessed when selecting a site.

C1

For proposed developments in or adjacent to a residential zone, consider:

- the acoustic and privacy impacts of the proposed development on the residential properties
- the setbacks and siting of buildings within the residential context
- traffic and parking impacts of the proposal on residential amenity.

For proposed developments in commercial and industrial zones, consider:

- potential impacts on the health, safety and wellbeing of children, staff and visitors with regard to local environmental or amenity issues such as air or noise pollution and local traffic conditions
- the potential impact of the facility on the viability of existing commercial or industrial uses.

For proposed developments in public or private recreation zones, consider:

- the compatibly of the proposal with the operations and nature of the community or private recreational facilities
- if the existing premises is licensed for alcohol or gambling
- if the use requires permanent or casual occupation of the premises or site
- the availability of on site parking
- compatibility of proposed hours of operation with surrounding uses, particularly residential uses
- the availability of appropriate and dedicated sanitation facilities for the development.

For proposed developments on school, TAFE or university sites in Special Purpose zones, consider:

- the compatibly of the proposal with the operation of the institution and its users
- the proximity of the proposed facility to other uses on the site, including premises licensed for alcohol or gambling
- proximity to sources of noise, such as places of entertainment or mechanical workshops
- proximity to odours, particularly at agricultural institutions
- previous uses of a premises such as scientific, medical or chemical laboratories, storage areas and the like.

Objective: To ensure that the site selected for a proposed child care facility is suitable for the use.

C2

When selecting a site, ensure that:

- the location and surrounding uses are compatible with the proposed development or use
- the site is environmentally safe including risks such as flooding, land slip, bushfires, coastal hazards
- there are no potential environmental contaminants on the land, in the building or the general proximity, and whether hazardous materials remediation is needed
- the characteristics of the site are suitable for the scale and type of development proposed having regard to:
  - size of street frontage, lot configuration, dimensions and overall size
  - number of shared boundaries with residential properties
  - the development will not have adverse environmental impacts on the surrounding area, particularly in sensitive environmental or cultural areas

Matters for consideration

- where the proposal is to occupy or retrofit an existing premises, the interior and exterior spaces are suitable for the proposed use
- there are suitable drop off and pick up areas, and off and on street parking
- the type of adjoining road (for example classified, arterial, local road, cul-de-sac) is appropriate and safe for the proposed use
- it is not located closely to incompatible social activities and uses such as restricted premises, injecting rooms, drug clinics and the like, premises licensed for alcohol or gambling such as hotels, clubs, cellar door premises and sex services premises.

Objective: To ensure that sites for child care facilities are appropriately located.

C3

A child care facility should be located:

- near compatible social uses such as schools and other educational establishments, parks and other public open space, community facilities, places of public worship
- near or within employment areas, town centres, business centres, shops
- with access to public transport including rail, buses, ferries
- in areas with pedestrian connectivity to the local community, businesses, shops, services and the like.

Objective: To ensure that sites for child care facilities do not incur risks from environmental, health or safety hazards.

C4

A child care facility should be located to avoid risks to children, staff or visitors and adverse environmental conditions arising from:

- proximity to:
  - heavy or hazardous industry, waste transfer depots or landfill sites
  - LPG tanks or service stations
  - water cooling and water warming systems
  - odour (and other air pollutant) generating uses and sources or sites which, due to prevailing land use zoning, may in future accommodate noise or odour generating uses
  - extractive industries, intensive agriculture, agricultural spraying activities
- any other identified environmental hazard or risk relevant to the site and/ or existing buildings within the site.

3

3.2 Local character, streetscape and the public domain interface

A detailed understanding of the overall site context will help create a well-designed and integrated child care facility. Context is the character and setting of the area within which the facility will sit. This character and setting is influenced by environmental, physical, economic and social factors.

New development should appropriately consider surrounding identified heritage items and identified heritage conservation areas. Local heritage provisions may apply to the proposal.

The key priorities when responding to character and context are:

Communities - understanding social dynamics can help developments reinforce local communities.

Place - drawing inspiration from indigenous character and heritage can strengthen local identity.

Natural resources - maximising use of the intrinsic resources of the site can create more sustainable developments.

Connections - understanding existing street and road linkages can help develop an effective and integrated movement framework.

Feasibility - ensuring schemes are economically viable and deliverable.

Vision - understanding the aspirations of the site within the setting of the wider area.

Streetscape impacts are integral to local character and identity. Streetscape is particularly important in areas with a strong unified, environmental, architectural, design, planting or cultural character such as scenic protection areas, environmental protection areas or heritage and urban conservation areas.

The public domain interface is the transition area between the child care facility, its private or communal space at the street edge and the public domain. The interface contributes to the quality and character of the street. The key components of the interface include entries, fences and walls, changes in level, service locations, interactions with outdoor play spaces and the location and size of street facing windows.

Considerations

Objective: To ensure that the child care facility is compatible with the local character and surrounding streetscape.

C5

The proposed development should:

- contribute to the local area by being designed in character with the locality and existing streetscape
- reflect the predominant form of surrounding land uses, particularly in low density residential areas
- recognise predominant streetscape qualities, such as building form, scale, materials and colours
- include design and architectural treatments that respond to and integrate with the existing streetscape
- use landscaping to positively contribute to the streetscape and neighbouring amenity
- integrate car parking into the building and site landscaping design in residential areas.

Objective: To ensure clear delineation between the child care facility and public spaces.

C6

Create a threshold with a clear transition between public and private realms, including:

- fencing to ensure safety for children entering and leaving the facility
- windows facing from the facility towards the public domain to provide passive surveillance to the street as a safety measure and connection between the facility and the community
- integrating existing and proposed landscaping with fencing.

C7

On sites with multiple buildings and/or entries, pedestrian entries and spaces associated with the child care facility should be differentiated to improve legibility for visitors and children by changes in materials, plant species and colours.

Matters for consideration

C8

Where development adjoins public parks, open space or bushland, the facility should provide an appealing streetscape frontage by adopting some of the following design solutions:

- clearly defined street access, pedestrian paths and building entries
- low fences and planting which delineate communal/ private open space from adjoining public open space
- minimal use of blank walls and high fences.

Objective: To ensure that front fences and retaining walls respond to and complement the context and character of the area and do not dominate the public domain.

C9

Front fences and walls within the front setback should be constructed of visually permeable materials and treatments. Where the site is listed as a heritage item, adjacent to a heritage item or within a conservation area front fencing should be designed in accordance with local heritage provisions.

C10

High solid acoustic fencing may be used when shielding the facility from noise on classified roads. The walls should be setback from the property boundary with screen landscaping of a similar height between the wall and the boundary.

3.3 Building orientation, envelope and design

Orientation refers to the position of a building and its internal spaces in relation to its site, the street, the subdivision and neighbouring buildings, vistas and weather factors such as sun and wind. Building orientation influences the urban form of the street and building address. In residential areas, orientation of the facility may directly affect residential amenity including solar access and visual and acoustic privacy.

The building envelope is determined by the permissible building height and site setbacks. In combination with height and setbacks, the following elements of building design make up the overall built form.

Building height helps shape the desired future character of a place relative to its setting and topography.

Setbacks are expressed as distance of a building from property boundaries and are important to the amenity of new development and buildings on adjacent sites. Setbacks to the street establish the alignment of buildings along a street frontage. Combined with building height and road reservation, street setbacks define the proportion and scale of the street and contribute to the character of the public domain.

Floor space ratios primarily apply to mixed use developments.

Architectural form defines a building as viewed from a distance and makes a strong contribution to local character. Aesthetics and articulation can assist in refining the form and enhancing it with scale and proportion.

Roof design forms an important part of the skyline and may provide opportunities for open space.

Facades contribute to the visual interest of the building and the character of the local area. They have an impact on the public domain where they face the street and may influence the amenity of neighbouring buildings.

Materials and finishes provide visual interest and create good amenity and a positive visual impact through consistency of finish, well-considered use of colour and texture, durability of surface finishes and fixtures, resistance to damage and vandalism, and minimal recurrent maintenance.

Buildings for child care services must be designed so that they are safe and secure for children, staff and other users. Child care facilities need to allow equitable access by all members of the community, including those with disabilities. They should also provide suitable play areas for children with disabilities.

3

Considerations

Objective: To respond to the streetscape and site, while optimising solar access and opportunities for shade.

C11

Orient a development on a site and design the building layout to:

- ensure visual privacy and minimise potential noise and overlooking impacts on neighbours by:
  - facing doors and windows away from private open space, living rooms and bedrooms in adjoining residential properties
  - placing play equipment away from common boundaries with residential properties
  - locating outdoor play areas away from residential dwellings and other sensitive uses
- optimise solar access to internal and external play areas
- avoid overshadowing of adjoining residential properties
- minimise cut and fill
- ensure buildings along the street frontage define the street by facing it
- ensure that where a child care facility is located above ground level, outdoor play areas are protected from wind and other climatic conditions.

Objective: To ensure that the scale of the child care facility is compatible with adjoining development and the impact on adjoining buildings is minimised.

C12

The following matters may be considered to minimise the impacts of the proposal on local character:

- building height should be consistent with other buildings in the locality
- building height should respond to the scale and character of the street
- setbacks should allow for adequate privacy for neighbours and children at the proposed child care facility
- setbacks should provide adequate access for building maintenance
- setbacks to the street should be consistent with the existing character.

Objective: To ensure that setbacks from the boundary of a child care facility are consistent with the predominant development within the immediate context.

C13

Where there are no prevailing setback controls minimum setback to a classified road should be 10 metres. On other road frontages where there are existing buildings within 50 metres, the setback should be the average of the two closest buildings. Where there are no buildings within 50 metres, the same setback is required for the predominant adjoining land use.

Matters for consideration

C14

On land in a residential zone, side and rear boundary setbacks should observe the prevailing setbacks required for a dwelling house.

Objective: To ensure that the built form, articulation and scale of development relates to its context and buildings are well designed to contribute to an area's character.

C15

The built form of the development should contribute to the character of the local area, including how it:

- respects and responds to its physical context such as adjacent built form, neighbourhood character, streetscape quality and heritage
- contributes to the identity of the place
- retains and reinforces existing built form and vegetation where significant
- considers heritage within the local neighbourhood including identified heritage items and conservation areas
- responds to its natural environment including local landscape setting and climate
- contributes to the identity of place.

Objective: To ensure that buildings are designed to create safe environments for all users.

C16

Entry to the facility should be limited to one secure point which is:

- located to allow ease of access, particularly for pedestrians
- directly accessible from the street where possible
- directly visible from the street frontage
- easily monitored through natural or camera surveillance
- not accessed through an outdoor play area.
- in a mixed-use development, clearly defined and separate from entrances to other uses in the building.

Objective: To ensure that child care facilities are designed to be accessible by all potential users.

C17

Accessible design can be achieved by:

- providing accessibility to and within the building in accordance with all relevant legislation
- linking all key areas of the site by level or ramped pathways that are accessible to prams and wheelchairs, including between all car parking areas and the main building entry
- providing a continuous path of travel to and within the building, including access between the street entry and car parking and main building entrance. Platform lifts should be avoided where possible
- minimising ramping by ensuring building entries and ground floors are well located relative to the level of the footpath.

NOTE: The *National Construction Code*, the *Discrimination Disability Act 1992* and the *Disability (Access to Premises – Buildings) Standards 2010* set out the requirements for access to buildings for people with disabilities.

3

3.4 Landscaping

Landscaping of child care facilities can play an important role in integrating facilities into the surrounding streetscape and context. Good integration of facilities benefits neighbours and future residents.

Special attention is required when designing landscaping for sites on bush fire prone land. (For detailed guidance refer to *Planning for Bush Fire Protection* and NSW Rural Fire Service website.) The type, location and ongoing maintenance of landscaping within the Asset Protection Zone (APZ) is a necessary Bush Fire Protection Measure.

Considerations

Objective: To provide landscape design that contributes to the streetscape and amenity.

C18

Appropriate planting should be provided along the boundary integrated with fencing. Screen planting should not be included in calculations of unencumbered outdoor space.

Use the existing landscape where feasible to provide a high quality landscaped area by:

- reflecting and reinforcing the local context
- incorporating natural features of the site, such as trees, rocky outcrops and vegetation communities into landscaping.

C19

Incorporate car parking into the landscape design of the site by:

- planting shade trees in large car parking areas to create a cool outdoor environment and reduce summer heat radiating into buildings
- taking into account streetscape, local character and context when siting car parking areas within the front setback
- using low level landscaping to soften and screen parking areas.

3.5 Visual and acoustic privacy

Visual privacy is about allowing residents on adjacent properties to occupy their private space without being overlooked by child care facilities and ensuring child care facilities are not overlooked by neighbouring properties. Privacy is influenced by the activities in each of the spaces where overlooking may occur, the times and frequency these spaces are being used, the expectations of occupants for privacy and residents' willingness to reduce overlooking with screening devices.

Acoustic privacy involves reducing sound transmission between activity rooms and outdoor play areas of the child care facility and its neighbours. Design and site layout are the main ways of reducing acoustic impacts for example:

- site context and orientation of the building
- building design including the location of public and private open spaces and the arrangement of internal spaces
- physical relationship to surrounding uses
- building separation and providing physical barriers between the outdoor areas and the noise receivers.

Outdoor areas near residential uses can be designed to encourage more passive activities. Acoustic attenuation measures can be used to reduce reflected noise and once a facility is operating the installation of public address systems should be discouraged.

Matters for consideration

Considerations

Objective: To protect the privacy and security of children attending the facility.

C20

Open balconies in mixed use developments should not overlook facilities nor overhang outdoor play spaces.

C21

Minimise direct overlooking of indoor rooms and outdoor play spaces from public areas through:

- appropriate site and building layout
- suitably locating pathways, windows and doors
- permanent screening and landscape design.

Objective: To minimise impacts on privacy of adjoining properties.

C22

Minimise direct overlooking of main internal living areas and private open spaces in adjoining developments through:

- appropriate site and building layout
- suitable location of pathways, windows and doors
- landscape design and screening.

Objective: To minimise the impact of child care facilities on the acoustic privacy of neighbouring residential developments.

C23

A new development, or development that includes alterations to more than 50 per cent of the existing floor area, and is located adjacent to residential accommodation should:

- provide an acoustic fence along any boundary where the adjoining property contains a residential use. (An acoustic fence is one that is a solid, gap free fence).
- ensure that mechanical plant or equipment is screened by solid, gap free material and constructed to reduce noise levels e.g. acoustic fence, building, or enclosure.

C24

A suitably qualified acoustic professional should prepare an acoustic report which will cover the following matters:

- identify an appropriate noise level for a child care facility located in residential and other zones
- determine an appropriate background noise level for outdoor play areas during times they are proposed to be in use
- determine the appropriate height of any acoustic fence to enable the noise criteria to be met.

3

3.6 Noise and air pollution

Child care facilities located near major roads, rail lines, and beneath flight paths are likely to be subject to noise impacts. Other noisy environments such as industrial areas and substations may impact on the amenity and well-being of the children and staff. The location of child care facilities should be selected to avoid or minimise the potential impact of external sources of significant noise.

The *Protection of the Environment Operations Act 1997* provides the statutory framework for managing air emissions in NSW and should be consulted when proposing facilities in or close to industrial areas. The *Protection of the Environment Operations (Clean Air) Regulation* sets air emission standards for different industries.

Considerations

Objective: To ensure that outside noise levels on the facility are minimised to acceptable levels.

C25

Adopt design solutions to minimise the impacts of noise, such as:

- creating physical separation between buildings and the noise source
- orienting the facility perpendicular to the noise source and where possible buffered by other uses
- using landscaping to reduce the perception of noise
- limiting the number and size of openings facing noise sources
- using double or acoustic glazing, acoustic louvres or enclosed balconies (wintergardens)
- using materials with mass and/or sound insulation or absorption properties, such as solid balcony balustrades, external screens and soffits
- locating cot rooms, sleeping areas and play areas away from external noise sources.

C26

An acoustic report should identify appropriate noise levels for sleeping areas and other non play areas and examine impacts and noise attenuation measures where a child care facility is proposed in any of the following locations:

- on industrial zoned land
- where the ANEF contour is between 20 and 25, consistent with AS 2021 - 2000
- along a railway or mass transit corridor, as defined by *State Environmental Planning Policy (Infrastructure) 2007*
- on a major or busy road
- other land that is impacted by substantial external noise.

Objective: To ensure air quality is acceptable where child care facilities are proposed close to external sources of air pollution such as major roads and industrial development.

C27

Locate child care facilities on sites which avoid or minimise the potential impact of external sources of air pollution such as major roads and industrial development.

C28

A suitably qualified air quality professional should prepare an air quality assessment report to demonstrate that proposed child care facilities close to major roads or industrial developments can meet air quality standards in accordance with relevant legislation and guidelines.

The air quality assessment report should evaluate design considerations to minimise air pollution such as:

- creating an appropriate separation distance between the facility and the pollution source. The location of play areas, sleeping areas and outdoor areas should be as far as practicable from the major source of air pollution
- using landscaping to act as a filter for air pollution generated by traffic and industry. Landscaping has the added benefit of improving aesthetics and minimising visual intrusion from an adjacent roadway
- incorporating ventilation design into the design of the facility.

Matters for consideration

3.7 Hours of operation

The hours of operation of child care facilities should not adversely impact the amenity of surrounding properties, particularly in residential areas. However, there is increasing demand for child care services outside the standard 7.00am to 7.00pm period as working hours become increasingly flexible for both shift and office workers. Hence there is a need to strike a balance between the needs of families and compatibility with the surrounding uses in an area.

Considerations

Objective: To minimise the impact of the child care facility on the amenity of neighbouring residential developments.

C29

Hours of operation within areas where the predominant land use is residiential should be confined to the core hours of 7.00am to 7.00pm weekdays. The hours of operation of the proposed child care facility may be extended if it adjoins or is adjacent to non-residential land uses.

C30

Within mixed use areas or predominantly commercial areas, the hours of operation for each child care facility should be assessed with respect to its compatibility with adjoining and co-located land uses.

3.8 Traffic, parking and pedestrian circulation

Site access from the public road to the site is important to ensure safety. At the same time, a safe pedestrian environment is essential on the site.

Car parking areas need to ensure the safety of all visitors to the site, whether it is a stand-alone facility or part of a mixed use residential, commercial or industrial development.

On and off site conflicts with children, visitors and users of the facility can be avoided through a combination of design and management plans. For example, drop off, parking and play areas in light industrial or commercial areas need to be carefully sited, away from heavy truck traffic and main roads to minimise risk of accidents.

Car parking rates are generally measured as a function of capacity, that is, spaces per number of children and staff. The capacity of a facility will be determined by several factors dictated by compliance with requirements under the National Regulations. These include:

- the amount of unencumbered space provided within a facility
- the reigning staff / child ratio provisions.

Rates of car parking should also be determined relative to the availability, frequency and convenience of public transport. Facilities located in inner urban and high density areas may require fewer off street car parking spaces than in lower density areas with limited access to transport, employment and services.

Car parking within a basement can provide optimum use of the site area and minimise visual impacts. Where basement car parking is provided, design should aim to:

- locate car park entries behind the building line
- integrate entries with the overall building façade. Design options include ventilation grills, louvres, screening devices, 'hit and miss' brickwork and similar cladding finishes
- minimise visual prominence. This can be done by stepping car park levels or using split levels on sloping sites.

Bicycle parking should be provided suitable for the context and user needs of the centre.

Considerations

Objective: To provide parking that satisfies the needs of users and demand generated by the centre.

C31

Off street car parking should be provided at the rates for child care facilities specified in a Development Control Plan that applies to the land.

3

Where a Development Control Plan does not specify car parking rates, off street car parking should be provided at the following rates:

Within 400 metres of a metropolitan train station:

- 1 space per 10 children
- 1 space per 2 staff. Staff parking may be stack or tandem parking with no more than 2 spaces in each tandem space.

In other areas:

- 1 space per 4 children.

A reduction in car parking rates may be considered where:

- the proposal is an adaptive re-use of a heritage item
- the site is in a B8 Metropolitan Zone or other high density business or residential zone
- the site is in proximity to high frequency and well connected public transport
- the site is co-located or in proximity to other uses where parking is appropriately provided (for example business centres, schools, public open space, car parks)
- there is sufficient on street parking available at appropriate times within proximity of the site.

C32

In commercial or industrial zones and mixed use developments, on street parking may only be considered where there are no conflicts with adjoining uses, that is, no high levels of vehicle movement or potential conflicts with trucks and large vehicles.

C33

A Traffic and Parking Study should be prepared to support the proposal to quantify potential impacts on the surrounding land uses and demonstrate how impacts on amenity will be minimised. The study should also address any proposed variations to parking rates and demonstrate that:

- the amenity of the surrounding area will not be affected
- there will be no impacts on the safe operation of the surrounding road network.

Objective: To provide vehicle access from the street in a safe environment that does not disrupt traffic flows.

C34

Alternate vehicular access should be provided where child care facilities are on sites fronting:

- a classified road
- roads which carry freight traffic or transport dangerous goods or hazardous materials.

The alternate access must have regard to:

- the prevailing traffic conditions
- pedestrian and vehicle safety including bicycle movements
- the likely impact of the development on traffic.

C35

Child care facilities proposed within cul-de-sacs or narrow lanes or roads should ensure that safe access can be provided to and from the site, and to and from the wider locality in times of emergency.

Objective: To provide a safe and connected environment for pedestrians both on and around the site.

C36

The following design solutions may be incorporated into a development to help provide a safe pedestrian environment:

- separate pedestrian access from the car park to the facility
- defined pedestrian crossings included within large car parking areas
- separate pedestrian and vehicle entries from the street for parents, children and visitors
- pedestrian paths that enable two prams to pass each other
- delivery and loading areas located away from the main pedestrian access to the building and in clearly designated, separate facilities
- in commercial or industrial zones and mixed use developments, the path of travel from the car parking to the centre entrance physically separated from any truck circulation or parking areas
- vehicles can enter and leave the site in a forward direction.

C37

Mixed use developments should include:

- driveway access, manoeuvring areas and parking areas for the facility that are separate to parking and manoeuvring areas used by trucks
- drop off and pick up zones that are exclusively available for use during the facility's operating hours with spaces clearly marked accordingly, close to the main entrance and preferably at the same floor level. Alternatively, direct access should avoid crossing driveways or maneuvering areas used by vehicles accessing other parts of the site

Matters for consideration

- parking that is separate from other uses, located and grouped together and conveniently located near the entrance or access point to the facility.

C38

Car parking design should:

- include a child safe fence to separate car parking areas from the building entrance and play areas
- provide clearly marked accessible parking as close as possible to the primary entrance to the building in accordance with appropriate Australian Standards
- include wheelchair and pram accessible parking.


3

4. Applying the National Regulations to development proposals

This part covers:

Internal physical environment

This section describes the specific regulations that apply to internal physical environment matters, references related construction standards and provides design guidance on how the regulations may be met.

External physical environment

This section describes the specific regulations that apply to external physical environmental matters, references related construction standards and provides design guidance on how the regulations may be met.

Best practice example

This section outlines a recommended layout for a stand-alone child care facility by bringing together the internal and external physical environmental matters. The underpinning principles may also be applied to mixed use developments which include a centre-based child care facility in commercial, industrial or high density zones.

National Quality Framework Assessment Checklist

The checklist will assist applicants demonstrate that the development is designed to achieve the requirements of Part 4.3 Physical Environment of the Education and Care Services National Regulations.

4

The physical environment of a child care facility must be safe, suitable and provide a rich and diverse range of experiences that promote children's learning and development.

This fundamentally underpins the National Regulations covering education and care services, which need to be met before a child care facility can be given service approval to operate. The good design of a child care facility is a major contributor to ensuring these regulations are addressed and service approval processing is quick and efficient.

The SEPP states that if the requirements of the National Regulations relating to the amount of unencumbered indoor and outdoor space are not met in a DA in NSW, the concurrence of the regulatory authority will be required. In determining whether to grant or refuse concurrence, the authority must consider all requirements applicable to the proposal under the Regulations.

The following advice and information will assist child care developers and operators in applying the requirements of the National Regulations when preparing DAs. The minimum construction standards contained in the *National Construction Code* relating to child care facilities also apply.

Applying the National Regulations

A. INTERNAL PHYSICAL ENVIRONMENT

4.1 Indoor space requirements

Regulation 107
Education and Care Services National Regulations

Every child being educated and cared for within a facility must have a minimum of 3.25m^2 of unencumbered indoor space.

If this requirement is not met, the concurrence of the regulatory authority is required under the SEPP.

Unencumbered indoor space excludes any of the following:

- passageway or thoroughfare (including door swings) used for circulation
- toilet and hygiene facilities
- nappy changing area or area for preparing bottles
- area permanently set aside for the use or storage of cots
- area permanently set aside for storage
- area or room for staff or administration
- kitchens, unless the kitchen is designed to be used predominately by the children as part of an educational program e.g. a learning kitchen
- on-site laundry
- other space that is not suitable for children.

All unencumbered indoor spaces must be provided as a secure area for children. The design of these spaces should consider the safe supervision of children.

When calculating indoor space requirements, the area required for any additional child may be waived when the child is being cared for in an emergency circumstance as set out in regulation 123(5) or the child is being educated or cared for in exceptional circumstances as set out in regulation 124(5) and (6) of the National Regulations.

Applicants should also note that regulation 81 requires that the needs for sleep and rest of children at the service be met, having regard to their ages, development stages and individual needs. Development applications should indicate how these needs will be accommodated.

Verandahs may be included when calculating indoor space with the written approval from the regulatory authority.

Design Guidance

Verandahs as indoor space

For a verandah to be included as unencumbered indoor space, any opening must be able to be fully closed during inclement weather. It can only be counted once and therefore cannot be counted as outdoor space as well as indoor space (refer to Figure 1).

Storage

Storage areas including joinery units are not to be included in the calculation of indoor space. To achieve a functional unencumbered area free of clutter, storage areas must be considered when designing and calculating the spatial requirements of the facility. It is recommended that a child care facility provide:

- a minimum of 0.3m^3 per child of external storage space
- a minimum of 0.2m^3 per child of internal storage space.

Storage does not need to be in a separate room or screened, and there should be a mixture of safe shelving and storage that children can access independently.

Storage of items such as prams, bikes and scooters should be located adjacent to the building entrance.

Where an external laundry service is used, storage and collection points for soiled items should be in an area with separate external access, away from children. This will prevent clothes being carried through public areas and reduce danger to children during drop off and collection of laundry.

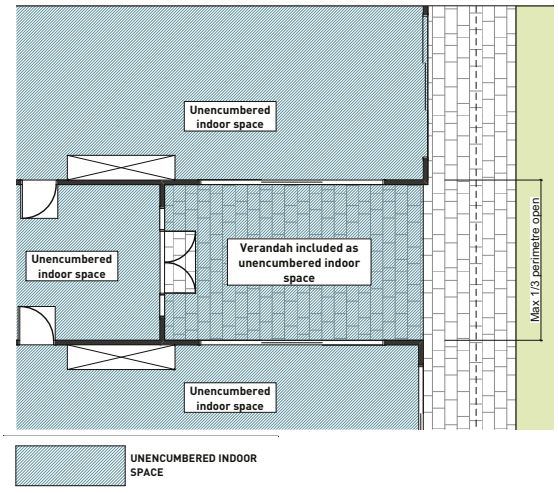

Figure 1 An outdoor verandah can be included as unencumbered indoor space with written approval. In spatial calculations this can only be counted once.

4

4.2 Laundry and hygiene facilities

Regulation 106
Education and Care Services National Regulations

There must be laundry facilities or access to laundry facilities; or other arrangements for dealing with soiled clothing, nappies and linen, including hygienic facilities for storage prior to their disposal or laundering. The laundry and hygienic facilities must be located and maintained in a way that does not pose a risk to children.

Child care facilities must also comply with the requirements for laundry facilities that are contained in the *National Construction Code*.

Design Guidance

Laundry and hygiene facilities are a key consideration for education and care service premises. The type of laundry facilities provided must be appropriate to the age of children accommodated.

On site laundry

On site laundry facilities should contain:

- a washer or washers capable of dealing with the heavy requirements of the facility
- a dryer
- laundry sinks
- adequate storage for soiled items prior to cleaning
- an on site laundry cannot be calculated as usable unencumbered play space for children (refer to Figure 2).

External laundry service

A facility that does not contain on site laundry facilities must make external laundering arrangements. Any external laundry facility providing services to the facility needs to comply with any relevant Australian Standards.

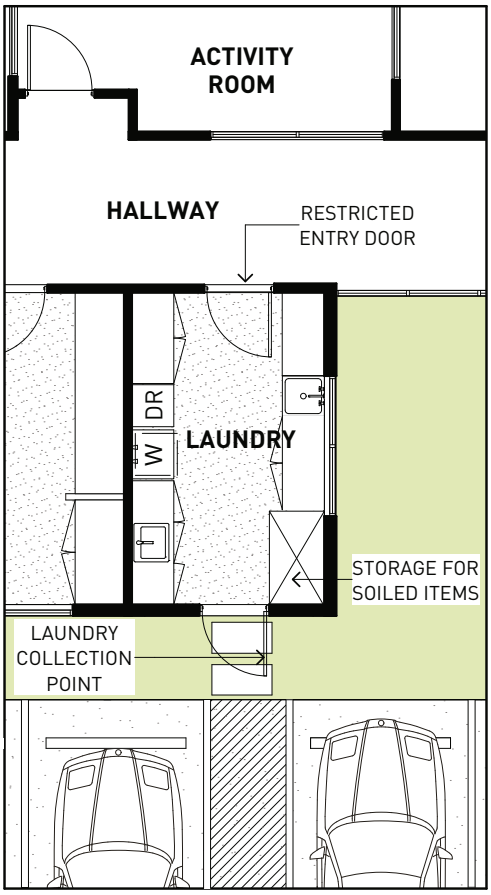

Figure 2 A typical child care facility laundry layout. External access may be provided if laundry is done off site or for deliveries.

A typical child care facility laundry with plenty of storage.

Applying the National Regulations

4.3 Toilet and hygiene facilities

Regulation 109
Education and Care Services National Regulations

A service must ensure that adequate, developmentally and age-appropriate toilet, washing and drying facilities are provided for use by children being educated and cared for by the service; and the location and design of the toilet, washing and drying facilities enable safe use and convenient access by the children.

Child care facilities must comply with the requirements for sanitary facilities that are contained in the *National Construction Code*.

Design Guidance

Toilet and hygiene facilities should be designed to maintain the amenity and dignity of the occupants (refer to Figure 3). Design considerations could include:

- junior toilet pans, low level sinks and hand drying facilities for children
- a sink and handwashing facilities in all bathrooms for adults
- direct access from both activity rooms and outdoor play areas
- windows into bathrooms and cubicles without doors to allow supervision by staff
- external windows in locations that prevent observation from neighbouring properties or from side boundaries

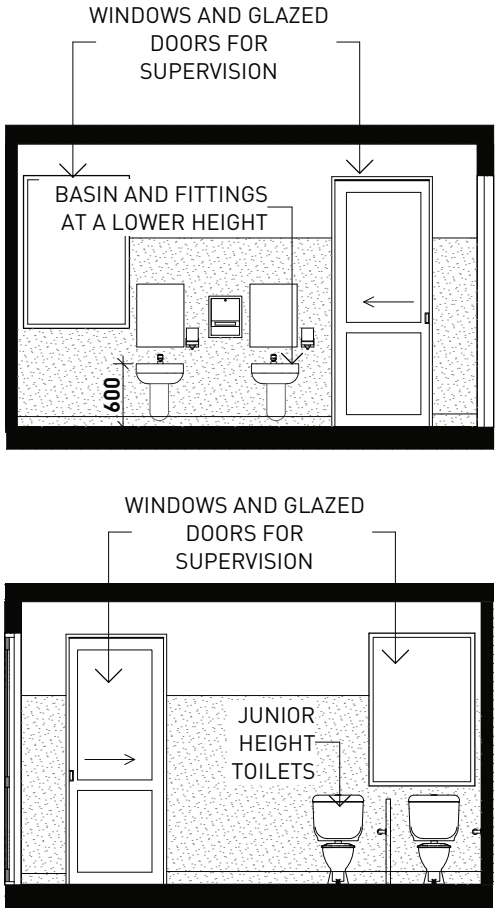

Figure 3 Bathroom facilities including toilet pans for use by children at a lower height.

Windows from activity rooms provide supervision into the bathrooms.

4

4.4 Ventilation and natural light

Regulation 110
Education and Care Services National Regulations

Services must be well ventilated, have adequate natural light, and be maintained at a temperature that ensures the safety and wellbeing of children.

Child care facilities must comply with the light and ventilation and minimum ceiling height requirements of the *National Construction Code*. Ceiling height requirements may be affected by the capacity of the facility.

Design Guidance

Ventilation

Good ventilation can be achieved through a mixture of natural cross ventilation and air conditioning. Encouraging natural ventilation is the basis of sustainable design; however, there will be circumstances where mechanical ventilation will be essential to creating ambient temperatures within a facility.

To achieve adequate natural ventilation, the design of the child care facilities must address the orientation of the building, the configuration of rooms and the external building envelope, with natural air flow generally reducing the deeper a building becomes. It is recommended that child care facilities ensure natural ventilation is available to each indoor activity room.

Natural light

Solar and daylight access reduces reliance on artificial lighting and heating, improves energy efficiency and creates comfortable learning environments through pleasant conditions. Natural light contributes to a sense of well-being, is important to the development of children and improves service outcomes. Daylight and solar access changes with the time of day, seasons and weather conditions. When designing child care facilities consideration should be given to:

- providing windows facing different orientations
- using skylights as appropriate
- ceiling heights.

Designers should aim to minimise the need for artificial lighting during the day, especially in circumstances where room depth exceeds ceiling height by 2.5 times. It is recommended that ceiling heights be proportional to the room size, which can be achieved using raked ceilings and exposed trusses, creating a sense of space and visual interest.

Clerestory windows are effective at adding natural light to activity rooms.

Louvres can be incorporated to allow for ventilation when doors are closed.

High ceiling heights provide good proportion in long and wide rooms.

Applying the National Regulations

4.5 Administrative space

Regulation 111
Education and Care Services National Regulations

A service must provide adequate area or areas for the purposes of conducting the administrative functions of the service, consulting with parents of children and conducting private conversations.

Design Guidance

Design considerations could include closing doors for privacy and glass partitions to ensure supervision.

When designing administrative spaces, consideration should be given to functions which can share spaces and those which cannot (refer Figure 4). Sound proofing of meeting rooms may be appropriate where they are located adjacent to public areas, or in large rooms where sound can easily travel.

Administrative spaces should be designed to ensure equitable use by parents and children at the facility. A reception desk may be designed to have a portion of it at a lower level for children or people in a wheel chair.

Reception spaces in administrative areas should be welcoming to adults and children and be designed for equitable access by all.

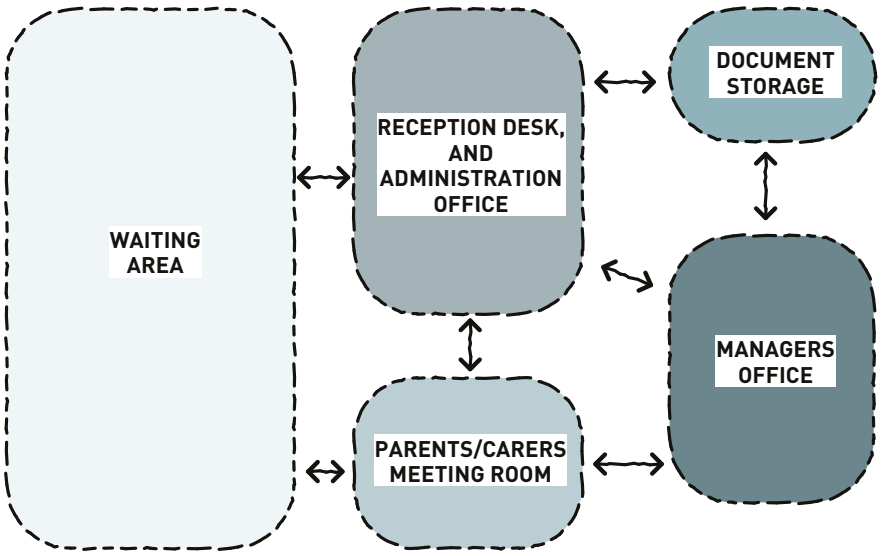

Figure 4 Diagram showing relationships between administrative spaces within a child care facility. Requirements of rooms and functions may vary depending on the size and individual requirements of the facility.

4

4.6 Nappy change facilities

Regulation 112
Education and Care Services National Regulations

Child care facilities must provide for children who wear nappies, including appropriate hygienic facilities for nappy changing and bathing. All nappy changing facilities should be designed and located in an area that prevents unsupervised access by children.

Child care facilities must also comply with the requirements for nappy changing and bathing facilities that are contained in the *National Construction Code*.

Design Guidance

In circumstances where nappy change facilities must be provided, design considerations could include:

- properly constructed nappy changing bench or benches
- a bench type baby bath within one metre from the nappy change bench
- the provision of hand cleansing facilities for adults in the immediate vicinity of the nappy change area
- a space to store steps
- positioning to enable supervision of the activity and play areas.

Baby change facilities located in the bathroom.

Applying the National Regulations

4.7 Premises designed to facilitate supervision

Regulation 115
Education and Care Services National Regulations

A centre-based service must ensure that the rooms and facilities within the premises (including toilets, nappy change facilities, indoor and outdoor activity rooms and play spaces) are designed to facilitate supervision of children at all times, having regard to the need to maintain their rights and dignity.

Child care facilities must also comply with any requirements regarding the ability to facilitate supervision that are contained in the *National Construction Code*.

Design Guidance

Design considerations should include:

- solid walls in children's toilet cubicles (but no doors) to provide dignity whilst enabling supervision
- locating windows into bathrooms or nappy change areas away from view of visitors to the facility, the public or neighbouring properties
- avoiding room layouts with hidden corners where supervision is poor, or multi room activity rooms for single groups of children
- avoiding multi-level rooms which compromise, or require additional staffing, to ensure proper supervision. If multi-level spaces are proposed, consideration should be given to providing areas that can be closed off and used only under supervision for controlled activities (refer to Figures 5, 6 and 7).

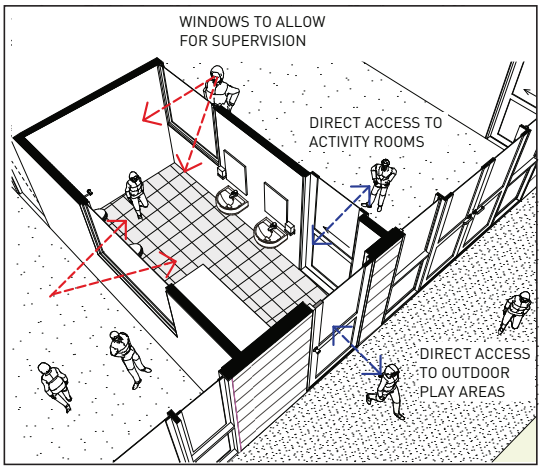

Figure 5 Bathroom facilities to have direct access to outdoor areas and activity rooms. Supervision requirements need to be considered in the design to prevent blind spots.

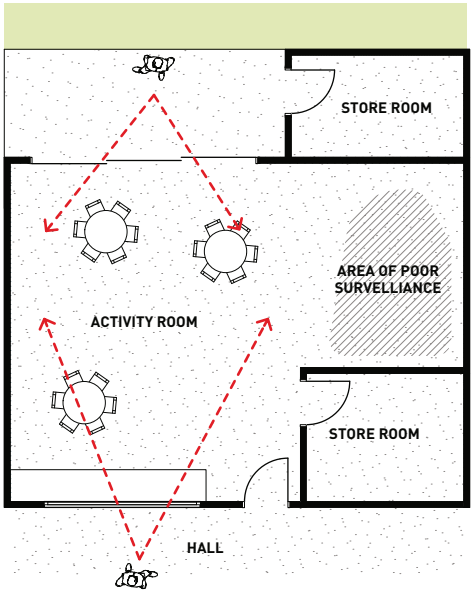

Figure 6 Avoid tucked away areas as these reduce effective supervision.

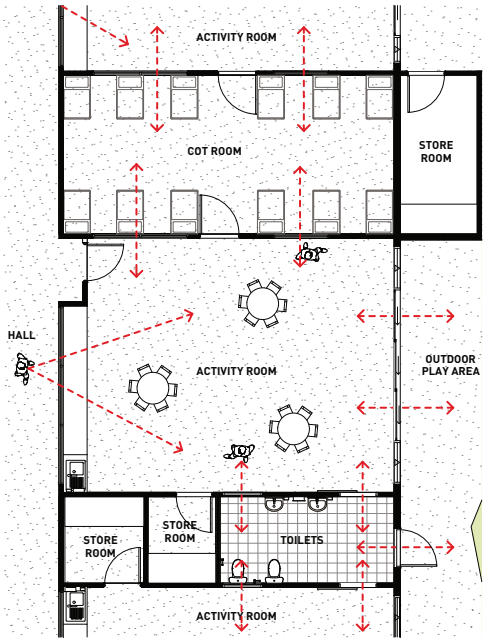

Figure 7 Good design of spaces allows for effective supervision between all areas children will occupy.

4

4.8 Emergency and evacuation procedures

Regulations 97 and 168
Education and Care Services National Regulations

Regulation 168 sets out the list of procedures that a care service must have, including procedures for emergency and evacuation.

Regulation 97 sets out the detail for what those procedures must cover including:

- instructions for what must be done in the event of an emergency
- an emergency and evacuation floor plan, a copy of which is displayed in a prominent position near each exit
- a risk assessment to identify potential emergencies that are relevant to the service.

Design Guidance

Facility design and features should provide for the safe and managed evacuation of children and staff from the facility in the event of a fire or other emergency.

Multi-storey buildings with proposed child care facilities above ground level may consider providing additional measures to protect staff and children. For example:

- independent emergency escape routes from the facility to the ground level that would separate children from other building users to address child protection concerns during evacuations
- a safe haven or separate emergency area where children and staff can muster during the initial stages of a fire alert or other emergency. This would enable staff to account for all children prior to evacuation.

An emergency and evaluation plan should be submitted with a DA and should consider:

- the mobility of children and how this is to be accommodated during an evacuation
- the location of a safe congregation/assembly point, away from the evacuated building, busy roads and other hazards, and away from evacuation points used by other occupants or tenants of the same building or of surrounding buildings
- how children will be supervised during the evacuation and at the congregation/assembly point, relative to the capacity of the facility and governing child-to-staff ratios.

