

# REPORT

## **Shoalhaven City Council Coastal Cliffs and Slopes Recommendations Report**

### **Emergency Action Sub Plan**

Client: Shoalhaven City Council

Reference: M&APA1474R002F0.2

Revision: 0.2/Final

Date: 18 May 2018



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## 1 Introduction

Significant weather conditions resulting in increased rainfall, generation of strong winds, large waves and elevated sea water levels can trigger a series of coastal hazards along NSW coastlines. In addition to excessive beach erosion, coastal cliffs and slopes can experience increased levels of instability affecting both bedrock cliff faces and soil foreshore slopes.

For the Shoalhaven area, a number of risk areas have been identified, and potential geotechnical hazards addressed. The hazards include mechanisms of instability which may result in landslides.

Shoalhaven City Council's long term strategy for managing coastal threats and hazards is documented within the Shoalhaven Coastal Zone Management Plan (CZMP). This Emergency Action Sub Plan (EASP) forms an integral part of the CZMP, outlining Council's intended response to coastal emergencies relevant to cliffs and slopes within Shoalhaven coastal areas, in accordance with the Coastal Protection Act 1979 (CPA). The EASP also outlines ways in which property owners can place emergency protection works relevant to instability hazards.

This EASP has been structured in a similar format as the Coastal Emergency Action Subplans for Beaches in Shoalhaven City Council (2011)<sup>1</sup>.

### 1.1 Context and Associated Plans and Guidelines

This Emergency Action Subplan has been prepared in accordance with the Coastal Protection Act 1979, Coastal Management Act 2016, and the Shoalhaven Coastal Zone Management Plan. This EASP should be read in conjunction with the following plans and guidelines:

- NSW State Storm Plan (SES 2018 (draft)) - covers arrangement for emergency management of storms in accordance with the State Emergency Service Act 1989 and the State Emergency and Rescue Management Act 1989;
- NSW State Emergency Management Plan (EMPLAN) (2012);
- Shoalhaven Coastal Zone Management Plan (2012);
- Guide to the Statutory Requirements for Temporary Coastal Protection Works (OEH 2013);
- Code of Practice under the Coastal Protection Act 1979 (OEH 2013);
- Shoalhaven Emergency Management Plan (Shoalhaven EMPLAN) (2016);
- Coastal Emergency Action Subplans for Beaches in Shoalhaven City Council (Draft 2011).
- Coastal Zone Management Guide Note – Emergency Action Subplans (OEH, July 2011).

This EASP should be reviewed periodically in conjunction with review of Council's CZMP and EMPLAN, and specifically following a coastal cliffs and slopes related emergency event as defined within in Section 1.2 of this document. Other triggers for review of this EASP include where deficiencies have been identified, where roles and responsibilities of agencies change, and in the event of legislative changes.

### 1.2 Definition of Emergencies and Triggers

In accordance with the Shoalhaven EMPLAN, there are number of hazards which have risk of causing loss of life, property, utilities, services and / or the community's ability to function within its normal

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<sup>1</sup> This document is currently being updated as a part of the updates to the CZMP

capacity. Hazards (such as a flood, storm, earthquake, landslide) have been identified which have the potential to create an emergency situation.

The EASP is triggered in an emergency, which in this case is defined as:

*“a situation in which instability of cliffs and slopes is imminent, occurring or has occurred, and the threat of landslide endangers, or threatens to endanger the safety or health of people or destroys or damages, or threatens to destroy or damage any property and which requires a significant and coordinated response.”*

(Source: definition adapted based on the Shoalhaven DISPLAN).<sup>2</sup> However, for coastal cliffs and slopes, proactive measures for management of risk areas should be implemented in preparation as this is the best measure for ensuring emergency situations are minimised. Therefore this EASP includes pre, during and post emergency action measures.