Applying the National Regulations

B. EXTERNAL PHYSICAL ENVIRONMENT

4.9 Outdoor space requirements

Regulation 108
Education and Care Services National Regulations

An education and care service premises must provide for every child being educated and cared for within the facility to have a minimum of 7.0m^2 of unencumbered outdoor space.

If this requirement is not met, the concurrence of the regulatory authority is required under the SEPP.

Unencumbered outdoor space excludes any of the following:

- pathway or thoroughfare, except where used by children as part of the education and care program
- car parking area
- storage shed or other storage area
- laundry
- other space that is not suitable for children.

When calculating outdoor space requirements, the area required for any additional child may be waived when the child is being cared for in an emergency circumstance as set out in regulation 123(5) or the child is being educated or cared for in exceptional circumstances as set out in regulation 124(5) and (6) of the National Regulations.

Applicants should also note that regulation 274 (Part 7.3 NSW Provisions) states that a centre-based service for children preschool age or under must ensure there is no swimming pool on the premises, unless the swimming pool existed before 6 November 1996. Where there is an existing swimming pool, a water safety policy will be required.

A verandah that is included within indoor space cannot be included when calculating outdoor space and vice versa.

Design Guidance

Calculating unencumbered space for outdoor areas should not include areas of dense hedges or plantings along boundaries which are designed for landscaping purposes and not for children's play (refer to Figures 9 and 10).

When new equipment or storage areas are added to existing services, the potential impact on unencumbered space calculations and service approvals must be considered.

Verandahs as outdoor space

Where a covered space such as a verandah is to be included in outdoor space it should:

- be open on at least one third of its perimeter
- have a clear height of 2.1 metres
- have a wall height of less than 1.4 metres where a wall with an opening forms the perimeter
- have adequate flooring and roofing
- be designed to provide adequate protection from the elements (refer to Figure 8).

Outdoor play areas are important for growth and development.

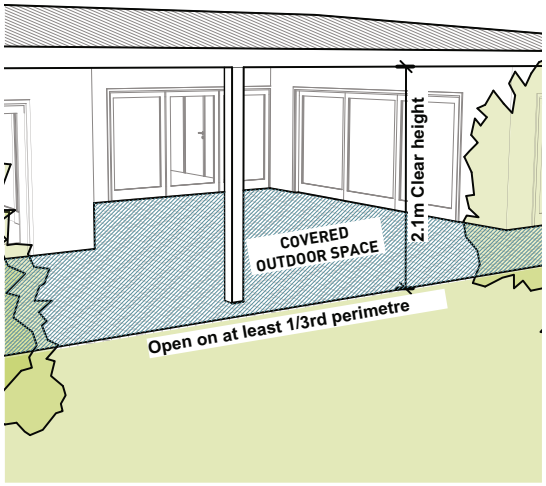

Figure 8 Covered areas such as verandahs can be included in outdoor space calculations.

4

Figure 9 Dense planting along boundaries and other areas not suitable for children should be excluded when calculating outdoor unencumbered space.

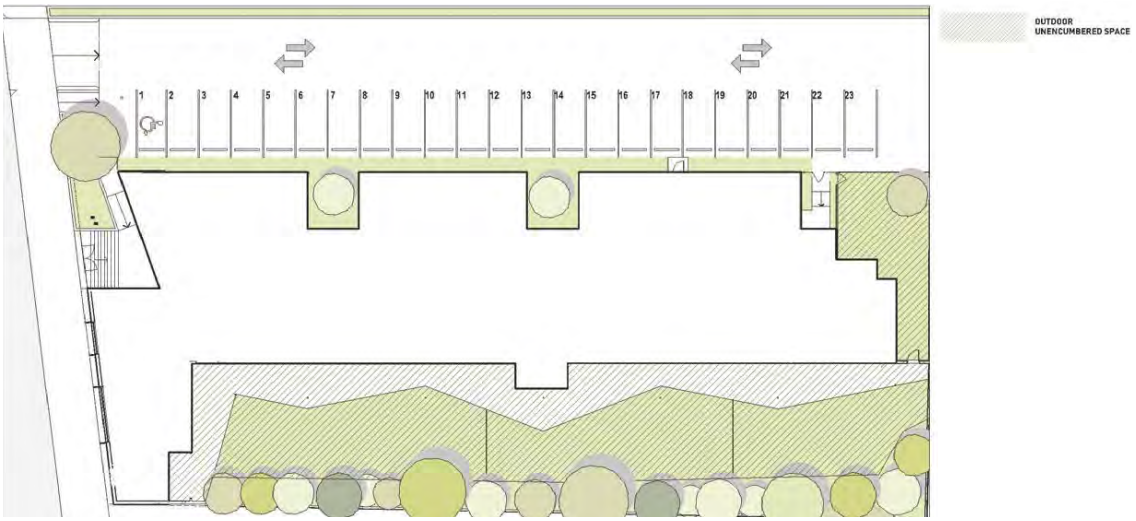

Figure 10 Areas to be included when calculating outdoor unencumbered space.

Applying the National Regulations

Simulated outdoor environments

Proponents should aim to provide the requisite amount of unencumbered outdoor space in all development applications.

A service approval will only be granted in exceptional circumstances when outdoor space requirements are not met. For an exemption to be granted, the preferred alternate solution is that indoor space be designed as a simulated outdoor environment.

Simulated outdoor space must be provided in addition to indoor space and cannot be counted twice when calculating areas.

Simulated outdoor environments are internal spaces that have all the features and experiences and qualities of an outdoor space. They should promote the same learning outcomes that are developed during outdoor play. Simulated outdoor environments should have:

- more access to natural light and ventilation than required for an internal space through large windows, glass doors and panels to enable views of trees, views of the sky and clouds and movement outside the facility
- skylights to give a sense of the external climate
- a combination of different floor types and textures, including wooden decking, pebbles, mounds, ridges, grass, bark and artificial grass, to mimic the uneven surfaces of an outdoor environment
- sand pits and water play areas
- furniture made of logs and stepping logs
- dense indoor planting and green vegetated walls
- climbing frames, walking and/or bike tracks
- vegetable gardens and gardening tubs.

Simulated outdoor environments contain sand pits, rocks and elements from the natural environment.

An indoor space designed to be a simulated outdoor space.

4

4.10 Natural environment

Regulation 113
Education and Care Services National Regulations

The approved provider of a centre-based service must ensure that the outdoor spaces allow children to explore and experience the natural environment.

Design Guidance

Creating a natural environment to meet this regulation includes the use of natural features such as trees, sand and natural vegetation within the outdoor space.

Shrubs and trees selected for the play space must be safe for children. Avoid plant species that risk the health, safety and welfare of the facility's occupants, such as those which:

- are known to be poisonous, produce toxins or have toxic leaves or berries
- have seed pods or stone fruit, attract bees,have thorns, spikes or prickly foliage or drop branches

The outdoor space should be designed to:

- provide a variety of experiences that facilitate the development of cognitive and physical skills, provide opportunities for social interaction and appreciation of the natural environment
- assist supervision and minimise opportunities for bullying and antisocial behaviour
- enhance outdoor learning, socialisation and recreation by positioning outdoor urban furniture and play equipment in configurations that facilitate interaction.

Natural environments are important for growth and play.

Applying the National Regulations

4.11 Shade

Regulation 114
Education and Care Services National Regulations

The approved provider of a centre-based service must ensure that outdoor spaces include adequate shaded areas to protect children from overexposure to ultraviolet radiation from the sun.

Design Guidance

Providing the correct balance of sunlight and shade to play areas is important for the health and well-being of children and staff. Combining built and natural shade will often be the best option.

Solar access

Controlled exposure to daylight for limited periods is essential as sunlight provides vitamin D which promotes healthy muscles, bones and overall wellbeing. Outdoor play areas should be provided with controlled solar access throughout the year. Outdoor play areas should:

- have year-round solar access to at least 30 per cent of the ground area, with no more than 60 per cent of the outdoor space covered.
- provide shade in the form of trees or built shade structures giving protection from ultraviolet radiation to at least 30 per cent of the outdoor play area
- have evenly distributed shade structures over different activity spaces.

Natural shade

Natural shade should be a major element in outdoor play areas. Trees with dense foliage and wide-spreading canopies provide the best protection. Existing stands of trees, particularly in rear setbacks, should be retained to provide shaded play areas. Species that suit local soil and climatic conditions and the character of the environment are recommended.

Dense shrubs can also provide shade. They should be planted around the site perimeter so they don't obstruct supervision. Pruning shrubs on the underside may create shaded play nooks underneath.

Planting for shade and solar access is enhanced by:

- placing appropriately scaled trees near the eastern and western elevations
- providing a balance of evergreen and deciduous trees to give shade in summer and sunlight access in winter.

Built shade structures

Built structures providing effective shade include:

- permanent structures (pergolas, sails and verandahs)
- demountable shade (marquees and tents)
- adjustable systems (awnings)
- shade sails.

Shade structures should not create safety hazards. Support systems such as upright posts should be clearly visible with rounded edges or padding. Vertical barriers at the sides of shade structures should be designed to prevent children using them for climbing. Shade structures should allow adults to view and access the children's play areas, with a recommended head clearance of 2.1 metres. The floor area underneath the structure should be of a sufficient size and shape to allow children to gather or play actively.

Shade structure can be a fixed structural element or a shade sail.

4

4.12 Fencing

Regulation 104
Education and Care Services National Regulations

Any outdoor space used by children must be enclosed by a fence or barrier that is of a height and design that children preschool age or under cannot go through, over or under it.

This regulation does not apply to a centre-based service that primarily provides education and care to children over preschool age, including a family day care venue where all children are over preschool age.

Child care facilities must also comply with the requirements for fencing and protection of outdoor play spaces that are contained in the *National Construction Code*.

Design guidance

Fencing at child care facilities must provide a secure, safe environment for children and minimise access to dangerous areas. Fencing also needs to positively contribute to the visual amenity of the streetscape and surrounding area. In general, fencing around outdoor spaces should:

- prevent children climbing over, under or though fences
- prevent people outside the facility from gaining access by climbing over, under or through the fence
- not create a sense of enclosure.

Design considerations for side and rear boundary fences could include:

- being made from solid prefinished metal, timber or masonry
- having a minimum height of 1.8 metres
- having no rails or elements for climbing higher than 150mm from the ground.

Fencing and gates should be designed to ensure adequate sightlines for vehicles and pedestrian safety in accordance with Australian Standards and Roads and Maritime Services Traffic Management Guidelines. Gates should be designed to prevent children leaving/entering unsupervised by use of childproof locking systems (refer to Figure 11).

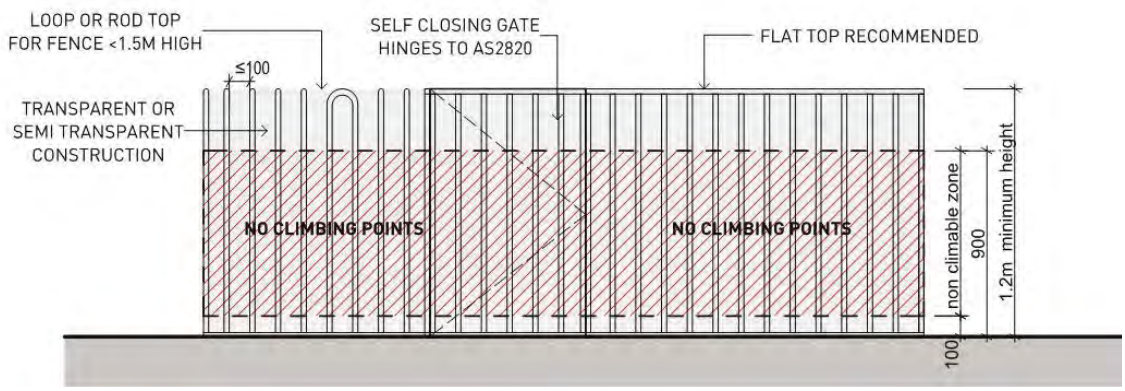

Figure 11 Heights and requirements for child care facility fencing.

Applying the National Regulations

4.13 Soil assessment

Regulation 25
Education and Care Services National Regulations

Subclause (d) of regulation 25 requires an assessment of soil at a proposed site, and in some cases, sites already in use for such purposes as part of an application for service approval.

With every service application one of the following is required:

- a soil assessment for the site of the proposed education and care service premises
- if a soil assessment for the site of the proposed child care facility has previously been undertaken, a statement to that effect specifying when the soil assessment was undertaken
- a statement made by the applicant that states, to the best of the applicant's knowledge, the site history does not indicate that the site is likely to be contaminated in a way that poses an unacceptable risk to the health of children.

Design Guidance

To ensure consistency between the development consent and the service approval application, a soil assessment should be undertaken as part of the development application process.

Where children will have access to soil the regulatory authority requires a preliminary investigation of the soil. This includes sites with or without buildings and existing approved children's services where:

- the application is to alter or extend the premises
- the alteration or extension requires earthworks or deep excavations (exceeding a depth of one metre)
- the works are going to take place in an area used for children's outdoor play or will be used for children's outdoor play after the work is completed
- a soil assessment has not been undertaken at the children's service.

Minor landscaping, creation of sand pits, movement of play equipment and so on do not qualify as earthworks and do not require a soil assessment.

An assessment of soil for a children's service approval application may require three levels of investigation:

- Stage 1 - Preliminary investigation (with or without soil sampling)
- Stage 2 - Detailed site investigation
- Stage 3 - Site specific human health risk assessment.


4

Applying the National Regulations

C. BEST PRACTICE EXAMPLE

Figure 12 is a sample plan of a facility designed with a best practice layout. The arrangement of rooms is linear with activity rooms and administration areas located off a central hallway.

Children's bathrooms and cot rooms are located between activity rooms to allow direct and easy access from both internal and external play areas.

Administration and services rooms such as the laundry and kitchen are located nearest the parking. This allows for separate access for deliveries away from children and their play areas.

The best practice example shows an optimal layout for new single storey, standalone developments. However, many of the underpinning principles apply equally to modifications of existing facilities, mixed use developments, and conversions of buildings to new facilities.

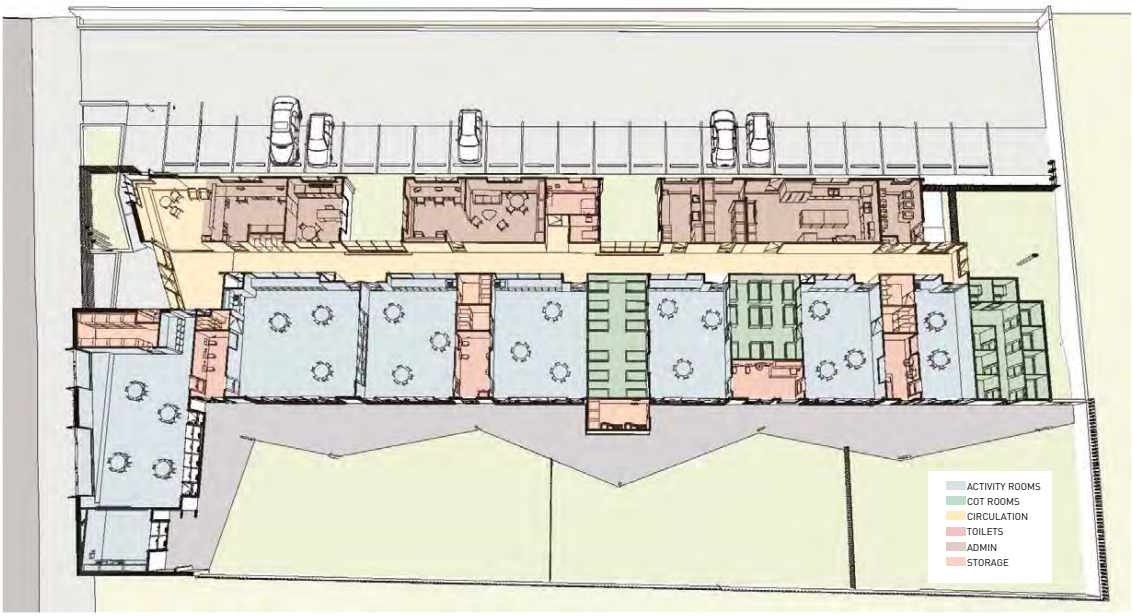

Figure 12 Cutaway plan showing arrangement and relationship between rooms within a child care facility.


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Child Care Planning Guideline Delivering quality child care for NSW 41

Applying the National Regulations

D. NATIONAL QUALITY FRAMEWORK ASSESSMENT CHECKLIST

Regulation	***Proposed***	***Complies*** *(Tick or Cross)*
104. Fencing or barrier that encloses outdoor spaces. Outdoor space that will be used by children will be enclosed by a fence or barrier that is of a height and design that children preschool age or under cannot go through, over or under it. Note: This clause does not apply to a centre-based service primarily for children over preschool age or a family day care residence or venue for over preschool age children.	*Indicate height, materials and style on plans.*	
106. Laundry and hygiene facilities The proposed development includes laundry facilities or access to laundry facilities OR explain the other arrangements for dealing with soiled clothing, nappies and linen, including hygienic facilities for storage of soiled clothing, nappies and linen prior to their disposal or laundering. Laundry/hygienic facilities are located where they do not pose a risk to children	*On site or off site facilities*	
107. Unencumbered indoor space The proposed development includes at least 3.25 square metres of unencumbered indoor space for each child. Refer to regulation 107 of the Education and Care Services National Regulation for further information on calculating indoor space.	*Number of children:* *Required area:* *Provided Area:*	
108. Unencumbered outdoor space The proposed development includes at least 7.0 square metres of unencumbered outdoor space for each child. Refer to regulation 108 of the Education and Care Services National Regulation for further information on calculating outdoor space, and for different requirements for out-of-school-hours care services.	*Number of children:* *Required area:* *Provided Area:*	
109. Toilet and hygiene facilities The proposed development includes adequate, developmentally and age-appropriate toilet, washing and drying facilities for use by children being educated and cared for by the service. The location and design of the toilet, washing and drying facilities enable safe and convenient use by the children.	*Show number of toilets and hand basins on plan*	
110. Ventilation and natural light The proposed development includes indoor spaces to be used by children that — • will be well ventilated; and • will have adequate natural light; and • can be maintained at a temperature that ensures the safety and well-being of children.	*Indicate on plans and elevations how natural ventilation and lighting is achieved.*	

Regulation	Proposed	Complies (Tick or Cross)
111. Administrative space The proposed development includes an adequate area or areas for the purposes of conducting the administrative functions of the service; and consulting with parents of children; and conducting private conversations. Note: This space cannot be included in the calculation of unencumbered indoor space – see regulation 107	*Indicate administrative space on plans*	
112. Nappy change facilities (To be completed only if the proposed development is for a service that will care for children who wear nappies) The proposed development includes an adequate area for construction of appropriate hygienic facilities for nappy changing including at least one properly constructed nappy changing bench and hand cleansing facilities for adults in the immediate vicinity of the nappy change area. The proposed nappy change facilities can be designed and located in a way that prevents unsupervised access by children.	*Indicate nappy change on plans*	
113. Outdoor space—natural environment The proposed development includes outdoor spaces that will allow children to explore and experience the natural environment.	*Indicate on landscape plans*	
114. Outdoor space—shade The proposed development includes adequate shaded areas to protect children from overexposure to ultraviolet radiation from the sun.	*Indicate shade on landscape plans*	
115. Premises designed to facilitate supervision The proposed development (including toilets and nappy change facilities) are designed in a way that facilitates supervision of children at all times, having regard to the need to maintain the rights and dignity of the children.	*Indicate on floor plans*	

5. Glossary of Terms

Acoustic privacy

A measure of sound insulation between dwellings, between dwellings and communal areas, and between external and internal spaces.

Adaptive reuse

The conversion of an existing building or structure from one use to another, or from one configuration to another.

Aircraft noise

Aircraft noise is identified as contours on the Australian Noise Exposure Forecast (ANEF) Map. The higher the ANEF contour value, the greater the exposure to aircraft noise.

Amenity

The 'liveability', comfort or quality of a place which makes it pleasant and agreeable to be in for individuals and the community. Amenity is important in the public, communal and private domains and includes the enjoyment of sunlight, views, privacy and quiet. It also includes protection from pollution and odours.

ANEF

Australian Noise Exposure Forecast
(Refer www.airservicesaustralia.com)

BCA

Building Code of Australia.

Building line

The predominant line formed by the main external face of the building. Balconies or bay window projections may or may not be included depending on desired streetscape.

Building height

As defined in the *Standard Instrument - Principal Local Environmental Plan.*

Business zones

Land identified on a Land Zoning Map within a local environmental plan as a B1 Neighbourhood Centre, B2 Local Centre, B3 Commercial Core, B4 Mixed Use, B5 Business Development, B6 Enterprise Corridor, B7 Business Park or B8 Metropolitan Centre zone.

Busy road or rail line

As defined in *State Environmental Planning Policy (Infrastructure) 2007.*

Centre-based service

As defined in the *Education and Care Services National Regulations.*

Child care facility

Term used as an abbreviation of centre-based child care facility.

Centre-based child care facility

As defined in the *Standard Instrument - Principal Local Environmental Plan.*

Classified Road

As defined in the *Roads Act 1993.* (Note: Classified road includes all State Roads and specified Regional Roads. Regional roads comprise two categories: those regional roads that are classified under the *Roads Act 1993* and those regional roads that are not classified. Local roads are not classified).

Core

Vertical circulation (lift and/or stairs) within a building. A single core may include multiple lifts serving the same floor area.

Concurrence

State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017 includes a provision that consent cannot be given by a local council for a centre-based child care facility under certain circumstances unless the Regulatory Authority (currently NSW Secretary of Education) grants concurrence.

Daylight

Consists of both skylight (diffuse light from the sky) and sunlight (direct beam radiation from the sun). Daylight changes with the time of day, season and weather conditions

DCP

Development Control Plan

Education and care service

As defined in the Children (Education and Care Services) National Law (NSW) 104a.

Education and care service premises

As defined in the *Children (Education and Care Services) National Law (NSW) 104a.*

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Facade

The external face of a building, generally the principal face, facing a public street or space.

Floor Space Ratio

As defined in the *Standard Instrument - Principal Local Environmental Plan*.

Guide to Traffic Generating Developments

Guide to Traffic Generating Developments, published by Roads and Maritime Services (formerly RTA) and available on its website.

Landscaped Area

As defined in the *Standard Instrument - Principal Local Environmental Plan*.

NCC

National Construction Code. The NCC is made up of the Building Code of Australia and the Plumbing Code of Australia.

National Law

Refers to the *Children (Education and Care Services) National Law (NSW) 104a*.

National Regulations

Refers to the *Education and Care Services National Regulations*.

NQF (National Quality Framework)

'National Quality Framework' is made up of the *Children (Education and Care Services) National Law*, the *Education and Care Services National Regulations*, the National Quality Standard (Schedule 1 of the Regulations), an assessment and rating scheme, and an approved learning framework. The National Quality Framework regulates children's education and safety, staffing, partnerships with families and the community, the physical environment and use of child care facilities throughout Australia.

Regulatory authority

As defined in *Children (Education and Care Services) National Law (NSW) 104a* and *Children (Education and Care Services National Law Application) Act 2010 No 104*. In NSW, this is the Secretary of Education.

SEPP

State Environmental Planning Policy. In the context of this Guideline, *State Environmental Planning Policy (Educational Establishments and Child Care Facilities)* 2017.

Sloping site

A site with a slope of 15 per cent or greater.

Solar access

The ability of a building to continue to receive direct sunlight without obstruction from other buildings or impediments, not including trees.

Street setback

The space along the street frontage between the property boundary and the building. Refer to building line or setback as defined in the *Standard Instrument - Principal Local Environmental Plan*.

Sunlight

Direct beam radiation from the sun.

Unencumbered indoor space

As defined by regulation 107 of the *Education and Care Services National Regulations*.

Unencumbered outdoor space

As defined by regulation 108 of the *Education and Care Services National Regulations*.

Notes

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Tel: 1300 305 695
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NSW GOVERNMENT Planning & Environment

COUNCIL NOTICES

Brooms Head Beach and Lake Cakora Coastal Zone Management Plan (CZMP)

clarence
VALLEY COUNCIL

Project Name:	Brooms Head Lake Cakora Coastal Zone Management Plan (CZMP)
Project Number:	30011071
Report for:	Clarence Valley Council

PREPARATION, REVIEW AND AUTHORISATION

Revision #	Date	Prepared by	Reviewed by	Approved for Issue by
Prelim Draft	27/02/2014	H Nelson	CVC/OEH	
Draft	17/04/2014	H Nelson / A Brook	A Brook	A Brook
Draft	05/06/2014	H Nelson / A Brook	A Brook	A Brook
Draft	15/04/2015	A Brook	For review by CVC/OEH	For review
Final Draft	21/05/2015	A Brook	E Whitehill	A Brook
Final Draft	20/07/2015	A Brook	CVC	A Brook
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FOREWORD

The original CZMP was prepared by SMEC up to the revision issued to Clarence Valley Council (CVC) on 20th July 2015. Subsequent revisions have been undertaken by CVC, as such the document is no longer under SMEC quality or document control and any changes or revisions made have not been checked or confirmed by SMEC staff for accuracy.

Changes to the CZMP were made by CVC in response to feedback on the Draft CZMP from the Department of Industry – Lands, particularly regarding content of Actions 2.3 and 9.3 and associated text in the CZMP. Timeframes for commencement of actions in Table 7 were adjusted and other minor clarifications to text were provided at the request of the Office of Environment and Heritage in January 2017.

EXECUTIVE SUMMARY

The Brooms Head coastline boasts a diverse natural landscape including sandy beaches, intertidal rock platforms, rocky headlands and a natural lake. These natural features surround the coastal village of Brooms Head and the Brooms Head Coastal Foreshore Coastal Reserve. This Reserve is highly valued by residents and visitors due to the visual, holiday and recreational amenity it provides. However, long term beach recession and predictions of increasing sea level will mean the Brooms Head coastline is under increasing threat.

Clarence Valley Council (CVC) with assistance from the NSW Office of Environment and Heritage (OEH) has prepared a Coastal Zone Management Plan (CZMP) for the Brooms Head coastal zone in accordance with the NSW State Government's coastal legislation, polices and guidelines. The extent of coastline addressed in the CZMP is shown in *Figure ES-1*.

The Plan has a sound technical foundation and is based upon a number of technical investigations undertaken by Council with assistance from OEH. These investigations are reported in the following documents:

- *Cakora Point Slope Stability and Risks Assessment* (SMEC2012),
- *Lake Cakora Estuary Processes Study* (SMEC2013a),
- *Brooms Head Coastal Processes and Hazard Study* (SMEC2013b) and,
- *Brooms Head and Lake Cakora Coastal Management Study* (SMEC2013c).

Ongoing consultation with the Brooms Head community has been a strong feature of the CZMP preparation and will continue during CZMP implementation.

The management theme for this CZMP is dominated by 'holding the line' and effectively maintaining the coastal environment and associated values for the Brooms Head community. In a wider sense the management actions in the CZMP aim to retain existing beach amenity, protect the high value public coastal reserve asset, ensure future development is compatible with coastal hazards and village character, refresh the provision of beach access, continue sustainable management of high conservation values, apply adaptive and responsible management for the coastal erosion hotspot and reducing risk to public safety for Brooms Head Beach, Lake Cakora and the headland, Cakora Point.
To maintain the utility and recreational value of the public reserve it is proposed to extend the existing revetment wall northwards to the Ocean Rd Bridge with crest levels consistent with the existing revetment to not unreasonably interrupt views from the Reserve. This CZMP introduces coordinated management of the Lake Cakora, Lake entrance and the foreshore north of Lake Cakora, including the coastal hotspot, for the first time. The CZMP recognises the feedback from owners of private residential land within the hotspot and proposes a geotechnical investigation of the lake entrance area to obtain local data and subsequently determine how local geology may alter the coastal risk, and hence future management, in this precinct. A coordinated monitoring program will document how the coastal foreshore changes in response to oceanic storm conditions over time and this will further inform adaptive management of the coastal environment at Brooms Head.

The CZMP provides an opportunity to collate a range of management actions, both proposed and continuing existing management, for the Brooms Head and Lake Cakora area into a single planning document. These actions have been identified through assessment of coastal hazards, values and issues identified by the local community, Council and NSW agencies, as well as consideration of relevant legislation, policies and guidelines.

The primary purpose of the CZMP is to describe actions to be implemented by CVC to address priority coastal management issues in the Brooms Head coastal zone over the next 10 years. These actions accord with the strategies adopted in preparing the CZMP. Actions that may be implemented by other public authorities and private sector are also provided.

The priority management issues for the Brooms Head coastline are addressed in the CZMP under the following headings:

- Coastal hazards and risks to public safety, land and assets;
- Pressures on coastal ecosystems; and

- Community uses and coastal values.

Key management issues and adopted management actions to be implemented are summarized in *Table ES-1* below, with *Figure ES-1* diagrammatically showing key management actions.

Table ES-1 Priority coastal management issues and response actions

Priority Coastal Management Issue	Management Action – to be implemented	Table 7 No.
Risk to public safety – due to inundation / wave overtopping in extreme events.	Review and Implementation of Emergency Action Sub Plan (EASP), Community Education of Coastal Hazards and EASP.	3.1/3.2 8.1/8.3
Risk to home owners and houses – Lake entrance precinct.	Geotechnical investigation of beach sub-strata in this precinct, Retain existing Ocean Road revetment (subject to findings of geotechnical investigation which will inform the future and management of these works), Development Controls, Monitoring of existing revetment post significant storm.	1.1 2.3 5.1-5.6 10.1
Ensure adequate provision of public access to beach and headland.	New access locations, Localised beach scraping at access points after storm events, Upgrade beach access east of Prawn Farm, Maintain current access to reserve adjacent northern bridge abutment, Realign and formalise tracks at Cakora Point away from potentially unstable areas, 4WD access to be managed in accordance with CVC Beach Access and Vehicles on Beaches Policy.	9.5 9.2 9.3 9.4 9.1 9.7
Risk to public assets.	Extend foreshore revetment at north end of Brooms Head Reserve to southern bridge abutment, Maintain foreshore reserve revetment, Relocate/modification of public facilities – foreshore reserve precinct.	2.1 2.2 12.1/12.2
Water quality in Lake Cakora and risk to public safety.	Implement Brooms Head Caravan Park effluent management (including treatment and disposal), Ensure domestic effluent management systems are performing, Artificially breakout lake entrance in swimming season if water level above 1.6m AHD, Information/Signage on ecological values and risks to public health & safety.	6.1 6.2 7.1 8.2
Maintain native vegetation communities.	Continue to control weed and pest species, Implement Brooms Head Reserve Vegetation Management Plan, Dune Revegetation and Rehabilitation, Ensure compliance to manage vehicles on the beach and activities around Lake Cakora.	4.1 4.2 4.3 11.1
Reduced beach amenity/access due to beach erosion and debris.	Removal of debris (kelp & other) from beach and lagoon, Localised beach scraping at access points after storm events, Excess sand extracted during dredging or other public infrastructure to be deposited on Brooms Head Beach (where compatible/suitable).	13.1 9.2 13.2

The detailed action implementation schedule is presented in *Table 7* of the CZMP including a summary of likely costs. *Figure ES-1 below* diagrammatically showing key management actions.

The CZMP anticipates costs of actions implementation will be shared between the New South Wales Government and Council under the NSW Coastal Program, and Council will also actively monitor and pursue grant opportunities as they become available.

Implementation of the CZMP actions will be overseen by a Council CZMP implementation committee to be established following certification of the CZMP. The committee will include community and OEH representation and have the roles of monitoring and guiding actions implementation, and reporting progress during the ten year plan duration.

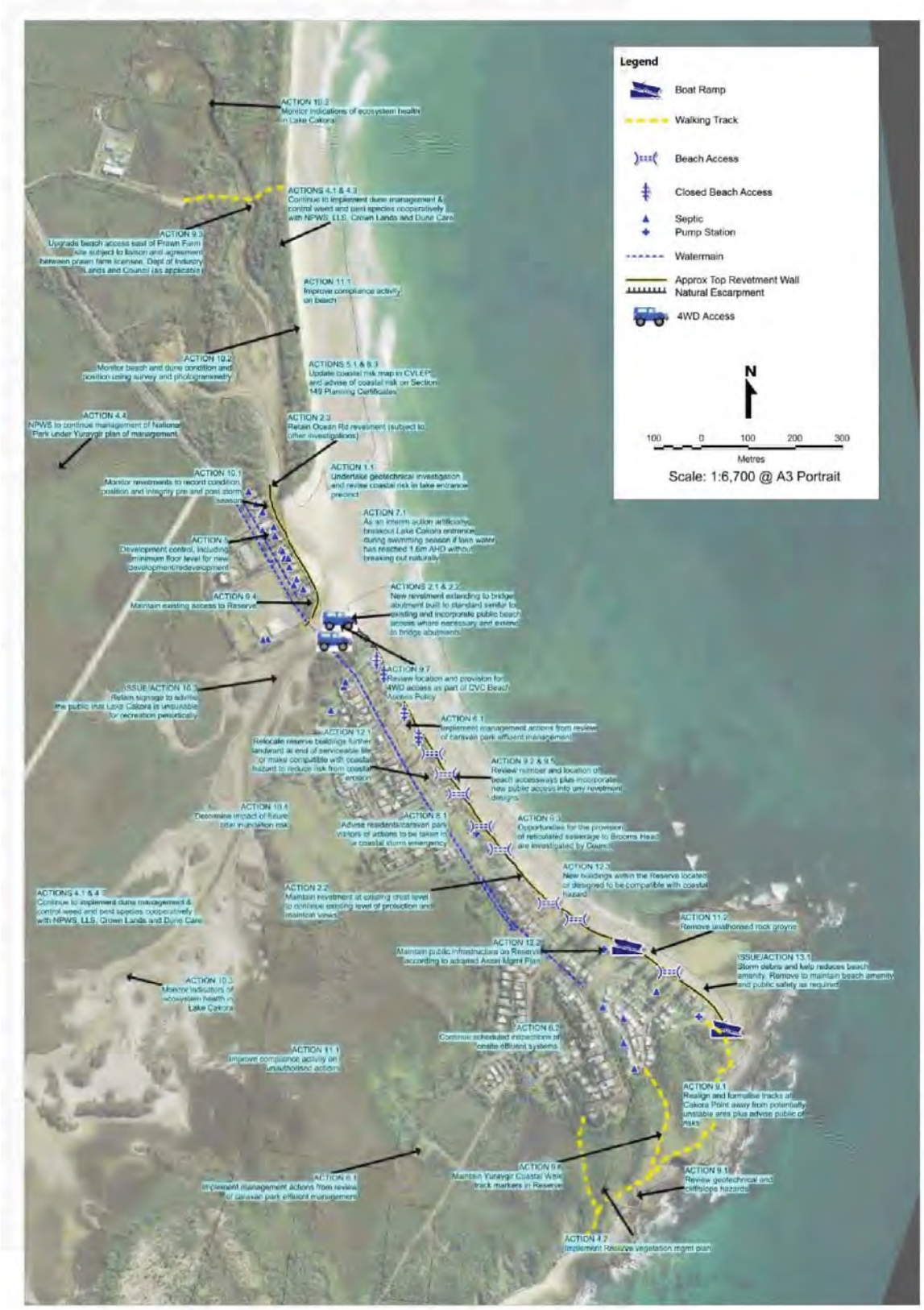

Figure ES-1 Management Actions for Brooms Head

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1 INTRODUCTION

1.1 Background

The NSW Government identified part of Brooms Head as a coastal erosion 'hotspot' (Lake Cakora entrance: Ocean Road Bridge to at least 400m to the north) requiring the preparation of a Coastal Zone Management Plan (CZMP) and Emergency Action Plan (EAP).

1.2 Coastal Zone Management Plan Area

Brooms Head is located on the north coast of NSW in the Clarence Valley Local Government Area (LGA), approximately 530 km north of Sydney. The village is approximately 23 km by road from Maclean, which is about 46 km by road north of Grafton.

Brooms Head Beach is part of a coastal compartment that contains the significant rocky offshore/ nearshore reef (incorporating Buchanans Rocks), headland (Cakora Point), and a sandy beach stretching some 4 km north to the Red Cliff headland, see *Figure 1*. The area covered by this CZMP includes a portion of Back Beach (northern end of Sandon Beach), Cakora Point, Brooms Head Beach, Lake Cakora and its catchment adjacent to the Brooms Head village. The majority of Lake Cakora and its catchment are within the boundaries of Yuraygir National Park. For planning purposes Brooms Head Beach was divided into four foreshore precincts as shown in *Figure 2*.

Figure 1 Location plan

Figure 2 CZMP Foreshore Precincts

1.3 Current Coastline Management Strategy

Actions adopted in November 2001 and February 2002 by the then Maclean Shire Council (MSC) from the *Brooms Head Beach Coastal Study* (WRL 2001) for the foreshore reserve are shown in *Table 1*, along with information on their implementation. On 21 February 2002 Council resolved to discontinue the Brooms Head Beach Coastal Study process for the coastline north of the Bridge (including the private land along Ocean Road) and as a result no actions were adopted for that precinct. Further, the WRL Study did not include the Lake Cakora catchment. There is currently no coordinated management plan for Lake Cakora, the lake entrance or it's catchment, although the Yuraygir National Park plan of management,

albeit with broad management actions, does apply to the majority of Lake Cakora and its catchment that is within the national park estate.

Table 1 2001/2002 Foreshore Reserve Coastal Management Actions

Action	Status
Rebuild and adjust profile of existing rock wall to make safe and fence off the wall.	Wall rebuilt between Cakora Point and the northern boatramp in 2010. Maintenance works to other sections of the wall were also carried out post 2010.
Control access across the rock wall by dedicated fenced access-ways.	Formal accessways have been built/ maintained (some have more recently been closed off due to damage from coastal erosion). The foreshore reserve (south) has never been fenced off. A koppers log barrier and revegetation along the top of the dune discourages ad hoc access to the beach along the Northern Foreshore Reserve.
Sand nourishment, ongoing, to retain beach amenity, with the sand level to about half the wall height.	Not implemented (no feasible sand source available).
Monitor impact of rebuilt wall to ascertain longer term need to extend a further 200 m to Lake Cakora entrance.	Revetment extended by approximately 50 m in October/ November 2012 to protect reserve/ amenities block at risk from coastal erosion/ scour at the end of original revetment.
Stabilise foreshore behind wall with planting, etc.	Dune management activities have been carried out e.g. weed removal/ control and barrier fencing to encourage regeneration of native plants. Vegetation management plan adopted for the Foreshore Reserve.

1.4 Priority coastal management issues

Investigations and consultation with community and other key stakeholders have identified and defined a range of priority coastline management issues in the CZMP precincts requiring management responses. These include:

Northern Beach

- Damage to fore dune vegetation due to 4WD's and other recreation,
- Bitou bush and other weed infestation,
- Limited pedestrian access,
- Beach subject to coastal erosion and recession.

Lake Entrance

- Risk to home owners and houses,
- Scour at toe of ad hoc revetment from lake and creek breakouts,
- Water quality in Lake Cakora,
- Retaining visual amenity,
- 4WD access,
- Domestic onsite effluent management systems if not functioning correctly are risk to water quality,
- Limited pedestrian access.

Foreshore North

- Risk to public assets,
- Risk to public safety due to waves overtopping revetment during storm events,
- Scour and exacerbated erosion at end of existing revetment,
- Damage to beach access-ways due to erosion,
- Caravan park effluent disposal, if system is not functioning correctly are a risk to water quality.

Foreshore South

- Risk to public assets,
- Risk to public safety due to waves overtopping revetment during storm events,
- Public risk from rockfalls and cliff instability at Cakora Point,
- Brooms Head Hall and Brooms Head Reserve Norfolk Island Pines hold local heritage significance and are at risk if the revetment does not continue to afford adequate protection,
- Domestic onsite effluent management systems if not functioning correctly are risk to water quality,
- Caravan park effluent disposal, if system is not functioning correctly are a risk to water quality.
- Yuraygir Coastal Walk track needs to be clearly defined by markers,
- Kelp and other debris causing odour and possible safety issues,
- Unauthorised rock groyne.

1.5 Coastline Management Options

As part of the CZMP preparation, a number of investigations were undertaken to supplement and update previous studies. Current and future coastal hazards and risks are specifically addressed in the updates.

Previous CZMP investigations undertaken by Council are reported in:

- *Brooms Head Beach Coastal Study* (WRL 2001a)
- Brooms Head Revetment Extension Draft Technical Report (WRL2001b)
- *Lake Cakora Estuary Management Plan – Survey Results* (CVC 2009)
- *Brooms Head Reserves Vegetation Management Plan* (CVC 2009)
- A draft Emergency Action Sub-Plan (a sub-plan of the CZMP) was also prepared by Clarence Valley Council (CVC) in 2012.

Update investigations to supplement previous studies are documented in the:

- *Cakora Point Slope Stability and Risks Assessment* (SMEC 2012)
- *Lake Cakora Estuary Processes Study* (SMEC 2013a)
- *Brooms Head Coastal Processes and Hazard Study* (SMEC 2013b).

Fifteen management options to address the identified coastal issues were formulated and reviewed in the *Brooms Head and Lake Cakora Coastal Management Study* (SMEC 2013c). These options were further refined in the *Support Study for the Brooms Head and Lake Cakora Coastal Zone Management Plan (CZMP)* (Appendix D - SMEC 2014) which was exhibited as the draft CZMP in 2014.

1.6 Community consultation

Preparation of this final CZMP and supporting documents has been overseen by the CVC Coast & Estuary Management Committee which has representatives from Council, Government agencies and the community. Key stakeholder consultation activities carried out are summarised in *Table 2* .