With regards to coastal cliffs and slopes, an emergency situation is most likely to arise due to periods of heavy and/or prolonged rainfall. Monitoring heavy and prolonged rainfall is suggested against the following:

- Heavy Rainfall: at least 150mm of rainfall in one day; and
- Prolonged Rainfall: at least 250mm of rainfall over a 5 day period.

Application of expert engineering judgement at times of storms is required to assess when emergency action may be required. This requires regular monitoring of environmental conditions and cliff and slope behaviour, seeking appropriate advice when necessary. Coastal property residents or other community members should also provide early warning to Council in the event of coastal instability or hazards.

In monitoring the potential for instability and/or landslide, signs of impending slope instability such as distortions to fences and structures, ground depressions and tension cracks, falling rock or debris should also be assessed, as well as forecast environmental conditions.

### 1.3 Purpose of the EASP

The key objective of the EASP is to document the actions that Shoalhaven City Council and/or coastal landowners can and/or will take in response to coastal instability emergency situations relevant to the cliffs and slopes within Shoalhaven. In order to achieve this above objective, specified actions are required with regards to emergency preparedness, response and recovery phases of any emergency situation. This EASP outlines the requirements for identified key areas of risk of coastal related hazards and instability of cliffs and slopes within Shoalhaven.

Primarily the focus is for Council to ensure prevention of harm to property and/or harm to or loss of life. Consistent with standard emergency procedure Council will also seek to ensure that their public assets and infrastructure (such as stormwater drainage systems, kerbs and gutters) are maintained and managed. Whilst there is also a role for private property management and maintenance, Council's aim is to provide facilitation for approved, adequate actions by landowners through the implementation of the EASP.

### 1.4 Communication and Warnings

In a coastal emergency event, Council provides the following information and warnings to the community.

<sup>2</sup> The DISPLAN 2011 has been superseded by the Shoalhaven EMPLAN 2016. However the EMPLAN does not include a robust definition of emergency relevant to landslide, therefore the definition for the DISPLAN 2011 has been retained here.

- During an emergency event, Council will coordinate with SES to provide additional support through emergency response centres / local community centres;
- Placement of barriers and signs at lookouts, car parks and access ways that are closed due to instability hazards;
- After an emergency event, Council will provide updates to the community with regards to any closures of lookouts and carparks within risk areas;
- Information on Council web site about public area closures due to instability hazards. Update information when public areas re-opened.

## 1.5 Geographical Setting

A number of sites were considered as risk areas for instability and landslides along the coastline of Shoalhaven Local Government Area (LGA) and this EASP is relevant to those areas, outlined as follows:

1. Penguin Head and Culburra Beach;
2. Plantation Point;
3. Hyams Point;
4. Berrara Point;
5. Inyadda Point, Manyana;
6. Narrawallee;
7. Bannisters Point;
8. Collers Beach;
9. Rennies Beach; and
10. Racecourse Beach.

**Figure 1** indicates the 10 risk areas considered as a part of this EASP.



Figure 1: Shoalhaven LGA cliffs and slopes risk areas

The above risk areas include both public and private property. This EASP considers those areas of cliffs and slopes only, not the active beach systems (those have been considered within a separate EASP for beach erosion hazards - Coastal Emergency Action Subplans for Beaches in Shoalhaven City Council (Draft 2018)).

The following section outlines the emergency actions for each of the identified risk locations.

## 2 Emergency Action Sub Plan for Identified Risk Areas

### 2.1 Background

Hazardous landslides have occurred in parts of Shoalhaven Local Government Area (LGA) in January and February 2008, and again in August 2015. The landslides occurred in areas previously identified to be at risk of coastal cliff and slope instability. SCC has in the past commissioned a number of expert reports to assess slope instability and the risk of landslide hazards. A Coastal Cliffs and Slope Instability Risk Management Program was developed to assist the effective development of the EASP. A number of previous studies and reports were reviewed and considered as a part of the risk management program and considered in the context of forward planning for emergency actions in the event of future hazards.