Table 2 Consultation Activities

Date	Activity	Approx. number of attendees/ respondents
2009 (prior to this study)	Lake Cakora Estuary Management Plan Survey (CVC)	21 (13 permanent residents of Brooms Head or surrounding area)
14 October 2011	Site meeting with Brooms Head Landcare Group	24 community members plus SMEC and CVC staff

Date	Activity	Approx. number of attendees/ respondents
14 and 15 October 2011	Community Drop in Sessions (Brooms Head Hall)	9 persons each day (18 total), plus SMEC and CVC staff
20 August 2013	Coastal Management Study presentation to Clarence Valley Coast & Estuary Management Committee	16 committee members and 2 observers (Brooms Head residents)
3 October 2013	Community Drop in Day (Brooms Head Hall)	25 people attended (comprising 16 groups)
27 September - 28 October 2013	Exhibition of Coastal Management Study and supporting studies	11 written submissions were received (representing all of the Lakefront Precinct/ Ocean Road landowners, with only 1 submission from a community member who is not a landholder in this precinct). A submission was also received from OEH.
3 & 21 July 2014	Community Drop In Days (Brooms Head Hall)	5 & 10 persons, respectively (15 total), plus CVC staff.
11 June – 28 July 2014	Exhibition of draft Coastal Zone Management Plan and supporting studies	19 written submissions
12 February 2015	Meeting and site visits with representatives from OEH and the NSW Coastal Panel	6 OEH staff 4 members of the NSW Coastal Panel 4 CVC staff and 1 Councillor Approximately 20 residents

The options included in the Coastal Management Study (SMEC 2013c) and submissions received during the exhibition period were considered by the CVC Coast & Estuary Management Committee at its meeting on 19 November 2013. Of the 14 options presented, seven were recommended and later adopted by Council at its meeting on 10 December 2013. This included two options for different levels of revetment protection to seek further input from the community through exhibition of the draft CZMP to determine a preferred option for adoption in the final CZMP. There was general consensus in public submissions to maintain crest levels for revetments (existing or proposed) at current heights in order to maintain visual amenity. Following exhibition of the draft CZMP and consideration of the submissions, CVC met with representatives from the NSW Office of Environment and Heritage (OEH) and NSW Coastal Panel who provided advice on the coastal management options.

A summary of the adopted actions to manage coastal hazards are presented in Section 4.4 .

1.7 Coastal Management Principles, Goals and Objectives

The 2013 *Guidelines for Preparing Coastal Zone Management Plans* (referred to hereafter as the *Guideline*) set out ten principles for preparing CZMPs. The first principle is to consider the objectives of the *Coastal Protection Act 1979* and the goals, objectives and principles of the *NSW Coastal Policy 1997*. Section 3 of the *Coastal Protection Act 1979* sets out objectives which are to provide for the protection of the coastal environment of the State for the benefit of both present and future generations. The overriding vision of the 1997 *NSW Coastal Policy* is the ecologically sustainability of the NSW Coast. This Policy has nine goals.

Table 3 lists the goals, objectives and principles contained in the above legislation, policy and *Guideline* and indicates how these have been considered in the preparation of the Brooms Head CZMP. Many of the principles, goals and objectives are similar and have been grouped against the *Guideline* principles in *Table 3*.

Table 3 Consideration of Coastal Management Principles, Goals and Objectives in CZMP Preparation

Guidelines for Preparing CZMPs Principles	Coastal Protection Act Objectives	NSW Coastal Policy Goals	How Principles, Goals and Objectives have been considered
1. Consider the objectives of the *Coastal Protection Act 1979* and the goals, objectives and principles of the *NSW Coastal Policy 1997* and the *NSW Sea Level Rise Policy Statement 2009. Note: NSW Sea Level Rise Policy is no longer State Government Policy.*	To encourage, promote and secure the orderly and balanced utilisation and conservation of the coastal region and its natural and man-made resources, having regard to the principles of ecologically sustainable development.	Providing for ecologically sustainable development and use of resources.	Coastal protection options are confined to the area of the beach embayment and lake entrance that has already been modified by foreshore structures. Other actions and measures to protect natural resources are defined in *Table 7* and include but not limited to : • Control of weed and pest species (4.1), • Implementation of Brooms Head Reserve Vegetation Management Plan (VMP) (4.2), • Dune revegetation & rehabilitation (4.3), • Stormwater management & water quality management (6), • Access management & 4WD access management (9).
	To recognise and foster the significant social and economic benefits to the State that result from a sustainable coastal environment, including: - benefits to the environment, - benefits to urban communities, fisheries, industry and recreation, - benefits to culture and heritage, and - benefits to the Aboriginal people in relation to their spiritual, social, customary and economic use of land and water.	Providing for ecologically sustainable human settlement in the coastal zone. Protecting and enhancing the aesthetic qualities of the coastal zone.	Shoreline management actions will: • maintain the foreshore reserve for recreational use, • maintain income to the Clarence Coast Reserve Trust (CCRT) from the Brooms Head caravan park, • protect items of non-indigenous cultural heritage value, • provide certainty for lakefront Ocean Road property owners, • protect an Endangered Ecological Community (wetland), • reduce future risk to Ocean Road, • maintain views of the beach from the Foreshore Reserve. Other actions include measures to provide environmental, recreational and cultural benefits refer in *Table 7*.
	To provide for the acquisition of land in the coastal region to promote the protection, enhancement, maintenance and restoration of the environment of the coastal region.	-	n/a
	-	Protecting and conserving the cultural heritage of the coastal zone.	Shoreline protection will also protect items of non-indigenous cultural heritage value at Brooms Head. Legislation relating to the protection of sites and places of Aboriginal significance applies to the CZMP actions.
2. Optimise links between plans relating to the management of the coastal zone.	To ensure co-ordination of the policies and activities of the Government and public authorities relating to the coastal region and to facilitate the proper integration of their management activities.	Providing for integrated planning and management of the coastal zone	Actions to be implemented through other plans and programs are defined in *Table 7* including; • Brooms Head Reserve Vegetation Management Plan (VMP) (4.2), • Yuraygir National Park Plan of Management (4.4), • Coastal Risk Map CVCLEP (5.1), • CVC Beach Access and Vehicle on Beach Policy (9.3), • CVC Asset Management Plan (12).
3. Involve the community in decision-making and make coastal information publicly available.	To recognise the role of the community, as a partner with government, in resolving issues relating to the protection of the coastal environment.	Providing information to enable effective management of the coastal zone.	Recommended management actions generally recognise community input. A summary of consultation activities is provided in Section 1.6 and *Table 2*.
4. Base decisions on the best available information and reasonable practice; acknowledge the interrelationship between catchment, estuarine and coastal processes; adopt a continuous improvement management approach.	-	Recognising and accommodating the natural processes of the coastal zone.	The technical studies referred to in Section 1.4 provide detailed information on catchment, estuarine and coastal processes to the best current standards. The studies were prepared and reviewed with assistance from OEH. These studies document the natural processes data guidelines and other information that was used to assess coastal hazards and management options. Actions to undertake further investigations to increase knowledge on local geology and coastal processes affecting Brooms Head Beach will enable adaptive management based on best available information. Refer to *Table 7*.
5. The priority for public expenditure is public benefit; public expenditure should cost-effectively achieve the best practical long-term outcomes.	-	-	Management actions benefitting the public will be implemented with public expenditure. No physical work to the revetment north of the bridge and fronting the Ocean Road properties is proposed at this stage.
6. Adopt a risk management approach to managing risks to public safety and assets; adopt a risk management hierarchy involving avoiding risks where feasible and mitigation where risks cannot be reasonably avoided; adopt interim actions to manage high risks while long-term options are implemented.	-		The revised Brooms Head Main Beach Emergency Action Sub-Plan (EASP) (CVC 2015), in Appendix C, identifies actions to manage risks to public safety in the event of a coastal erosion emergency. *Table 7* includes development controls and a strategy for relocating buildings in the Foreshore Reserve. Coastal Hazards Mapping (Appendix A) was undertaken based on assessed erosion potential, long-term recession, oceanic inundation, and Council's sea level rise planning benchmarks. Other actions that aim to reduce risk to safety include: (Refer *Table 7*.) • Community Education (8.1), • Advisory signage at Lake Cakora (8.2), • Monitoring walking tracks and cliff stability (9.1), • Minor beach scraping at public access points when subject to erosion (9.2), • 4WD access management and compliance enforcement (9.7/11.1).
7. Adopt an adaptive risk management approach if risks are expected to increase over time, or to accommodate uncertainty in risk predictions.	To encourage and promote plans and strategies for adaptation in response to coastal climate change impacts, including projected sea level rise.	-	CVC's sea level rise planning benchmarks were adopted in the review of coastal Hazards (See Appendix A Hazard Maps). Structured ongoing monitoring (10) will identify changes in hazards driven risk refer *Table 7*. Planning controls (5), asset relocation (12), geotechnical investigation (1) and review of coastal risk for hotspot. Increased foreshore protection (sloping rock rubble structures) could be provided by moderate increase of crest height of seawalls if required in the future.
8. Maintain the condition of high value coastal ecosystems; rehabilitate priority degraded coastal ecosystems.	To protect, enhance, maintain and restore the environment of the coastal region, its associated ecosystems, ecological processes and biological diversity, and its water quality.	Protecting, rehabilitating and improving the natural environment of the coastal zone.	Actions to improve water quality and enhance native vegetation and habitat have been included as part of the CZMP, see *Table 7*.
9. Maintain and improve safe public access to beaches and headlands consistent with the goals of the NSW Coastal Policy.	To promote public pedestrian access to the coastal region and recognise the public's right to access.	Providing for appropriate public access and use.	Design of foreshore protection structures along the reserve foreshore will include provision for public access to be maintained by Council. Access pathways improvements at Cakora Point will reduce risks and enhance public access. Public access will be maintained along the foreshore north of the lakes entrance. Opportunities for additional safe public access to Brooms Head Beach will be sought through the CZMP implementation refer *Table 7* – Action 9 Access Management.
10. Support recreational activities consistent with the goals of the NSW Coastal Policy.	To promote beach amenity.	As above.	Foreshore access and maintenance of beach amenity is a fundamental objective of the CZMP as evidenced through the range of actions in *Table 7*. High quality foreshore access at Brooms Head, as managed by Council, complements the rest of the Brooms Head beach coastal embayment which remains in an essentially natural state and is protected within Yuraygir National Park and Crown reserves. Visual amenity and views to the beach and Lake entrance from adjacent public land will be maintained by limiting revetment crest levels to current heights.

2 SUMMARY OF COASTAL & ESTUARINE PROCESSES

2.1 Brooms Head Beach

The *Coastal Hazard Study* (SMEC 2013b) concludes that a net northwards littoral sand movement exists at Brooms Head, based on the following.

- The general orientation of the coastal compartment is north-east, indicating net northerly drift.
- Infilling of the natural rock pool and significant sediment deposition at the southern boatramp indicates a sediment pathway (for a small amount of sediment) across the rocky foreshore of Cakora Point from Back Beach/ Sandon Beach.
- In recent years, minor shoreline accretion has been evident near the former prawn hatchery where the shoreline trends south-west (as identified in photogrammetric profiles).

Observed northerly movement of a rock shingle deposit that extends towards the Lake Cakora entrance (north of the foreshore reserve revetment) also supports a net northerly transport regime (CVC 9/10/2012).

The *Brooms Head Beach Coastal Study* (2001) noted four main mechanisms of sand supply to Brooms Head Beach:

- *Southward drift of sand during north-easterly waves*
- *Onshore transport during mild waves*
- *Sand bypassing from the south around Buchanans Rock*
- *Natural erosion of the dune (prior to revetment construction).*

The reef at Cakora Point has a significant effect on coastal processes at Brooms Head (PWD 1978). *It refracts waves from the south-eastern quarter on to the beach to the north in its lee, and it reduces the energy of the waves passing through it in large seas. These effects may result in the formation of complicated rip patterns and currents along the beach with associated sediment movements.* Although the reef reduces wave energy at the southern end of the beach, wave energy would still be significant during a major storm event.

A clay bed underlies the beach and consolidated material in the form of weathered rock, clay and indurated sands (coffee rock) are found on the seabed offshore (WRL 2001). An indurated sand layer was also observed at the base of the eroded dune escarpment at the northern end of the foreshore reserve during a site inspection in August 2011. The clay base layer has been exposed on the beach adjacent to the caravan park office, lake entrance and northern beach in recent times. This has the potential to limit short term erosion/ scour.

The conceptual model illustrated in *Figure 3* summarises coastal processes affecting Brooms Head Beach. The primary hazards affecting Brooms Head are:

- Storm Erosion
- Oceanic inundation during storm events
- Ongoing long-term recession of the beach
- Predicted rise in ocean level potentially bringing increased inundation and erosion.

Refer to the *Coastal Processes and Hazards Report* (SMEC 2013b) for more information.

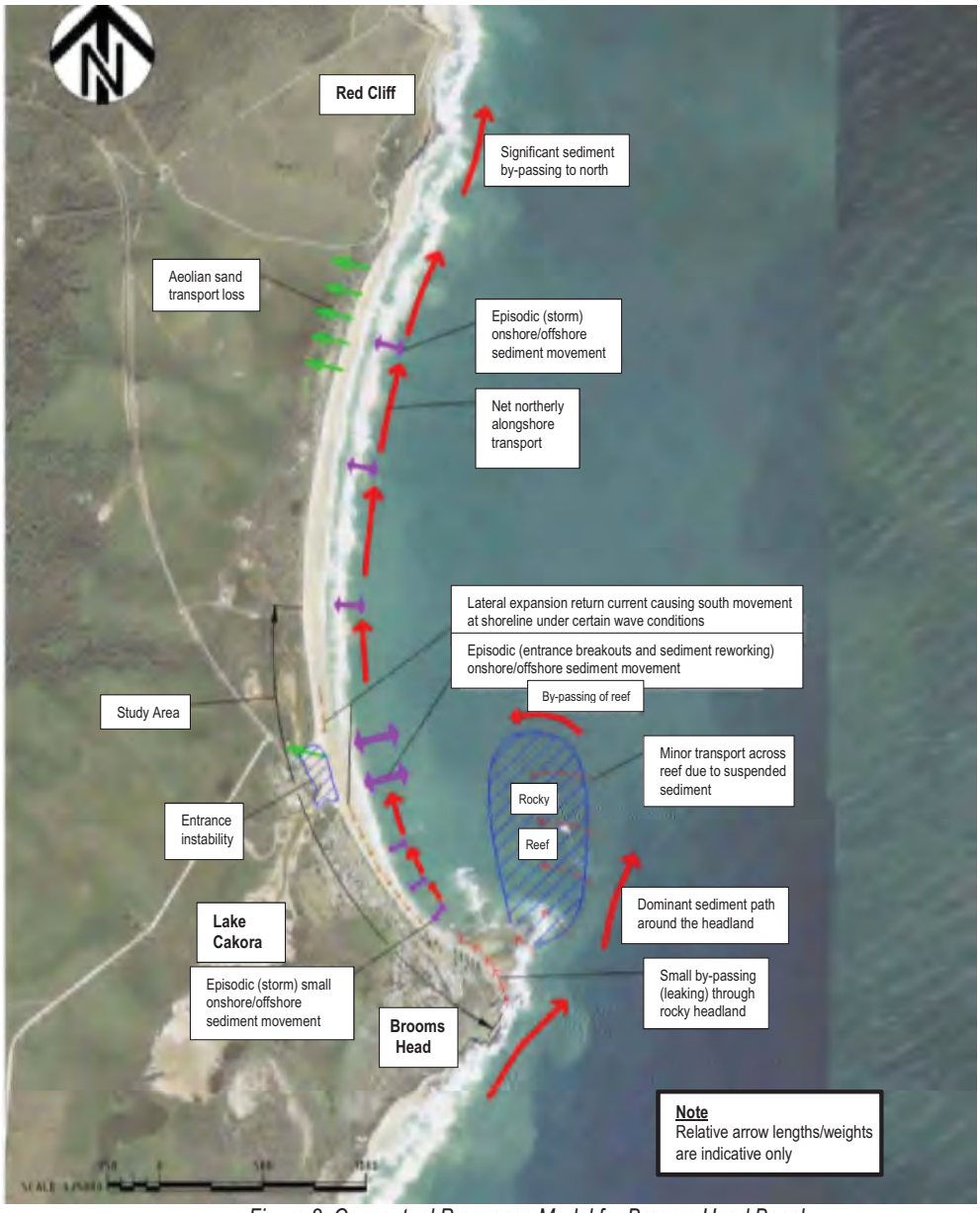

Figure 3 Conceptual Processes Model for Brooms Head Beach

2.2 Lake Cakora ICOLL (Intermittently Closed and Open Lakes and Lagoons)

Lake Cakora consists of two components, a creek north of the entrance and a lake or lagoon to the south-west of the entrance. The beach berm across the entrance, which forms as waves transport sand onshore, can reach heights of 1 – 2 m AHD (as estimated from photogrammetry based on aerial photography back to 1942). The observed pattern of berm building is that the dune to the south of the entrance builds and extends northwards under the influence of the dominant south-easterly wind and wave climate (WRL 2001).

The water level within the lake is controlled by the height of the entrance berm. Entrance breakouts are dependent on a number of variables including rainfall, the initial lake storage volume, ocean tide levels, waves and berm height. Based on CVC staff observations, the entrance opened on six occasions between September 1999 and July 2000, with three of

these openings being natural and three being artificial. The water level within the lake was 1 m AHD for all of the natural openings and for the artificial openings it ranged between 1.1 and 1.6 m AHD. Based on this information, the duration the entrance remained open varied from 1 to 37 days.

Analysis of water level and salinity data between July 2010 and November 2011 from the automatic recorder in Lake Cakora, indicated that the highest breakout level was about 1.7 m AHD on 13 October 2011.

Water quality in Lake Cakora is influenced by catchment runoff, the shallowness of the lake, entrance conditions and the degree of mixing and flushing of the lake waters. Water levels varied from just under 0.2 m AHD to 1.63 m AHD. Salinity ranged from just over 35 parts per thousand (ppt), which is the average salinity of sea water, to zero during rainfall peaks. Temperature ranged from 10^{O}C in July to just over 35^{O}C in February and showed a general seasonal variation. A temperature spike in November 2010 (about 34 ^{O}C) corresponded to a period of low water level (i.e. shallow water depths).

Refer to the *Lake Cakora Estuary Processes Study* (SMEC 2013a) for more information.

It is recommend that prior to Brooms Head becoming sewered that artificial breakout during swimming season take place if the lake water level has reached 1.6m AHD and not broken out naturally.

2.3 Cakora Headland

At Cakora Point the slopes are directly exposed to weathering processes, including wave cutting, wind, rain and atmospheric exposure. This causes joints in the rock to weaken and blocks to loosen. Intersection of bedding joint sets and orthogonal joints sets favours toppling of rock blocks. The upper weak and weathered portions of the slopes are subjected to weathering processes that cause fretting of material such that the crest gradually recedes at an angle of approximately 35° to 50°. This is accelerated by undercutting action caused by dislodgement of underlying blocks.

Refer to the *Cakora Point Slope Stability Report* (SMEC 2012) for more information.

3 PRIORITY COASTAL MANAGEMENT ISSUES

The priority coastal management issues for the Brooms Head coastline are addressed in the following sections:

- Coastal hazards and risks to public safety, land and assets;
- Pressures on coastal ecosystems; and
- Community uses and coastal values.

4 COASTAL HAZARDS AND RISKS

Coastal hazards are fully discussed and considered in the *Brooms Head and Lake Cakora Coastal Management Study* (SMEC 2013a) and *Brooms Head Coastal Processes and Hazard Study* (SMEC 2013b). A more detailed summary is also provided in Appendix D *Support Study for the Brooms Head and Lake Cakora CZMP* (SMEC 2014).

4.1 Hazards presented by coastal processes

Storm Erosion

For an unconsolidated (erodible) sandy shoreline, a number of coastline hazard zones can be delineated based on Nielsen *et al* (1992) (refer to *Figure 4*).

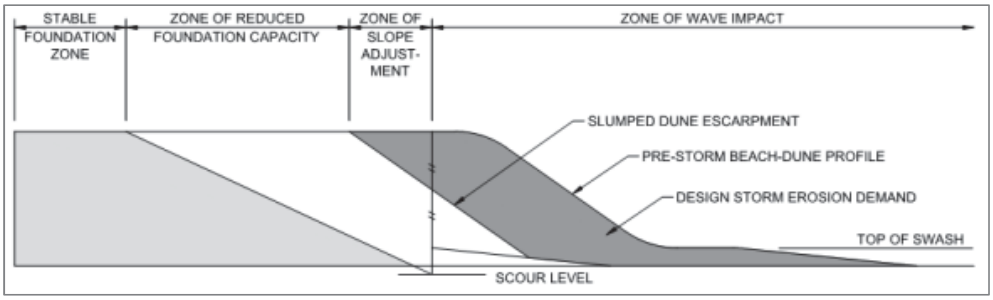

Figure 4 Schematic Representation of Coastline Hazard Zones (Nielsen et al 1992)

Taking into account the adopted values for storm demand (40-220 m^3/m), estimated width of the zone of reduced foundation capacity (7 to 9 m) and shoreline recession, hazard maps were produced for Brooms Head Beach indicating the immediate hazard line and 2050 and 2100 hazard lines. The hazard lines (i.e. the position of the slumped erosion escarpment due to a major storm event in the vicinity of Brooms Head) take into account shoreline recession due to sand loss from the beach compartment and Sea Level Rise.

Long-term beach recession

Long term recession due to sediment loss occurs due to longshore transport into offshore sinks from which it does not return to the beach and windborne transport beyond that of the active beach system. Analysis of historical photogrammetric data showed evidence of net sediment loss at a rate of approximately 0.6m/yr described further in the *Coastal Processes and Hazard Study* (SMEC 2013b).

Predicted sea level rise

Sea level rise (SLR) was considered in the hazards assessment based on planning benchmarks of a 0.4 m rise by 2050 and further 0.5 m rise by 2100 relative to the 1990 mean sea level consistent with Council's climate change policy. Recession due to SLR was calculated using the Bruun Rule described further in the *Coastal Processes and Hazard Study* (SMEC 2013b).

Oceanic inundation

Dune/revetment crest heights along the foreshore reserve (south of the Ocean Road bridge) range from around 3 m to 4.5 m AHD, while the crest level of the *ad hoc* Ocean Road revetment (north of the bridge) varies between around 2.5 m to 3.5 m. These levels are generally higher than the estimated 100 year ARI design elevated still water level of 2.6 m AHD. In addition, applying the adopted sea level rise planning benchmarks to 2100 results in inundation of only a narrow strip of the foreshore at the southern end of beach, and a low point in the Ocean Road revetment (see *Figure A4*).

During storm events waves may run up the beach and reach levels of 5.1m AHD. Under these conditions the whole foreshore reserve revetment and Ocean Road revetment would be overtopped and the adjacent foreshore lands subject to oceanic inundation or flooding (see *Figure A5*). These overtopping events pose a risk to public safety and to property assets through direct impact of wave action and depth and flow of water (including intermittent surging associated with waves). It would be unsafe for persons to occupy affected land and assets at this time and assets, such as revetments and dwellings could be undermined or destabilised, through wave action and impacts of debris (both natural and debris from damaged or uplifted assets, such as garden furniture or outbuildings). Applying the sea level rise planning benchmarks to 2100, would result in additional areas of the foreshore being affected, also shown in *Figure A5*, and impacts of inundation being exacerbated.

Hazard Lines

Figure A1 (see Appendix A) indicates the position of the hazard lines, ignoring protection provided by the foreshore reserve revetment (see *Plate 1*) and the *ad hoc* Ocean Road revetment. *Table 4* lists assets at risk under this scenario.

Figure A2 shows the position of the hazard lines, assuming the foreshore reserve revetment met design criteria for a major storm. As the current revetment does not meet the standard required for a major storm event the hazard lines will exist at a location between those marked on *Figure A1* and *Figure A2.*

Figure A3 shows the immediate hazard line (as per *Figure A1*) and associated limit of the Zone of Reduced Foundation Capacity (ZRFC). These hazard lines will be reviewed subject to a geotechnical investigation taking place and further monitoring of the revetments.

Table 4 Assets impacted by coastal erosion and shoreline recession assuming shoreline was erodible

Location	Assets at Risk over Planning Timeframes		
	Immediate (2012)	2050 (incl. SLR)	2100 (incl. SLR)
Foreshore Reserve (south)	Beach access-ways Norfolk Island Pines Community Hall, Kiosk and adjacent public amenities Foreshore caravan and camping sites Caravan Park foreshore access road	As for Immediate Risk	As for Immediate Risk
Foreshore Reserve (north)	Foreshore caravan and camping sites Caravan Park office and caretakers' residence All amenities blocks	Caravan Park Ocean Road	Caravan Park Ocean Road General Store Dwellings on landward side of Ocean Road
Lake Entrance	Ocean Road – most dwellings	Ocean Road dwellings Ocean Road Ocean Road Bridge Bowling Club Carpark	Ocean Road dwellings Ocean Road Ocean Road Bridge Bowling Club, carpark and eastern bowling green Units/ dwelling on the western side of Ocean Road, closest to the road and north of the Bowling Club
Northern Beach	No infrastructure	Informal access to beach from Crown land via dilapidated Pedestrian Bridge	Dilapidated Pedestrian Bridge and informal access

No design details for the original revetment at the Foreshore Reserve are available. However, sections have failed in the past in conditions more benign than would be expected during a major storm event. Dislodged/ loose rocks have also been observed which suggest the rock armour is undersized. Although most of the original revetment has been rebuilt using locally available rock, the rock armour size and quality would not meet design standards for the 1 in 100 ARI storm event and hence the structure would be likely to fail during a major storm event.

Failure most commonly occurs when sand is scoured out under the toe of the revetment and the rock armour slumps. Slumping of the foreshore reserve revetment would still provide some toe protection during the design storm, which would limit the extent of foreshore erosion. Accordingly, in reality, this would mean that the position of the current hazard line along the protected section of the foreshore reserve would be closer to that shown in *Figure A2*. A further hazard may result from smaller rocks being tossed by waves in a severe storm event see *Plate 4*. *Plate 1* shows a section of the foreshore reserve revetment north of the northern boatramp which has been subject to repairs.

As shown in *Figures A1* and *A2*, in the event of the design storm (which may comprise a series of storms), the spit to the north of the entrance could be eroded and may eventually be breached, with the landward bank of the creek becoming the new shoreline over time. This would leave properties along Ocean Road more exposed to ocean storms from the north. This is however based on the assumption that the foreshore is fully erodible. Existence of clay/rock sub-strata potentially reduces wave energy and resulting erosion. The geotechnical investigation proposed as a CZMP action will clarify the extent of influence of the sub-strata in this regard. The investigation outcome may provide a basis for revising the hazard lines in *Figures A2*.

Plate 1 Foreshore Reserve Revetment (22/8/2011)

Plate 2 Wave overtopping at southern end of caravan park 25/12/2011 (Mr Mark Cameron)

4.2 Catchment Flooding

Based on a range of lake still water levels between 1 m and 2.0 m AHD (berm height range), plots of associated inundation extents were produced as part of the *Estuary Processes Study* (SMEC 2013a) to indicate areas subject to flooding from Lake Cakora, see Appendix B.

The lowest dwelling floor level (south-west of the Ocean Road Bridge) is approximately 2.6 m AHD, hence no dwellings are at risk from overfloor flooding. The Ocean Road Bridge deck and footpath are also above 2.0 m AHD. Merritt *et al* (2007) reported that the lake entrance has been opened by members of the public by digging a channel across the entrance berm. Unauthorised entrance openings have been observed by CVC staff.

Although not part of the investigations for this study, flooding due to stormwater runoff from the catchment above Sandon Road also affects Brooms Head north of the Ocean Road Bridge.

4.3 Cliff Instability

Slope instability of bluffs and headlands is a result of the continuing operation of physical processes as well as anthropogenic activities within a particular geological and geomorphological setting in the coastal landscape. Physical processes could include rainfall, climate, rock weathering and disintegration, surface and ground water movement, soil erosion, sea level fluctuation, wave impact and earthquakes. On the other hand, coastal urbanisation and land use, destruction of vegetation either intentionally or otherwise (such as by bushfire or informal access), and changes to surface stormwater flows and drainage lines may be regarded as anthropogenic activities.

Qualitative assessments were used to define the risk to assets at the Cakora Point headland whilst quantitative assessments were used to define the risk to life. The full assessment can be seen in the *Cakora Point Slope Stability and Risk Assessment* (SMEC2012).

The cause of all failure mechanisms identified can be predominantly contributed to natural coastal exposure weathering effects. CVC's assets are not considered to contribute to the acceleration of these mechanisms.

The following assets were assessed to be at risk from the failure mechanisms in the longer term:

- walkways around the headland (receding cove, undermining of overhanging slope, crest fretting and block toppling)
- access road to the lookout (receding cove and undermining of overhanging slope)
- lookout carpark (crest fretting and block toppling)

It is noted that the location of the closest private property is approximately 140 m away from the closest point of the headland and therefore risks associated with private property are considered negligible.

4.4 Coastal hazards risk management options and actions

Fourteen management options were proposed in the *Brooms Head & Lake Cakora Management Study* (SMEC2013c). The study made recommendations on the viability of options which were later adopted by Council. These options were further refined in the *Support Study for the Brooms Head and Lake Cakora Coastal Zone Management Plan (CZMP)* (Appendix D - SMEC 2014) which was exhibited as the draft CZMP.

As part of the assessment of options the draft CZMP was exhibited publicly and a key finding was that visual amenity was highly valued and the community preferred that all revetment crest levels not be raised. It was also recognised that the current revetments although not designed to withstand a 1 in 50 yr event (or greater) have offered a level of protection to the foreshore assets over a sustained period of 40 plus years. It is possible the underlying hard stratum has contributed to allowing these *ad hoc* revetments, particularly the Ocean Road revetment, to provide a higher level of protection than expected and this will be confirmed following the geotechnical investigation.

Subsequent to exhibition of draft CZMP, CVC met with representatives from OEH and the NSW Coastal Panel. From this meeting it was acknowledged the Ocean Road revetment provides a limited but important foreshore protection function. However, because of its relatively low crest level and inadequate design, the wall is most unlikely to provide protection from significant storm erosion events. Accordingly both the foreshore and houses landward will remain at risk.

Actions to be implemented under the CZMP will assess the potential for a suspected hard sub-surface stratum to reduce the impacts of storm erosion on the revetment. When the effects are known further actions with regard to securing the revetment will be considered by Council. Actions may include the strengthening of the revetment, without wholesale reconstruction. NSW Department of Industry – Lands have been consulted on the matter as the Ocean Road revetment (currently on land managed by Department of Industry – Lands)

plays a major role in stabilising the entrance to Lake Cakora. In this sense the revetment plays a dual role of training the entrance and offering some foreshore defence. Council resolved in July 2016 to agree to transfer of part of the Crown reserve containing the revetment to management of Council as corporate manager of the CCRT.

Given the revetment is most unlikely to provide adequate protection from erosion in major storm events the CZMP requires, as a primary risk reduction action, the implementation of an Emergency Action Plan, and a Community Education Plan about the risks posed by the coastal hazards. Development controls will also be implemented to ensure existing risk are not expanded to new, and renewal, developments.

Based on the recommended strategies for each section of coastline, the following management actions to address coastal hazards have been adopted for implementation.

1. Investigation and Monitoring,
    i. Geotechnical Investigation to determine underlying stratum,
    ii. Beach and revetment monitoring pre and post significant storm season,
    iii. Monitoring cliff stability every 5 years,
2. Revetments,
    i. Extension of Foreshore Reserve revetment north to southern bridge abutment,
    ii. Maintain existing Foreshore Reserve revetment,
    iii. Retain existing Ocean Rd revetment (subject to findings of geotechnical investigation which will inform the future and management of these works).
3. Emergency Action Sub Plan,
4. Development controls, and
5. Foreshore Facility Relocation (Reserve Precinct only),

A summary of these actions is set out in the *Table 7 Implementation Schedule* in Section 8 .

4.4.1 Cost Benefit Analysis of hazards risk management actions

The extension of the foreshore reserve revetment to the bridge abutment is the only CZMP action with estimated cost in excess of $100,000. The assets at risk landward of the foreshore that will be protected by the extension works include public reserve (providing recreation and holiday accommodation), high value conservation wetland (endangered ecological community), and ultimately the Ocean Road thoroughfare. The high benefit of this expenditure against costs of community disruption through road closure and structural damages is, 'by inspection', obvious and a formal cost – benefit analysis is not proposed. Further, it is more economical to undertake these protective works as soon as possible rather than delay, increase risk of losing assets in the interim and complete the works when costs are higher.

This revetment extension will also 'safeguard' a significant community asset at the northern end of the Foreshore Reserve Precinct. This is a valuable parcel of community recreational land, which also contains facilities for the caravan park that may be lost before the end of their serviceable life if left unprotected. The freshwater wetland immediately south of the Lake Cakora entrance comprises an endangered ecological community as well as offering a visual and environmental buffer between the Caravan Park and Lake Cakora. Protecting the shoreline at the northern end of the Foreshore Reserve is likely to significantly reduce the threat of losing this high conservation value asset.

Costs of all other CZMP actions, relative to the scale and significance of the coastal zone issues they address and benefit provided, are low. Benefits include: improving public safety, maintaining and enhancing community access, improving water quality, development controls to minimise risk to development from coastal hazards, while retaining important community values. Costs of implementing these actions are considered by Council to be relatively minor and will clearly return a positive benefit/cost ratio.

5 PRESSURES ON COASTAL ECOSYSTEM

5.1 Estuary Health Status

The NSW Government's *State of the catchments 2010 Northern Rivers Region Estuaries and Coastal Lakes* report, based on data collected to 2009, does not specifically include a condition indicator score for Lake Cakora. The indicators of estuary condition used in the Estuaries and Coastal Lakes report were therefore:

- eutrophication: chlorophyll-a, macroalgae and turbidity
- habitat distribution: change in seagrass, mangrove and saltmarsh (macrophytes) extent
- fish assemblages: species diversity and composition, species abundance, nursery function and trophic integrity (food web).

5.1.1 Water and Sediment Quality

Water quality in Lake Cakora is influenced by catchment runoff, the shallowness of the lake, entrance conditions and the degree of mixing and flushing of the lake waters. Merritt *et al* (2007) reported that faecal coliform levels in Lake Cakora exceeded guidelines for swimming (primary contact) around once every two years, and *enterococci* more often. Poor water quality in Lake Cakora would also have the potential to impact on beach water quality at the time of entrance breakouts.

CVC collected data on water levels, rainfall (Townsend), faecal coliforms and entrance conditions (open/ closed) between 1 September 1999 and 22 July 2000. Although sampling did not conform to current guidelines, the data indicate that after three or more days of rain when the entrance is closed, Lake Cakora is unlikely to be suitable for swimming (see *Lake Cakora Estuary Processes Study* (SMEC 2013a) for more information).

5.1.2 Flow Conditions

The catchment of Lake Cakora is largely contained within Yuraygir national Park and in a natural state, with associated natural inflows including tannin stained waters. Around the urban area several stormwater pipes discharge to the lake. Drainage swales have also been constructed near urban development on the southern side of the lake, west of Ocean Road.

The entrance to Lake Cakora is untrained. Opening of the lake is dependent on a number of variables including rainfall, the initial lake storage volume, ocean tide, waves and a berm height. As noted in Section 2.2 , berm heights can range between 1 - 2 m AHD. During entrance breakouts, sediment from the entrance is transported into the nearshore area. Sediment is then reworked by coastal processes and transported back onshore by waves to reform the entrance berm.

5.1.3 Estuarine Biota and Habitat Condition

The latest estuarine vegetation mapping (seagrass, mangroves and saltmarsh) was based on aerial photo interpretation and field work in 2000. Previous mapping of NSW estuaries based on 1981 aerial photography and field surveys in 1983 (West *et al* 1985) did not include mapping for Lake Cakora and hence no comparison on the extent of estuarine vegetation can be made.

The Department of Environment and Climate Change (DECC) undertook a riparian condition assessment for NSW estuaries. Riparian condition was rated as either 'Good', 'Moderate' or 'Degraded'. For Lake Cakora, riparian condition was generally rated moderate to good. Degraded areas were identified around the Ocean Road Bridge (presumably as the foreshore has been altered due to the bridge abutments) and approximately 600 m to the north, near Brooms Head Road.

Although vegetation within the Brooms Head Reserves has been subject to degradation through high visitation, recreational impacts, excessive mowing, coastal erosion,

unauthorised tree removal for views, weed infestations and garden waste dumping, and exotic plantings, CVC (2006) identified that, in general, it was in relatively good health.

There is no data on fish assemblages. In the 2009 survey, one resident indicated that Lake Cakora is a nursery for eastern king and school prawns (CVC 2009).

5.1.4 Estuary Health Pressures

Pressures affecting Lake Cakora are listed in *Table 5*, together with comment on their likely significance on the health of the lake.

The pressure indicator score for Lake Cakora in the NSW Government's *State of the Catchments 2010 Northern Rivers Region Estuaries and Coastal Lakes* was assessed as very low for the following parameters: cleared land, sediment input, nutrient input, freshwater flow, disturbed habitat and fishing. Population pressure was assessed as low.

5.1.5 Key Management Issues

The most significant issues identified in the 2009 community survey were septic overflows/ leaching, poor water quality, stormwater and drainage management, and bank erosion (in that order) (CVC 2009). These issues were raised by survey respondents and data is not necessarily available to quantify their significance or impacts.

Key issues identified through the CZMP process and supporting *Brooms Head & Lake Cakora Management Study* (SMEC2013c) include;

- Potential impacts on water quality due to Brooms Head Caravan Park current effluent management systems,
- Potential impacts on water quality due to domestic onsite effluent systems that are not functioning correctly,
- Bacteriological contamination of Lake Cakora making it unsuitable for recreation
- Damage to saltmarsh and increased erosion due to illegal vehicle access,

Ecosystem Management Actions include;

- Implement Brooms Head Caravan Park effluent management (including treatment and disposal).
- Routinely inspect domestic systems to ensure they are performing as per design.
- Artificially breakout lake entrance in swimming season if water level above 1.6m AHD.
- Information/Signage on ecological values and risks to public health & safety.
- Compliance enforcement for unauthorised vehicle access around Lake Cakora.

The adopted management actions are included in the *Table 7 Implementation Schedule* in Section 8 .

Table 5 Pressures affecting Estuary Health

Category	Potential pressures and sources	Comment
Water and Sediment Quality	Point sources of pollution (e.g. effluent, contaminated sites)	The catchment of Lake Cakora is largely contained within Yuraygir national Park and in a natural state. Based on available information on former and current land uses, the only potential source of contamination is the former waste disposal facility located off Brooms Head Road. However, the landfill closed over a decade ago and it was remediated by capping.
	Diffuse sources of pollution (e.g. urban stormwater, acid sulphate soils, bank or foreshore erosion, agricultural runoff, sewer overflows, septic tank effluent	Brooms Head is not sewered. Effluent disposal is via septic tanks and absorption trenches. The effectiveness of absorption trenches close to the lake may be affected by high groundwater levels. Although the caravan park sewerage system has been upgraded there is potential for the disposal pond to the south-west of the village to overflow into the catchment of Lake Cakora during high rainfall events. Potential bacteriological contamination of the lake affects the recreational value and puts at risk the health of the public. Stormwater discharges to the lake may include pollutants associated with urban development, e.g. fertilisers etc. Other potential diffuse sources of pollution do not appear to be an issue for Lake Cakora. There is no agricultural landuse in the catchment and no significant bank erosion sites. Lake Cakora and surrounds are mapped as Acid Sulphate Soils (ASS). Excavation into and exposure of ASS can lead to acid runoff.
Flow Conditions and Sediment Movement	Changes to catchment inflows (e.g. land clearing, urbanisation)	The steeper slopes within the catchment are well vegetated and old disturbances, such as quarries and areas cleared for grazing have largely regenerated since incorporation in the national park (NPWS 2003). There is little opportunity for urban expansion as Brooms Head is surrounded by Yuraygir National Park and Crown and Council managed reserves, mainly zoned for environmental protection. There is also little opportunity for intensification of development as the village is zoned for low density residential development and few vacant urban allotments exist.
	Changes to tidal exchange, salinity regimes and inundation levels (e.g. altered entrance conditions for ICOLLs, berm status, entrance training works)	Lake Cakora entrance is untrained. The average level at which the lake breaks out is influenced by periodical artificial openings. Artificial opening of the lake also impacts on the natural patterns and fluctuations in salinity and tidal exchange.
	Changes to tidal/ flood flows across an estuary (e.g. due to culverts, flood gates or reclamation)	Apart from artificial openings, the only other potential anthropogenic influence on tidal/ flood flows is the minor constriction at the Ocean Road Bridge abutments.
	Sea level rise and upward movement of water tables	Haines (2006) noted that sea level rise would cause ICOLL entrance sand berms to move inland and build-up to a higher level relative to local topography. The increase in berm height would be expected to match the increase in sea level rise, given that the berm is built primarily by wave run-up processes. Sea level rise poses an increased threat of inundation of assets and development on private lands in proximity to the lake shoreline. Gravity drained stormwater infrastructure and sewerage systems may also be compromised. The predicted impacts on Lake Cakora water quality (assessed in the CLAM model) as a result of postulated 2100 sea level rise were identified as increased salinity and increased dilution of pollutants due to increased flushing, resulting in a decrease in the potential for algal blooms and aquatic weeds and an increase in native estuarine flora and fauna (Merritt *et al* 2007).
Estuarine biota	Changes to the extent and condition of seagrass, saltmarsh, mangroves, coastal wetlands, littoral rainforest and riparian vegetation	Disturbances to riparian and wetland vegetation may result from informal access for recreational activities. It was noted in the 2009 survey, that on occasions motorbikes have been ridden through the lake area when levels are low. Data is not available to determine changes in estuarine habitat and biota.
	Recreational and commercial fishing	There is no commercial fishing within Lake Cakora. However, NPWS (2003) noted that commercial beach netting is carried out between Brooms Head and the Sandon River. Ocean hauling is closed over the Christmas period (15 December to 15 January) between Cakora Point and Brooms Head Bridge (DPI Fisheries). Respondents to the 2009 survey indicated that recreational fishing and bait collection are popular activities. The small size of the lake makes it more susceptible to recreational fishing pressures at peak holiday periods.
	Outbreaks of aquatic weeds or pests	Large tracts of the coastal dunes in northern Yuraygir National Park were sandmined during the 1970s and 80s. Several weed species were introduced to these areas during postmining rehabilitation that have resulted in large scale, multi-species infestations. These include bitou bush *Chrysanthemoides monilifera* (NPWS 2003). NPWS (2003) identified large dense infestations of groundsel bush *Baccharis halimifolia* in the northern section of Yuraygir National Park in the Brooms Head – Sandon area. However, groundsel is not a major problem in the Lake Cakora catchment. In addition to bitou bush and groundsel, the *Brooms Head Reserves Vegetation Management Plan* (2006) identified lantana *Lantana camara*, camphor laurel *Cinnamomum camphora*, as the principle target weeds (as these are all declared noxious species). Second priorities for weed control included gloria lilly, asparagus fern and a range of exotic 'garden escapes' within natural areas on CVC managed reserves. Staged removal of buffalo grass with native couch and kangaroo grass was also a priority. As well as foxes and feral domestic animals, individual cane toads are sporadically collected from public and private lands in and around Brooms Head where they have been accidentally introduced through inadvertent transportation (NPWS 2003). Also likely that coss-country migration from populations further north near Yamba and Lake Arragan has occurred.