Following detailed site assessments at specific properties, a geotechnical assessment was undertaken by JK which addressed the geological setting of each of the sites and the key factors affecting cliff face stability with regards to the bedrock cliff faces and the soil foreshore slopes.

The assessment of bedrock cliff faces within the risk areas revealed a number of relatively weak features:

- Extremely weathered claystone (Tertiary sediments) underlying sub-vertically jointed Tertiary basalt (an old volcanic lava flow) at Bannisters Point and Sunset Strip, Manyana;
- Tertiary claystones overlying Conjola Formation sandstone at Rennies Beach;
- Tertiary sediments forming cliff faces at Collers Beach Headland;
- Siltstone bands within the sandstone at Penguin Head and Berrara; and
- Weaker silty sandstone bands within sandstones and conglomerates at Plantation Point, Hyams Point, Inyadda Point (Manyana), Narrawallee, Bannisters Point (Mollymook), and Collers Beach Headland, Rennies Beach and Racecourse Beach (Ulladulla).

Additional triggers to collapse of potentially unstable features (undercuts, overhangs, blocks and wedges) over the cliff faces where also highlighted:

- Water pressure in sub-vertical joints (rainfall, leaking pipelines, vegetation);
- Localised tree root 'jacking';
- Water collecting in open defects;
- Expansion and contraction of bedrock due to temperature variations;

Colluvial and/or residual soils slopes comprising moderately steep to steep slopes were identified at the sites. Instability of such slopes is usually caused by elevated water pressures within the soils, or over-steep slopes caused by erosion or excavation during development.

Based on this assessment and in combination with site observations and the review of previous reports and documentation, it has been concluded that the majority of instability affecting the foreshore areas at the ten sites has impacted soil slopes. Where the lower portion of the soil profile impacted by landslips represents a residual profile, bedrock has occasionally been impacted.

Whilst the principal trigger for the known landslips was rainfall, there is an increased likelihood of instability associated with a number of other factors. These are highlighted at the following locations:

- The areas of erosion over the upper portions of soil slopes described at various sites;
- The older instabilities that have impacted the slopes lining the north-eastern side of Mollymook Beach below Mitchell Parade and Cliff Avenue;
- Landslips at a number of private properties in Berrara , Manyana and Mollymook;

- The area of recent and older instability at Surfers Avenue, Tallwood Avenue and Bannister Head Road, Narrawallee. Elevated groundwater levels (possibly artesian) are believed to be the most significant factor impacting stability.

There are some recent areas of instability along Sunset Strip, Manyana, the southern side of Penguin Head and the upper portion of the cliff face at the eastern end of Rennies Beach Close, Ulladulla, which are also likely to have been triggered during rainfall events. Whilst it is evident that erosion of the cliff face is occurring in some locations, the instability appears to be localized and typically of relatively small scale. However, larger scale instabilities of the cliff faces were noted at the Eastern end of Racecourse Beach, Ulladulla (an old landslide), Bannister Head Road Narrawallee and Bannisters Point, Mollymook.

## 2.2 Overview of Risk

As a part of geotechnical assessment undertaken for the Coastal Cliffs and Slope Instability Risk Management Program, a qualitative assessment of risk to property was undertaken in accordance with the guidance provided in Australian Geomechanics Society (2007c) Practice Note Guidelines for Landslide Risk Management (The Guidelines). These overall risks are summarised here.

The assessment indicates that for hazard related to instability of overhang/undercut features, blocks and/or wedges of rock over the cliff face the assessed risk to property is Low in all risk areas. This would be considered to be 'acceptable'<sup>3</sup>, in accordance with the criteria given in the Guidelines.

For hazards related to instability of foreshore colluvial/residual soil slopes, small scale (less than 5m<sup>3</sup>) and a larger scale instability impacting the full width of a residential lot (at least 200m<sup>3</sup>), the assessed risk to property is Very Low for small scale instability and Low for larger scale instability. This would be considered to be 'acceptable', in accordance with the criteria given in the Guidelines.

For hazards related to large scale cliff face instability, the assessed risk to property is Very Low or Low. The Guidelines consider that this is an 'acceptable' level of risk.

Levels of risk to property at both the Penguin Head Lookout, Culburra Beach and the timber lookout at Bannisters Point, Mollymook Beach were considered to be 'acceptable' in accordance with the criteria given in the Guidelines.

Levels of risk to property were considered to be 'tolerable'<sup>4</sup> in accordance with the criteria given in the Guidelines at a number of private properties in Culburra Beach, Berrara, Manyana, Mollymook and Ulladulla. There were 2 properties in Manyana identified as having levels of risk to property considered to be 'unacceptable'<sup>5</sup> in accordance with the criteria given in the Guidelines.

The following sub-sections outline the proposed Emergency Action Sub Plan for the 10 identified risk areas within the Shoalhaven LGA. The EASP is based on specific requirements noted to be necessary for immediate implementation at risk areas, and in the event of an emergency event or situation.

<sup>3</sup> Very Low qualitative risk, manage by normal slope maintenance procedures.

<sup>4</sup> Moderate qualitative risk, requires investigation, planning and implementation of treatment options to reduce risk to Low.

<sup>5</sup> High or Very High qualitative risk requiring essential treatment based on detailed investigation, planning and implementation to reduce risk to Low or acceptable level.

## 2.3 Council actions

Council will respond to potential instability hazards by implementing the following actions:

- As a part of emergency response preparedness (where there is sufficient warning) check public stormwater drainage within identified risk area, repair/upgrade as required as part of maintenance programs.
- Monitor identified risk areas on public land (where it is safe to do so) during periods of heavy and/or prolonged rainfall and identify where instability hazards may occur.
- Close access to public areas where identified instability hazards may cause risk to property or people.
- Immediate closure of public lookouts in the event of instability occurring due to heavy rainfall or extreme weather events.
- Place signage and barriers at other public areas to ensure no access until a detailed inspection of condition and safety is conducted and remediation measures implemented.
- Post significant storm events and/or rainfall, check public stormwater drainage for leaks and repair/upgrade as required.

Council actions specific to individual risk areas have been outlined in the following sections.

### 2.3.1 Penguin Head and Culburra Beach

- Immediately close the Penguin Head lookout in the event of instability occurring due to heavy rainfall or extreme weather events.
- Immediate prevention of access to public car parking bays at the crest of cliffs.
- Place signage and barriers at the lookout to ensure no access until a detailed inspection of condition and safety is conducted and remediation measures implemented.

### 2.3.2 Narrawallee

- Install groundwater instrumentation near instability at Surfers Avenue and Tallwood Avenue to ascertain information on groundwater levels and movements. Based on this identify suitable landslip remediation measures at this location.

### 2.3.3 Mollymook

- Council should immediately close the car park at Bannisters Point near the lookout, in the event of instability occurring due to heavy rainfall or extreme weather events.

### 2.3.4 Rennies Beach

- Kerb and guttering to be inspected and upgraded/repared where necessary to appropriately direct drainage away from cliffs and slopes.

### 2.3.5 Racecourse Beach

- In the event of instability impacting the car park at Racecourse Beach, Council is to immediately prevent access to the car parking bays at the crest of the hill.
- Place signage and barriers at car park to ensure no access until a detailed inspection of condition and safety is conducted and remediation measures implemented.