6 COMMUNITY USES

6.1 Access

As indicated in *Figure 5* the Brooms Head Village is surrounded by public lands, mainly national park and crown land, with a foreshore reserve fronting the lakefront properties along Ocean Road.

Access points for the four precincts and any key issues around access are discussed below.

Figure 5 Land Tenure

Northern Beach

- There is an informal track and dilapidated bridge accessing the northern lake and beach to the north of Brooms Head on Crown land near the former prawn farm.
- Damage is occurring to fore dune vegetation due to 4WD's and other recreation.

Lakes Entrance

- There is no formal access to the foreshore reserve fronting the lakefront Ocean Road houses and the area appears as if it is part of private property. There is parking available for this access at the Brooms Head Bowling and Recreation Club.
- A 4WD access track is located on the southern side of Lake Cakora entrance.

Foreshore North

- There are a number of beach access stairs over the foreshore revetment.
- Some of the access stairs have been damaged by storm erosion and have been closed off.
- After storm events, erosion to the beach will mean there is often a drop off from the access stairs to the beach.

Foreshore South

- There are a number of beach access stairs over the foreshore revetment.
- At the southern end of the foreshore reserve there is a concrete path adjacent to the revetment.
- There are two boat ramps in this area.
- There is a formal lookout carpark at Cakora Point and informal tracks around the headland.
- Some informal tracks are close to the headland crest and/ or cliff face.
- Public risk from rockfalls and cliff instability at Cakora Point.
- Yuraygir Coastal Walk track needs to be clearly defined by markers.

The adopted management actions to address access issues are included in the *Table 7 Implementation Schedule* in Section 8 , specifically action numbers 9.1 to 9.7. These include;

- An upgrade of the beach access east of the Prawn Farm site,
- Ensuring the current level of public access is maintained or improved,
- As part of the revetment upgrade works the access points are to be reviewed and a new access point created in the northern section of the Brooms Head Foreshore Reserve,
- Localised beach scraping after storm events to build up the sand around the bottom step of foreshore stairs to allow safe transiting to the beach,
- 4WD access to Brooms Head Beach to be managed in accordance with CVCs Beach Access and Vehicles on Beaches Policy.

6.2 Amenity

Beach amenity to the north of Lake Cakora entrance is considered high as this unprotected area appears to be in a natural state. However it was sand mined in the late 1970s to early 1980s resulting in the reconstructed frontal dune being lower and located further landward and the introduction of exotic species for dune stabilisation. Some trees/ shrubs on the northern dune and unprotected section of the northern end of the foreshore reserve have been lost due to erosion. Vegetation on either side of Lake Cakora entrance and, in particular the northern side of the entrance, is affected by the variable location of entrance breakouts.

The entrance area has been modified by the *ad hoc* revetment and the Ocean Street bridge abutments. When the entrance breaks out it can scour back to the toe of the revetment, see *Plate 3*.

Most of the beach to the south of the entrance is protected by a revetment. Inundation of the sandy beach in front of the foreshore reserve revetment occurs at times during high tides. During a site visit on 29 December 2011 there was no beach in the 'flagged' patrolled area, see *Plate 4*.

Plate 3 scour at the revetment toe (13/2/2002 source: CVC)

Plate 4 Brooms Head Patrolled Swimming Area (29/12/2011)

6.3 Recreational Use

Recreational activities at Brooms Head include:

- Camping, caravanning and picnicking along the foreshore reserve.
- Driving on the beach – 4WD access is located on the southern side of Lake Cakora entrance with driving on the beach permitted from the lake entrance, north to Red Cliff (damage to dune vegetation has been observed due to 4WDs).
- Fishing – the beach is fished for bream, tailor, whiting and flathead as well as a variety of rock fish (Maclean Historical Society Inc. 1990). Rock fishing spots are located around the base of Cakora Point. Mud crabs are caught in Lake Cakora. Pumping for yabbies is popular just upstream of the bridge adjacent to the southern shore of Lake Cakora. The boat launching ramps at the foreshore reserve provide access for deep sea fishing.
- Surfing (including at Back Beach), snorkelling (in the tidal pool at Cakora Point) and swimming at Lake Cakora entrance (most popular area for this activity), Brooms Head main beach and the tidal pool. The beach is patrolled by lifeguards during the summer holidays.
- Walking and sightseeing – Brooms Head is on the Yuraygir Coastal Walk which extends from Angourie in the north to Red Rock in the south, with the walk being mainly along the beach between Red Cliff and Sandon. Cakora Point carpark and lookout is a vantage point for whale and dolphin watching.
- Canoeing and nature observation on Lake Cakora – a variety of wading birds live on the mud-flats (www.clarencetourism.com).

6.4 Cultural Heritage

6.4.1 Aboriginal Cultural Heritage

The Brooms Head area is part of the Yaegl country. Native Title has been determined to exist over some land and waters, including Lake Cakora, within the area covered by this CZMP. This native title currently exists with the Yaegl Traditional Owners Aboriginal Corporation. The legal interest of any native title claimant or holder needs to be appropriately recognised and notified in implementation of the CZMP.

Mapping of Aboriginal Cultural Landscapes in 2005 indicated that the Brooms Head area is of spiritual/ ceremonial significance to local Aboriginal people (DNR undated, www.northern.cma.nsw.gov.au).

A search of the Aboriginal Heritage Information System (AHIMS) indicated that 10 sites have been recorded in the vicinity of Brooms Head. Byrne (1986) described 11 sites in total (located around Brooms Head, Cakora Point and Lake Cakora), eight midden sites, along with three open camp sites. The middens contained beach and rock shellfish remains and stone artefacts ranging from simple flakes to edge ground axes. The open campsites contained evidence of quarry or workshop activity. Most sites had been subject to erosion, with some middens damaged or essentially destroyed by sand mining. Byrne (1966) noted that the margins of Lake Cakora were of particular interest archaeologically as very little archaeological reconnaissance in the region had focussed on coastal wetlands.

6.4.2 Non-Indigenous Cultural Heritage

The remains of various huts, yards and stock fences etc associated with former grazing leases, located within the national park around Brooms Head, are of historical interest (NPWS 2003, DECC 2007).

The *Clarence Valley Local Environmental Plan (CVC LEP) 2011* heritage schedule lists the following items as being of local significance: Brooms Head Hall, Brooms Head Reserve; and Brooms Head Pine trees, Brooms Head Reserve. As indicated in *Table 4*, these heritage items and places are at risk from coastal erosion. It is proposed to maintain the Foreshore Reserve Revetment and hence maintain a level of protection for these valued heritage items. The adopted management action to address this is included in the *Table 7 Implementation Schedule* in Section 8 , specifically action number 2.2.

7 KEY COASTAL VALUES

7.1 Ecological Values

Flora and fauna of conservation significance in the vicinity of Brooms Head include the following protected communities and species.

- Endangered Ecological Communities (EECs) of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions, protected under the *Threatened Species Conservation Act (TSC) 1995*:
  - *Coastal Saltmarsh*
  - *Littoral Rainforest*
  - *Themeda grassland* [Kangaroo Grass] *on seacliffs and coastal headlands*
  - *Swamp Oak Floodplain Forest*
- Some of these vegetation communities are also protected under State Environmental Planning Policy:
  - SEPP 14 – Coastal Wetlands (saltmarsh, wet heath and swamp forest)
- The northern arm of Lake Cakora contains mangrove stands. Mangroves are protected under the *Fisheries Management Act 1994.*
- Lake Cakora, Brooms Head Beach and the Cakora Point rock platforms provide habitat for threatened and migratory shorebirds and waders listed under the *NSW TSC Act*, Commonwealth *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* and international agreements. Residents have observed the following listed fauna species (*TSC Act and/ or EPBC Act*) nesting and/ or feeding at Brooms Head Beach or Lake Cakora: Little Terns, Pied Oyster Catchers, Osprey and Sea Eagles (CVC 2009). Pied Oystercatchers, a Whitefaced Heron and a tern were observed close to, or within, the Lake Cakora entrance area on 22 August 2011. Sooty Oyster Catchers are also found on the southern section of the beach and around the rocky shores (headland/lagoon). Beach Stone Curlews periodically frequent the beach adjacent to the Lake entrance.
- As part of the inspections for this study a live Loggerhead turtle was also observed on the beach near the entrance on 15 October 2011. Hawksbill[1], Green[2] and Loggerhead[3] marine turtles are known to forage in the waters off Brooms Head Beach (TDE2010[1], Zietch 2012[2], SMEC 2011[3]). Since 1968 OEH/NPWS has recorded 30 turtle events in the immediate study region. Although there have been sightings of emergent turtles on Brooms Head Beach these have been attributed to stranding events and not attempted nesting activity, as the region is approximately 350 km south of established marine turtle nesting areas (DoE2014, GBRMPA2014). All marine turtles found in Australian waters are listed under the *EPBC* Act, with the Loggerhead, Green and Leatherback Turtles listed under the *TSC Act*.
- The catchment of Lake Cakora provides habitat for a variety of threatened fauna species including the Eastern Ground Parrot *Pezoporus wallicus wallicus* and Eastern Chestnut Mouse *Pseudomys gracilicaudatus* which are known to inhabit the Brooms Head Reserve (CVC 2006).
- A large part of the catchment of Lake Cakora forms regional habitat corridors.

See the Estuary Processes Study (SMEC 2012a) for more information on flora and fauna recorded within the catchment of Lake Cakora.

It should also be noted that the majority of the study area and of Lake Cakora catchment is within the Yuraygir National Park. This estate is subject to management under the National Parks and Wildlife Service (NPWS) *Yuraygir National Park and Yuraygir State Conservation Area Plan of Management* (NPWS 2003) and *Yuraygir National Park and State Conservation Area Fire Management Strategy* (NPWS 2007). This CZMP will not duplicate management nor impose additional management actions for NPWS who administer the national park. Existing management, including implementation of the relevant plans of management by NPWS should continue to maintain the ecological and cultural heritage values of the Yuraygir National Park.

7.2 Cultural Heritage

As noted in Section 6.4 , Aboriginal sites have been recorded around Brooms Head. All Aboriginal sites are protected under the National Parks and Wildlife Act 1974. Local heritage items are protected under Council's LEP.

7.3 Socio-Economic Values

The *Brooms Head Reserves Vegetation Management Plan* (CVC 2006) identified that the local community and visitors value the reserve for its natural environment, scenic qualities and recreational opportunities and as a buffer from storms and oceanic forces.

A 2009 survey by CVC indicated that the most important values associated with Lake Cakora are peace and tranquillity, clean swimming water and native animals and plants.

Tourist accommodation at Brooms Head includes the caravan park which has 291 sites including cabins (52 are long stay), bed and breakfast accommodation, holiday houses and units. The caravan park contributes significant income to the CCRT, over $285,000 in the 2011/12 financial year, with visitation providing flow on effects to local businesses.

The Brooms Head area and its beaches are highly valued as a destination for residents of Maclean and nearby areas with a long history as a chosen destination for day trips and short visits. The Reserves foreshore land is highly valued due to the amenity and the social, cultural and recreational value it provides to the local community, both residents of the village as well as persons who visit from nearby communities, such as Maclean, for camping holidays.

8 COASTLINE MANAGEMENT STRATEGY

The priority coastal management issues for the Brooms Head coastline discussed in proceeding sections of the CZMP are summarised in *Table 6* along with the corresponding adopted management actions.

The detailed action implementation schedule is presented in *Table 7* of the CZMP including a summary of likely costs.

Table 6 Priority coastal management issues and response actions

Priority Coastal Management Issue	Management Action – to be implemented	Table 7 No.
Risk to public safety – due to inundation / wave overtopping in extreme events.	Review and Implementation of Emergency Action Sub Plan (EASP), Community Education of Coastal Hazards and EASP.	3.1/3.2 8.1/8.3
Risk to home owners and houses – Lake entrance precinct.	Geotechnical investigation of beach sub-strata, Retain existing Ocean Road revetment (subject to findings of geotechnical investigation which will inform the future and management of these works), Development Controls, Monitoring of existing revetment post significant storm.	1.1 2.3 5.1-5.6 10.1
Risk to public assets. Risk to heritage listed public hall and Norfolk Island Pines.	Extend foreshore revetment at north end of Brooms head reserve to southern bridge abutment, Maintain foreshore reserve revetment, Relocation of public facilities – foreshore reserve precinct.	2.1 2.2 12.1/12.2
Maintain native vegetation communities.	Continue to control weed and pest species, Implement Brooms Head Reserve Vegetation Management Plan, Dune Revegetation and Rehabilitation, Implement Yuraygir National Park plan of management.	4.1 4.2 4.3 4.4
Risk to home owners and houses – Future Development.	Development Controls, Building and Development Standards.	5.1/5.2/5.4 5.3/5.5
Water quality in Lake Cakora and risk to public safety.	Implement Brooms Head Caravan Park effluent management (including treatment and disposal), Ensure domestic systems are performing, Artificially breakout lake entrance in swimming season if water level above 1.6m AHD, Information/Signage on ecological values and risks to public health & safety.	6.1 6.2 7.1 8.2
Public risk from rockfalls and cliff instability – Cakora Point.	Realign and formalise tracks at Cakora Point away from potentially unstable areas.	9.1
Beach access has been cut due to erosion – foreshore reserve.	Ensure current level of public access is maintained or improved, New access locations, Localised beach scraping at access points after storm events.	9.2 9.5 9.2
Limited access to Northern Beach with dilapidated bridge.	Upgrade beach access east of Prawn Farm site.	9.3
No formal access to the foreshore reserve fronting the lakefront Ocean Road houses.	Maintain access to reserve adjacent northern bridge abutment.	9.4
Yuraygir Coastal Walk needs to be clearly defined by markers.	Maintain track markers through the reserve to ensure track is clearly defined by markers.	9.6
Damage to fore dune vegetation due to 4WD access. Damage to saltmarsh due to illegal vehicle access.	4WD access to be managed in accordance with CVC Beach Access and Vehicles on Beaches Policy. Improve compliance/enforce penalties for unauthorised vehicles and driving over dune vegetation.	9.7 11.1
Damage to fore dune vegetation due to recreation – Northern Beaches.	Upgrade beach access east of Prawn Farm, Maintain current access to reserve adjacent northern bridge abutment.	9.2
Reduced beach amenity/access due to beach erosion and debris.	Removal of debris (kelp & other) from beach and lagoon, Localised beach scraping at access points after storm events, Excess sand extracted during dredging or other public infrastructure to be deposited on Brooms Head Beach (where compatible/suitable), Beach Profile Monitoring.	13.1 9.2 13.2 10.2

Strategies and actions adopted by Council at the conclusion of the CZMP development process to address the coastal issues are grouped and summarised in an Implementation Schedule (*Table 7*) under the following thirteen headings:

1. Investigation,
2. Revetments (extend foreshore reserve revetment and maintain existing),
3. Emergency Planning,
4. Dune/natural area management,
5. Development Controls,
6. Stormwater management/water quality,
7. Lake Cakora entrance management,
8. Education,
9. Access management,
10. Monitoring and Reviews,
11. Compliance Issues,
12. Foreshore Facilities, and
13. Beach Amenity.

The recommended management strategies and actions in *Table 7* are generally listed in priority order, however some sub-actions are of lesser priority. For all options the planning, design and implementation of any works should take due consideration of;

- Heritage Management / Cultural Heritage
  - Aboriginal
  - Non-indigenous
- Environmental significance,
- Ecological Values, and
- Any potential environmental impacts.

Some of the actions listed will be implemented through existing management plans and programs and cooperatively with other agencies. A representation of coastal values, public access, issues and management actions are shown in *Figure 6* to *Figure 10*.

- *Figure 6* details the issues and management actions for the Northern Beach Precincts and Lake Cakora (north).
- *Figure 7* details the issues and management actions for the Lakes Entrance Precinct.
- *Figure 8* details the issues and management actions for the Foreshore Reserve (North) Precinct.
- *Figure 9* details the issues and management actions for the Foreshore Reserve (South) and Cakora Point.
- *Figure 10* details the issues and management actions for Lake Cakora (South).

Table 7 Implementation Schedule

No.	Management Strategy - Action Details	Method of Implementation	Responsibility	Performance Criteria	Commencing	Indicative Costs			Annual	Priority	Funding Options
						Yr 1 (2016-2017)	Yr 2-5 (2017-2020)	Yr 6-10 (2021-2026)	Maintenance		
1	**Investigation**										
1.1	Geotechnical Investigation Undertake Geotechnical Investigation in Lake Entrance precinct at, • Ocean Road revetment, • southern unprotected shoreline, & • across lake berm to determine what stratum exists & assess whether it provides confidence in protection offered by existing revetment. Subsequently review coastal hazard risk for this Precinct. Use investigation to also obtain geotechnical conditions for extension of Foreshore Reserve revetment to bridge abutment (see 2.1).	Through this CZMP	Clarence Valley Council (CVC) with support from the Office of Environment & Heritage (OEH)	Improve understanding of protection offered by existing revetment & underlying ground conditions. Review of coastal hazard lines at lake entrance area. Geotechnical information for design of extension of Foreshore Reserve Revetment to bridge abutment (see 2.1).	2016	$60,000				High	OEH coastal management grants may be feasible. 50% NSW Government. CVC share may utilise CCRT funds.
2	**Revetments**										
2.1	Extend Foreshore Reserve Revetment at north end of Brooms Head Reserve to southern bridge abutment. (Crest level to be similar to existing revetment along Reserve). Detailed Design & undertake Environmental Impact Assessment (EIA). Design to allow for public foreshore access & stormwater management. EIA to include assessment of impact on entrance area due to extension of revetment to the bridge abutment. Obtain funding for revetment. Revetment construction.	Through this CZMP	CVC with support from OEH	New revetment capable of withstanding 1 in 100yr event, with crest level to match existing ground levels.	2017		$100,000 for Design EIA & Approvals. $250,000 - Capital Cost			High	OEH coastal management grants may be feasible. 50% NSW Government. CVC share may utilise CCRT funds.
2.2	Maintain Foreshore Reserve Revetment After extreme event or longer term damage requiring revetment repair.	Through this CZMP	CVC	Revetment continues to provide current level of protection. Life expectancy of heritage listed public hall & Norfolk Island pines not reduced.	Subject to extreme storm events or longer term damage requiring repair.	Subject to extreme storm events.	$7,000* /yr average maintenance	$7,000* /yr average maintenance	$7,000* /yr average maintenance	Medium	CVC General funds. CCRT funds
2.3	Retain existing Ocean Road Revetment Subject to findings of geotechnical study (Action 1.1) and EIA (see Action 2.1) which will inform the future and management of these works.	Liability & development approvals issues to be resolved.	Council/CCRT in consultation with OEH	Existing revetment retained and review management when further investigations complete (refer also to Performance Criteria at Action 1.1).	2016					High	No funding required at this stage. No works proposed.
3	**Emergency Planning**										
3.1	Review Emergency Action Sub-Plan (EASP) following endorsement of CZMP by CVC.	Council to review	CVC with SES & OEH support.	EASP to be regularly reviewed against CZMP & work being untaken to ensure it is able to meet emergency needs.	2017		CVC Staff time & advertising costs. $2,000	CVC Staff time & advertising costs. $3,000		High	No grants required, undertaken with council resources. CVC General funds.
3.2	Implement EASP Implement adopted certified EASP.	CVC	CVC with SES & NSW Police.	EASP implemented according to adopted criteria & actions.	2016	CVC Staff time	CVC Staff time	CVC Staff time	$1,000 / review & advertising	Very High	Council resources. CVC General funds.
4	**Dune/Natural area management**										
4.1	Control Weeds & Pest Species Continue to control weed & pest species.	Cooperatively with NPWS, Crown Lands, LLS & Dune Care through: • *Brooms Head Reserves Vegetation Management Plan* • *Weed control program on Crown LANDs* • *Yuraygir National Park & Yuraygir State Conservation Area Plan of Management*	CVC cooperatively with NPWS, Crown Lands, LLS & Landcare	Maintain & improve health of dune vegetation. Reduce weed & pest species.	Ongoing (minimum 5 year frequency)	$5,000 annually (for weed control)	$5,000 annually (for weed control)		$5,000 annually (for weed control)	High	CVC, NPWS, Crown LANDs to contribute. Landcare Group to contribute labour.
4.2	Implement Brooms Head Reserve Vegetation Management Plan (VMP) to sustain existing vegetation communities on land managed by CCRT & Crown Lands at Brooms Head.	CVC	CVC in conjunction with Crown Lands.		Ongoing	Refer to VMP	Refer to VMP	Refer to VMP	Refer to VMP	Medium	CVC General funds (GF).
4.3	Dune Revegetation & Rehabilitation Implement revegetation & rehabilitation of dunes, Lake Cakora berm & adjacent to revetments and in	CVC cooperatively with Landcare.	Cooperatively with Landcare.	Maintain & improve health of dune vegetation. Opportunities	Ongoing	Landcare time & resources.	Landcare time & resources.	Landcare time & resources.		Medium	Landcare time & resources. Potential

No.	Management Strategy - Action Details	Method of Implementation	Responsibility	Performance Criteria	Commencing	Indicative Costs			Annual	Priority	Funding Options
						Yr 1 (2016-2017)	Yr 2-5 (2017-2020)	Yr 6-10 (2021-2026)	Maintenance		
	association with any new works in accordance with Brooms Head VMP.			for sand build up on dunes & beach provided.							NSW Govt funding. CVC GF or CCRT.
4.4	Implement Yuraygir National Park Plan of Management.	NPWS management	NPWS	Management actions completed in accordance with adopted Plan.	Ongoing	Refer to Plan	Refer to Plan	Refer to Plan	Refer to Plan	Medium	NPWS
5	**Development Controls**										
5.1	Coastal Risk Map Clarence Valley Local Environmental Plan 2011 (CVLEP) clause 7.5. Post review of coastal hazard at lake entrance area (see 1.1). CVLEP Coastal Risk Map needs to be updated with latest coastal hazard lines.	Through CVC Clarence Valley Local Environmental Plan 2011 (CVLEP)	CVC Planning Staff	No new sub-divsions or LEP amendments be approved that would increase development potential seaward of the 2100 hazard zone.	2017	)	CVC Planning / Development (P/D)	CVC Planning / Development (P/D)		High	Grants do not cover council or admin staff time. CVC General funds.
5.2	Development Control Plan (DCP) Post review of coastal hazard at lake entrance area (see 1.1). New development/redevelopment in areas subject to coastal/lake inundation, or coastal erosion shall be required to meet new coastal development controls.	Through CVC Development Control Plan (DCP).	CVC Planning Staff	All future development within coastal hazard areas to be assessed against coastal development controls once they have been developed.	2017		CVC P/D assessment staff time. $2,000 for advertising Draft DCP	CVC P/D assessment staff time	CVC P/D assessment staff time	Medium	Grants do not cover council or admin staff time. CVC General funds.
5.3	Floor level - Apply minimum floor level for new development/ redevelopment in areas subject to coastal inundation & associated flooding. CVC to prepare development controls to provide minimum floor level (3.1m AHD) for coastal hazard zones at Brooms Head.	Through CVC Development Control Plan (DCP)	CVC Planning Staff	All future development to have floor levels immune or resilient to inundation.	2017		CVC P/D assessment staff time	CVC P/D assessment staff time	CVC P/D assessment staff time	Medium	Grants do not cover council or admin staff time. CVC General funds.
5.4	Development Footprint New development should not occur seaward of existing development / immediate coastal hazard lines.	Through CVC DCP	CVC Planning Staff	All future local development to be located Landward of immediate hazard line.	2017		CVC P/D assessment staff time	CVC P/D assessment staff time	CVC P/D assessment staff time	Medium	Grants do not cover council or admin staff time. CVC General funds.
5.5	Building & Development Standards New development/redevelopment within coastal hazard areas to be subject to development controls to ensure compatibility with current & future coastal hazards. Guidance to apply to adaptation of effluent management systems, relocation of modification of built assets, emergency management & impact of coastal risks. Improved building standards for new development to provide resilience to coastal hazards & ensure compatibility with coastal character. Measures may include; • Resilience to inundation of lower level, • Geotechnical design to accommodate reduced foundation capacity (Pilled construction), • Lightweight/relocatable construction, • View corridors between developments.	Through CVC DCP	CVC Planning Staff	All future local development to be compatible with current & future coastal hazards affecting the subject land.	2017		CVC P/D assessment staff time	CVC P/D assessment staff time	CVC P/D assessment staff time	Medium	Grants do not cover council or admin staff time. CVC General funds.
5.6	Existing Development When substantial renovation occurs promote house retrofitting to suit coastal hazards & coastal character. House retrofitting & design standards – raising habitable floor level, improved design & usage of appropriate construction materials for resilience against coastal hazards.	Through this CZMP & Education see 8.3.	CVC & Community/ Residents	Community/Residents are aware that retrofitting houses can make them more resilient to coastal hazards. Some retrofitting of existing houses occurs to make them more suited to coastal hazard area.	2017		CVC staff time	CVC staff time	CVC staff time	Medium	Grants do not cover council or admin staff time. CVC General funds.
6	**Stormwater Management/ Water Quality**										
6.1	Caravan Park effluent disposal Implement management actions contained in CVCs review of Brooms Head Caravan Park effluent management (including treatment and disposal).	Through this CZMP	CVC in conjunction with Caravan Park operators	Adopted actions completed on time.	2017		Note; Unable to cost accurately without details of adopted actions			High	Undertaken under council caravan park maintenance.
6.2	Domestic onsite effluent management systems. Ensure existing domestic onsite effluent management systems are performing as per design.	Through regular inspections of systems by CVC.	CVC	Systems inspected at least once every 5 years.	2017		CVC Staff Time	Ongoing until sewer has been implemented.		Medium	Grants do not cover council or admin staff time.
6.3	Sewerage reticulation Opportunities for the provision of reticulated sewerage to Brooms Head are investigated by Council as part of its rural village's sewerage investigation.	Through State Govt Country Towns Water Supply & Sewerage Scheme.	CVC in conjunction with NSW Government (Public Works)		2016/17		$50,000 (in 2016/17)			Medium	CVC Sewerage Fund
7	**Lake Cakora entrance management**										

No.	Management Strategy - Action Details	Method of Implementation	Responsibility	Performance Criteria	Commencing	Indicative Costs			Annual Maintenance	Priority	Funding Options
						Yr 1 (2016-2017)	Yr 2-5 (2017-2020)	Yr 6-10 (2021-2026)			
7.1	Control/ Manage Opening of Lake Cakora Implement artificial breakout of Lake Cakora entrance during swimming season for recreational purposes if lake water level has reached 1.6m AHD without breaking out naturally. The location of the pilot channel to be determined in association with preparation of a review of environmental factors for implementation of this action. Install fixed gauge adjacent to Ocean Rd Bridge to monitor Lake water levels.	Through this CZMP.	CVC with support from OEH	Improved water quality within Lake Cakora. No reported human health problems from recreation in lake. No flooding of adjacent residential land in summer months.	2017	CVC staff costs & plant to excavate pilot channel $10,000 Installation and survey for gauge $10,000				High	CVC General Fund (GF). OEH coastal management grants possible for part funding.
8	**Education**										
8.1	Community Education Coastal hazard community education program. Advise residents/ caravan park visitors of actions to be taken in a coastal storm emergency.	Through promotion & implementation of EASP, review of BH Caravan Park emergency/ evacuation plan, CV local flood plan & development of procedures for emergency evacuation should Brooms Head Rd be cut by major oceanic flooding or catchment flooding.	CVC Emergency Management Committee, SES and CVC staff.	Ensure community (& visitors) are well educated about emergency procedures.	Dependent on frequency of major storm events	SES & CVC Staff time & advertising costs	SES & CVC Staff time & advertising costs	SES & CVC Staff time & advertising costs		Very High	No grants required, undertaken with council resources in conjunction with Clarence Valley Coast & Estuary Management Committee & SES.
8.2	Information/Signage Distribute information/review and install/replace signage to educate community (including visitors) on ecological values, risks to public health & safety: • advise when the lake is likely to be unsuitable for swimming, • outline maintenance requirements for on-site effluent disposal systems, • outline practices to reduce stormwater pollution (e.g. minimal use of fertilisers, removal & disposal of dog droppings), • provide information on the source of periodical discolouration of the lake & that it does not pose a health or ecological risk, • convey additional information on the ecological & habitat values of Lake Cakora, • provide advice on lake opening strategy, • warn of danger of rock falls at base of Cakora Point & public access areas at the top of slopes, such as at the carpark.	Through general funding for environmental improvement, in association with Landcare activities, in partnership with NP&WS.	CVC, Landcare, & NP&WS		Ongoing	NP&WS & CVC Staff time & signage costs.	NP&WS & CVC Staff time & signage costs	NP&WS & CVC Staff time & signage costs.		High for matters relating to public risk. Medium for other matters.	Undertaken with council resources &/or grant funds in conjunction with Landcare.
8.3	Planning advice Provide planning advice on Section 149 Planning Certificates to advise of coastal hazards & the adopted CZMP.	Through issue of Section 149 certificates.	CVC Planning Staff.	Compliance with relevant NSW Government guidance and legislation.	Ongoing	CVC Staff time	CVC Staff time	CVC Staff time		High	Grants do not cover council or admin staff time.
9	**Access Management**										
9.1	Cakora Point Slopes Realign & formalise tracks at Cakora Point away from potentially unstable areas in accordance with *Cakora Point Slope Stability and Risk Assessment (SMEC 2012).* Inspections of all slopes which are subject to impacts from coastal processes by a suitably qualified geotechnical practitioner (min 1 in 5yrs) Install fencing where tracks within 2m of slope.	Through *Cakora Point Slope Stability and Risk Assessment (SMEC 2012)*	CVC in conjunction with suitable geotechnical engineer	Ensure no formal tracks are on unstable areas. Geotechnical inspection and report obtained at least once every 5yrs or after visible ground movement.	2017	CVC Staff Time	CVC Staff Time, $5,000 to 10,000 for geotechnical engineer	CVC Staff Time, $5,000 to 10,000 for geotechnical engineer		High	Grant funds are unlikely – fund from council budget. CVC General Funds (GF)&/or CCRT fund.
9.2	Pedestrian – General Ensure current level of public access is maintained or improved. Review number & location of beach access ways. Perform localised beach scraping at access points after storm events to allow beach access.	Subject to liaison & agreement between Council & Crown Lands.	CVC	Current level of pedestrian public access is maintained or improved.	2017					Medium	Grant funds are unlikely – fund from council budget for facilities. CVC GF &/or CCRT fund.
9.3	Pedestrian – Prawn Farm Upgrade beach access - east of Prawn Farm site. a. The pedestrian bridge over Lake Cakora east of the prawn farm be repaired and made safe by the prawn farm licensee. b. The beach access east of the pedestrian bridge be upgraded as part of any development of recreational facilities or assets on the	a. Subject to liaison between DoI – Lands and prawn farm licensee b. Subject to liaison & agreement between CVC and	a. Prawn Farm licensee, and DoI - Lands (as licence administrator) b. CVC in liaison with DoI - Lands	a) The pedestrian bridge is made safe for pedestrian use and b) The beach access east of the pedestrian bridge is upgraded when any facilities or assets are developed on	2017		$20,000 for design. $50,000 for materials if constructed with CVC labour			Medium	a. Prawn farm licensee b. Crown Lands/Public Reserve Management Fund

No.	Management Strategy - Action Details	Method of Implementation	Responsibility	Performance Criteria	Commencing	Indicative Costs			Annual Maintenance	Priority	Funding Options
						Yr 1 (2016-2017)	Yr 2-5 (2017-2020)	Yr 6-10 (2021-2026)			
	Crown land west of the pedestrian bridge.	DOI - Lands		the Crown land west of the bridge.							
9.4	Pedestrian – Ocean Road Reserve Maintain current access to reserve adjacent to northern bridge abutment.	Through this CZMP	CVC	Current level of pedestrian public access is maintained or improved.	2016	CVC Staff time	CVC Staff time	CVC Staff time		Medium	CVC GF Crown Lands funding
9.5	Pedestrian – South of Bridge Determine locations for provision of public beach access in northern foreshore reserve in conjunction with design and construction of extension of foreshore revetment.	Through this CZMP	CVC	New access locations determined.	2017		As part of extension of foreshore revetment.			Medium	In conjunction with extension of foreshore revetment.
9.6	Pedestrian – Yuraygir Coastal Walk Maintain track markers through the reserve.		CVC in conjunction with NPWS	Track clearly defined by markers.	2016		CVC and NPWS staff time			Medium	In conjunction with
9.7	4WD 4WD access to Brooms Head Beach to be managed in accordance with CVCs Beach Access and Vehicles on Beaches Policy.	As part of CVC vehicle & beach access policy & design/construction of revetment at bridge.	CVC	4WD public access is consistent with Councils adopted 4WD access policy.	2016	CVC Staff time				Medium	Grant funds are unlikely – fund from council budget for facilities. CVC GF &/or CCRT fund.
10	**Monitoring & Reviews**										
10.1	Monitor Revetments Pre and post storm season monitoring of revetments to provide better understanding of trends of revetment change, wall integrity and level of protection offered by revetments.	Council has undertaken surveys in the past. Additional CVC surveys & photos	CVC with support from OEH	Record of revetment stability gained over next 10 years to improve understanding of level of protection offered.	2016 combined with Beach Profile Monitoring.	Combined with Beach Profile Monitoring (see 10.2).	Combined with Beach Profile Monitoring (see 10.2).	Combined with Beach Profile Monitoring (see 10.2).	Combined with Beach Profile Monitoring (see 10.2).	High	Combined with Beach Profile Monitoring (see 10.2).
10.2	Beach Profile Monitoring Pre & post storm season beach profiling to enable storm demand volume to be better estimated. Monthly recording of sand levels at monitoring poles at both sides of Lake Cakora entrance. Pre-storm survey to occur at end of winter (Sep). Post-storm subject to events but no later than May.	Council undertook two surveys of beach in 2013 & installed monitoring poles on in 2014. Additional CVC surveys &/or NSW photogrammetric surveys.	CVC with support from OEH	Record of beach profiles gained over next 10 years to improve understanding of storm demand. At least one measurement per month at each beach pole.	2016 subject to agreement/ funding availability from OEH & Local Land Services (LLS)	$6.000 (based on $3,000/survey) CVC/Landcare time	$24,000 CVC/Landcare time	$30,000 CVC/Landcare time	$6,000/yr CVC/Landcare time	Medium	OEH part funding. CCRT, CVC staff time & Landcare Labour
10.3	Tidal Inundation Assessment of future tidal inundation to be incorporated into future revisions of the CZMP consistent with relevant NSW Government CZMP Guidelines at time of review.	Through revised CZMP and transition to CMP (see 10.5)	CVC		2021			See 10.5 CZMP review		Low	OEH coastal management grants part funding, CCRT and GF.
10.4	Establish a sub-Committee of CVCs Coast and Estuary Management Committee to supervise implementation of the CZMP following certification.	Through a sub-Committee of the CVC Coast and Estuary Management Committee	CVC	Sub-Committee established and CZMP implementation monitored.	2017	CVC Staff time	CVC Staff time	CVC Staff time	CVC Staff time	High	CVC Recurrent funds
10.5	Review of Coastal Zone Management Plan (CZMP) and transition to a Coastal Management Program (CMP) Review CZMP based on performance of management actions and transition to a CMP.	Through a scoping study and CMP	CVC		2021			$100,000 CVC staff time		Low, High in 2021	OEH coastal management grants part funding, CCRT and GF.
11	**Compliance Issues**										
11.1	Compliance issues Improve compliance/ enforce penalties for: • unauthorised vehicle access around Lake Cakora, • 4WDing contrary to CVC policy or driving over dune vegetation, • littering.	Cooperatively between CVC, NPWS and NSW police.	CVC & NPWS in liaison with Crown Lands	Positive compliance gains as determined through CVC Compliance Group monitoring.	ongoing	Enforcement staff time	Enforcement staff time	Enforcement staff time		Medium	NPWS to provide staff time.
11.2	Unauthorised groyne Remove unauthorised low rock groyne east of boat ramp.	Through this CZMP subject to liaison & permit from Crown Lands and DPI.	CVC in liaison with Crown Lands and DPI-Fisheries	Removal of rock groyne.	2018		CVC Staff time Council labour & plant. $1000 licence/permit fees			Low	CVC General funds
12	**Foreshore Facilities**										

No.	Management Strategy - Action Details	Method of Implementation	Responsibility	Performance Criteria	Commencing	Indicative Costs			Annual Maintenance	Priority	Funding Options
						Yr 1 (2016-2017)	Yr 2-5 (2017-2020)	Yr 6-10 (2021-2026)			
12.1	Relocation of Public Facilities - *Reserve Precinct only* Existing reserve facilities including; • Amenities, • caravan park office, and • public building residence are relocated landward at the end of their serviceable life or when substantially modified, or made to be compatible with the coastal risk.	Through CVC asset management program.	CVC	Facilities are relocated/modified prior to damage due to coastal hazards. New facilities constructed within the reserve are outside coastal hazard zone or as far landward as practical or compatible with coastal risk.	As assets become at risk or reach the end of their serviceable life or are substantially modified. Refer to CVC Asset Management Plan (AMP).	Not costed	Cost expected to occur over this period & beyond. Refer to CVC Asset Management Plan	Cost expected to occur over this period & beyond.		Low	Grant funds are unlikely – fund from CCRT/council budget for facilities.
12.2	Foreshore Facilities Maintain, replace & improve foreshore facilities such as boat ramp, fish cleaning tables, & picnic & recreation facilities consistent with community adopted CVC Asset Management Plan (AMP).	Through relevant CVC asset management plan.	CVC	Facilities are maintained, replaced & improved in compliance with adopted AMP.	Ongoing maintenance as per AMP. Replace/upgrade assets as they reach the end of their serviceable life or need for additional facilities is identified.	Not costed	Cost expected to occur over this period & beyond. Refer to CVC Asset Management Plan (AMP)	Cost expected to occur over this period & beyond.		Low	Grant funds are unlikely – CVC General funds &/or CCRT fund.
12.3	Brooms Head Coastal Foreshore Reserve New buildings constructed within the Reserve to be located outside coastal hazard zone or as far landward as practical or compatible with the coastal risk.	Through this CZMP	CVC	New facilities constructed within the reserve are outside coastal hazard zone or as far landward as practical or compatible with coastal risk.		Not Costed	Cost expected to occur over this period & beyond.	Cost expected to occur over this period & beyond.		Low	Grant funds are unlikely – CVC General funds &/or CCRT fund.
13	**Beach Amenity**										
13.1	Beach Amenity - Debris Periodically remove debris (kelp & other) from beach and lagoon area to reduce odour, impact on beach amenity and maintain public safety.	Through this CZMP subject to liaison with Crown Lands and DPI-Fisheries.	CVC	Brooms Head Main Beach remains relatively debris free with no odour complaints due to rotting kelp. No public safety incidents reported.	2016	CVC Staff time Council labour & plant $1000 for licence/permit fees	CVC Staff time Council labour & plant	CVC Staff time Council labour & plant		Low	CVC General funds
13.2	Beach Amenity –Minor Sand Nourishment Excess sand extracted from nearby marine or terrestrial environments from dredging or other public infrastructure projects should be deposited onto Brooms Head Beach adjacent to the lagoon at the southern end of the beach where sand is compatible.	Opportunistic, subject to other sand extraction works occurring.	CVC in conjunction with other stakeholders undertaking sand extraction.	NA	Opportunistic, subject to other sand extraction works occurring.		Opportunistic, subject to other sand extraction works occurring.			Low	Opportunistic, subject to other sand extraction works occurring.

*Averaged annual maintenance costs for revetments is based on 0.7% of the capital cost for construction of a new revetment.