## 2.4 Private Property Owner Actions

Property owners will respond to potential instability hazards on their properties by implementing the following actions:

- Seek their own geotechnical advice regarding the stability of the coastal portions of their sites where required.
- Assess drainage, water mains, sewer systems, pool backwash systems, any other water carrying services for leaks/damage. Repair as necessary.
- Ensure no uncontrolled discharge of stormwater through property or over slopes.
- Private properties undergoing remediation works must ensure approved design documentation is included to support applications for permitting of works by Council. Council will require geotechnical assessments to support development applications for landslip remediation works on private property, including confirmation that risk will be reduced to 'acceptable' levels (geotechnical engineer to approve the design of the remediation measures/works).
- Seek their own geotechnical advice regarding the stability of their sites where required.
- Monitor and record information on instability concerns and seek advice from geotechnical/coastal engineer (refer template for site inspection/maintenance sheet **Attachment 1**).

Property owner actions specific to individual risk areas have been outlined below.

### 2.4.1 Penguin Head and Culburra Beach

- Penguin Head Road property owners with coastal frontage to seek their own geotechnical advice regarding the stability of the coastal portions of their sites where required.

### 2.4.2 Berrara Point

- Myrniong Grove property owners with coastal frontage to seek their own geotechnical advice regarding the stability of the coastal portions of their sites where required.

### 2.4.3 Inyadda Point

- Property owners along Sunset Strip Inyadda Point with coastal frontage to seek geotechnical advice regarding the stability of the coastal portions of their sites where required.

### 2.4.4 Collers Beach

- Property owners along Shipton Crescent with coastal frontage to seek their own geotechnical advice regarding the stability of the coastal portions of their sites where required.

### 3 Remediation and Coastal Protection Works on Private Property

#### 3.1 Private Property Remediation Works

A number of varying remediation measures may be prescribed for individual private properties, dependent on the types and degree of risk associated with each. Suitable remediation measures must be, designed by a suitably experienced and qualified geotechnical and/or coastal engineer as part of a development application for the proposed works.

Potential remediation works for blocks within or adjacent to coastal cliffs and slopes may include:

Landslides in rock:

- Trimming the slope to remove hazardous blocks of rock.
- Bolting, or anchoring, to fix hazardous blocks in position and prevent movement.
- Installation of catch fences and other rock fall protection measures to limit the impact of rock falls.
- Deep drainage designed to limit changes in the ground water table.

Water, drainage and surface protection:

- Limit the effect of water with sensible drainage design and clearing of surface water drains.
- Surface protection to prevent scour and minimise water inflow to slope.
- Sub-soil drains constructed behind retaining walls and on hillsides to intercept groundwater.
- Deep drainage designed to limit changes in the ground water table.

Soil slopes:

- Retaining walls to support cuts and fills. Design of retaining walls more than 900 mm high should be undertaken by a geotechnical/structural engineer.
- Walls should be inspected at least annually for tilting and other signs of deterioration.
- Keeping vegetation clearance to a minimum as vegetation helps keep the ground water table lower, in turn helping to maintain stability of the slope. While roots of saplings and small trees generally assists by reinforcing the soil, roots from larger mature trees can pose a landslide hazard due to ability to dislodge boulders. Removal of such vegetation should be considered.

Further information and guidance on potential remediation measures for coastal properties can be found here:

- Australian Geomechanics Society (2007c) 'Practice Note Guidelines for Landslide Risk Management', Australian Geomechanics, Vol 42, No 1, March 2007.
- The latest versions of the GeoGuides are downloadable from the AGS website: [www.australiangeomechanics.org](http://www.australiangeomechanics.org).

##### 3.1.1 Approvals Required for Implementation of Remediation Works

Council approval is required for any development on private property within Shoalhaven. Remediation or land stabilisation works on coastal properties require development approval via a Development Application (DA). For advice on DA's, property owners should go to Council's website:

<https://shoalhaven.nsw.gov.au/Planning-amp-Building/Planning-amp-Building-Copy>

<https://www.shoalhaven.nsw.gov.au/Planning-amp-Building/Development/Development-in-areas-of-coastal-instability>

The Shoalhaven Development Control Plan (DCP 2014), Section 5.1.2, outlines specific requirements for development within areas of cliff/slope instability:

*A2.1 A geotechnical report prepared by a professional geotechnical engineer is to be submitted with a development application. This report is to:*

- *Analyse the existing site stability and the suitability of the proposed development and its likely impact on that site stability. The report is to make reference to:*
  - *Shoalhaven City Council Coastal Zone Management Study and Plan – Coastal Slope Instability Hazard Study Final Report (SMEC August 2008); and*
  - *Douglas Partners Report – Supplementary Geotechnical Observations Project 72051 (DP July 2011); and*
  - *Douglas Partners Report – Scoping Study and Stability Assessment Project 78319 (DP December 2011).*
- *Provide recommendations for engineering design of the proposal. This is to include building foundation design and stormwater drainage design; and*
- *Be prepared in accordance with the Guideline for Landslide Susceptibility, Hazard and Risk Zoning for Land Use Planning Accompanying Commentaries and Practice Note (Australian Geomechanics Society, 2007).*

The *Coastal Management Act 2016* (CM Act) replaces the *Coastal Protection Act 1979* and establishes management objectives specific to vulnerable coastal areas. Under the CM Act, local councils are to implement coastal management programs, inclusive of linkages to and/or updates to their development control plans. The CM Act also outlines requirements with regards to granting of development consent relating to coastal protection works:

**Part 5, Section 27, Clause 1:**

- 1) Development consent must not be granted under the *Environmental Planning and Assessment Act 1979* to development for the purpose of coastal protection works, unless the consent authority is satisfied that:
  - (a) the works will not, over the life of the works:
    - (i) unreasonably limit or be likely to unreasonably limit public access to or the use of a beach or headland, or
    - (ii) pose or be likely to pose a threat to public safety, and
  - (b) satisfactory arrangements have been made (by conditions imposed on the consent) for the following for the life of the works:
    - (iii) the restoration of a beach, or land adjacent to the beach, if any increased erosion of the beach or adjacent land is caused by the presence of the works,
    - (iv) the maintenance of the works.

The *State Environmental Planning Policy (Coastal Management) 2018* identifies development controls for consent authorities to apply to each coastal management area in order to achieve the objectives of the CM Act.

**Part 3, Section 19, Clause 1, 2 and 3:**

- 1) Coastal protection works by person other than public authority Development for the purpose of coastal protection works may be carried out on land to which this Policy applies by a person other than a public authority only with development consent.
- 2) Coastal protection works by public authority Development for the purpose of coastal protection works may be carried out on land to which this Policy applies by or on behalf of a public authority:

- (a) without development consent—if the coastal protection works are:
    - i. identified in the relevant certified coastal management program, or
    - ii. beach nourishment, or
    - iii. the placing of sandbags for a period of not more than 90 days, or
    - iv. routine maintenance works or repairs to any existing coastal protection works, or
  - (b) with development consent—in any other case.
- 3) Emergency coastal protection works by public authority Development for the purpose of emergency coastal protection works carried out on land to which this Policy applies is exempt development if it is carried out by or on behalf of a public authority in accordance with a coastal zone emergency action subplan (or a coastal zone management plan under the *Coastal Protection Act 1979* containing an emergency action subplan that continues to have effect under clause 4 of Schedule 3 to the *Coastal Management Act 2016*).
- 4) In this clause, emergency coastal protection works means works comprising the placement of sand, or the placing of sandbags for a period of not more than 90 days, on a beach, or a sand dune adjacent to a beach, to mitigate the effects of coastal hazards on land.

## 4 Roles and Responsibilities

There are a number of stakeholders with roles and responsibilities in coastal emergency management within Shoalhaven LGA. The NSW State Storm Plan (Draft 2018) is a sub plan of the State Emergency Management Plan (EMPLAN). The State Storm Plan sets out the state wide multi-agency arrangements for emergency management of storms in NSW, and outlines roles and responsibilities of stakeholders with regards to coastal erosion. Roles and responsibilities include those relevant to planning, preparation, response and recovery. Outlined within the EASP are those roles and responsibilities relevant to emergency response.