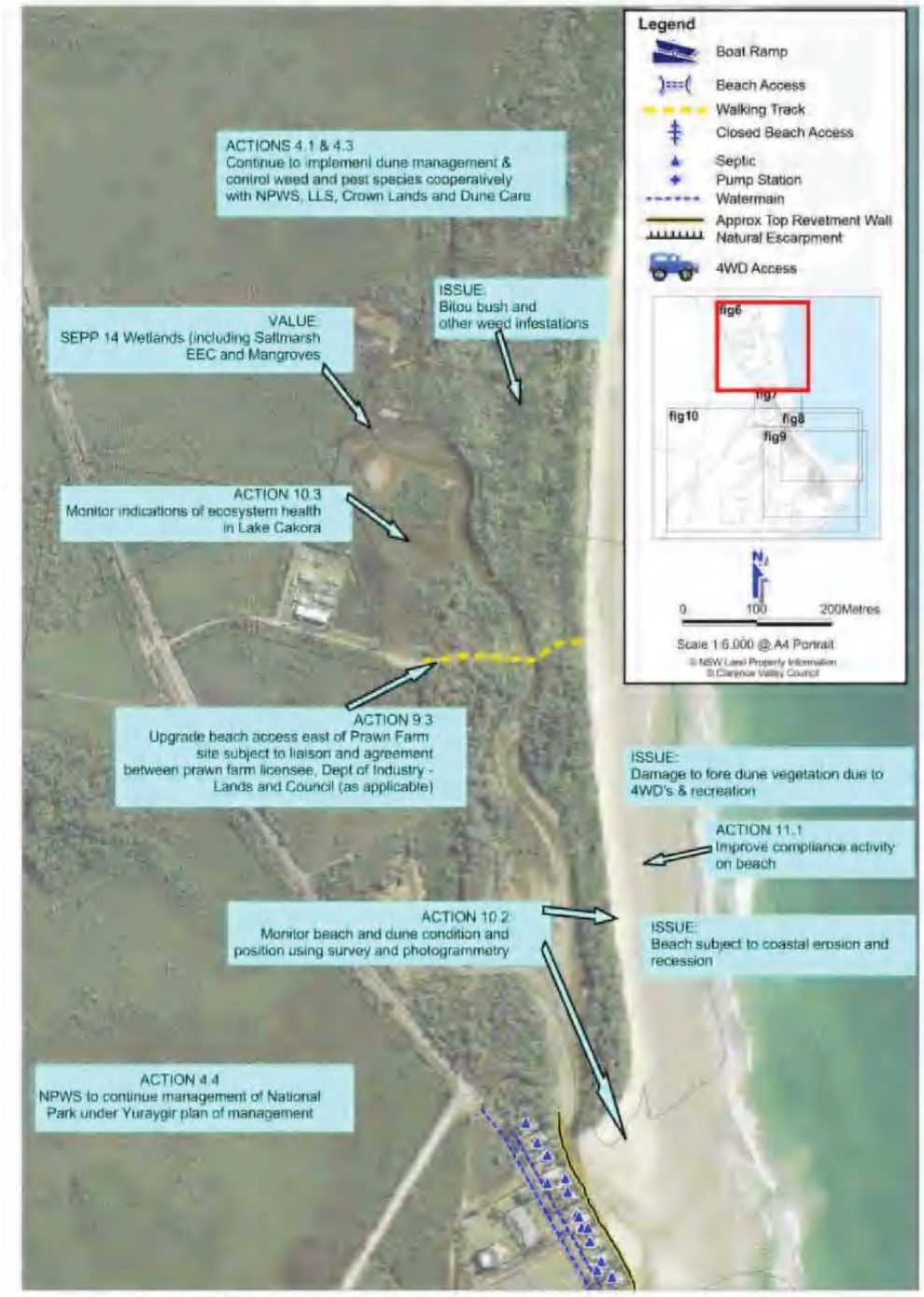

Figure 6 Issues and management actions for the Northern Beach Precinct and Lake Cakora (north)

Figure 7 Issues and management actions for the Lake Entrance Precinct

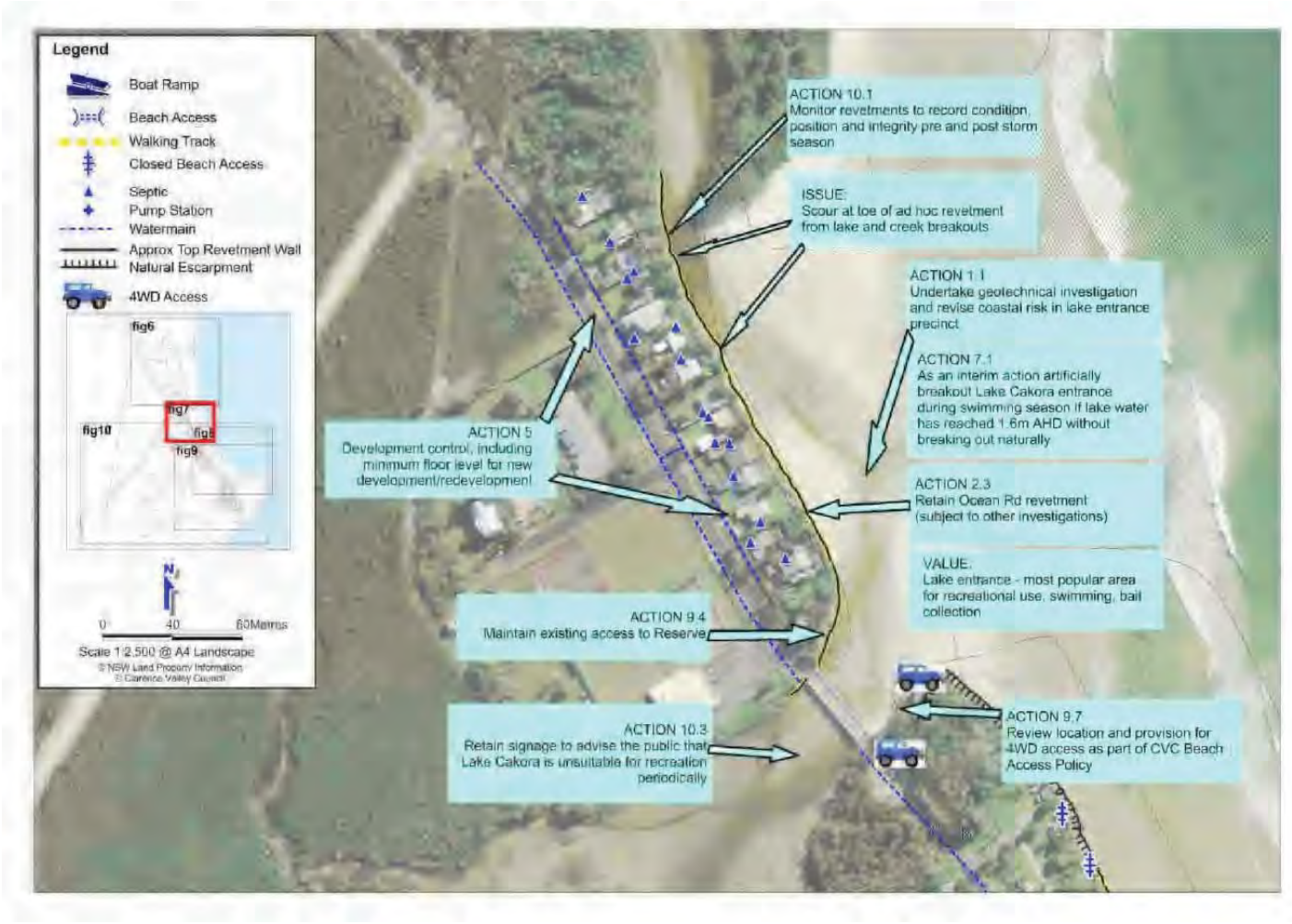

Figure 8 Issues and management actions for the Foreshore Reserve (North) Precinct

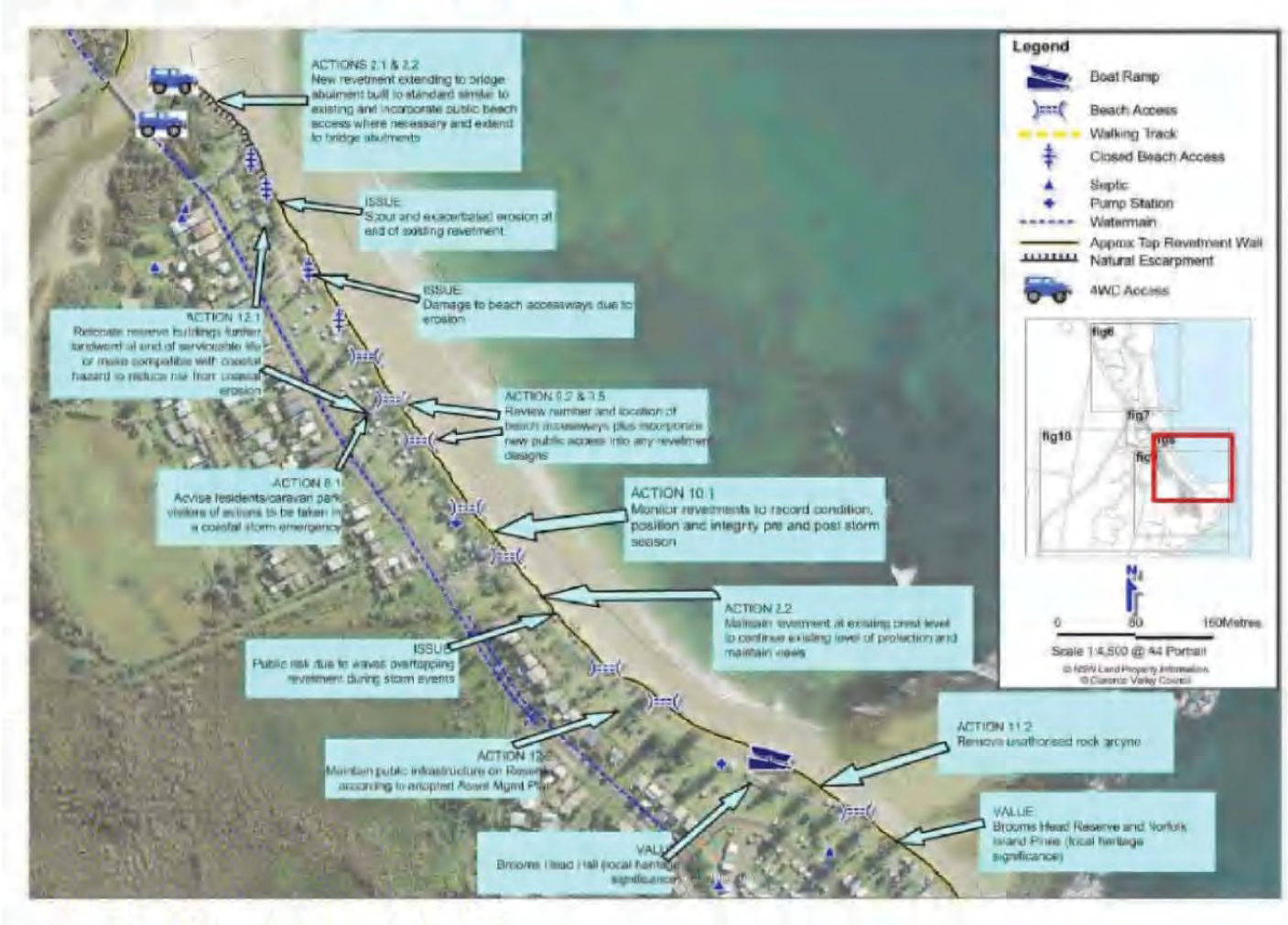

Figure 9 Issues and management actions for the Foreshore Reserve (South) and Cakora Point

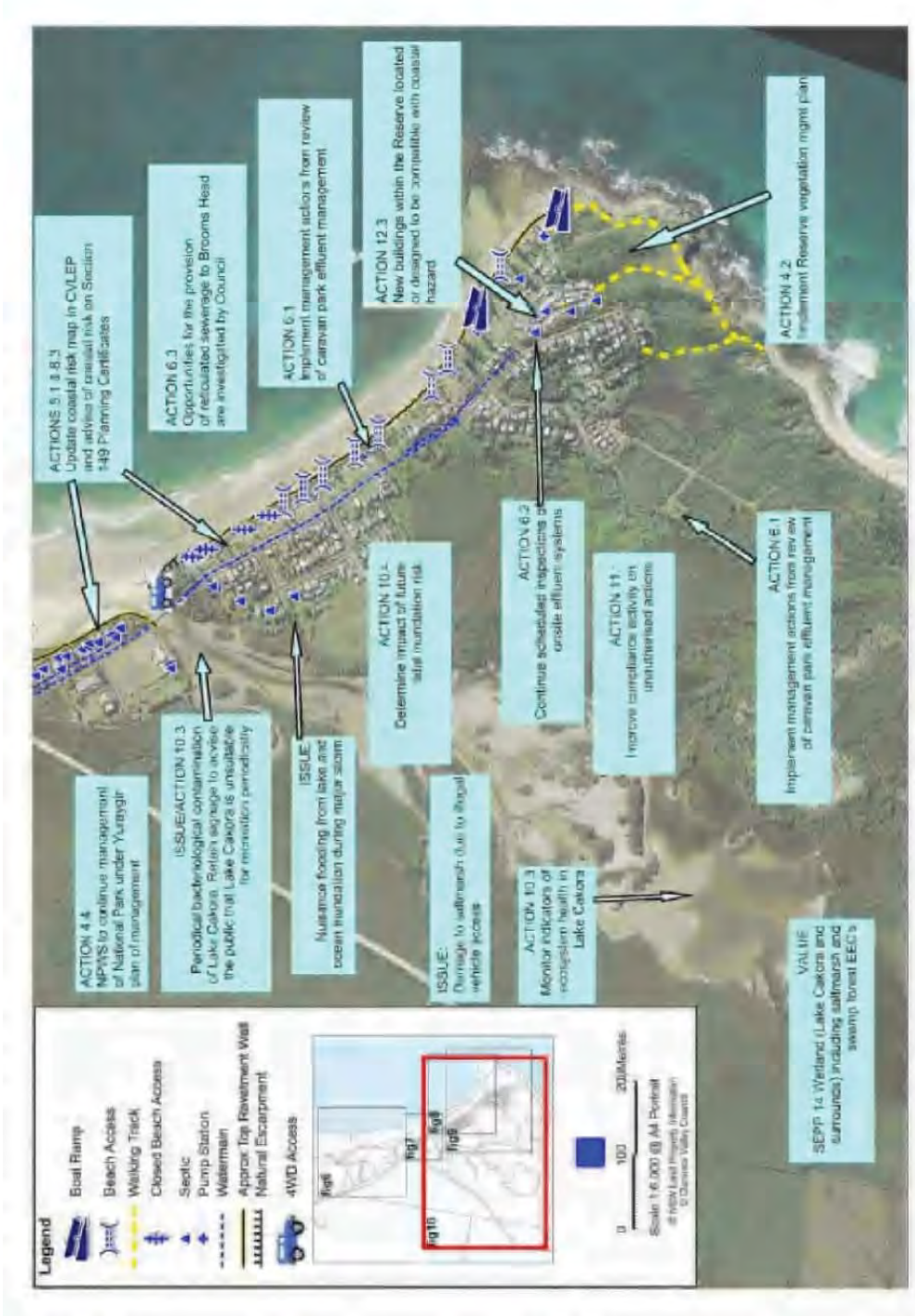

Figure 10 Issues and management actions for Lake Cakora (south)

9 CZMP FUNDING, MONITORING AND REVIEW

9.1 Funding

Implementation of CZMP actions is eligible for funding via the Coastal or Estuary Management Program on a 50/50 basis between Council and NSW State Government. As noted in the program Guidelines, the priority for public expenditure is public benefit. Funding under these NSW Government Programs typically does not cover Councils administrative or staffing costs.

Under the *Local Government Act 1993*, *Coastal Protection Works* may be constructed by, or on behalf of, landowners or by landowners jointly with a council or public authority. The *Local Government Act 1993* also provides for *Coastal Protection Services* to maintain and repair coastal protection works, and to manage the impacts of such works. Section 496B provides for the making and levying of annual charges for coastal protection services for properties that benefit from coastal protection works. This means that landowners which would benefit from the works or services can be charged an additional levy by Council. Under the *Coastal Protection Service Charge Guideline* (DECCW 2010), maintenance costs can be apportioned. There is no intention to utilise these funding provisions for any work under this CZMP.

Resources for implementation of some actions included in the CZMP include various State Government environmental programs and volunteer groups such as the local Landcare group.

Clarence Valley Council will make contributions towards resourcing implementation of certain actions through staff time and expertise (recurrent funding) as well as capital contributions (non-recurrent funding). Funds may be sourced from the Council's General Fund, Water and Sewerage Fund (specifically for any water and sewerage infrastructure-related actions) or the Clarence Coast Reserve Trust (CCRT) fund. The CCRT is the Reserve Trust established to manage several Crown reserves, including the Brooms Head Foreshore Reserve (Reserve 65975), within the Clarence Valley Local Government Area. Further, the Minister for Lands has appointed Clarence Valley Council as the corporate manager of the CCRT. Management of CCRT Reserves is funded through income derived from leases, licences and caravan parks located on Reserves within the CCRT. Hence, some of the actions contained in this Draft Plan that relate directly to management of the Brooms Head Foreshore Reserve may be funded from CCRT monies.

9.2 Further Investigations

The following investigations could be undertaken in the future to improve the understanding of coastal processes and hazards affecting Brooms Head.

- Analysis of directional wave data from Coffs Harbour once an extended period of record is available (until very recently, it was non-directional) to better appreciate the influence of wave energy direction on the erosion/ recession of the beach. This will become increasingly important in adaptive management of the beach if the angle of approach of the dominant wave climate changes due to climate change.
- Wave transformation modelling based on a detailed bathymetric survey of the nearshore area to capture the extent of the headland and reef system accurately (offshore survey work was completed by OEH in 2013).

- Ongoing aerial photography and subsequent photogrammetry profiling and analysis of the entire beach compartment (photogrammetric data was only available for the southern half of the embayment for this study)
- Tidal inundation impacts, especially within Lake Cakora, and changes to the Lake Cakora entrance berm, associated with any future sea level rise (refer to Action 10.4).

9.3 CZMP Review

The Brooms Head Main Beach Emergency Action Sub-Plan is to be reviewed following adoption of the management actions.

The CZMP is to be reviewed periodically following the completion of various actions; and as more data on coastal processes and climate change becomes available; and in response to changes in Government policy. This would include:

- Review of long term risks associated with coastal hazards as more data becomes available e.g: updates on climate change induced sea level rise.
- Based on the above, review of the hazard lines shown in Appendix A.
- The hazard lines should also be reviewed subsequent to geotechnical investigation and conditions assessment of revetments.

An initial review in 2020 is suggested to consider the progress of key actions identified in the CZMP and subsequent reviews (if not triggered by factors as outlined above) no later than 10 years to ensure the plan remains current.

Any major amendments to the CZMP would be publicly exhibited for community comment and progress on the implementation of the CZMP would be included in Council's Annual Corporate Report.

10 REFERENCES

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APPENDIX A HAZARD MAPS

[NOTE: The report contained in this Appendix was prepared prior to the final CZMP and hence, the date on the report and the date on page footers represent the date of the report and not the date of the final CZMP]

APPENDIX A – HAZARD MAPS AND INUNDATION LINES

Appendix A1 – Hazard Lines (Rock Revetments Erodible)

Appendix A2 – Hazard Lines (Foreshore Reserve Revetment Maintained)

Appendix A3 – Zone of Reduced Foundation Capacity

Appendix A4 – Coastal Inundation due to Design Still Water Levels

Appendix A5 - Coastal Inundation due to Wave Runup Levels and Wave Overtopping

Appendix A1 – Hazard Lines (Rock Revetments Erodible)

Appendix A2 – Hazard Lines (Foreshore Reserve Revetment Maintained)

Appendix A3 – Zone of Reduced Foundation Capacity

Appendix A4 — Coastal Inundation due to Design Still Water Levels

Appendix A5 - Inundation due to Wave Runup Levels and Wave Overtopping

APPENDIX B FLOOD MAPS

[NOTE: The report contained in this Appendix was prepared prior to the final CZMP and hence, the date on the report and the date on page footers represent the date of the report and not the date of the final CZMP]

APPENDIX B FLOOD EXTENTS

Note: red box shows urban area immediately south of the bridge.

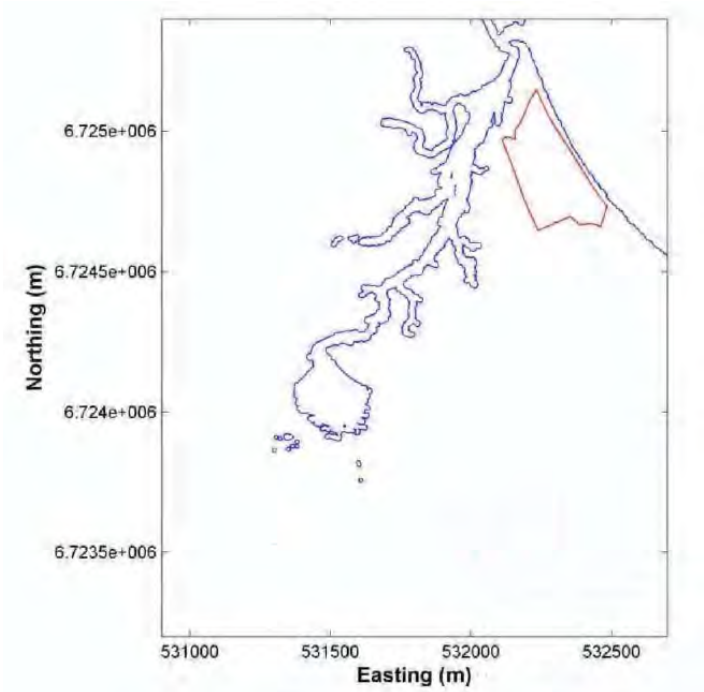

Figure B.1 Flood extent for 1 m water level.

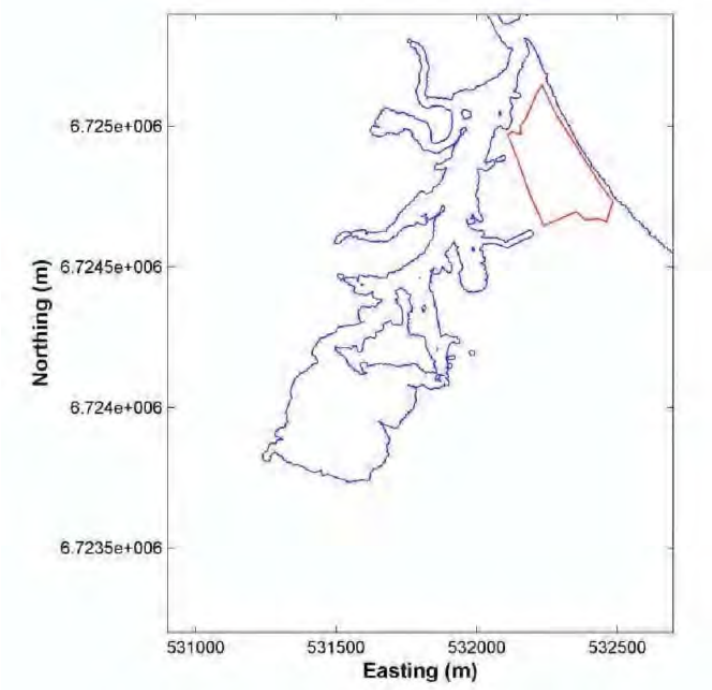

Figure B.2 Flood extent for 1.25 m water level.

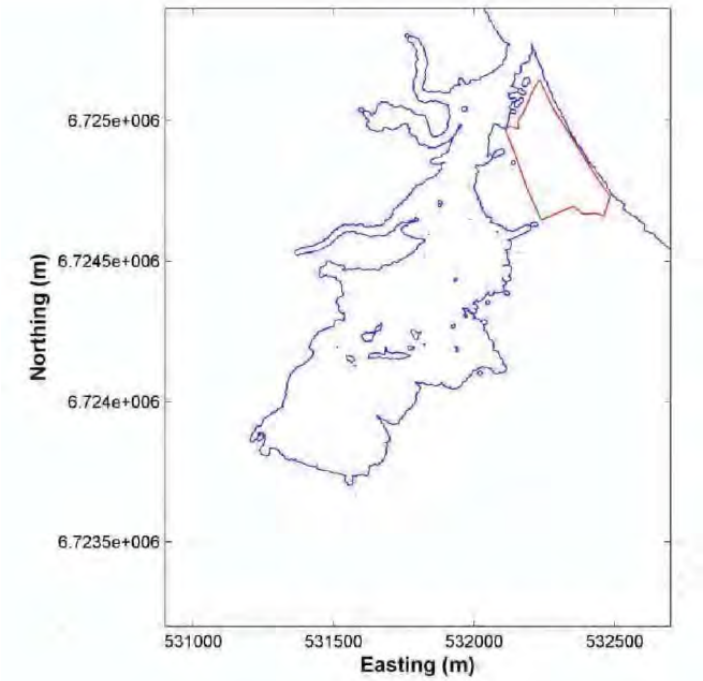

Figure B.3 Flood extent for 1.5m water level.

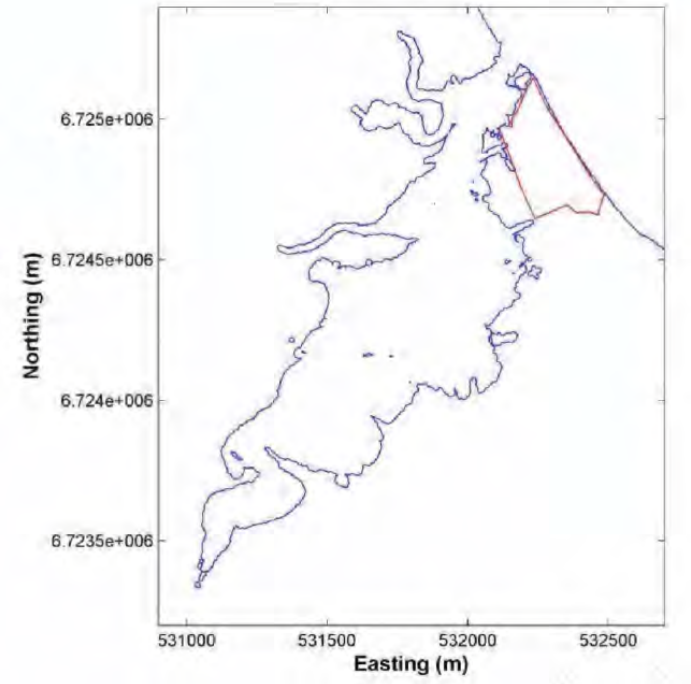

Figure B.4 Flood extent for 1.75m water level.

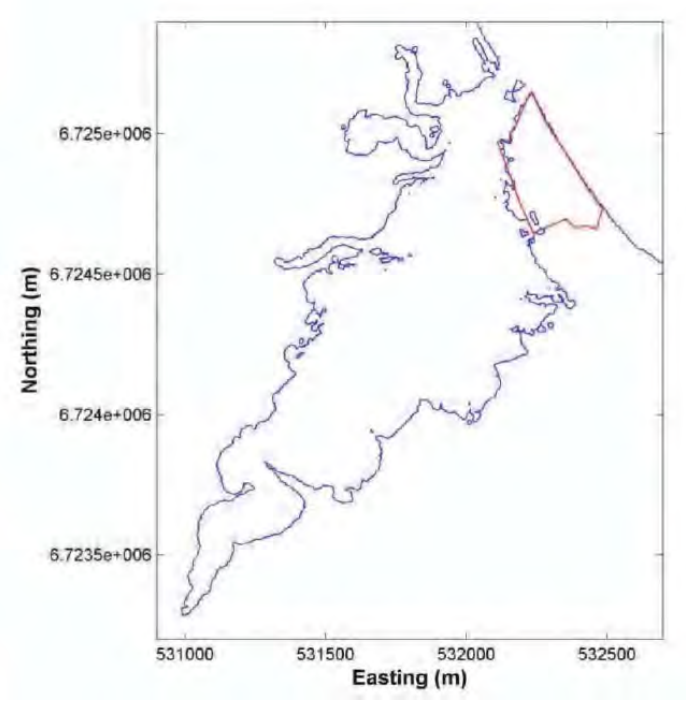

Figure B.5 Flood extent for 2.0m water level.

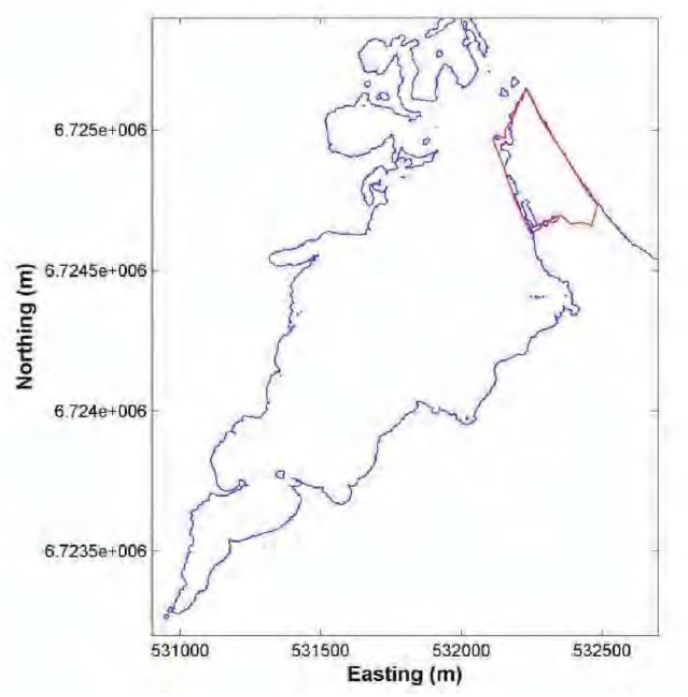

Figure B.6 Flood extent for 2.25m water level.

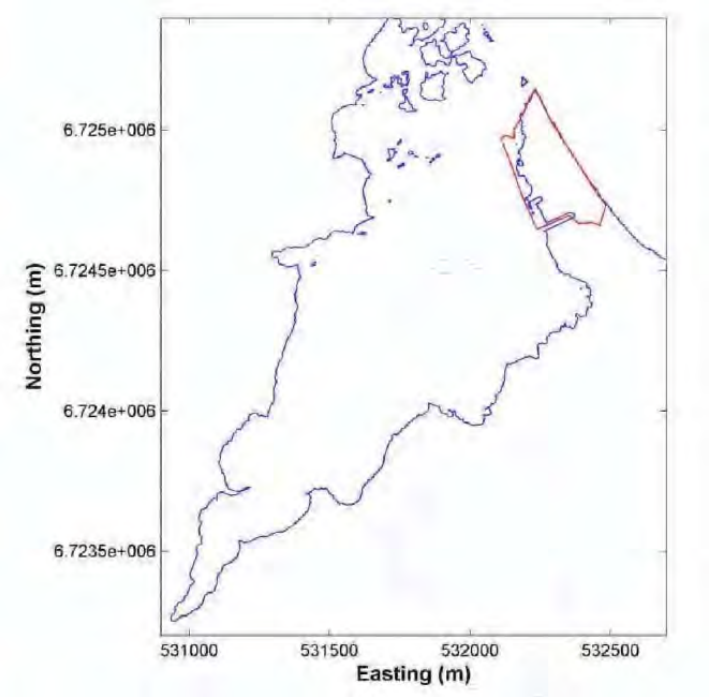

Figure B.7 Flood extent for 2.5m water level.

APPENDIX C EMERGENCY ACTION SUB PLAN

[NOTE: The report contained in this Appendix was prepared prior to the final CZMP and hence, the date on the report and the date on page footers represent the date of the report and not the date of the final CZMP]

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BROOMS HEAD MAIN BEACH
Emergency Action Sub Plan

A Sub Plan of the Brooms Head Beach and Lake Cakora Coastal Zone Management Plan

FINAL DRAFT JULY 2015

To be reviewed no later than July 2020

AUTHORISATION

This Brooms Head Beach Emergency Action Sub Plan is a sub plan of the Brooms Head Beach and Lake Cakora Coastal Zone Management Plan. It has been prepared in accordance with the NSW Governments Coastal zone management guide note – Emergency action subplans (OEH, 2011). This Sub Plan has been endorsed by Clarence Valley Council. This 'Final Draft' version is to be referred to the NSW Office of Environment and Heritage/Minister for the Environment for certification or endorsement as part of the Brooms Head Beach and Lake Cakora Coastal Zone Management Plan under the provisions of the *Coastal Protection Act 1979*.

Council endorsement _____

(Mr Scott Greensill)

General Manager

Clarence Valley Council

Dated:

NSW Office of Environment & Heritage endorsement _____

(??)

Director

Office of Environment & Heritage

Dated:

DISCLAIMER

This report has been prepared by and for the exclusive use of Clarence Valley Council. Clarence Valley Council accepts no liability or responsibility whatsoever for it in respect of any use of or reliance upon this report by any third party.

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Certification

This Sub Plan was certified, under the *Coastal Protection Act 1979*, by the NSW Minister for the Environment on _____.

Cover Photo

Waves overtopping rock revetment wall at southern end of Brooms Head Reserve on 25 December 2011 *(Taken by Mark Cameron, Woolgoolga)*

VERSION HISTORY

The following table lists all previously endorsed versions of the Sub Plan.

Plan	Endorsed	Endorsed By/Date
Brooms Head Beach Emergency Action Subplan (April 2012)	July 2012	Clarence Valley Council only At the 17 July 2012 Council meeting (Council resolution 12.102/12)
Brooms Head Beach Emergency Action Sub Plan (March 2015)	June 2015	Clarence Valley Council only At the 23 June 2015 Council meeting (Council resolution 07.012/15)
Brooms Head Beach Emergency Action Sub Plan (July 2015)		

AMENDMENT LIST

Proposals for amendment to this Sub Plan are to be forwarded to:

General Manager

Clarence Valley Council

Locked Bag 23

GRAFTON NSW 2460.

Amendments promulgated are to be certified below when entered:

Amendment Number	Description	Updated by	Endorsed Date

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DISTRIBUTION

THIS SUB PLAN IS PRIMARILY UTILISED INTERNALLY BY CLARENCE VALLEY COUNCIL AND HENCE, THE SUB PLAN WILL BE AVAILABLE IN ELECTRONIC FORMAT TO THIRD PARTIES EITHER VIA THE CLARENCE VALLEY LOCAL EMERGENCY MANAGEMENT COMMITTEE OR VIA COUNCIL'S WEBSITE, WWW.CLARENCE.NSW.GOV.AU.

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1. INTRODUCTION

Adverse weather systems can produce storms that generate strong winds, large waves and elevated ocean water levels along the NSW coastline. These conditions are generally short lived but can result in extensive erosion along sandy beaches, and seawater inundation where waves can overtop coastal dunes or sea defence barriers.

Extreme beach erosion or seawater inundation (or overtopping) can directly threaten assets and infrastructure on or adjacent to an active beach.
Erosion can occur either through erosion of the dunal system as a result of undermining, or indirectly because the foundation capacity of the remaining dune adjacent to the eroded area has been reduced. Erosion can also lower the beach berm (a nearly horizontal plateau on the beach face or backshore, formed by the deposition of beach material by wave action, or by means of a mechanical plant as part of a beach recharge scheme), often resulting in a tall, unstable, near-vertical back-beach erosion escarpment. Damaged berms can also present hazards for beach users.

Even without severe coastal storms, an erosion escarpment can erode and migrate landward or oceanic inundation can occur. Relatively minor wave action coinciding with high spring tides can induce erosion and undercut an erosion escarpment or promote waves to overtop the shoreline (oceanic inundation).

A council's long-term strategy for managing these threatening processes should be documented in a coastal zone management plan (CZMP). An emergency action subplan (EASP) forms an integral component of a CZMP. It outlines a council's intended response to a coastal erosion emergency and in certain locations explains ways in which, and where, beachfront property owners can place temporary coastal protection works (TCPW) according to the *Coastal Protection Act 1979* (CPA). *(OEH, July 2011)*

1.1 Context and associated Plans and Guidelines

This Emergency Action Sub Plan (EASP) has been prepared in accordance with provisions of the *Coastal Protection Act 1979* and is intended to supplement implementation of the Brooms Head Beach and Lake Cakora CZMP. This EASP for Brooms Head Main Beach should be read in conjunction with the following associated plans and guidelines:

- *NSW State Storm Plan (SES, 2013) – A sub plan of the State Emergency* Management Plan (2012) prepared under the *State Emergency Service Act 1989 (NSW)* and authorised in accordance with the *State Emergency and Rescue Management Act 1989* (NSW).
- *NSW State Flood Sub Plan (SES, 2015) – A* sub plan of the State Emergency Management Plan (2012) prepared under the *State Emergency Service Act 1989 (NSW)* and authorised in accordance with the *State Emergency and Rescue Management Act 1989* (NSW).

- *Clarence Valley Local Disaster Plan (DISPLAN) for the Clarence Valley Council Local Government Area* (CVC, 2014)
- *Clarence Valley Local Flood Plan (June 2012)* – A Sub-Plan of the Clarence Valley Local Disaster Plan (DISPLAN)
- *Coastal zone management guide note – Emergency action subplans (OEH, July 2011)*
- *Guide to the Statutory Requirements for Emergency Coastal Protection Works* (OEH, 2013b)
- *Code of Practice under the Coastal Protection Act 1979* (OEH, 2013).

Arrangements detailed in the EASP will be undertaken by Clarence Valley Council based on the assumption that the resources upon which the EASP relies are available when required. This EASP does not prevent additional action/s being undertaken by other authorities, or combat agencies, such as the NSW State Emergency Service, in accordance with relevant Emergency Management Plans and/or DISPLANs.

Some information in this EASP has been obtained from the Brooms Head Beach Coastal Processes and Hazards Study (SMEC, 2013) in association with the preparation of the draft Coastal Zone Management Plan for Brooms Head Beach (including headland) and Lake Cakora.

This EASP should be reviewed periodically in conjunction with revisions of the State Storm Plan, the State Flood Sub Plan, Council's DISPLAN, Clarence Valley Local Flood Plan, a future CZMP and following a coastal erosion emergency event as defined in Section 1.2, or within five (5) years of the date of endorsement if any of these circumstances do not arise.

1.2 Purpose of Emergency Action Sub Plan

The objective of this EASP is to document the actions that Clarence Valley Council and/or landowners will or can undertake in response to a coastal erosion emergency situation at Brooms Head Main Beach. This includes actions performed by Council/landowners whether associated with action under any plan made under the *State Emergency and Rescue Management Act 1989* (SERMA) or not. However, in accordance with section 55C(2)(a) this EASP will not include matters dealt with in any plan made under the SERMA in relation to emergency responses by Council/landowners.

To achieve this objective action is required in emergency planning/preparedness, response and recovery phases of an emergency. The primary focus of Council will be

to prevent harm to, or loss of human life. Secondly, Council will seek to ensure public assets, such as formal beach access, roads and/or infrastructure are managed in a safe manner. Private property management has a lesser priority and in this regard Council will facilitate authorised and lawful actions by landowners once Council's priority obligations are fulfilled. This is consistent with standard emergency management procedure.

This EASP will document emergency management arrangements of the coastal hotspot at Brooms Head Beach, being the beach from the Cakora Lagoon entrance at the Ocean Road bridge for at least 400m north of the bridge, plus the length of Beach and headland from the southern side of Brooms Head Reserve (being Lot 2 DP 1095139, Reserve No 65975) to the north side of Crown Reserve 1010649 (being Lot 7302 DP 1140380) (see Figure 1).

Figure 1 – Area covered by this EASP and length of beach covered by the Brooms Head coastal erosion 'hotspot'.

A *"coastal erosion emergency"* is classified (for the purposes of this EASP) as an oceanic event that could result in lowering of beaches, high unstable erosion escarpments and/ or direct threats to public and private assets from undermining or wave action and includes seawater inundation or overtopping of the foreshore. A coastal erosion emergency could occur due to a combination of elevated ocean water levels and waves that are not generated by a severe weather event that would otherwise trigger actions under the State Storm Plan or State Flood Sub Plan.

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1.3 Assets potentially affected by Beach Erosion

Brooms Head Beach was subject to peak 'storminess' in 1967, 1988 and 1996 *(Water Research Laboratory, 2001)*. SMEC (2013) identifies a range of oceanic storm events, which are likely to have affected Brooms Head, recorded at wave rider buoys at Byron Bay and Coffs Harbour. More recent erosion events since mid-2011 have lowered the beach profile resulting in periodic exposure of bedrock, old tree stumps and clay sedimentary strata. Generally these underlying features are covered by beach sand material that has deposited on the beach. The rock revetment wall along the foreshore reserve was reconstructed between 2010 and late-2012. In addition, a short section of rock revetment was added towards the north end of the reserve in October-November 2012 The 'unprotected' section of Brooms Head Reserve north of the rock revetment wall has been eroded from time to time and a vertical escarpment up to 2 metres high exists from time to time. Recession of the unprotected dune occurs due to a combination of wave-induced erosion and subsequent slumping events. The CZMP proposes action to extend the rock revetment north to the Lake Cakora/Ocean Road bridge in order to mitigate erosion and impact on the reserve and foreshore vegetation.

A review of coastline hazard for Brooms Head Beach (SMEC, 2013) has identified that 14 privately-owned lots on the eastern side of Ocean Road are located in the 2012, or immediate, hazard zone for a design storm (assuming the existing revetment wall fails). Eleven (11) of these lots contain a dwelling that is also within the 2012 or immediate hazard zone. In addition, a caravan park/camping ground is located partly within the 2012 or immediate hazard zone on a CVC-managed Crown Reserve. The Caravan Park Office/manager's residence is also located in the immediate hazard zone. Details of these properties are shown in Schedule 1.

There is deemed to be no zone of reduced foundation capacity (ZRFC) for these lands containing dwellings in the 2012 hazard zone due to the presence of a rock revetment wall seaward of those lands according to advice from SMEC.

Oceanic storm events would also affect foreshore lands along the beach and frontage to Lake Cakora due to wave overtopping and coastal inundation in a design storm event. Council does not have complete rock revetment crest levels or floor level data (in AHD) of dwellings in these areas.

Management of the impacts of coastal erosion at Brooms Head is further complicated as the village is not serviced by reticulated sewerage. On-site effluent management systems are located on each property containing residential dwellings and other development, eg caravan park and the Bowling Club. Most of these systems and associated disposal areas (as applicable) are located on the Ocean Road side of dwellings within the 'hotspot'. Erosion that enters private lands or other lands containing effluent systems may adversely impact such systems, especially where systems are located on the ocean side of dwellings, with potential implications for occupants as well as public and environmental health.

Council infrastructure may also be at risk in some locations. In the short term this is expected to be confined to pedestrian and 4WD beach access ways, as well as roads within the Reserve. Landward recession of the foreshore would affect road/bridge assets, Brooms Head Hall, reserve improvements and amenities, infrastructure and services, in the longer term.

Access to/from Brooms Head can be restricted due to periodic flash flooding at Tailem Flat in the catchment west of the coastal range isolating Brooms Head for up to a few hours at a time (pers comm., Bob Moyle, Brooms Head resident and CVC employee, 2 April 2012). In addition, at the peak of a 1-in-100-year flood of the Clarence River it is also probable that road access to/from Brooms Head would be restricted at several locations at Townsend. These potential road closures limit the potential for emergency response on occasions.

1.4 NSW Emergency Management Plans

1.4.1 NSW State Storm Plan

The NSW State Storm Plan documents emergency action with regard to storms, including coastal erosion.

1.4.2 NSW Flood Sub Plan

The NSW State Flood Sub Plan documents emergency action with regard to flooding, including oceanic or seawater inundation.

1.5 Clarence Valley Local Flood Plan

The 2012 *Clarence Valley Local Flood Plan* [sub-plan of the *Clarence Valley Local Disaster Plan (DISPLAN)*], being a Plan prepared under the SERMA, guides emergency activities in the event of flood (including coastal or oceanic inundation) and/ or coastal erosion.

SES advise that NSW SES Local Flood Emergency Sub Plans are always active; however SES response operations for storms including coastal erosion will begin on receipt of an Australian Government Bureau of Meteorology weather warning. This may be indicated by:

- Severe Weather Warning for hail, flash flooding, damaging surf; or
- Tropical Cyclone Watch or Warning [clause 6.1.3(a), page 32, NSW State Storm Emergency Sub Plan (September, 2013)].

Alternatively, NSW SES response operations may begin following impact of a storm not covered by a formal warning [clause 6.1.3(b), page 32, NSW State Storm Emergency Sub Plan (September, 2013)].

Emergency assistance in flooding and storm events is available to residents by phoning the State Emergency Service (SES) on 132 500. Details of road closures are also

available at www.myroadinfo.com.au. The Brooms Head Shop is an appropriate point of contact for residents in the event that power and phones are disconnected.

The Clarence Valley Local Disaster Plan (DISPLAN) lists the Brooms Head Bowling Club as an evacuation centre (as identified by the Clarence Valley Local Emergency Management Committee).

1.6 Code of Practice for Temporary Coastal Protection Works

A Code of Practice (OEH, 2013), under the *CPA 1979*, and a Guide to Statutory Requirements for TCPW (OEH, 2013b) details the requirements for 'temporary coastal protection works' placed by landowners at prescribed locations and where certain physical and weather conditions exist. Brooms Head Beach is NOT a prescribed location for the placing of TCPW and hence, landowners cannot place TCPW in accordance with these OEH publications.