### 4.1 State Emergency Service

With regards to emergency situations and management of risks due to instability of coastal cliffs and slopes, the State Emergency Services (SES) has the following roles and responsibilities:

- Maintain effective control of storm operations, emergency response action centres and incident control centres as required.
- Provide effective liaison between SES and other agencies/stakeholders
- Coordinate resources, equipment and logistics
- Provision of information and warnings to the community:
  - Timely and effective warnings are distributed to the community.
- Protection of life and property:
  - Coordinate the project of life and property from damage arising from storms to minimise further damage/potential injury
  - Coordinate the protection (relocation/removal) of property (limited to readily movable contents) from destruction or damage arising from coastal erosion.
- Protection of essential services:
  - Minimise disruption to the community by ensuring protection of infrastructure and supply of essential energy, telecommunication and utility services.
- Evacuation management and welfare:
  - Evacuate people from dangerous or potentially dangerous places created by storm damage or coastal erosion to safe locations away from the hazard.
  - Maintain the welfare of communities and individuals affected by the impact of a storm.
  - Coordinate available and accessible health services for storm affected communities.
- Control and coordinate search and rescue of people from collapsed structures.
- Coordinate resupply to isolated areas.
- Establish access to properties, dwellings and impact areas.

### 4.2 Shoalhaven City Council

With regards to emergency situations and management of risks due to instability of coastal cliffs and slopes<sup>6</sup>, Shoalhaven City Council has the following roles and responsibilities:

- During and following major rainfall and/or storm events:
  - Close access ways, carparks and lookouts during or immediately after a storm event;
  - Inspect access ways, carparks and lookouts post storm;
  - Photograph any damage;

<sup>6</sup> Note: Many of the roles and responsibilities are as per those for emergency action on beaches.

- Repair access ways, carpark and lookouts (in prioritised order); and
- Inspect remediated landslide areas.
- Coordinate emergency protection works on public property;
- Maintain records of impacted assets;
- Consult with the SES and other relevant agencies when developing emergency management arrangements;
- Provide SES with copies of relevant coastal hazard and management studies if available to assist with emergency planning and operational intelligence systems;
- Assist the SES with community awareness programs to ensure people in locations potentially threatened by coastal instability understand the threat and its management;
- Assist the SES with reconnaissance of areas susceptible to coastal instability;
- After the storm, remove and/or mitigate the impact of temporary physical protective measures on the beach; and
- Assist the SES with the protection of readily moveable household and business contents in areas where coastal storms (likely to result in coastal erosion / inundation) are forecast or occurring.

### 4.3 Office of Environment and Heritage

The Office of Environment and Heritage (OEH) is the New South Wales government authority responsible for advising on coastal zone management. OEH provides a Coastal Zone Management Guide Note for preparation of Emergency Action Subplans.

### 4.4 Bureau of Meteorology

The Bureau of Meteorology (BoM) is responsible for releasing Severe Weather Warnings. Severe Weather Warnings provide official triggers to the SES for mobilisation and involvement in coastal hazards.

### 4.5 NSW Police

The NSW Police Force has responsibility for law enforcement and search and rescue, and controlling and coordinating the evacuation of victims from areas affected by emergencies. Typically, in a coastal instability related emergency NSW Police may assist SES where required, undertake or coordinate activities such as evacuation, barricading, removal of contents of buildings etc., where SES is not available or mobilised. Some members of the NSW Police may also be appointed as Local Emergency Operations Controllers (LEOCON).

### 4.6 Private Landowners

Private property owners have responsibilities to monitor, manage, prepare and repair their properties for risks associated with instability. Council should be notified immediately of any concerns outside of their property, however property owners should seek advice directly from suitably qualified geotechnical and/or coastal engineers with regards to instability concerns within their property boundaries.