Any private landowner that proposes to construct or place coastal protection works on or adjacent to the beach at Brooms Head would need to lodge a development application and obtain development consent under the provisions of the *Environmental Planning and Assessment Act 1979* and Clarence Valley Local Environmental Plan 2011.

2. Emergency Action Sub plan

For each phase of emergency management the triggers for response and emergency actions in the EASP are outlined in **Table 1**. Table 1 also lists actions to be taken by Council prior to the triggers being met. It is envisaged that the SES would be involved if a significant number of dwellings or persons at Brooms Head were threatened. Any arrangements for evacuation would need to be coordinated by the SES. A diagrammatic representation of the actions in Table 1 is shown in Appendix 1.

Table 1. Brooms Head Main Beach Emergency Action Sub Plan

NOTE: Actions are separated into Pre-Planning, Pre-Storm, Storm and Post-Storm phase stages to assist Council's management of coastal erosion emergency event management. Whilst actions are listed in an order it is not necessary that each action is taken after another (especially in the same phase or stage) and different actions will often need to be implemented concurrently by the relevant designated officer/s or their delegate/s.

Category	Trigger	Responsible Council Officer	Action /Reporting
Pre-Planning	Pre-planning for possible storm event should be undertaken as soon as possible	CVC WHS Officer	BHPLAN 1. Coordinate preparation of WHS procedures (including risk assessment and Safe Work Method Statement) with relevant CVC Managers and WHS Officer for dealing with storm debris (including materials containing asbestos) and access to the beach for any post-storm activities, eg clean up and repair of beach accesses. Training for personnel involved in such works to be provided (as relevant).
		CVC Environmental Planning Coordinator (as delegate of the CVC Director – Environment, Planning and Community)	BHPLAN 2. Compile phone numbers of relevant contacts in case of a storm event (e.g. internal Council contacts, OEH, SES, NSW Police, coastal/geotechnical engineer (not CVC-employee), other relevant stakeholders – Brooms Head Caravan Park managers, Brooms Head Store, Brooms Head Bowling & Recreation Club and owners of land (containing a dwelling/s) within the immediate hazard zone) similar to shown in Section 3. The completed contact list (including owner/s name and phone numbers) shall be attached as a Schedule to the final Plan (for CVC use only and will not be provided on publicly available versions of this EASP). *(NOTE: Schedules attached to this EASP are not part of the formal EASP and can be modified according to operational needs without the need to formal amendment of the EASP under the Coastal Protection Act 1979 and associated procedures).*
		CVC Environmental Planning Coordinator	BHPLAN 3. Make landowners of land (containing a dwelling) within the immediate hazard zone and Caravan Park manager aware of the Brooms Head coastal hazard lines for 2012 (immediate hazard) and where their properties/dwellings are positioned in relation to these, eg advise owners of properties affected by the immediate hazard line that their dwellings

Category	Trigger	Responsible Council Officer	Action /Reporting
			and/or outbuildings would be at risk of damage or destruction in a severe storm event, and advise residents and non-resident owners of actions that could be taken in advance to reduce losses (e.g. make arrangements to move valuables, secure outdoor furniture, etc, monitor ocean and property conditions, weather warnings and follow advice of CVC and/or SES).
		CVC Environmental Planning Coordinator	BHPLAN 4. Review and update list of landowners in immediate hazard zone (IHZ) and ZRFC (as applicable) in Schedule 1 on an annual basis. *(NOTE: Schedules attached to this EASP are not part of the formal EASP and can be modified according to operational needs without the need to formal amendment of the EASP under the Coastal Protection Act 1979 and associated procedures).*
		CVC Environmental Planning Coordinator	BHPLAN 5. Issue updated advises to landowners of properties affected by IHZ or ZRFC (as above) where ownership or circumstances have changed or at least once every 5 years. When applicable suggest that landowner/s seek independent geotechnical engineering advice in relation to the potential impact on any structure from changing geotechnical conditions, and review status of any development consent containing triggers for relocation or removal of assets.
		CVC Environmental Planning Coordinator	BHPLAN 6. Prior to any extension to the rock revetment at the northern end of the Brooms Head Coastal Reserve that the position of the unprotected dune be monitored periodically and following erosion events to determine whether safe to continue occupy or use camp sites and beach access/s.
		CVC Environmental Planning Coordinator	BHPLAN 7. Require details of house ground floor levels and effluent disposal areas for any new dwellings or redevelopment on land on east side of Ocean Rd (including caravan park managers residence), Bowling Club, and land to west/north side of Honeysuckle St) in association with relevant development consent notices, and record this information with existing CVC survey plans.

Category	Trigger	Responsible Council Officer	Action /Reporting
		CVC Environmental Planning Coordinator	BHPLAN 8. Develop media advice pro-forma/s for different phases of emergency management under this EASP consistent with Part 4 Preparation of the Clarence Valley Local DISPLAN. CVCs Environmental Planning Coordinator(and an alternate) shall be the preferred contact for all enquiries from landowners and emergency agencies during and following a Council-managed coastal erosion emergency event. Contact details (email, direct phone number and mobile number) shall be provided to relevant persons/agencies/media on all media communications. The aim is to ensure consistent messages and continuity of contact to reduce stress for persons involved in such events.
		CVC Environmental Planning Coordinator	BHPLAN 9. Advise SES of CVC Coast and Estuary Committee meeting agendas and request Council to consider adding SES to the membership of this Committee for its 2016-2020 term.
		CVC Environmental Planning Coordinator	BHPLAN 10. Liaise with SES to prepare and distribute a local Coastal Erosion Guide (based on the SES Coastal Erosion Guide) to the local community.
		Manager Open Spaces & Facilities	BHPLAN 11. Ensure rigid barriers, beach closed signs () and road closed signs () are stored at the Townsend CVC depot premises sufficient to enable effective closure of all Council-managed pedestrian (13 of), reserve road access (2 of) and 4WD (2 of) beach access points to/from Brooms Head Main Beach and Back Beach.

Category	Trigger	Responsible Council Officer	Action /Reporting
Pre-storm Phase	Significant offshore wave height is in the range of 3m to 5m and tides exceeding 1.8m are predicted at Fort Denison	CVC Environmental Planning Coordinator	BHPRE 1. Undertake web-based monitoring and reporting of weather, wave forecasts (Bureau of Meteorology/National Weather Service website) and beach conditions on a daily basis and record findings.
	Significant offshore wave height exceeds or is forecast (by Bureau of Meteorology) to be in the range of 5m to 7m and tides exceeding 1.8m are predicted at Fort Denison OR storm surge of at least 0.5m	CVC Environmental Planning Coordinator	BHPRE 2. Undertake web-based monitoring and reporting of weather, wave forecasts (Bureau of Meteorology/National Weather Service website) and beach conditions on a 12-hourly basis, eg 0600 and 1800 hrs, and record findings.
		CVC Environmental Planning Coordinator	BHPRE 3. Notify Manager Civil Services, Manager Open Spaces and Facilities and Manager Environment, Development and Regulated Services that a coastal erosion event is likely and for relevant Managers to make plans for post-event response, as applicable.
		CVC Environmental Planning Coordinator	BHPRE 4. Advise local community contacts and other stakeholders (see Section 3) of the likelihood of coastal erosion and provide updates (using pro-forma advices) so they can advise residents in the event that phones/ power is cut.
		CVC Environmental Planning Coordinator	BHPRE 5. Advise Brooms Head land owners and Caravan Park manager (priority to owners of properties with dwellings in immediate hazard zone) of the likelihood of coastal erosion or oceanic inundation and actions they should take (e.g. monitor ocean and property conditions, weather warnings, comply with advice of CVC and/or SES, move valuables, comply with warning signs and avoid accessing the beach, dismantle outbuildings and/or securely store items/goods or yard furnishings).

Category	Trigger	Responsible Council Officer	Action /Reporting
		LEMO/Executive support officer	BHPRE 6. Notify all appropriate persons including the Local Emergency Management Committee (LEMC) members, Mayor, OEH, SES Incident Controller, LEOCON, CVC staff, experienced coastal/geotechnical engineer (non-CVC) and have them on alert for an emergency meeting.

Category	Trigger	Responsible Council Officer	Action /Reporting
Storm Phase	The erosion escarpment begins receding landward **and** is less than 10m from a built asset; Or Wave overtopping/oceanic inundation is affecting private land or public land landward of the revetment wall Or There is a predicted increase in storm threat by a current BoM warning (ie waves predicted to exceed 7m **and** tides exceeding 1.6m OR storm surge greater than 0.6 metres)	CVC Environmental Planning Coordinator	BHSTORM 1. Increase frequency of monitoring web-based weather forecast information (eg Bureau of Meteorology/National Weather Service website) on a minimum 8-hr basis (eg 0600, 1400, 2200 hrs) and keep records of any weather warnings and/or reports of erosion.
		CVC Environmental Planning Coordinator	BHSTORM 2. Landowners/residents/caravan park manager (as at Action BHPRE 5) informed (using pro-forma advices) of increased threat and advised to take action to reduce risk to life and property, continue to monitor ocean and property conditions, weather warnings, comply with advice from CVC or SES and to make preparations for potential evacuation. *(NOTE: Council will not issue any direction to evacuate. Such direction would be issued by SES, if applicable)*

Category	Trigger	Responsible Council Officer	Action /Reporting
		LEMO/Executive support officer	BHSTORM 3. Notify all appropriate persons including the Local Emergency Management Committee (LEMC) members, Mayor, OEH, SES Incident Controller, LEOCON, CVC staff, experienced coastal/geotechnical engineer (non-CVC) and have them on alert for an emergency meeting.
		Manager Open Spaces & Facilities	BHSTORM 4. Close the beach at all public access points (pedestrian and vehicular/4WD access off Ocean Road and adjacent to the Brooms Head Coastal Reserve, including the access to Back Beach) with rigid barriers and erect 'Closed Beach' signs.
		Manager Open Spaces & Facilities	BHSTORM 5. Close internal access road/s through the Brooms Head Coastal Reserve (priority to the vehicular access along the Terrace between the Brooms Head Caravan Park office/managers residence and the lower amenities/laundry block adjacent to the north side of Cakora Point) with rigid barriers and erect 'Closed Road' signs.
		Manager Open Spaces & Facilities	BHSTORM 6. Vehicular access to the beach (for authorised vehicles only) during a coastal erosion emergency event shall be via the Brooms Head Coastal Reserve boat ramp or the 4WD beach access immediately south of the Brooms Head Rd bridge over Lake Cakora (refer to Figure 2) only where safe to access. The safest access shall be chosen at the time. If not safe, then close/barricade off the access. If necessary, minor scraping works (to the minimum extent necessary) may be undertaken to make beach access safe by adding natural beach sand material to the access point/s.
		Manager Open Spaces & Facilities	BHSTORM 7. Prevent public access/use while beach, accessways (including boat ramp) or parts of Reserve are deemed to be unsafe. Safety to be assessed by a CVC Engineer or Health and Building Surveyor (as relevant) with suitable qualifications and experience (or a consultant where Council does not have expertise in house). Minor beach scraping works to enable continued and safe public access may be implemented where adequate sand and funding is available.

Category	Trigger	Responsible Council Officer	Action /Reporting
		Manager Open Spaces & Facilities	BHSTORM 8. Monitor erosion escarpment position, revetment condition, the location of any Lake breakout channel and extent of any overtopping (using photos or measurements), and forward these to the CVC Environmental Planning Coordinator.
	The erosion escarpment begins receding landward **and** is less than 5m from a built asset Or Wave overtopping/oceanic inundation is directly impacting residential or commercial buildings (not including associated outbuildings) on private land or public land landward of the revetment wall	LEMO/Executive support officer	BHSTORM 9. Arrange emergency meeting with LEMC, Mayor, OEH, SES, CVC staff, a professional engineer (not CVC-employed) and any other relevant stakeholders to determine whether evacuation measures should be implemented – report on current situation – record outcome. *(NOTE: Any evacuation shall be undertaken under direction of the SES in accordance with the Clarence Valley Local Flood Plan)*
		CVC Environmental Planning Coordinator	BHSTORM 10. Regularly monitor web-based weather forecast information (eg Bureau of Meteorology/National Weather Service website) on a minimum 8-hr basis (eg 0600, 1400, 2200 hrs) and keep records of any weather warnings/ reports of erosion
		CVC Environmental Planning Coordinator	BHSTORM 11. Organise site inspection by a professional engineer experienced in coastal engineering for post-event assessment and reporting.
		Manager Open Spaces & Facilities	BHSTORM 12. Take photos and/or observations (at least every 6-8 hrs) of the erosion escarpment/revetment walls, oceanic inundation, Lake breakout channel and beach features (as applicable) and forward to CVC Environmental Planning Coordinator for reporting. Liaise with a professional engineer experienced in coastal engineering (not a CVC-engineer) for advice on updated reports.

Category	Trigger	Responsible Council Officer	Action /Reporting
Post-storm Phase	Storm has abated and it is safe to conduct post-storm activities	CVC Environmental Planning Coordinator	BHPOST 1. Advise Manager Civil Services, Manager Open Spaces and Facilities or Manager Environment, Development and Regulated Services (as applicable) to assess damage to public property, roads, services, parks/reserves (including Brooms Head Caravan Park), and effluent management systems, dwellings, etc.
		CVC Environmental Planning Coordinator	BHPOST 2. Organise professional engineer (not CVC-employed) to be available to assess private dwelling-houses, other non-Council buildings, and Council assets in imminent danger of collapse due to post-storm conditions, and to assess potential dune or revetment modification or management to provide acceptable public safety and to determine safety for continued occupation of buildings (see also Actions BHPOST 3, 11 and 16).
		CVC Environmental Planning Coordinator	BHPOST 3. Advise landowners of properties impacted or threatened by coastal processes during the storm (or expected thereafter, eg due to residual dune slumping) to seek independent advice from a qualified coastal engineer to assess damage/threat/remedial measures needed (see also Actions BHPOST 2 and 11)..
		CVC Environmental Planning Coordinator	BHPOST 4. Arrange for an identification survey of unprotected dune (adjacent to the north end of Brooms Head Coastal Reserve/Camping Ground) or damaged revetment works (as applicable) (see also Action BHPOST 5, 6, 7 and 12).
		CVC Environmental Planning Coordinator	BHPOST 5. Document proximity of dwellings to dune/revetment crest and update Schedule 1 and issue updated advice to affected landowners.
		CVC Environmental Planning Coordinator	BHPOST 6. Liaise with OEH to determine any changes to the coastline and any new areas at risk
		CVC Environmental	BHPOST 7. Review and collate all records of the storm event, actions taken prior to and

Category	Trigger	Responsible Council Officer	Action /Reporting
		Planning Coordinator	during storm event, lessons learned, photos of the event and retain for future reference. Report and discuss outcomes at debrief meeting (see Action BHPOST 18).
		CVC Environmental Planning Coordinator	BHPOST 8. Review the *Brooms Head Main Beach Emergency Action Sub Plan* (EASP) and following debrief meeting (see Action BHPOST 18) seek endorsement of any changes by both Council and OEH.
		CVC Environmental Planning Coordinator	BHPOST 9. Review the *Brooms Head and Lake Cakora Coastal Zone Management Plan* (as relevant) in consultation with other stakeholders.
		Manager Environment, Development and Regulated Services	BHPOST 10. Council staff and/or private consultants to inspect lands containing effluent management systems that may be adversely impacted by erosion and make recommendations as necessary to reduce potential environment or public health impacts.
		Manager Environment, Development and Regulated Services	BHPOST 11. Council staff to determine the need for issue of orders relating to the structural integrity and continued occupation of damaged structures, especially dwellings, in association with advice from non-CVC engineer (see also Action WBPOST 2).
		Manager Open Spaces & Facilities	BHPOST 12. Organise a review of safety of beach accesses and camp sites adjacent to the beach/revetment wall to determine whether safe to continue use. Safety to be assessed by a Council's Engineer with suitable qualifications and experience (or the non-CVC professional engineer where Council does not have expertise in house) (see also Action BHPOST 4).
		Manager Open Spaces & Facilities	BHPOST 13. Coordinate general cleanup and restoration works to public beach accesses/4WD access and remove any hazardous materials from the beach in accordance with adopted SWMS (see also Action BHPLAN 1).

Category	Trigger	Responsible Council Officer	Action /Reporting
		Manager Open Spaces & Facilities	BHPOST 14. Vehicular access to the beach after an erosion event shall be via the Brooms Head Coastal Reserve boat ramp or the 4WD beach access immediately south of the Brooms Head Rd bridge over Lake Cakora (refer to Figure 2). The safest access shall be chosen at the time. If necessary, minor scraping works (to the minimum extent necessary) may be undertaken to make beach access safe by adding natural beach sand material adjacent to the access point.
		Manager Open Spaces & Facilities	BHPOST 15. Maintain closure of public and vehicular access while beach, accessways or parts of Reserve are deemed to be unsafe. Safety to be assessed by a CVC Engineer or Health and Building Surveyor (as relevant) with suitable qualifications and experience (or a consultant where Council does not have expertise in house). Minor beach scraping works to enable continued and safe public access may be implemented where adequate sand and funding is available.
		Manager Open Spaces & Facilities	BHPOST 16. Erect relevant safety warning signs and barricading where unstable dune escarpments or rock revetments present a public safety hazard. In high use areas consider options to collapse the erosion escarpment to a more stable slope using machinery and after consultation with OEH, adjacent landowners and a professional engineer experienced in coastal engineering (not CVC-employed)
		Manager Open Spaces & Facilities	BHPOST 17. Assist Caravan Park Managers with review of emergency/evacuation plan for the Brooms Head Caravan Park/Camping Ground to ensure emergency event management of coastal hazards are properly considered.
		LEMO/Executive support officer	BHPOST 18. Coordinate a debrief meeting as soon as practical post-event with the LEMC, relevant Council Managers and other CVC staff involved in response, SES (including local Controller), and OEH. Document recommended changes to the EASP.

3. CONTACT LIST FOR EMERGENCY ACTION SUB PLAN

The following list of contacts indicates the range of persons that should be included on a contact list for the purposes of implementing this EASP.

A completed list shall be prepared and maintained periodically and attached as Schedule 2 to this EASP for internal CVC staff use only due to confidentiality of contact information.

(NOTE: Schedules attached to this EASP are not part of the formal EASP and can be modified according to operational needs without the need to formal amendment of the EASP under the Coastal Protection Act 1979 and associated procedures).

Title/Contact	Name	Phone Number

CVC Environmental Planning Coordinator (and alternate):

CVC Mayor:

CVC Manager Civil Services (and delegate):

CVC Manager Environment, Development and Regulatory Services (and delegate):

CVC Manager Open Space and Facilities (and delegate):

CVC LEMO/Executive support officer (and alternate):

SES Region controller:

OEH representative (and alternate):

Brooms Head Caravan Park Manager/s:

Brooms Head Store:

Brooms Head Bowling & Recreation Club:

NSW Police (Maclean Station):

Consultant Coastal Engineer:

Owners of land in IHZ (east side of Ocean Rd north of bridge per Schedule 1)

4. REFERENCES

Clarence Valley Council (2014) Local Disaster Plan (DISPLAN) for Clarence Valley Council Local Government Area. February 2012 (incorporating minor updates of May 2013 and October 2014).

OEH (2011) *Coastal zone management guide note: Emergency action subplans* (July 2011)

OEH (2013) Code of Practice under the Coastal Protection Act 1979 (August 2013)

OEH (2013b) *Guide to the Statutory Requirements for Temporary Coastal Protection Works* (August 2013)

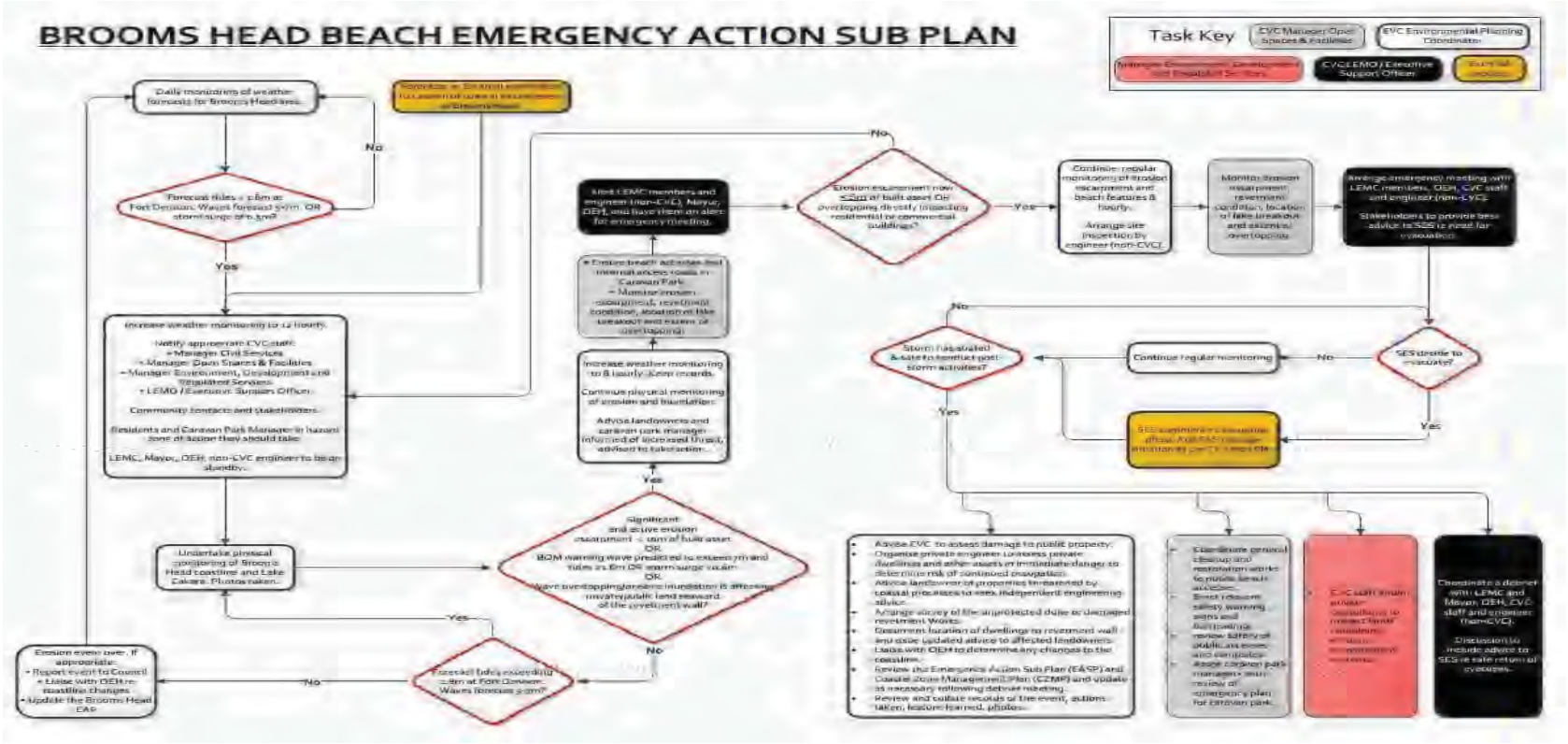
SMEC Australia (2013) *Brooms Head Beach Coastal Processes and Hazard Study. Project No 30011071, April 2013. Prepared for Clarence Valley Council*

SES (2012) Clarence Valley Local Flood Plan – A sub plan of the Clarence Valley Local Disaster Plan (DISPLAN), June 2012.

SES (2013) NSW State Storm Plan - A Sub Plan of the State Emergency Management Plan (EMPLAN), September 2013.

SES (2015) NSW State Flood Sub Plan – A Sub Plan of the State Emergency Management Plan (EMPLAN), March 2015.

APPENDIX 1. FLOW CHART REPRESENTING THE BROOMS HEAD MAIN BEACH EASP



APPENDIX D SUPPORT STUDY FOR BROOMS HEAD LAKE CAKORA CZMP

[NOTE: The report contained in this Appendix was prepared prior to the final CZMP and hence, the date on the report and the date on page footers represent the date of the report and not the date of the final CZMP]

Support Study for Brooms Head Lake
Cakora Coastal Zone Mangement Plan (CZMP)

For: Clarence Valley Council

clarence
VALLEY COUNCIL

JUNE 05, 2014

Project Name:	Support Study for Brooms Head Lake Cakora Coastal Zone Management Plan (CZMP)
Project Number:	30011071
Report for:	Clarence Valley Council

PREPARATION, REVIEW AND AUTHORISATION

Revision #	Date	Prepared by	Reviewed by	Approved for Issue by
Prelim Draft	27/02/2014	H Nelson	CVC/OEH	
Draft	17/04/2014	H Nelson / A Brook	A Brook	A Brook
Draft Exhibited as Draft CZMP	05/06/2014	H Nelson / A Brook	A Brook	A Brook

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FOREWORD

This report was originally exhibited as the draft CZMP. Subsequent to a meeting with representatives from the NSW Office of Environment and Heritage (OEH) and the NSW Coastal Panel on the 12th February 2015 it was decided that the final CZMP should become a more concise document. As such this document has now become the "Support Study for the Brooms Head Lake Cakora Coastal Zone Management Plan (CZMP)".

The final CZMP has now made decisions on the preferred management options to be implemented whereas this support study provides information on the varying options considered.

Throughout this document where draft CZMP is referred to it is actually referring to this document the "Support Study for the Brooms Head Lake Cakora Coastal Zone Management Plan (CZMP)".

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Background

The NSW Government identified part of Brooms Head as a coastal erosion 'hotspot' (Lake Cakora entrance: Ocean Road Bridge to at least 400 m to the north) requiring the preparation of a Coastal Zone Management Plan (CZMP) and Emergency Action Plan (EAP).

1.2 Study Area

Brooms Head is located on the north coast of NSW in the Clarence Valley Local Government Area (LGA), approximately 530 km north of Sydney. The village is approximately 23 km by road from Maclean, which is about 46 km by road north of Grafton.

Brooms Head Beach is part of a coastal compartment that contains the significant rocky offshore/ nearshore reef (incorporating Buchanans Rocks), headland (Cakora Point), and a sandy beach stretching some 4 km north to the Red Cliff headland, see *Figure 1*. The area covered by this CZMP includes a portion of Back Beach (northern end of Sandon Beach), Cakora Point, Brooms Head Beach, Lake Cakora entrance and foreshores adjacent to the Brooms Head village.

The remainder of Lake Cakora and its catchment are within the boundaries of Yuraygir National Park. For planning purposes Brooms Head Beach was divided into four foreshore precincts as shown in *Figure 2*.

Figure 1 Location plan

Figure 2 Foreshore Precincts

1.3 Current Coastline Management Strategy

Actions adopted in November 2001 and February 2002 by the then Maclean Shire Council (MSC) from the *Brooms Head Beach Coastal Study* (WRL 2001) for the foreshore reserve are shown in *Table 1*, along with information on their implementation. On 21 February 2002 Council resolved to discontinue the Brooms Head Beach Coastal Study process as it related to lakefront development within the entrance to Lake Cakora. Accordingly, no actions were adopted for the Lake Entrance precinct.

Table 1 2001/2002 Foreshore Reserve Coastal Management Actions

Action	Status
Rebuild and adjust profile of existing rock wall to make safe and fence off the wall	Wall rebuilt between Cakora Point and the northern boatramp in 2010. Maintenance works to other sections of the wall were also carried out post 2010
Control access across the rock wall by dedicated fenced accessways	Formal accessways have been built/ maintained (some have more recently been closed off due to damage from coastal erosion). The foreshore reserve (south) has never been fenced off. A koppers log and revegetation along the top of the due discourages ad hoc access to the beach along the Northern Foreshore Reserve.
Sand nourishment, ongoing, to retain beach amenity, with the sand level to about half the wall height	Not implemented (no feasible sand source available)
Monitor impact of rebuilt wall to ascertain longer term need to extend a further 200 m to Lake Cakora entrance	Revetment extended by approximately 50 m in October/ November 2012 to protect reserve/ amenities block at risk from coastal erosion/ scour at the end of original revetment.
Stabilise foreshore behind wall with planting, etc.	Dune management activities have been carried out e.g. weed removal/ control and barrier fencing to encourage regeneration of native plants.

1.4 Review of Coastline Management Options

As part of this process a number of investigations were undertaken to update previous studies to identify current and future coastal hazards and risks. These investigations are documented in the:

- *Cakora Point Slope Stability and Risks Assessment* (2012)
- *Lake Cakora Estuary Processes Study* (2013a)
- *Brooms Head Coastal Processes and Hazard Study* (2013b).

A draft EAP was also prepared by Clarence Valley Council (CVC) in 2012

A number of coastline management options (15 in total) were reviewed in the *Brooms Head and Lake Cakora Coastal Management Study* (SMEC 2013c).

1.5 Consultation

Preparation of this CZMP and supporting documents was overseen by the CVC Coast & Estuary Management Committee which has representatives from Council, Government agencies and the community. Consultation activities for the preparation of the CZMP are listed in *Table 2* .

Table 2 Consultation Activities

Date	Activity	Approx. number of attendees/ respondents
2009 (prior to this study)	Lake Cakora Estuary Management Plan Survey (CVC)	21 (13 permanent residents of Brooms Head or surrounding area)
14 October 2011	Site meeting with OEH and Brooms Head Dune Management Group	24 community members plus SMEC and CVC staff
14 and 15 October 2011	Community Drop in Sessions (Brooms Head Hall)	9 each day (18 total)
20 August 2013	Coastal Management Study presentation to Clarence Valley Coast & Estuary Management Committee	16 committee members and 2 observers (Brooms Head residents)
3 October 2013	Community Drop in Day (Brooms Head Hall)	25 people attended (comprising 16 groups)
27 September - 28 October 2013.	Exhibition of Coastal Management Study and supporting studies	11 written submissions were received (representing all of the Lakefront Precinct/ Ocean Road landowners, with only 1 submission from a community member who is not a landholder in this precinct) A submission was also received from OEH

The options included in the Coastal Management Study (SMEC 2013c) and submissions received during the exhibition period were considered by the CVC Coast & Estuary Management Committee at its meeting on 19 November 2013. Of the 14 options presented, seven were recommended and later adopted by Council at its meeting on 10 December 2013. This included two options for different levels of revetment protection to seek further input from the community through exhibition of this Draft CZMP to determine a preferred option for adoption in the final CZMP.

A summary of the adopted options to manage coastal hazards is presented in Section 3.5

1.6 Preparation of Coastal Zone Management Plan

Part 4A, Section 55 C (1) of the Coastal Protection Act 1979 lists matters to be dealt with in coastal zone management plans:

A coastal zone management plan must make provision for:

(a) protecting and preserving beach environments and beach amenity, and

(b) emergency actions carried out during periods of beach erosion, including the carrying out of related works, such as works for the protection of property affected or likely to be affected by

beach erosion, where beach erosion occurs through storm activity or an extreme or irregular event, and

(c) ensuring continuing and undiminished public access to beaches, headlands and waterways, particularly where public access is threatened or affected by accretion, and

(d) where the plan relates to a part of the coastline, the management of risks arising from coastal hazards, and

(e) where the plan relates to an estuary, the management of estuary health and any risks to the estuary arising from coastal hazards, and

(f) the impacts from climate change on risks arising from coastal hazards and on estuary health, as appropriate, and

(g) where the plan proposes the construction of coastal protection works (other than emergency coastal protection works) that are to be funded by the council or a private landowner or both, the proposed arrangements for the adequate maintenance of the works and for managing associated impacts of such works (such as changed or increased beach erosion elsewhere or a restriction of public access to beaches or headlands).

1.7 Coastal Management Principles, Goals and Objectives

The 2013 *Guidelines for Preparing Coastal Zone Management Plans* (referred to hereafter as the *Guideline*) set out ten principles for preparing CZMPs. The first principle is to consider the objectives of the *Coastal Protection Act 1979* and the goals, objectives and principles of the *NSW Coastal Policy 1997*. Section 3 of the *Coastal Protection Act 1979* sets out objectives which are to provide for the protection of the coastal environment of the State for the benefit of both present and future generations. The overriding vision of the 1997 *NSW Coastal Policy* is the ecologically sustainability of the NSW Coast. This Policy has nine goals.

Table 3 lists the goals, objectives and principles contained in the above legislation, policy and guideline and indicates how these have been considered in the preparation of the Brooms Head CZMP. Many of the principles, goals and objectives are similar and have been grouped against the *Guideline* principles in *Table 3*.

Table 3 Consideration of Coastal Management Principles, Goals and Objectives in CZMP Preparation

Guidelines for Preparing CZMPs Principles	Coastal Protection Act Objectives	NSW Coastal Policy Goals	How Principles, Goals and Objectives have been considered
1. Consider the objectives of the *Coastal Protection Act 1979* and the goals, objectives and principles of the *NSW Coastal Policy 1997* and the *NSW Sea Level Rise Policy Statement 2009*. *Note: NSW Sea Level Rise Policy is no longer State Government Policy.*	To encourage, promote and secure the orderly and balanced utilisation and conservation of the coastal region and its natural and man-made resources, having regard to the principles of ecologically sustainable development.	Providing for ecologically sustainable development and use of resources.	Coastal protection options are confined to the area of the beach embayment and lake entrance that has already been modified by foreshore structures. Other actions (refer to *Table* **7**) include measures to protect natural resources.
	To recognise and foster the significant social and economic benefits to the State that result from a sustainable coastal environment, including: - benefits to the environment, and - benefits to urban communities, fisheries, industry and recreation, and - benefits to culture and heritage, and - benefits to the Aboriginal people in relation to their spiritual, social, customary and economic use of land and water.	Providing for ecologically sustainable human settlement in the coastal zone. Protecting and enhancing the aesthetic qualities of the coastal zone.	Shoreline protection will: - maintain the foreshore reserve for recreational use - maintain income to the Clarence Coast Reserve Trust (CCRT) from the Brooms Head caravan park - protect items of non-indigenous cultural heritage value - provide certainty for lakefront Ocean Road property owners - other actions include measures to provide environmental benefits
	To provide for the acquisition of land in the coastal region to promote the protection, enhancement, maintenance and restoration of the environment of the coastal region.	-	n/a
	-	Protecting and conserving the cultural heritage of the coastal zone.	Shoreline protection will also protect items of non-indigenous cultural heritage value at Brooms Head. Legislation relating to the protection of sites and places of significance applies to the CZMP actions.
2. Optimise links between plans relating to the management of the coastal zone.	To ensure co-ordination of the policies and activities of the Government and public authorities relating to the coastal region and to facilitate the proper integration of their management activities.	Providing for integrated planning and management of the coastal zone	Actions to be implemented through other plans and programs are indicated in *Table* **7**.
3. Involve the community in decision-making	To recognise the role of the community, as a	Providing information to enable effective	A summary of consultation activities is provided in *Table 2*.

Guidelines for Preparing CZMPs Principles	Coastal Protection Act Objectives	NSW Coastal Policy Goals	How Principles, Goals and Objectives have been considered
and make coastal information publicly available.	partner with government, in resolving issues relating to the protection of the coastal environment	management of the coastal zone.	
4. Base decisions on the best available information and reasonable practice; acknowledge the interrelationship between catchment, estuarine and coastal processes; adopt a continuous improvement management approach.	-	Recognising and accommodating the natural processes of the coastal zone.	The technical studies referred to in Section 1.4 provide detailed information on catchment, estuarine and coastal processes. These studies and the *Brooms Head and Lake Cakora Management Study* document the data, guidelines and other information that was used to assess coastal hazards and management options. *Table* **7** includes actions to undertake further investigations to increase knowledge on coastal processes affecting Brooms Head Beach.
5. The priority for public expenditure is public benefit; public expenditure should cost-effectively achieve the best practical long-term outcomes.	-	-	Section 8.1 discusses public/ private benefits associated with protection of the lakefront Ocean Road properties.
6. Adopt a risk management approach to managing risks to public safety and assets; adopt a risk management hierarchy involving avoiding risks where feasible and mitigation where risks cannot be reasonably avoided; adopt interim actions to manage high risks while long-term options are implemented.	-	-	Brooms Head Main Beach Emergency Action Sub-Plan (EASP) (CVC 2012), identifies actions to manage risks to public safety in the event of a coastal erosion emergency. *Table* **7** includes development controls and a retreat strategy for the foreshore reserve. Coastal Hazards Mapping (Appendix A) was undertaken based on Sea level rise planning benchmarks. The EASP (Appendix C) has looked at the range of risks, considered their likelihood and proposes management actions to address these hazards.
7. Adopt an adaptive risk management approach if risks are expected to increase over time, or to accommodate uncertainty in risk predictions.	To encourage and promote plans and strategies for adaptation in response to coastal climate change impacts, including projected sea level rise.	-	Sea level rise planning benchmarks were adopted in the *Coastal Processes and Hazard Study*. Foreshore protection (sloping rock rubble structures) could be raised if required in the future to address risks from rising sea levels.
8. Maintain the condition of high value coastal ecosystems; rehabilitate priority degraded coastal ecosystems.	To protect, enhance, maintain and restore the environment of the coastal region, its associated ecosystems, ecological processes and biological	Protecting, rehabilitating and improving the natural environment of the coastal zone.	Actions to improve water quality and enhance native vegetation and habitat have been included as part of the CZMP, see *Table* **7**.

Guidelines for Preparing CZMPs Principles	Coastal Protection Act Objectives	NSW Coastal Policy Goals	How Principles, Goals and Objectives have been considered
	diversity, and its water quality.		
9. Maintain and improve safe public access to beaches and headlands consistent with the goals of the NSW Coastal Policy.	To promote public pedestrian access to the coastal region and recognise the public's right to access	Providing for appropriate public access and use.	Design of foreshore protection would include provision for public access. Access management at Cakora Head would reduce risks to the public. Opportunities for additional safe public access to Broom Head Beach will be sought through the CZMP implementation.
10. Support recreational activities consistent with the goals of the NSW Coastal Policy.	To promote beach amenity	as above	It is generally acknowledged by the community that protection of the foreshore reserve is likely to result in loss of the sandy beach in front of the revetment in the future. However, the rest of the Brooms Head beach coastal embayment is essentially in a natural state and is protected within Yuraygir National Park and Crown reserves.

2 SUMMARY OF COASTAL & ESTUARINE PROCESSES

2.1 Brooms Head Beach

Although available data is limited, net sediment transport along Brooms Head Beach is assumed to be to the north (as shown in *Figure 3*), consistent with the net northerly sediment transport regime along the northern NSW coast. The *Coastal Hazard Study* (SMEC 2013b) concluded this, based on the following.

- The general orientation of the coastal compartment is north-east, indicating net northerly drift.
- Infilling of the natural rock pool and significant sediment deposition at the southern boatramp indicates a sediment pathway (for a small amount of sediment) across the rocky foreshore of Cakora Point from Back Beach/ Sandon Beach.
- In recent years, minor shoreline accretion has been evident near the former prawn hatchery where the shoreline trends south-west (as identified in photogrammetric profiles).

Observed northerly movement of a rock shingle deposit that extends towards the Lake Cakora entrance (north of the foreshore reserve revetment) also supports a net northerly transport regime (CVC 9/10/2012).

The *Brooms Head Beach Coastal Study* (2001) noted four main sources of sand to Brooms Head Beach:

- *Southward drift of sand during north-easterly waves*
- *Onshore transport during mild waves*
- *Sand bypassing from the south around Buchanans Rock*
- *Natural erosion of the dune (prior to revetment construction).*

As noted by PWD (1978) the reef at Cakora Point has a significant effect on coastal processes at Brooms Head. *It refracts waves from the south-eastern quarter on to the beach to the north in its lee, and it reduces the energy of the waves passing through it in large seas. These effects may result in the formation of complicated rip patterns and currents along the beach with associated sediment movements.* Although the reef reduces wave energy at the southern end of the beach, wave energy would still be significant during a major storm event.

As shown in *Figure 3*, during ambient conditions, sediment movement to the south would occur close to the shoreline due to lateral expansion return currents generated by the differential in wave heights along the beach (i.e. larger wave heights away from the influence of the rocky reef).

As noted by WRL (2001), a clay bed underlies the beach and consolidated material in the form of weathered rock, clay and indurated sands (coffee rock) are found on the seabed offshore. An indurated sand layer was also observed at the base of the eroded dune escarpment at the northern end of the foreshore reserve during a site inspection in August 2011. The clay base layer has been exposed on the beach adjacent to the caravan park office, lake entrance and northern beach in recent times. This has the potential to limit short term erosion/ scour.

The conceptual model illustrated in *Figure 3* summarises coastal processes affecting Brooms Head Beach. Refer to the *Coastal Processes and Hazards Report* (SMEC 2013b) for more information.

Figure 3 Conceptual Processes Model for Brooms Head Beach

2.2 Lake Cakora ICOLL

Lake Cakora consists of two components, a creek north of the entrance and a lake or lagoon to the south-west of the entrance. The beach berm across the entrance, which forms as waves transport sand onshore, can reach heights of 1 – 2 m AHD (as estimated from photogrammetry based on aerial photography back to 1942). The observed pattern of berm building is that the dune to the south of the entrance builds and extends northwards under the influence of the dominant south-easterly wind and wave climate (WRL 2001).

The water level within the lake is controlled by the height of the entrance berm. Entrance breakouts are dependent on a number of variables including rainfall, the initial lake storage volume, ocean tide levels, waves and berm height. Based on CVC staff observations, the entrance opened on six occasions between September 1999 and July 2000, with three of these openings being natural and three being artificial. The water level within the lake was 1 m AHD for all of the natural openings and for the artificial openings it ranged between 1.1 and 1.6 m AHD. Based on this information, the duration the entrance remained open varied from 1 to 37 days.

Analysis of water level and salinity data between July 2010 and November 2011 from the automatic recorder in Lake Cakora, indicated that the highest breakout level was about 1.7 m AHD on 13 October 2011, see *Figure 4*. This information, along with rainfall measured at the BoM Yamba Pilot Station between July 2010 and November 2011 (closest location where data was available for the same time period), was also used to determine when the lake entrance opened and to estimate the duration it remained open.

During the months of July, August and September the entrance generally remained closed, corresponding with the period of lowest rainfall over the year. Between October and February the entrance opened and closed most frequently, this correlated with the higher rainfall rates experienced over the spring and summer months. Between July 2010 and November 2011 the entrance was open on 16 occasions, with it being open for more time than it was closed over the period. Over this 16 month period, the duration the entrance remained open varied from 2 to 58 days. In September 2012 the entrance closed and it was reported that it remained closed for more than 70 days. In general, Lake Cakora entrance breakouts occur as a result of high rainfall in the previous 1 – 2 days.