### 4.7 Key Contacts

The following list of contacts indicates the range of persons that should be included on a contact list for the purposes of implementing this Plan. The key contacts list should be maintained and regularly updated to ensure current and in effect at all times.

Table 1: Key Contacts for EASP

Title/ Contact Name	Phone Number/s
State Emergency Service	132 500



	02 4251 6111
<b>Police – Emergency</b>	000
<b>Police - South Coast District (Nowra)</b>	02 4421 9699
<b>Shoalhaven City Council general phone line and website</b>	Business hours: 02 4429 3111 After hours: 02 4421 3100 Website: <a href="http://www.shoalhaven.nsw.gov.au">www.shoalhaven.nsw.gov.au</a>
<b>Office of Environment and Heritage (Coastal Management Unit) local representative</b>	0244244199

## 5 References

1. NSW State Storm Plan (SES 2013)
2. NSW State Storm Plan (Draft 2018)
3. NSW State Emergency Management Plan (EMPLAN) (2012)
4. Draft Shoalhaven Coastal Zone Management Plan (2012)
5. Guide to the Statutory Requirements for Temporary Coastal Protection Works (OEH 2013)
6. Code of Practice under the Coastal Protection Act 1979 (OEH 2013)
7. Shoalhaven Emergency Management Plan (Shoalhaven EMPLAN) (2016)
8. Shoalhaven Local Disaster Plan (DISPLAN) (2011)
9. Coastal Emergency Action Subplans for Beaches in Shoalhaven City Council (Draft 2011)
10. Coastal Zone Management Guide Note – Emergency Action Subplans (OEH, July 2011)



## **Attachment 1 – Site inspection/maintenance record sheet template**

# INSPECTION/MAINTENANCE RECORD

(Tick boxes as appropriate and add information as required/relevant) Date: \_\_\_\_\_

**Site location** (street address / lot & DP numbers / map reference / latitude and longitude):

FEATURE	NOTES	Inspected	Photos attached	Tested	Maintained	By owner	By professional	Notes added
<b>Slopes &amp; surface protection:</b>								
<input type="checkbox"/>	Natural slope/cliff							
<input type="checkbox"/>	Surface water drains							
<input type="checkbox"/>	Shotcrete							
<input type="checkbox"/>	Cut/fill slope							
<input type="checkbox"/>	Stone pitching							
<input type="checkbox"/>	Other							
<b>Retaining walls:</b>								
<input type="checkbox"/>	Cast in situ concrete							
<input type="checkbox"/>	Masonry (natural stone)							
<input type="checkbox"/>	Cribwall (concrete)							
<input type="checkbox"/>	Anchored wall							
<input type="checkbox"/>	Sub-soil drains							
<input type="checkbox"/>	Concrete block							
<input type="checkbox"/>	Masonry (brick, block)							
<input type="checkbox"/>	Cribwall (timber)							
<input type="checkbox"/>	Reinforced soil wall							
<input type="checkbox"/>	Weep holes							
<b>Ground improvement:</b>								
<input type="checkbox"/>	Rock bolts							
<input type="checkbox"/>	Ground anchors							
<input type="checkbox"/>	Deep subsoil drains							
<input type="checkbox"/>	Soil nails							
<b>Effluent and storm water disposal systems:</b>								
<input type="checkbox"/>	Effluent treatment system							
<input type="checkbox"/>	Effluent disposal field							
<input type="checkbox"/>	Storm water disposal field							
<b>Other:</b>								
<input type="checkbox"/>	Netting							
<input type="checkbox"/>	Catch fence							
<input type="checkbox"/>	Catch pit							

Observations/Notes (add pages/details as appropriate) \_\_\_\_\_

Attachments:  Sketch(es)  Photograph(s)  Other (eg measurements, test results)

Record prepared by: \_\_\_\_\_ (name) \_\_\_\_\_ (signature)

Contact details: Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

Professional Status (in relation to landslide risk assessment): \_\_\_\_\_