Figure 4 Lake Water Levels, Salinity, Temperature and Rainfall (Yamba Pilot Station) Jul 2010 – Oct 2011

Water quality in Lake Cakora is influenced by catchment runoff, the shallowness of the lake, entrance conditions and the degree of mixing and flushing of the lake waters. *Figure*

4 shows measured water level, salinity and temperature in the lake and rainfall at Yamba Pilot Station.

As shown in *Figure 4*, water levels varied from just under 0.2 m AHD to 1.63 m AHD. Salinity ranged from just over 35 parts per thousand (ppt), which is the average salinity of sea water, to zero during rainfall peaks. Temperature ranged from 10^{O}C in July to just over 35^{O}C in February and showed a general seasonal variation. A temperature spike in November 2010 (about 34 ^{O}C) corresponded to a period of low water level (i.e. shallow water depths).

Refer to the *Lake Cakora Estuary Processes Study* (SMEC 2013a) for more information.

2.3 Cakora Headland

At Cakora Point the slopes are directly exposed to weathering processes, including wave cutting, wind, rain and atmospheric exposure. This causes joints in the rock to weaken and blocks to loosen. Intersection of bedding joint sets and orthogonal joints sets favours toppling of rock blocks. The upper weak and weathered portions of the slopes are subjected to weathering processes that cause fretting of material such that the crest gradually recedes at an angle of approximately 35° to 50°. This is accelerated by undercutting action caused by dislodgement of underlying blocks.

Refer to the *Cakora Point Slope Stability Report* (SMEC 2012) for more information.

3 SUMMARY OF COASTAL HAZARDS AND RISKS

For further information on coastal hazards, refer to the *Brooms Head and Lake Cakora Coastal Management Study* (SMEC 2013a) and *Brooms Head Coastal Processes and Hazard Study* (SMEC 2013b)

3.1 Storm Erosion and Shoreline Recession

For an unconsolidated (erodible) sandy shoreline, a number of coastline hazard zones can be delineated based on Nielsen *et al* (1992) (refer to *Figure 5*).

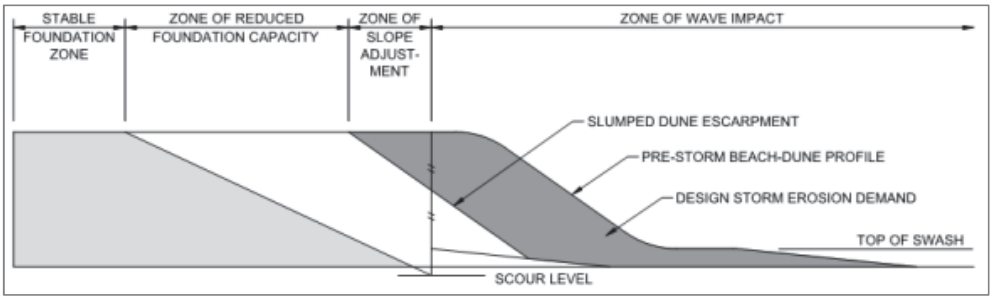

Figure 5 Schematic Representation of Coastline Hazard Zones (Nielsen et al 1992)

Taking into account the adopted values for storm demand (40-220 m^3/m), estimated width of the zone of reduced foundation capacity (7 to 9 m) and shoreline recession, hazard maps were produced for Brooms Head Beach indicating the immediate hazard line and 2050 and 2100 hazard lines. The hazard lines (i.e. the position of the slumped erosion escarpment due to a major storm event in the vicinity of Brooms Head) take into account shoreline recession due to sand loss from the beach compartment (up to 23.4 m and 53.4 m along the Northern Beach by 2050 and 2100 respectively) and Sea Level Rise (SLR)(up to 20 m and 45 m by 2050 and 2100 respectively).

Lesser recession was predicted at Lakes Entrance with 19.5m (2050) and 44.5m (2100) due to sand loss from the beach compartment and 20m (2050) and 45m (2100) due to SLR in addition to storm demand for the entrance beach berm.

Assuming no foreshore protection for the Foreshore Reserve recession was calculated at 15.6m (2050) and 35.6.5m (2100) due to sand loss from the beach compartment and 20m (2050) and 45m (2100) from SLR. Subject to the assumption that the existing rock revetment is entirely erodible the Southern Beach ranged in values 0-7.8m (2050) and 0-17.8m (2100) due to sand loss from the beach compartment and 0-20m (2050) and 0-45m (2100) due to SLR.

Long term recession due to sediment loss occurs due to, longshore transport, offshore sinks from which it does not return to the beach and windborne transport beyond that of the active beach system. Analysis of historical photogrammetric data showed evidence of net sediment loss at a rate of approximately 0.6m/yr described further in the *Coastal Processes and Hazard Study* (SMEC 2013b)

Long term recession due to SLR was based on planning benchmarks of a 0.4 m rise by 2050 and further 0.5 m rise by 2100 relative to the 1990 mean sea level consistent with Councils climate change policy. Recession due to SLR was calculated using the Bruun Rule described further in the *Coastal Processes and Hazard Study* (SMEC 2013b) and can be seen in *Figure 6*.

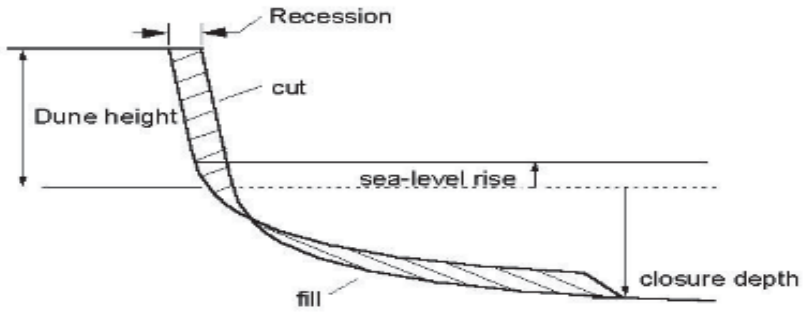

Figure 6 Schematic Representation of Shoreline Recession (Bruun 1983)

Figure A1 (see Appendix A) indicates the position of the hazard lines, ignoring protection provided by the foreshore reserve revetment (see *Plate 1*) and the *ad hoc* Ocean Road revetment. *Table 4* lists assets at risk under this scenario.

Figure A2 shows the position of the hazard lines, assuming the foreshore reserve revetment met design criteria for a major storm. Should the revetment be constructed to a lesser standard the hazard lines will exist somewhere between those marked on *Figure A1* and *Figure A2.* This will need to be reviewed during the design phase to ensure that if a lesser standard revetment is proposed suitable development controls are put in place.

Figure A3 shows the immediate hazard line (as per *Figure A1*) and associated limit of the ZRFC.

Table 4 Assets impacted by coastal erosion and shoreline recession assuming shoreline was erodible

Location	Assets at Risk over Planning Timeframes		
	Immediate (2012)	2050 (incl. SLR)	2100 (incl. SLR)
Foreshore Reserve (south)	Beach accessways Norfolk Island Pines Community Hall, Kiosk and adjacent public amenities Foreshore caravan and camping sites Caravan Park foreshore access road	As for Immediate Risk	As for Immediate Risk
Foreshore Reserve (north)	Foreshore caravan and camping sites Caravan Park office and caretakers' residence All amenities blocks	Caravan Park Ocean Road	Caravan Park Ocean Road General Store Dwellings on landward side of Ocean Road
Lake Entrance	Ocean Road – most dwellings	Ocean Road dwellings Ocean Road	Ocean Road dwellings Ocean Road

Location	Assets at Risk over Planning Timeframes		
	Immediate (2012)	2050 (incl. SLR)	2100 (incl. SLR)
		Ocean Road Bridge Bowling Club Carpark	Ocean Road Bridge Bowling Club, carpark and eastern bowling green Units/ dwelling on the western side of Ocean Road, closest to the road and north of the Bowling Club
Northern Beach	No infrastructure	Informal access to beach from Crown land via dilapidated Pedestrian Bridge	Dilapidated Pedestrian Bridge and informal access

No design details for the original foreshore reserve revetment are available, however, sections have failed in the past in conditions more benign than would be expected during a major storm event. Dislodged/ loose rocks have also been observed which suggest the rock armour is undersized. Although most of the original revetment has been rebuilt using locally available rock, the rock armour size and quality would not meet design standards for the 1 in 100 ARI storm event and hence the structure would be likely to fail during a major storm event. Failure occurs when sand is scoured out under the toe of the revetment and the rock armour slumps. Slumping of the foreshore reserve revetment would still provide some toe protection during the design storm, which would limit the extent of foreshore erosion. Accordingly, in reality, this would mean that the position of the current hazard line along the protected section of the foreshore reserve would be closer to that shown in *Figure A2*. A further hazard may result from smaller rocks being tossed around by waves in a severe storm event see *Plate 4*. *Plate 1* shows a section of the foreshore reserve revetment north of the northern boatramp which has been subject to repairs.

As shown in *Figures A1* and *A2*, in the event of the design storm (which may comprise a series of storms), the spit to the north of the entrance would be eroded and may eventually be breached, with the landward bank of the creek becoming the new shoreline over time. This would leave properties along Ocean Road more exposed to ocean storms from the north.

Plate 1 Foreshore Reserve Revetment (22/8/2011)

3.2 Coastal Inundation and Wave Overtopping

Dune/ revetment heights along the foreshore reserve range from around 3 m to 4.5 m AHD which are above the estimated 100 year ARI design elevated still water level (2.6 m AHD). The crest level of the *ad hoc* revetment along Ocean Road varies between around 2.5 m to 3.5 m, so is also generally above the design elevated still water level. Applying the adopted sea level rise planning benchmarks to 2100 results in inundation of only a narrow strip of the foreshore at the southern end of beach, and a low point in the *ad hoc* revetment (see *Figure A4*).

During storm events water levels higher than the still water level are experienced due to wave runup, which can result in waves overtopping the foreshore. For the estimated wave runup level of 5.1 m AHD during a severe storm, lower-lying areas along the open coast would be overtopped (see *Figure A5*). Applying the sea level rise planning benchmarks to 2100, would result in additional areas of the foreshore being affected, also shown in *Figure A5*.

Plate 2 taken along the foreshore reserve shows a significant wave overtopping event on 25th December, 2011. This event peaked with a significant wave height (H_s) of 3.6 m which coincided with a 'king' tide of 1 m AHD (i.e. extremely high astronomical tide of around 1.8 m). Analysis of data from the closest wave rider buoy (Coffs Harbour), between May 1976 and 31st December, 2011 showed:

- approximately 2 % of H_s exceeded 3.5 m and approximately 0.1 % of H_s exceeded 5 m.
- The largest H_s was 7.4 m recorded on 22nd June 1989, with an associated peak period (T_p) of 12.2 seconds and corresponding maximum wave height (H_{max}) of 13.5 m.

Accordingly, the Brooms Head Caravan Park could be affected by more severe overtopping events. Risks associated with 'green water' would include dangerous conditions for pedestrians walking along the footpath at the revetment crest. The stability of caravans and parked vehicles etc at foreshore sites would also be affected and potentially vehicles travelling along the loop road.

Plate 2 Wave overtopping at southern end of caravan park 25/12/2011 (Mr Mark Cameron)

Shoaling of waves at the entrance would result in a significant reduction in wave energy (and wave height) at the *ad hoc* Ocean Road revetment. Wave transformation studies by WRL (2001) indicated that the Ocean Road properties may be subject to oceanic flooding during severe storms and high tides but the risk is not high. The *ad hoc* Ocean Road Revetment and Foreshore Revetment were overtopped in several locations on 6 June 2012, see *Plates 3* and *4*. Water flowed to within approximately 1 m of some dwellings adjacent to the Ocean Road revetment.

Plate 3 Debris line from overtopping of ad hoc Ocean Rd revetment 6/6/2012 (CVC)

Plate 4 Rock & debris near boatramp from revetment overtopping 6/6/2012 (CVC)

Inundation from the ocean in May 2013 also affected the low-lying wetland area between the 4WD track and the northern end of the caravan park, indicating that in a more severe event access along Ocean Road immediately south of the bridge may be affected.

3.3 Catchment Flooding

Based on a range of lake still water levels between 1 m and 2.0 m AHD (berm height range), plots of associated inundation extents were produced as part of the *Estuary Processes Study* (SMEC 2013a) to indicate areas subject to flooding from Lake Cakora, see Appendix B.

The lowest dwelling floor level (south-west of the Ocean Road Bridge) is approximately 2.6 m AHD, hence no dwellings are at risk from overfloor flooding. The Ocean Road Bridge deck and footpath are also above 2.0 m AHD. Merritt *et al* (2007) reported that the lake entrance has been opened by members of the public by digging a channel across the entrance berm. Unauthorised entrance openings have been observed by CVC staff.

Although not part of the investigations for this study, flooding due to stormwater runoff from the catchment above Sandon Road also affects Brooms Head north of the Ocean Road Bridge, as shown in *Plates 5* and *6*.

Plate 5 Flooding of Brooms Head Rd near Sandon Road (CVC 22/2/2013)

Plate 6 Flooding near bowling club (CVC 22/2/2013)

3.4 Cliff Instability

Slope instability of bluffs and headlands is a result of the continuing operation of physical processes as well as anthropogenic activities within a particular geological and geomorphological setting in the coastal landscape. Physical processes could include rainfall, climate, rock weathering and disintegration, surface and ground water movement, soil erosion, sea level fluctuation, wave impact and earthquakes. On the other hand, coastal urbanisation and land use, destruction of vegetation either intentionally or otherwise (such as by bushfire or informal access), and changes to surface stormwater flows and drainage lines may be regarded as anthropogenic activities.

Qualitative assessments were used to define the risk to assets at the Cakora Point headland whilst quantitative assessments were used to define the risk to life. The cause of all failure mechanisms identified can be predominantly contributed to natural coastal exposure weathering effects. CVC's assets are not considered to contribute to the acceleration of these mechanisms.

The most commonly occurring failure mechanism identified was block falls/ topples due to undercutting, resulting from the erosive effects of weathering action and the jointed nature of the rock. Crest fretting and subsequent receding of the crest was also assessed as a common type of failure mechanism. Risk assessments were undertaken on those potential failures deemed significant in terms of potential to cause property damage or risk to life.

From the quantitative risk to life assessment, the annual probability of risk to life is estimated to range from 1.0x10-5 to 8.3x10-7 (or 0.000083% to 0.001%). The greatest risk to loss of life comes from falls or toppling of blocks with up to a 1.0 m side length and from collapse of overhangs. It should be noted that these values are based on

assumptions made on visitor numbers to the headland and that the value could increase or decrease if there is a greater or lesser usage than that assumed.

The AGS (2007) suggested tolerable loss of life individual risk for existing landslides is 10- 5/annum (or 0.001%), this suggests that the greatest risk calculated is tolerable, however, risk acceptance would depend on CVC's acceptance of the AGS' risk acceptance criteria.

The following assets were assessed to be at risk from the failure mechanisms in the longer term:

- walkways around the headland (receding cove, undermining of overhanging slope, crest fretting and block toppling, see examples, *Plates 7* and *8*)
- access road to the lookout (receding cove and undermining of overhanging slope)
- lookout carpark (crest fretting and block toppling)

It is noted that the location of the closest private property is approximately 140 m away from the closest point of the headland and therefore risks associated with private property are considered negligible.

Plate 7 Receding Cove

Plate 8 Crest Fretting & Block Toppling Point

3.5 Management Options

A number of management options (14 in total) were reviewed in the *Brooms Head & Lake Cakora Management Study* (SMEC2013C). The study made recommendations on the viability of option which were later adopted by Council.

A summary of the adopted options to manage coastal hazards is presented in *Table 5*. This includes comment of the residual risk associated with these options and potential environmental impacts. Included are two options for different levels of revetment protection to seek further input from the community through exhibition of this Draft CZMP to determine a preferred option for adoption in the final CZMP.

Other management options relating to water quality, public access and vegetation management have not been included in *Table 5*. These options that do not specifically relate to managing coastal erosion hazards are discussed further in Section 7

Table 5 Summary of Management Options to address Coastal Hazards

Option No.	Management Option	Description	Residual Risk over 50 year planning period	Indicative Costs	Comment
1	Planned Retreat *Reserve Precinct only*	Relocation of caravan park access roads, amenity blocks, Brooms Head Hall and other reserve facilities further landward when they reach the end of their design life/ come under threat from coastal erosion.	Nil for new assets - removed from foreshore at risk	Not costed	Reduction in heritage values associated with original site of Brooms Head Hall. Reduced need for active retreat if revetment is maintained or rebuilt.
2	Development Controls To reduce risk whilst retaining village character	Minimum floor level of 3.1 m AHD Improved building standards for new development to provide resilience to coastal hazards. House retrofitting and design standards – raising habitable floor level, improved design and usage of appropriate construction materials	Nuisance flooding of low-lying yards from oceanic inundation, high lake levels and catchment flooding. Potential overfloor flooding of some existing dwellings by 2050 due to sea level rise.	n/a	Inundation of septic tank absorption trenches still an issue.
3	New Revetments	Revetments constructed to higher design standard including higher crest level (4.5 m AHD) to minimise damage and overtopping during the 1 in 100 ARI storm event.	Risks associated with storm event more severe than the 1 in 100 ARI event	Capital cost $5.6 M (entire foreshore reserve to southern bridge abutment), averaged annual maintenance cost of $39,200. Capital cost $1.5 M Ocean Road frontage, averaged annual maintenance cost of $10,500.	Visual impact of revetments with crest levels up to around 1.5 m higher than existing revetments/ ground levels. Impacts on beach access, however, design could incorporate pedestrian access along the crest as well as beach accessways and four wheel drive vehicle access. Additional encroachment of revetment onto sandy beach if foreshore caravan park sites preserved, encroachment onto sites if existing revetment toe alignment maintained. Similar encroachments for lakefront revetment. Potential reduced sand volume along northern foreshore reserve and lake entrance where no existing revetment. Diminished views from foreshore caravan park sites. Eventual loss of sandy beach in front of foreshore reserve due to shoreline recession and revetment not allowing shoreline to retreat. Drainage behind revetment would also need to be

Option No.	Management Option	Description	Residual Risk over 50 year planning period	Indicative Costs	Comment
					considered to prevent ponding of runoff and to maintain wetland area (swamp forest) immediately south of bridge. Possible development of scour channel against revetment adjacent to bridge abutment reducing likelihood of lake break out to north and scour at toe of *ad hoc* revetment (toe would still be subject to scour from creek breakouts). Potential impacts on entrance area due to extension of the wall to the bridge abutment (effectively 'training' the entrance) would need to be assessed in more detail.
4	Rebuild and/ or Extend Foreshore Reserve Revetment Rebuild Ocean Road Revetment	Rebuilding foreshore reserve revetment to a similar standard to the revetment rebuilt in 2010 (approx. 1 in 10 ARI). This would be a lesser standard than Option 3 with a lower crest level and smaller armour rock (so existing rock can be used as an underlayer) Also rebuild the *ad hoc* Ocean Road revetment to the same standard as option 3 but with a lower crest level (overtopping structure)	Foreshore reserve revetment could sustain significant damage in a 1 in 10 ARI event (depending on water levels and scour levels at the structure) and have to be rebuilt. The probability of a 1 in 10 ARI storm occurring within a 50 year period is a certainty statistically, and more than one 1 in 10 ARI storm may occur during a given 50 year planning period. However, the number of times the revetment may need to be rebuilt/ repaired within a 50 year planning period depends on the number and severity of storms experienced over this time. For example, from available information, no major revetment maintenance works were carried out between 1978 and 2010. Inundation from overtopping of revetment crests during severe storms. Potential danger to pedestrians from 'green water' overtopping foreshore revetment during severe storms.	Capital cost $750,000 from northern boatramp to southern bridge abutment ($174,000 for revetment extension component), as the revetment south of boatramp has already been rebuilt and a 50 m extension has also been built to the north. Assuming the revetment had to be rebuilt to the same, lesser standard once during the 50 year planning period the 'maintenance' cost would be close to $1 M for the 50 years. However, the number of times the revetment may need to be rebuilt/repaired within a 50yr period depends on the number and severity of storms experienced over this time. Indicative cost for Ocean Road revetment is $1.2 M compared to $1.5 M for Option 3. Averaged annual maintenance cost is $8,500 for Ocean Road revetment.	Minor encroachments onto reserve and or beach. Similar for lakefront properties. Eventual loss of sandy beach in front of foreshore reserve due to shoreline recession and revetment not allowing shoreline to retreat. Possible development of scour channel against revetment adjacent to bridge abutment reducing likelihood of lake break out to north and scour at toe of *ad hoc* revetment (toe would still be subject to scour from creek breakouts). Potential impacts on entrance area due to extension of the wall to the bridge abutment (effectively 'training' the entrance) would need to be assessed in more detail. 'End effects', i.e. scour and erosion of unprotected dune if foreshore reserve revetment not extended to bridge.
5	Repair/ maintain existing Ocean	Repair of individual revetments as	Unknown, *ad hoc* structures have not been built to a known or consistent	unknown	Liability issues – if revetments were maintained/ repaired by Council and failed during a major storm resulting in

Option No.	Management Option	Description	Residual Risk over 50 year planning period	Indicative Costs	Comment
	Road Revetment	required.	design.		property damage. Approvals and liability issues – if revetments maintained by land owners as *ad hoc* structures are located on a Crown reserve.

Note: averaged annual maintenance cost for revetments based on 0.7% of the capital cost.

4 COASTAL ECOSYSTEM HEALTH

4.1 Estuary Health Status

The NSW Government's *State of the catchments 2010 Northern Rivers Region Estuaries and Coastal Lakes* report, based on data collected to 2009, does not include a condition indicator score for Lake Cakora, as limited data is available.

The indicators of estuary condition used in the Estuaries and Coastal Lakes report were:

- eutrophication: chlorophyll-a, macroalgae and turbidity
- habitat distribution: change in seagrass, mangrove and saltmarsh (macrophytes) extent
- fish assemblages: species diversity and composition, species abundance, nursery function and trophic integrity (food web).

4.1.1 Water and Sediment Quality

Water quality in Lake Cakora is influenced by catchment runoff, the shallowness of the lake, entrance conditions and the degree of mixing and flushing of the lake waters. As shown in *Figure 4*, salinity and temperature can naturally vary widely within Lake Cakora.

Merritt *et al* (2007) reported that faecal coliform levels in Lake Cakora exceeded guidelines for swimming (primary contact) around once every two years, and *enterococci* more often. Poor water quality in Lake Cakora would also have the potential to impact on beach water quality at the time of entrance breakouts.

CVC collected data on water levels, rainfall (Townsend), faecal coliforms and entrance conditions (open/ closed) between 1 September 1999 and 22 July 2000. Although sampling did not conform to current guidelines, the data indicate that after three or more days of rain when the entrance is closed, Lake Cakora is unlikely to be suitable for swimming (see *Lake Cakora Estuary Processes Study* (SMEC 2013a) for more information).

No information is available on other water quality parameters such as pH, turbidity or nutrient levels. As faecal coliform counts may indicate bacteriological contamination, this could also indicate associated nutrient inputs from sewage. However, there appear to be no records of algal blooms (which are associated with high nutrient levels). Lake Cakora and surrounds are mapped as potential acid sulphate soils. However, there appear to be no records of fish kills at Lake Cakora which could be an indicator of acid runoff or low dissolved oxygen levels. Dissolved oxygen concentrations are affected by temperature (decrease as temperature increases), salinity, turbidity and pH. Excessive algal growth due to high nutrient levels may result in low dissolved oxygen levels during the night.

No data is available on sediment quality, however, sediment contamination is not likely to be an issue, based on former land uses (limited grazing), and current land uses (e.g. no industrial land uses and essentially an undeveloped catchment). Although there are highly erodible soils within the catchment, it is well vegetated and hence accelerated rates of sedimentation of the lake would not be expected.

4.1.2 Flow Conditions

The catchment of Lake Cakora is largely contained within Yuraygir national Park and in a natural state, with associated natural inflows including tannin stained waters. Around the urban area several stormwater pipes discharge to the lake. Drainage swales have also been constructed near urban development on the southern side of the lake, west of Ocean Road.

The entrance to Lake Cakora is untrained. Opening of the lake is dependent on a number of variables including rainfall, the initial lake storage volume, ocean tide, waves and a berm height. As noted in Section 2.2 , berm heights can range between 1 - 2 m AHD. During entrance breakouts, sediment from the entrance is transported into the nearshore area. Sediment is then reworked by coastal processes and transported back onshore by waves to reform the entrance berm.

Based on analysis of information for the catchment flooding assessment (see Section 3.3), Lake Cakora was open more than it was closed from July 2010 to October 2011. However, not all entrance breakouts would have been natural occurrences. As shown in *Figure 4,* at times salinity was around 35 parts per thousand (ppt) at the automatic recorder, indicating when the lower lake is flushed by seawater.

4.1.3 Estuarine Biota and Habitat Condition

The latest estuarine vegetation mapping (seagrass, mangroves and saltmarsh) was based on aerial photo interpretation and field work in 2000. Previous mapping of NSW estuaries based on 1981 aerial photography and field surveys in 1983 (West *et al* 1985) did not include mapping for Lake Cakora and hence no comparison on the extent of estuarine vegetation can be made.

The Department of Environment and Climate Change (DECC) undertook a riparian condition assessment for NSW estuaries. Riparian condition was rated as either 'Good', 'Moderate' or 'Degraded'. For Lake Cakora, riparian condition was generally rated moderate to good. Degraded areas were identified around the Ocean Road Bridge (presumably as the foreshore has been altered due to the bridge abutments) and approximately 600 m to the north, near Brooms Head Road.

Although vegetation within the Brooms Head Reserves has been subject to degradation through high visitation, recreational impacts, excessive mowing, coastal erosion, unauthorised tree removal for views, weed infestations and garden waste dumping, and exotic plantings, CVC (2006) identified that, in general, it was in relatively good health.

There is no data on fish assemblages. In the 2009 survey, one resident indicated that Lake Cakora is a nursery for eastern king and school prawns (CVC 2009).

4.1.4 Estuary Health Pressures

Potential pressures affecting Lake Cakora are listed in *Table 6*, together with comment on their likely significance on the health of the lake.

4.1.5 Key Pressures

The pressure indicator score for Lake Cakora in the NSW Government's *State of the Catchments 2010 Northern Rivers Region Estuaries and Coastal Lakes* was assessed as very low for the following parameters: cleared land, sediment input, nutrient input, freshwater flow, disturbed habitat and fishing. Population pressure was assessed as low.

The most significant issues identified in the 2009 community survey were septic overflows/ leaching, poor water quality, stormwater and drainage management, and bank erosion (in that order) (CVC 2009). These issues were raised by survey respondents and data is not necessarily available to quantify their significance or impacts.

Data Sources:
DECC Riparian Condition Rating
(supplied by CVC)
Vector Backdrop – Roadnet - © Map

Table 6 Potential Pressures affecting Estuary Health

Category	Potential pressures and sources	Comment
Water and Sediment Quality	Point sources of pollution (e.g. effluent, contaminated sites)	The catchment of Lake Cakora is largely contained within Yuraygir national Park and in a natural state. Based on available information on former and current land uses, the only potential source of contamination is the former waste disposal facility located off Brooms Head Road. However, the landfill closed over a decade ago and it was remediated by capping.
	Diffuse sources of pollution (e.g. urban stormwater, acid sulphate soils, bank or foreshore erosion, agricultural runoff, sewer overflows, septic tank effluent	Brooms Head is not sewered. Effluent disposal is via septic tanks and absorption trenches. The effectiveness of absorption trenches close to the lake may be affected by high groundwater levels. Although the caravan park sewerage system has been upgraded there is potential for the disposal pond to the south-west of the village to overflow into the catchment of Lake Cakora during high rainfall events. Potential bacteriological contamination of the lake affects the recreational value and puts at risk the health of the public. Stormwater discharges to the lake may include pollutants associated with urban development, e.g. fertilisers etc. Other potential diffuse sources of pollution do not appear to be an issue for Lake Cakora. There is no agricultural landuse in the catchment and no significant bank erosion sites. Lake Cakora and surrounds are mapped as Acid Sulphate Soils (ASS). Excavation into and exposure of ASS can lead to acid runoff.
Flow Conditions and Sediment Movement	Changes to catchment inflows (e.g. land clearing, urbanisation)	The steeper slopes within the catchment are well vegetated and old disturbances, such as quarries and areas cleared for grazing have largely regenerated since incorporation in the national park (NPWS 2003). There is little opportunity for urban expansion as Brooms Head is surrounded by Yuraygir National Park and Crown and Council managed reserves, mainly zoned for environmental protection. There is also little opportunity for intensification of development as the village is zoned for low density residential development and few vacant urban allotments exist.
	Changes to tidal exchange, salinity regimes and inundation levels (e.g. altered entrance conditions for ICOLLs, berm status, entrance training works)	Lake Cakora entrance is untrained. The average level at which the lake breaks out is influenced by periodical artificial openings. Artificial opening of the lake also impacts on the natural patterns and fluctuations in salinity and tidal exchange.
	Changes to tidal/ flood flows across an estuary (e.g. due to culverts, flood gates or reclamation)	Apart from artificial openings, the only other potential anthropogenic influence on tidal/ flood flows is the minor constriction at the Ocean Road Bridge abutments.
	Sea level rise and upward movement of water tables	Haines (2006) noted that sea level rise would cause ICOLL entrance sand berms to move inland and build-up to a higher level relative to local topography. The increase in berm height would be expected to match the increase in sea level rise, given that the berm is built primarily by wave run-up processes. Sea level rise poses an increased threat of inundation of assets and development on private lands in proximity to the lake shoreline. Gravity drained stormwater infrastructure and sewerage systems may also be compromised. The predicted impacts on Lake Cakora water quality (assessed in the CLAM model) as a result of postulated 2100 sea level rise were identified as increased salinity and increased dilution of pollutants due to increased flushing, resulting in a decrease in the potential for algal blooms and aquatic weeds and an increase in native estuarine flora and fauna (Merritt *et al* 2007).
Estuarine biota	Changes to the extent and condition of seagrass, saltmarsh, mangroves, coastal	Disturbances to riparian and wetland vegetation may result from informal access for recreational activities. It was noted in the 2009 survey, that on occasions motorbikes have been ridden through the lake area when levels are low. Data is not available to determine

Category	Potential pressures and sources	Comment
	wetlands, littoral rainforest and riparian vegetation	changes in estuarine habitat and biota.
	Recreational and commercial fishing	There is no commercial fishing within Lake Cakora. However, NPWS (2003) noted that commercial beach netting is carried out between Brooms Head and the Sandon River. Ocean hauling is closed over the Christmas period (15 December to 15 January) between Cakora Point and Brooms Head Bridge (DPI Fisheries). Respondents to the 2009 survey indicated that recreational fishing and bait collection are popular activities. The small size of the lake makes it more susceptible to recreational fishing pressures at peak holiday periods.
	Outbreaks of aquatic weeds or pests	Large tracts of the coastal dunes in northern Yuraygir National Park were sandmined during the 1970s and 80s. Several weed species were introduced to these areas during postmining rehabilitation that have resulted in large scale, multi-species infestations. These include bitou bush *Chrysanthemoides monilifera* (NPWS 2003). NPWS (2003) identified large dense infestations of groundsel bush *Baccharis halimifolia* in the northern section of Yuraygir National Park in the Brooms Head – Sandon area. However, groundsel is not a major problem in the Lake Cakora catchment. In addition to bitou bush and groundsel, the *Brooms Head Reserves Vegetation Management Plan* (2006) identified lantana *Lantana camara*, camphor laurel *Cinnamomum camphora,* as the principle target weeds (as these are all declared noxious species). Second priorities for weed control included gloria lilly, asparagus fern and a range of exotic 'garden escapes' within natural areas on CVC managed reserves. Staged removal of buffalo grass with native couch and kangaroo grass was also a priority. As well as foxes and feral domestic animals, individual cane toads are sporadically collected from public and private lands in and around Brooms Head where they have been accidentally introduced through inadvertent transportation (NPWS 2003). Also likely that coss-country migration from populations further north near Yamba and Lake Arragan has occurred.

5 COMMUNITY USES

5.1 Access

As indicated in *Figure 7* the Brooms Head Village is surrounded by public lands mainly national park and crown land with a foreshore reserve fronting the lakefront properties along Ocean Road.

Figure 7 Land Tenure

There is an informal track and dilapidated bridge accessing the northern lake and beach to the north of Brooms Head on Crown land near the former prawn farm. There is no

formal access to the foreshore reserve fronting the lakefront Ocean Road houses and the area appears as if it is part of private property. A 4WD access track is located on the southern side of Lake Cakora entrance.

There are a number of beach access stairs over the foreshore revetment. Some of these have been damaged by storm erosion and have been closed off. At the southern end of the foreshore reserve there is a concrete path adjacent to the revetment. There are two boatramps in this area. There is a formal lookout carpark at Cakora Point and informal tracks around the headland. Some informal tracks are close to the headland crest and/ or cliff face. Dune fencing (to catch sand) has been erected and revegetation work implemented by the Brooms Head Landcare Group on both sides of the Lake Cakora entrance, with the primary focus on the northern side.

5.2 Amenity

Beach amenity to the north of Lake Cakora entrance is considered high as this unprotected area appears to be in a natural state. However it was sand mined in the late 1970s to early 1980s resulting in the reconstructed frontal dune being lower and located further landward and the introduction of exotic species for dune stabilisation. Some trees/ shrubs on the northern dune and unprotected section of the northern end of the foreshore reserve have been lost due to erosion. Vegetation on either side of Lake Cakora entrance and, in particular the northern side of the entrance, is affected by the variable location of entrance breakouts.

The entrance area has been modified by the *ad hoc* revetment and the Ocean Street bridge abutments. When the entrance breaks out it can scour back to the toe of the revetment, see ***Plate 9***.

Most of the beach to the south of the entrance is protected by a revetment. Inundation of the sandy beach in front of the foreshore reserve revetment occurs at times during high tides. During a site visit on 29 December 2011 there was no beach in the 'flagged' patrolled area, see ***Plate 10***.

Plate 9 scour at the revetment toe
13th February, 2002 (source: CVC)

Plate 10 Brooms Head
Patrolled Swimming Area (29/12/2011)

5.3 Recreational Use

Recreational activities at Brooms Head include:

- Camping, caravanning and picnicking along the foreshore reserve.

- Driving on the beach – 4WD access is located on the southern side of Lake Cakora entrance with driving on the beach permitted from the lake entrance, north to Red Cliff (damage to dune vegetation has been observed due to 4WDs).
- Fishing – the beach is fished for bream, tailor, whiting and flathead as well as a variety of rock fish (Maclean Historical Society Inc. 1990). Rock fishing spots are located around the base of Cakora Point. Mud crabs are caught in Lake Cakora. Pumping for yabbies is popular just upstream of the bridge adjacent to the southern shore of Lake Cakora. The boat launching ramps at the foreshore reserve provide access for deep sea fishing.
- Surfing (including at Back Beach), snorkelling (in the tidal pool at Cakora Point) and swimming at Lake Cakora entrance (most popular area for this activity), Brooms Head main beach and the tidal pool. The beach is patrolled by lifeguards during the summer holidays.
- Walking and sightseeing – Brooms Head is on the Yuraygir Coastal Walk which extends from Angourie in the north to Red Rock in the south, with the walk being mainly along the beach between Red Cliff and Sandon. Cakora Point carpark and lookout is a vantage point for whale and dolphin watching.
- Canoeing and nature observation on Lake Cakora – a variety of wading birds live on the mud-flats (www.clarencetourism.com).

5.4 Cultural Heritage

5.4.1 Aboriginal Cultural Heritage

Mapping of Aboriginal Cultural Landscapes in 2005 indicated that the Brooms Head area is of spiritual/ ceremonial significance to local Aboriginal people (DNR undated, www.northern.cma.nsw.gov.au).

A search of the Aboriginal Heritage Information System (AHIMS) indicated that 10 sites have been recorded in the vicinity of Brooms Head. Byrne (1986) described 11 sites in total (located around Brooms Head, Cakora Point and Lake Cakora), eight midden sites, along with three open camp sites. The middens contained beach and rock shellfish remains and stone artefacts ranging from simple flakes to edge ground axes. The open campsites contained evidence of quarry or workshop activity. Most sites had been subject to erosion, with some middens damaged or essentially destroyed by sand mining. Byrne (1966) noted that the margins of Lake Cakora were of particular interest archaeologically as very little archaeological reconnaissance in the region had focussed on coastal wetlands.

5.4.2 Non-Indigenous Cultural Heritage

The remains of various huts, yards and stock fences etc associated with former grazing leases, located within the national park around Brooms Head, are of historical interest (NPWS 2003, DECC 2007).

The *Clarence Valley Local Environmental Plan (CVC LEP) 2011* heritage schedule lists the following items as being of local significance: Brooms Head Hall, Brooms Head Reserve; and Brooms Head Pine trees, Brooms Head Reserve. As indicated in *Table 4*, these heritage items and places are at risk from coastal erosion.

6 KEY COASTAL VALUES

6.1 Ecological Values

Flora and fauna of conservation significance in the vicinity of Brooms Head include the following protected communities and species.

- Endangered Ecological Communities (EECs) of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions, protected under the *Threatened Species Conservation Act (TSC) 1995*:
  - *Coastal Saltmarsh*
  - *Littoral Rainforest*
  - *Themeda grassland* [Kangaroo Grass] *on seacliffs and coastal headlands*
  - *Swamp Oak Floodplain Forest*
- Some of these vegetation communities are also protected under State Environmental Planning Policy:
  - SEPP 14 – Coastal Wetlands (saltmarsh, wet heath and swamp forest)
- The northern arm of Lake Cakora contains mangrove stands. Mangroves are protected under the *Fisheries Management Act 1994.*
- Lake Cakora, Brooms Head Beach and the Cakora Point rock platforms provide habitat for threatened and migratory shorebirds and waders listed under the *NSW TSC Act*, Commonwealth *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* and international agreements. Residents have observed the following listed fauna species (*TSC Act and/ or EPBC Act*) nesting and/ or feeding at Brooms Head Beach or Lake Cakora: Little Terns, Pied Oyster Catchers, Osprey and Sea Eagles (CVC 2009). Pied Oystercatchers, a Whitefaced Heron and a tern were observed close to, or within, the Lake Cakora entrance area on 22 August 2011. Sooty Oyster Catchers are also found on the southern section of the beach and around the rocky shores (headland/lagoon). Beach Stone Curlews periodically frequent the beach adjacent to the Lake entrance.
- As part of the inspections for this study a live Loggerhead turtle was also observed on the beach near the entrance on 15 October 2011. Hawksbill[1], Green[2] and Loggerhead[3] marine turtles are known to forage in the waters off Brooms Head Beach (TDE2010[1], Zietch 2012[2], SMEC 2011[3]). Since 1968 OEH/NPWS has recorded 30 turtle events in the immediate study region. Although there have been sightings of emergent turtles on Brooms Head Beach these have been attributed to stranding events and not attempted nesting activity, as the region is approximately 350 km south of established marine turtle nesting areas (DoE2014, GBRMPA2014). All marine turtles found in Australian waters are listed under the *EPBC* Act, with the Loggerhead, Green and Leatherback Turtles listed under the *TSC Act*.
- The catchment of Lake Cakora provides habitat for a variety of threatened fauna species including the Eastern Ground Parrot *Pezoporus wallicus wallicus* and Eastern Chestnut Mouse *Pseudomys gracilicaudatus* which are known to inhabit the Brooms Head Reserve (CVC 2006).
- A large part of the catchment of Lake Cakora forms regional habitat corridors.

See the Estuary Processes Study (SMEC 2012a) for more information on flora and fauna recorded within the catchment of Lake Cakora.

It should also be noted that the majority of the study area and of Lake Cakora catchment is within the Yuraygir National Park. This estate is subject to management under the National Parks and Wildlife Service (NPWS) *Yuraygir National Park and Yuraygir State Conservation Area Plan of Management* (NPWS 2003) and *Yuraygir National Park and State Conservation Area Fire Management Strategy* (NPWS 2007). This CZMP will not duplicate management nor impose additional management actions for NPWS who administer the national park. Existing management, including implementation of the relevant plans of management by NPWS should continue to maintain the ecological and cultural heritage values of the Yuraygir National Park

6.2 Cultural Heritage

As noted in Section 5.4 , Aboriginal sites have been recorded around Brooms Head. All Aboriginal sites are protected under the National Parks and Wildlife Act 1974. Local heritage items are protected under Council's LEP.

6.3 Socio-Economic Values

The *Brooms Head Reserves Vegetation Management Plan* (CVC 2006) identified that the local community and visitors value the reserve for its natural environment, scenic qualities and recreational opportunities and as a buffer from storms and oceanic forces.

A 2009 survey by CVC indicated that the most important values associated with Lake Cakora are peace and tranquillity, clean swimming water and native animals and plants.

Tourist accommodation at Brooms Head includes the caravan park which has 291 sites including cabins (52 are long stay), bed and breakfast accommodation, holiday houses and units. The caravan park contributes significant income to the CCRT, over $285,000 in the 2011/12 financial year, with visitation providing flow on effects to local businesses.

The Brooms Head area and its beaches are highly valued as a destination for residents of Maclean and nearby areas with a long history as a chosen destination for day trips and short visits. The Reserves foreshore land is highly valued due to the amenity and the social, cultural and recreational value it provides to the local community, both residents of the village as well as persons who visit from nearby communities, such as Maclean, for camping holidays.

7 COASTLINE MANAGEMENT STRATEGY

Strategies and actions to address coastal hazards and issues, together with measures to enhance the natural environment and improve public access are listed in the Implementation Schedule (*Table 7*). A description of the options to mitigate coastal hazards is provided in *Table 5*. Recommended management strategies and actions in *Table 7* and *Table 5* are not listed in priority order and have generally been listed in the same order as mentioned on the *Brooms Head and Lake Cakora Coastal Management Study* (SMEC 2013c).

Some of the actions below would be implemented through existing management plans and programs and cooperatively with other agencies. Coastal values, access, issues and management options/ actions are shown in *Figure 8* to *Figure 12*.

- *Figure 8* details the issues and management actions for the Northern Beach Precincts and Lake Cakora (north)
- *Figure 9* details the issues and management actions for the Lakes Entrance Precinct
- *Figure 10* details the issues and management actions for the Foreshore Reserve (North) Precinct
- *Figure 11* details the issues and management actions for the Foreshore Reserve (South) and Cakora Point.
- *Figure 12* details the issues and management actions for Lake Cakora (South).

Table 7 Implementation Schedule (Management Strategies and Actions are not listed in order of priority)

No.	Management Strategy	Action	Method of Implementation	Responsibility	Performance Criteria	Commencing	Indicative Costs				Priority	Potential grant funds
							Yr 1 (2014-2015)	Yr 2-5 (2015-2018)	Yr 6-10 (2019-2024)	Annual Maintenance		
1	Planned Retreat *Reserve Precinct only*	Relocation of reserve facilities.	Through CVC asset management program.	CVC	Facilities are relocated prior to continual damage occurs due to coastal hazards. No new facilities are constructed within hazard zone of reserve precinct.	As assets become at risk or reach the end of their serviceable life. Refer to CVC Asset management Plan.	Not costed	Cost expected to occur over this period and beyond.	Cost expected to occur over this period and beyond.		Low	Grant funds are unlikely – fund from CCRT/council budget for facilities.
2	Development Controls	New development/redevelopment in areas subject to coastal/lake inundation, catchment flooding and coastal erosion shall be required to meet new coastal development controls.	Through CVC Development Control Plan (DCP).	CVC Planning Staff	All future development within coastal hazard areas to be assessed against coastal development controls once they have been developed.	2014	CVC planning / development assessment staff time. $2,000 for advertising Draft DCP	CVC planning / development assessment staff time	CVC planning / development assessment staff time	CVC planning / development assessment staff time	High	Grants do not cover council or admin staff time. CVC General funds.
2.1	Floor level	Apply minimum floor level for new development/ redevelopment in areas subject to coastal inundation and associated flooding. CVC to amend development controls to provide minimum floor level (3.1m AHD) for coastal hazard zones.	Through CVC Development Control Plan.	CVC Planning Staff	All future development to have floor levels immune or resilient to inundation.	2014	CVC planning / development assessment staff time	CVC planning / development assessment staff time	CVC planning / development assessment staff time	CVC planning / development assessment staff time	High	Grants do not cover council or admin staff time. CVC General funds.
2.2	Development Footprint	New development should not occur seaward of existing development/coastal hazard lines.	Through CVC Development Control Plan.	CVC Planning Staff	All future development to have floor levels immune or resilient to inundation.	2014	CVC planning / development assessment staff time	CVC planning / development assessment staff time	CVC planning / development assessment staff time	CVC planning / development assessment staff time	High	Grants do not cover council or admin staff time. CVC General funds.
2.3	Building Standards	New development/redevelopment within coastal hazard areas. Improved building standards for new development to provide resilience to coastal hazards and ensure compatible with coastal character. Such as; • Resilience to inundation of lower level • Geotechnical design to accommodate reduced foundation capacity (Pilled construction) • Lightweight/relocatable construction • View corridors between developments.	Through CVC Development Control Plan.	CVC Planning Staff	All future development to have floor levels immune or resilient to inundation.	2014	CVC planning / development assessment staff time	CVC planning / development assessment staff time	CVC planning / development assessment staff time	CVC planning / development assessment staff time	High	Grants do not cover council or admin staff time. CVC General funds.
2.4	Existing Development	When substantial renovation occurs promote house retrofitting to suit coastal hazards and coastal character. House retrofitting and design standards – raising habitable floor level, improved design and usage of appropriate construction materials for resilience against coastal hazards.	Through this CZMP and Education see 10.3.	CVC and Community/ Residents	Community/Residents are aware that retrofitting houses can make them more resilient to coastal hazards. Some retrofitting of existing houses occurs to make them more.	2016		CVC staff time	CVC staff time	CVC staff time	Medium	Grants do not cover council or admin staff time. CVC General funds.
3	New Revetments Designed for a 100yr Average Return Interval (ARI) event, with increased crest level above existing revetments.	Undertake concept design and Environmental Impact Assessment (EIA). Design to allow for public foreshore access and stormwater management. EIA to include assessment of visual impact and impact on entrance area due to extension of revetment to bridge abutment.	Through this CZMP (if preferred option).	CVC with support from OEH and DP&I		2014	If combined for both Ocean Road and Foreshore Reserve. $200,000 for Design, EIA and Approvals due to cooperative savings. Cost if developed separately provided below.				High	OEH coastal management grants may be feasible. 50% NSW Government. CVC share may utilise CCRT funds.

No.	Management Strategy	Action	Method of Implementation	Responsibility	Performance Criteria	Commencing	Indicative Costs				Priority	Potential grant funds
							Yr 1 (2014-2015)	Yr 2-5 (2015-2018)	Yr 6-10 (2019-2024)	Annual Maintenance		
3.1	New Foreshore Reserve Revetment (100yr ARI)	Revetment funding acquired. Revetment construction.	Through this CZMP (if preferred option).	CVC with support from OEH and DP&I	New revetment capable of withstanding 1 in 100yr event.	2014	$150,000 for Design EIA and Approvals. CVC staff and administration time. To manage projects and to apply for grants to fund works.	$5.6 million – Capital Cost		$39,200 * average yearly maintenance	Low	OEH coastal management grants may be feasible.
3.2	New Ocean Road Revetment (100yr ARI)	Revetment funding acquired. Revetment construction.	Through this CZMP (if preferred option).	CVC with support from OEH and DP&I	New revetment capable of withstanding 1 in 100yr event.	2014	$120,000 for Design EIA and Approvals. CVC staff and administration time. To apply for grants to fund works.	CVC staff and administration time. To apply for grants to fund works.	$1.5million -Capital Cost	$10,500 * average yearly maintenance	High	OEH coastal management grants may be feasible. Potential Levy on private landowners under LG Act.
4	Rebuild and/ or Extend Revetments. Crest built to similar level as existing. Minor overtopping in most storm events. Revetment designed to withstand overtopping from 1 in 10yr event however overtopping may cause damage behind revetment.	Refine concept design and undertake Environmental Impact Assessment (EIA). Design to allow for public foreshore access and stormwater management. EIA to include assessment of impact on entrance area due to extension of revetment to the bridge abutment.	Through this CZMP (if preferred option).	CVC with support from OEH and DP&I		2014	If combined for both Ocean Road and Foreshore Reserve Revetment. $200,000 for Design, EIA and Approvals due to cooperative savings. Cost if developed separately provided below.				High	OEH coastal management grants may be feasible. 50% NSW Government. CVC share may utilise CCRT funds.
4.1	Rebuild and/or Extent Foreshore Reserve Revetment	Revetment funding acquired. Revetment construction.	Through this CZMP (if preferred option).	CVC with support from OEH and DP&I	Revetment capable of withstanding 1 in 10yr event. Note; overtopping may contribute to damage of any infrastructure behind revetment.	2014	$150,000 for Design EIA and Approvals. CVC staff and administration time. To manage projects and to apply for grants to fund works.	$750,000+ –Capital Cost (as revetment south of boatramp has already been rebuilt and 50m extension to north has recently been built this includes $174,000 for extension). +$1.0million Capital Cost for rebuild (as revetment only built to sustain a 1in10yr event it is likely that within the 10 year period the entire revetment could require a significant rebuild).		$7,000 * average yearly maintenance *Does not account for damage that may occur to assets behind revetment	Low	OEH coastal management grants may be feasible.
4.2	Rebuild Ocean Road Revetment	Revetment funding acquired. Revetment construction.	Through this CZMP (if preferred option).	CVC with support from OEH and DP&I	Revetment capable of withstanding 1 in 10yr event for overtopping and rock armour sized to withstand 1 in 100 yr events. Note; overtopping may contribute to damage of any infrastructure behind revetment.	2014	$120,000 for Design EIA and Approvals. CVC staff and administration time. To apply for grants to fund works.	CVC staff and administration time. To apply for grants to fund works.	$1.2million -Capital Cost	$8,400 * average yearly maintenance *Does not account for damage that may occur to assets behind revetment	High	OEH coastal management grants may be feasible. Potential Levy on private landowners under LG Act.

No.	Management Strategy	Action	Method of Implementation	Responsibility	Performance Criteria	Commencing	Indicative Costs				Priority	Potential grant funds
							Yr 1 (2014-2015)	Yr 2-5 (2015-2018)	Yr 6-10 (2019-2024)	Annual Maintenance		
5	Repair/ maintain existing Ocean Road Revetment	As an interim action, prior to implementation of a revetment option.	Liability and development approvals issues to be resolved to determine method of implementation.	CVC in consultation with OEH	Houses/private land can be defended.	2015	Approx $50,000 for materials undertaken with council labour and plant. Or contractors at greater cost.				High	Funding unlikely. Potential Levy on private landowners under LG Act Subject to event may be able to apply for funding under Natural Disaster Assistance Scheme post event.
6	Stormwater Management/ Water Quality	Stormwater management to be considered in revetment design – could include drainage swale and infiltration behind revetment.	As part of revetment works.	CVC with support from OEH and DP&I	Stormwater upgraded with revetment.	2014	Included revetment costs	Included revetment costs	Included revetment costs	Included revetment costs	As per revetment options	As per revetment options.
6.1	Septic Tanks	Ensure existing septic tanks and absorption trenches are performing as per design.	Through regular inspections of systems by CVC.	CVC		2014	CVC Staff Time	Ongoing until sewer has been implemented.	Ongoing until sewer has been implemented.		High	Grants do not cover council or admin staff time.
6.2	Caravan effluent disposal	Investigate performance of caravan park effluent disposal pond and undertake maintenance and/or repair.	Through monitoring/ maintenance of system.	CVC in conjunction with Caravan Park operators		ongoing	CVC staff time for inspections	Note; Unable to cost accurately without details existing condition			High	No funding. Undertaken under council caravan park maintenance.
6.3	Sewerage reticulation	a)Opportunities for the provision of reticulated sewerage to Brooms Head are investigated and promoted by Council. b)Construct reticulated sewerage system for Brooms Head.	Through the State Government Country Towns Water Supply and Sewerage Scheme .	CVC in conjunction with NSW Government (Public Works)		a) 2015 b) Post 2016	a) CVC Staff Time	b)Note; Unable to cost accurately prior to design of reticulated sewerage system. $5million @$250/m for 20km.			Medium	Partial funding from NSW State Government under Country Towns Water Supply and Sewerage Scheme.
7	Control/ Manage Opening of Lake Cakora	As an interim action, prior to sewering Brooms Head, carry out artificial breakout during swimming season for recreational purposes if lake water level has reached 1.6m AHD without breaking out naturally.	Through this CZMP.	CVC with support from OEH	Improved water quality within Lake Cakora evidenced by Monitoring see 8. No reported human health problems from recreation in lake.	2015	CVC staff costs and plant to excavate pilot channel.$10,000				High	
8	Monitoring		Through this CZMP.									
8.1	Lake Monitoring	Bacteriological monitoring at Lake Cakora entrance prior and during Christmas holiday period. Monitoring of lake ecosystem health indicators.	Through inclusion of Lake Cakora in NSW Natural Resources Monitoring, Evaluation and Reporting (MER) program.	CVC with support from OEH and/or LLS	Yearly monitoring to ensure lake is safe for public.	2014 Ongoing (generally only expected to be undertaken once a year around peak Christmas holiday period)	$10,000 for lab testing and training. CVC staff to be trained in sampling.			$5,000-10,000/yr for lab testing. CVC staff time to undertake sampling	Medium	OEH and/or LLS part funding.
8.1	Beach Profile Monitoring	Pre and post storm beach profiling to enable storm demand volume to be better estimated.	Council undertook two survey of beach in 2013. Additional CVC surveys and/or NSW photogrammetric surveys.	CVC with support from OEH	Record of beach profiles gained over next 10years to improve understanding of storm demand.	2014 subject to agreement/ funding availability from OEH and Catchment Management Authority	$3,000	$12,000	$15,000	$3,000/yr	High	OEH part funding. CVC General funds.
9	Emergency Planning	Review Emergency Action Sub-Plan (EASP) following endorsement of CZMP by CVC.	Council to review	CVC with SES & OEH support.	EASP to be regularly reviewed against CZMP and work being untaken to ensure it is able to meet emergency needs.	2014	CVC Staff time and advertising costs. $1,000	CVC Staff time and advertising costs. $2,000	CVC Staff time and advertising costs. $3,000		High	No grants required, undertaken with council resources. CVC General funds.

No.	Management Strategy	Action	Method of Implementation	Responsibility	Performance Criteria	Commencing	Indicative Costs				Priority	Potential grant funds
							Yr 1 (2014-2015)	Yr 2-5 (2015-2018)	Yr 6-10 (2019-2024)	Annual Maintenance		
10	Education	Advise residents/ caravan park visitors of actions to be taken in a coastal storm emergency.	Through distribution/ promotion of EASP, review of Brooms Head Caravan Park emergency/ evacuation plan, flood management plan and development of procedures for emergency evacuation etc should Brooms Head Road be cut by major oceanic flooding or catchment flooding.	CVC Emergency Management Committee, Clarence Valley Coast & Estuary Management Committee and SES.	Ensure community (and visitors) are well educated about emergency procedures.	Dependent on frequency of major storm events	SES & CVC Staff time and advertising costs	SES & CVC Staff time and advertising costs	SES & CVC Staff time and advertising costs		High	No grants required, undertaken with council resources in conjunction with Clarence Valley Coast & Estuary Management Committee and SES.
10.1	Information/Signage	Distribute information/ install signage to educate community (including visitors) on ecological values, risks to public health and safety: • advise when the lake is likely to be unsuitable for swimming • outline maintenance requirements for on-site effluent disposal systems • outline practices to reduce stormwater pollution (e.g. minimal use of fertilisers, removal and disposal of dog droppings) • provide information on the source of periodical discolouration of the lake and that it does not pose a health or ecological risk • convey additional information on the ecological and habitat values of Lake Cakora • provide advice on lake opening strategy • warn of danger of rock falls at base of Cakora Point and public access areas at the top of slopes, such as at the carpark.	Through general funding for environmental improvement, in association with DuneCare activities, in partnership with NP&WS.	CVC, DuneCare, Clarence Valley Coast & Estuary Management Committee and NP&WS		ongoing	NP&WS and CVC Staff time and signage costs.	NP&WS and CVC Staff time and signage costs	NP&WS and CVC Staff time and signage costs.		High for matters relating to public risk. Medium for other matters.	Undertaken with council resources and/or grant funds in conjunction with DuneCare and Clarence Valley Coast & Estuary Management Committee.
10.2	Planning advice	Provide planning advice on Section 149 Planning Certificates to advise of coastal hazards and the adopted CZMP.	Through issue of Section 149 certificates.	CVC Planning Staff.		ongoing	CVC Staff time	CVC Staff time	CVC Staff time		Medium	Grants do not cover council or admin staff time.
10.3	Building Standards	Promote use of coastal compatible development and retrofitting.	Through CVC Development Control Plan.	CVC staff	Ensure community is updated and educated in benefits of coastal appropriate development.	ongoing	CVC Staff time	CVC Staff time	CVC Staff time		Low	Grant funds are unlikely – fund from council budget. CVC General funds.
11	Access Management	Ensure current level of public access is maintained or improved. Upgrade beach access - east of Prawn Farm site.	Subject to liaison and agreement between Council and Crown Lands. Through revetment design.	CVC	Current level of public access is maintained or improved.	2014	$20,000 for design, potentially part of revetment design. CVC staff time for approvals.	$50,000 for materials, to be constructed with CVC labour			Medium	Grant funds are unlikely – fund from council budget for facilities. CVC General funds &/or CCRT fund.
11.1	Pedestrians	Review number and location of beach accessways.	Through this CZMP.	CVC	Current level of pedestrian public access is maintained or improved.	2014	CVC Staff time	May identify future access ways requiring D&C			Medium	Grant funds are unlikely – fund from council budget for facilities. CVC GF &/or CCRT fund.

No.	Management Strategy	Action	Method of Implementation	Responsibility	Performance Criteria	Commencing	Indicative Costs				Priority	Potential grant funds
							Yr 1 (2014-2015)	Yr 2-5 (2015-2018)	Yr 6-10 (2019-2024)	Annual Maintenance		
11.2	4WD	Review location and provision for 4WD access.	As part of CVC 4WD access policy and design/construction of revetment at bridge (as applicable).	CVC	Current level of 4WD public access is maintained. If 4WD access policy is revised review and access may be stopped.	2014	CVC Staff time	May identify future access ways requiring D&C			Medium	Grant funds are unlikely – fund from council budget for facilities. CVC General funds &/or CCRT fund.
11.3	Slopes	Periodical inspections of all slopes which are subject to impacts from coastal processes by a suitably qualified geotechnical practitioner.	As required, realign and formalise tracks at Cakora Point away from potentially unstable areas.	CVC in conjunction with suitable geotechnical engineer	Ensure no tracks are on unstable areas.	2015	CVC Staff Time,	CVC Staff Time, $5,000 to 10,000 for geotechnical engineer	CVC Staff Time, $5,000 to 10,000 for geotechnical engineer		High	Grant funds are unlikely – fund from council budget. CVC General funds &/or CCRT fund.
12	Dune/ natural area management	Continue to control weed and pest species.	Cooperatively with NPWS, Crown Lands, CMA and Dune Care through: • *Brooms Head Reserves Vegetation Management Plan* • *Weed control program on Crown Lands* • *Yuraygir National Park and Yuraygir State Conservation Area Plan of Management*	CVC cooperatively with NPWS, Crown Lands, and Dune Care	Maintain and improve health of dune vegetation. Reduce weed and pest species.	ongoing (minimum 5 year frequency)	$5,000 annually (for weed control)	$5,000 annually (for weed control)		$5,000 annually (for weed control)	High	CVC, NPWS, Crown Lands, and Dune Care to contribute.
12.1	Dune/ natural area management	Dune revegetation and rehabilitation where no revetment is in place.	Cooperatively with DuneCare.	Cooperatively with DuneCare	Maintain and improve health of dune vegetation. Opportunities for sand build up on dunes and beach provided.	ongoing	DuneCare time and resources	DuneCare time and resources	DuneCare time and resources		Medium	DuneCare time and resources. Potential NSW Govt funding. CVC General funds.
13	Compliance issues	Improve compliance/ enforce penalties for: • unauthorised vehicle access around Lake Cakora • 4WDing over dune vegetation • littering	Cooperatively between CVC and NPWS staff.	CVC & NPWS		ongoing	Enforcement staff time	Enforcement staff time	Enforcement staff time		Medium	NPWS to provide staff time.
14	Foreshore Facilities	Maintain and improve foreshore facilities such as boat ramp, cleaning tables, and picnic and recreation facilities.	Through CVC asset management program.	CVC	Facilities are maintained and improved.	As assets reach the end of their serviceable life or need for additional facilities is identified.	Not costed	Cost expected to occur over this period and beyond.	Cost expected to occur over this period and beyond.		Low	Grant funds are unlikely – CVC General funds &/or CCRT fund.

Averaged annual maintenance costs for revetments is based on 0.7% of the capital cost.

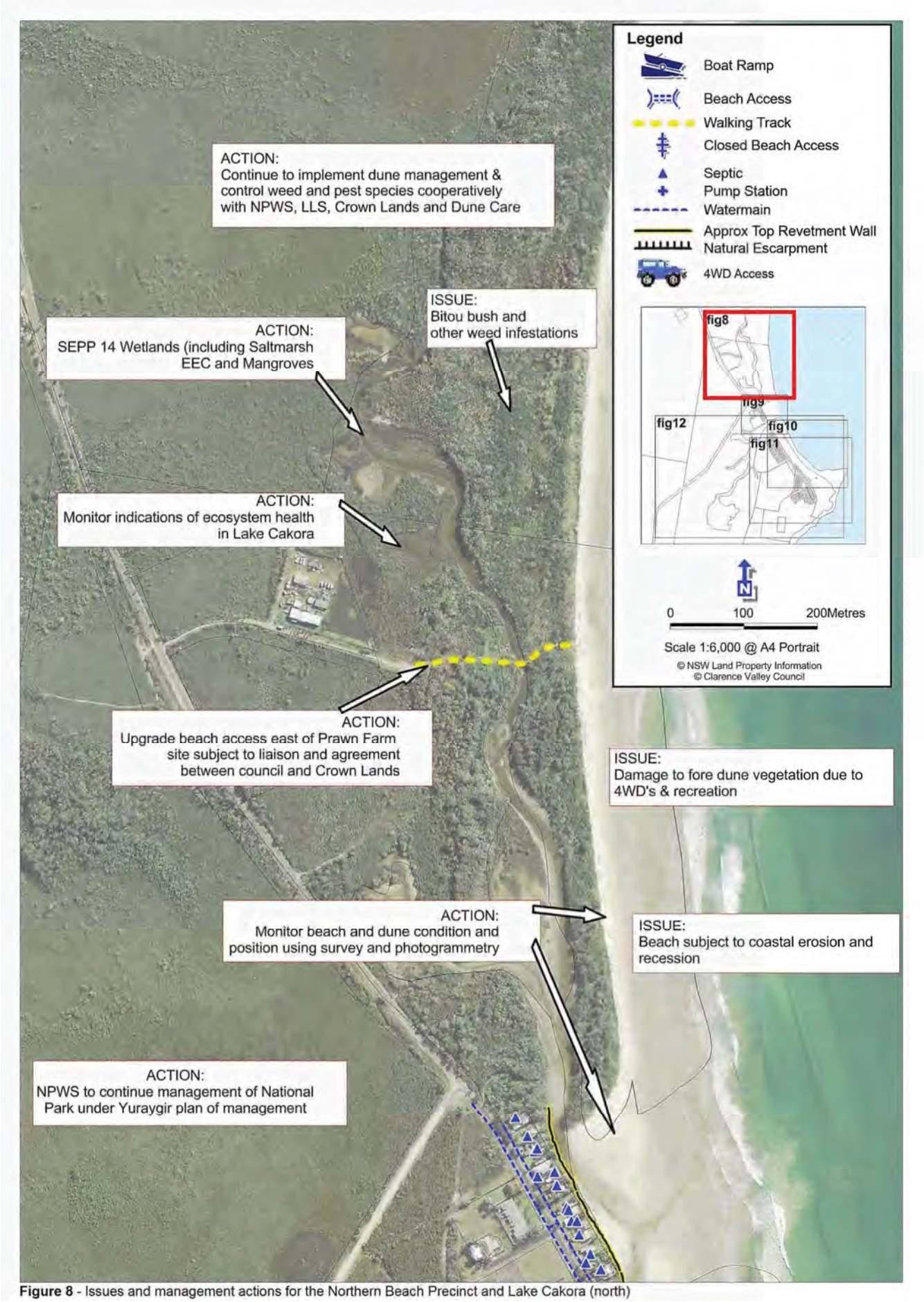

Figure 8 - Issues and management actions for the Northern Beach Precinct and Lake Cakora (north)

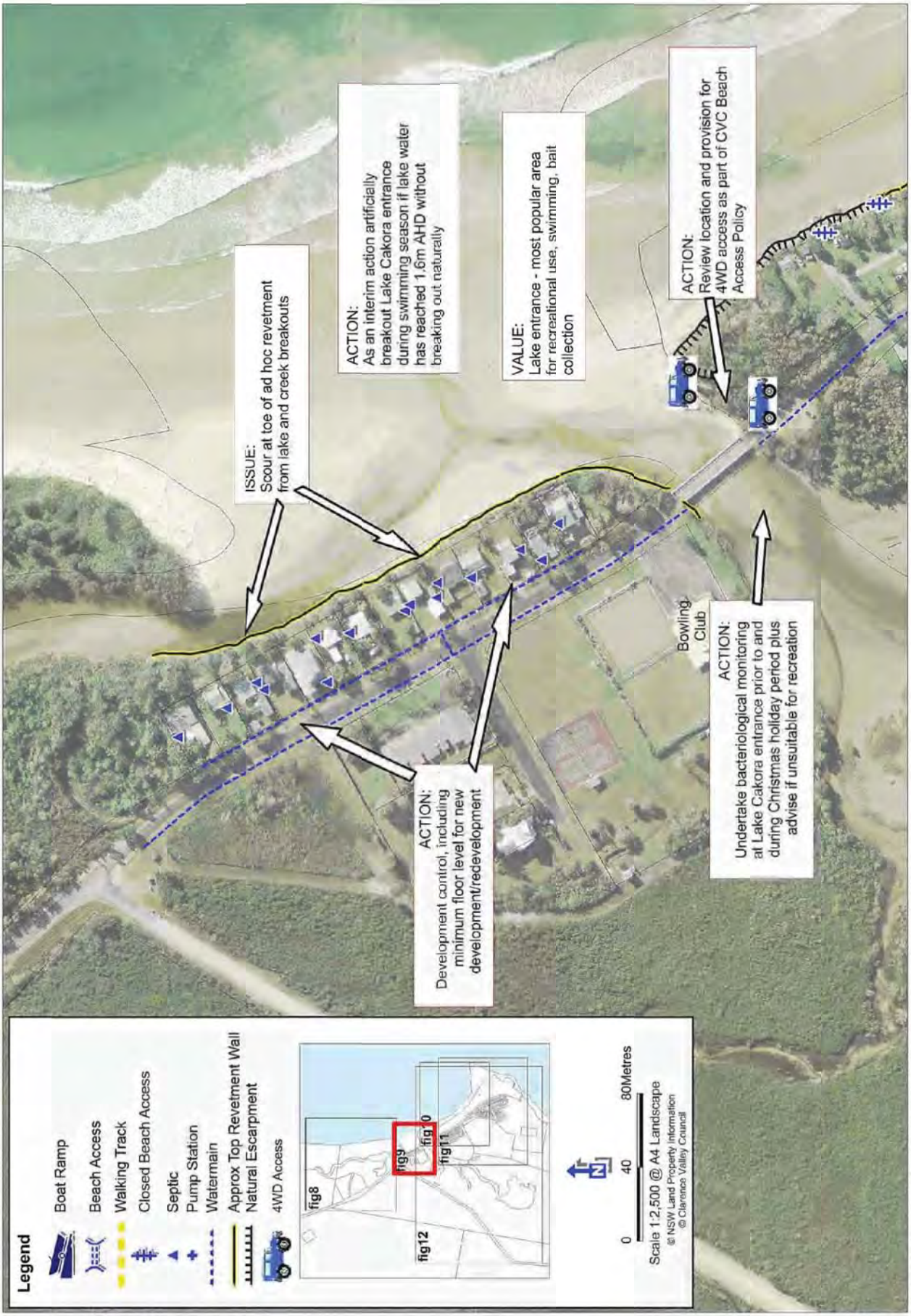

Figure 9 - Issues and management actions for the Lake Entrance Precinct

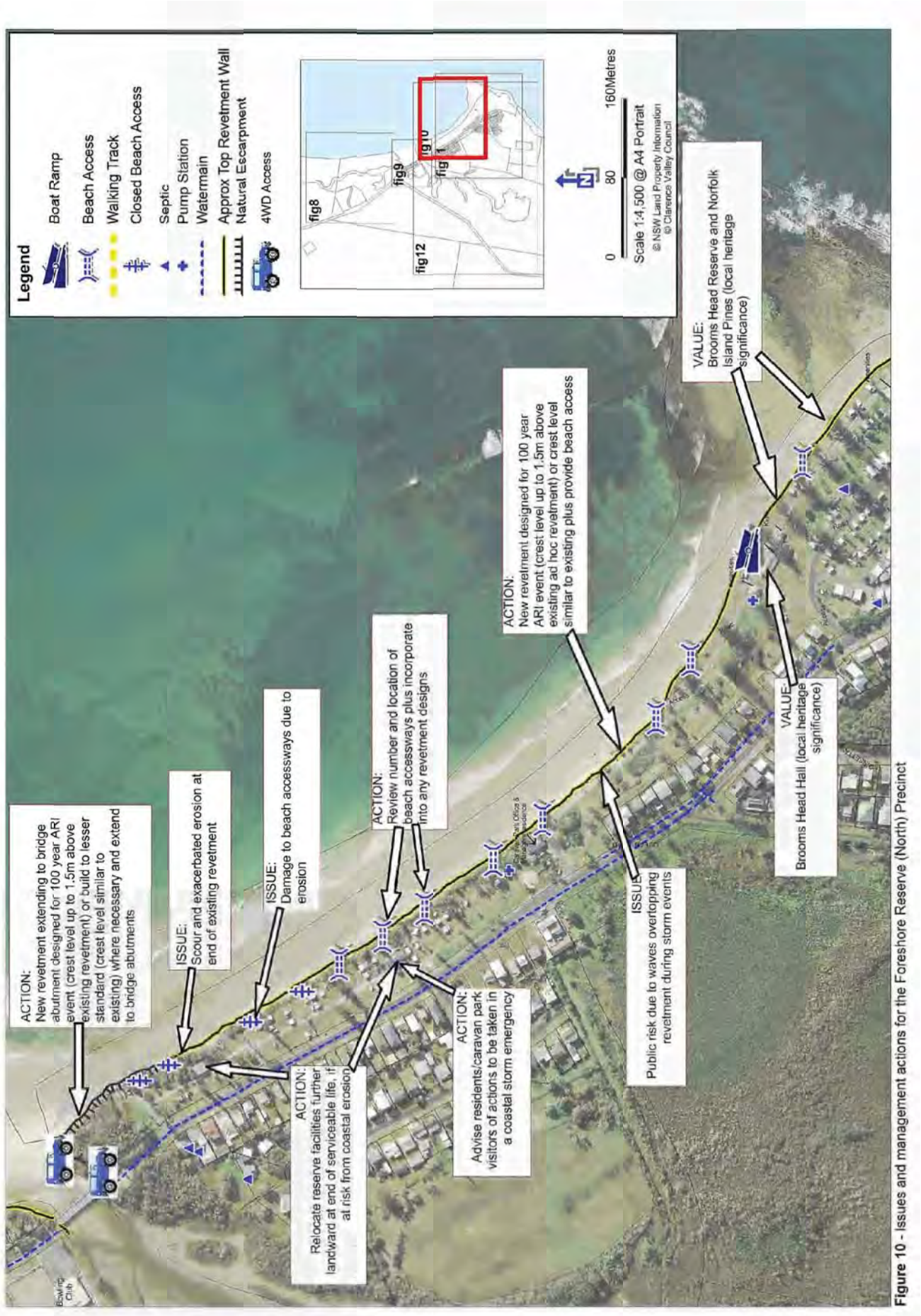

Figure 10 - Issues and management actions for the Foreshore Reserve (North) Precinct

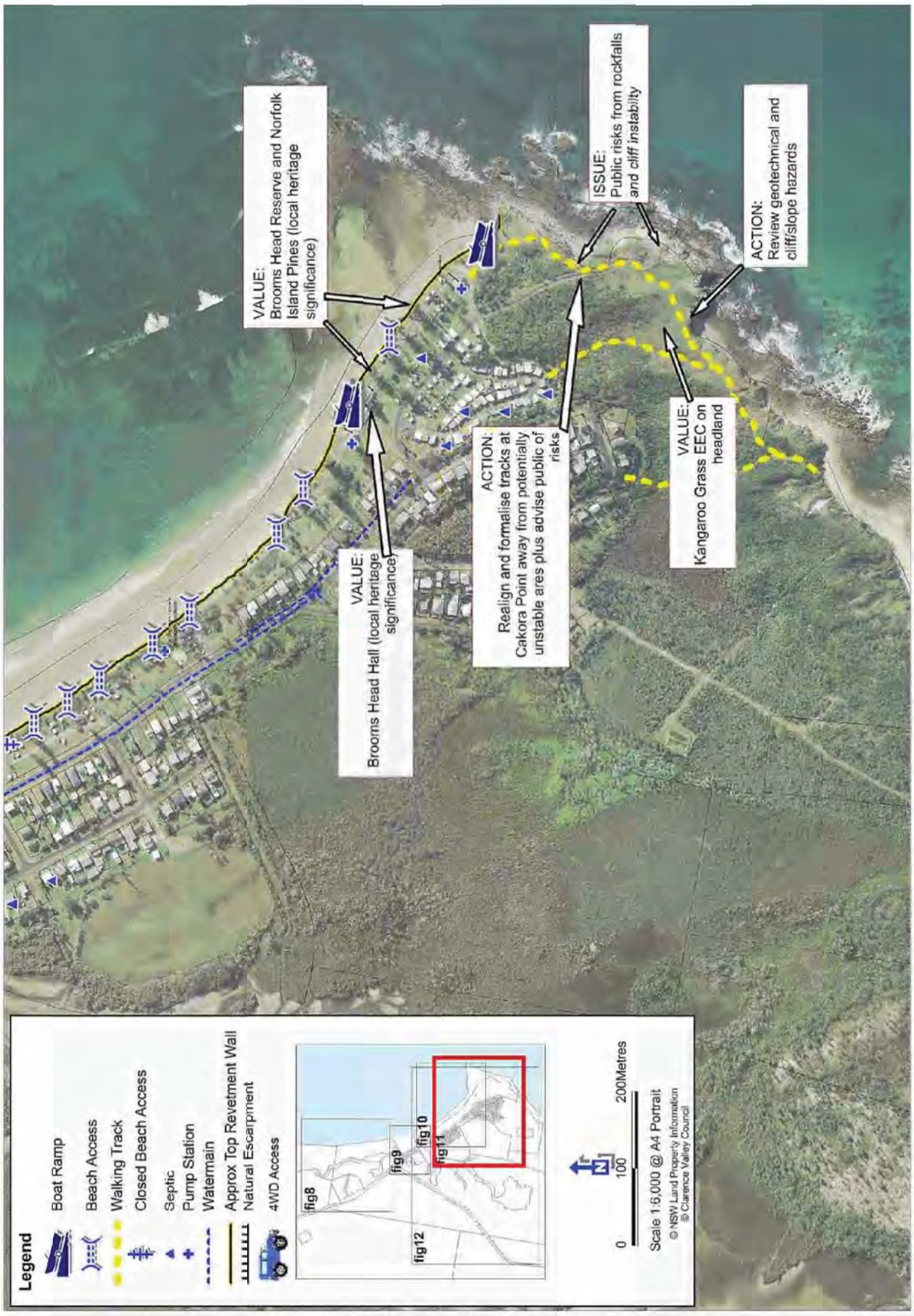

Figure 11 - Issues and management actions for the Foreshore Reserve (South) Precinct and Cakora Point

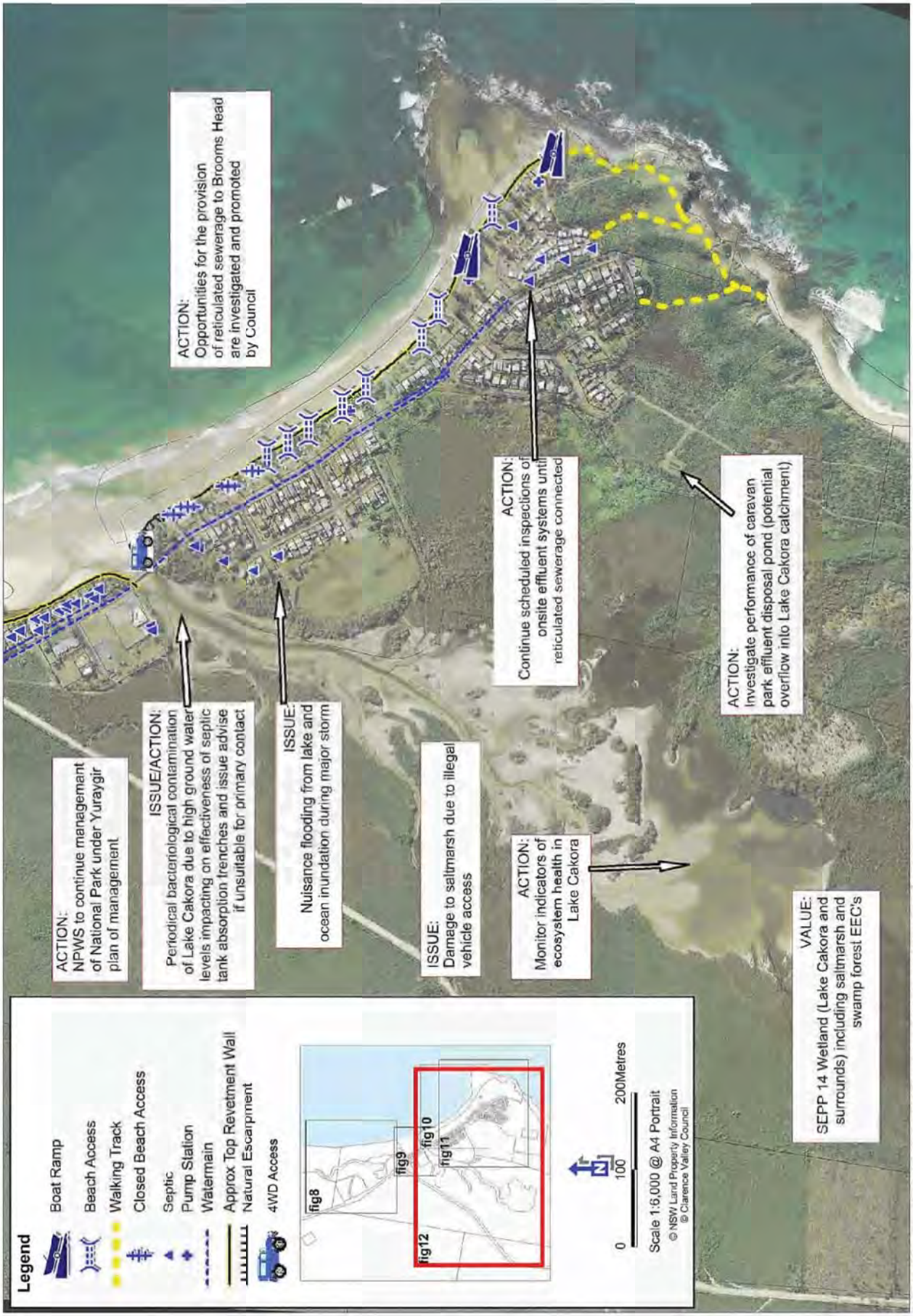

Figure 12 - Issues and management actions for Lake Cakora (south)

8 CZMP FUNDING, MONITORING AND REVIEW

8.1 Funding

Implementation of CZMP actions is eligible for funding via the Coastal or Estuary Management Program on a 50/50 basis between Council and NSW State Government. As noted in the program Guidelines, the priority for public expenditure is public benefit. Funding under these NSW Government Programs typically does not cover Councils administrative or staffing costs.

Under the *Local Government Act 1993*, *Coastal Protection Works* may be constructed by, or on behalf of, landowners or by landowners jointly with a council or public authority. *Coastal Protection Works* means activities or works to reduce the impact of coastal hazards on land adjacent to tidal waters and includes revetments.

The *Local Government Act 1993* also provides for *Coastal Protection Services* to maintain and repair coastal protection works, and to manage the impacts of such works. Section 496B provides for the making and levying of annual charges for coastal protection services for properties that benefit from coastal protection works. This means that landowners which would benefit from the works or services can be charged an additional levy by Council. Under the *Coastal Protection Service Charge Guideline* (DECCW 2010), maintenance costs can be apportioned.

Note that the *Coastal Protection Service Charge Guidelines* (DECCW 2010) provide further guidance on cost-sharing and include a number of items to be considered in calculating the charge such as legal costs, insurance, accounting and reporting.

An 'engineered' seawall would protect the foreshore properties at risk within the Lakefront Precinct. Benefits to private property owners would include:

- market values maintained due to reduced coastal hazard risk
- minimisation of development constraints associated with coastal hazards

In considering the public/ private benefit of the lakefront revetment the following matters need to be considered:

- Provision of any public access along a new revetment within the Crown reserve would provide a public benefit.
- As shown by the hazard maps (refer to Appendix A) Ocean Road north of the bridge (and hence access to the Brooms Head village proper) would be at risk in the future in the absence of foreshore protection. Hence protection of the Ocean Road lakefront properties would also ensure future road access, thereby providing a public benefit.

Resources for implementation of some actions included in the CZM include various State Government environmental programs and volunteer groups such as the local DuneCare group.

Clarence Valley Council will make contributions towards resourcing implementation of certain actions through staff time and expertise (recurrent funding) as well as capital contributions (non-recurrent funding). Funds may be sourced from the Council's General Fund, Water and Sewerage Fund (specifically for any water and sewerage infrastructure-related actions) or the Clarence Coast Reserve Trust (CCRT) fund. The CCRT is the Reserve Trust established to manage several Crown reserves, including the Brooms Head Foreshore Reserve (Reserve 65975), within the Clarence Valley Local Government Area. Further, the Minister for Lands has appointed Clarence Valley Council as the corporate manager of the CCRT. Management of CCRT Reserves is funded though income derived from leases, licences and caravan parks located on Reserves within the

CCRT. Hence, some of the actions contained in this Draft Plan that relate directly to management of the Brooms Head Foreshore Reserve may be funded from CCRT monies.

8.2 Further Investigations

The following investigations could be undertaken in the future to improve the understanding of coastal processes and hazards affecting Brooms Head.

- Analysis of directional wave data from Coffs Harbour once an extended period of record is available (until very recently, it was non-directional) to better appreciate the influence of wave energy direction on the erosion/ recession of the beach. This will become increasingly important in adaptive management of the beach if the angle of approach of the dominant wave climate changes due to climate change.
- Wave transformation modelling based on a detailed bathymetric survey of the nearshore area to capture the extent of the headland and reef system accurately (offshore survey work was completed by OEH in 2013).
- Condition assessment of existing *ad hoc* foreshore protection and adequacy (i.e. in protecting against coastal and entrance instability processes) if maintenance of lakefront revetment to Ocean Road dwellings was proposed as more than an interim option.
- Ongoing aerial photography and subsequent photogrammetry profiling and analysis of the entire beach compartment (photogrammetric data was only available for the southern half of the embayment for this study)

8.3 CZMP Review

The Brooms Head Main Beach Emergency Action Sub-Plan is to be reviewed following adoption of a preferred revetment option.

The CZMP is to be reviewed periodically following the completion of various actions; and as more data on coastal processes and climate change becomes available; and in response to changes in Government policy. This would include:

- Review of long term risks associated with coastal hazards as more data becomes available e.g: updates on climate change induced sea level rise.
- Based on the above, review of the hazard lines shown in Appendix A.

An initial review in 2020 is suggested to consider the progress of key actions identified in the CZMP and subsequent reviews (if not triggered by factors as outlined above) no later than 10 years to ensure the plan remains current.

Any major amendments to the CZMP would be publicly exhibited for community comment and progress on the implementation of the CZMP would be included in Council's Annual Corporate Report.

9 REFERENCES

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APPENDIX A HAZARD MAPS

See Appendix A of the main final CZMP document for Hazard Maps

APPENDIX B FLOOD MAPS

See Appendix B of the main final CZMP document for Flood Maps

APPENDIX C EMERGENCY ACTION PLAN

See Appendix C of the main final CZMP document for the Emergency Action Sub-Plan