

## Coastal Erosion Emergency Action Subplan for Beaches in Warringah



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**Note:** *In May 2015 this document was amended to reflect adoption of the Coastal Zone Management Plan for Collaroy-Narrabeen Beach and Fishermans Beach by Warringah Council as well as amendments to the NSW Coastal Protection Act 1979 and Code of Practice under the Coastal Protection Act 1979.*

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## 1. INTRODUCTION

The investigation reported herein is a *Coastal Erosion Emergency Action Subplan for Beaches in Warringah*. The study area comprises all of the open coast sandy beaches in the Warringah Council Local Government Area, namely (from north to south) Narrabeen Beach, Collaroy Beach, Fishermans Beach, Long Reef Beach, Dee Why Beach, North Curl Curl Beach, South Curl Curl Beach and Freshwater Beach

An “emergency action subplan” is defined in Section 55C (1) (b) of the NSW *Coastal Protection Act 1979*, and is required to include information on Council’s intended response to a coastal erosion emergency, as well as explanation being provided on ways in which beachfront property owners can undertake placement of “temporary coastal protection works” (Office of Environment and Heritage [OEH], 2013a).

“Temporary coastal protection works” (formerly referred to as “emergency coastal protection works”) has a specific meaning based on Part 4c of the *Coastal Protection Act 1979*, generally being sand or sandbags (also known as sand-filled geotextile containers or “geobags”) temporarily placed on a beach to reduce beach erosion impacts. To distinguish this specific meaning from the general meaning of emergency coastal protection works in coastal engineering practice (being any works implemented to limit coastal erosion in an emergency), the specific meaning is denoted as “Part 4c sand/sandbags TCPW” herein.

The report herein has been prepared based on a directive from the then NSW Minister for Climate Change and the Environment (now Minister for the Environment) to prepare an emergency action subplan for Collaroy-Narrabeen Beach, with the study area expanded (as a decision of Council) to include all of Warringah’s beaches. The report is accompanied by a more detailed reference document, namely WorleyParsons (2012) that provides further information.

OEH (2011) noted that the following are considered key elements of an emergency action subplan:

- a clear and concise description of the emergency response actions Council would take when coastal erosion is imminent, occurring or has occurred;
- determination of the criteria or threshold that would be used to initiate actions under the emergency action subplan;
- identifying actions that would be undertaken before, during and after an erosion emergency; and,
- identifying any site-specific issues that might limit landowners placing “Part 4c sand/sandbags TCPW” at authorised locations (as discussed above).

An emergency action subplan must not include matters dealt with in any plan made under the *State Emergency and Rescue Management Act 1989* (such as a State Emergency Service Local Flood Sub Plan), and no such duplication of material (or change in defined roles and responsibilities) has been included herein.

The investigation herein is set out as follows in relation to the study area of Warringah’s beaches:

- a description of the reference document (WorleyParsons, 2012) is provided in Section 2;
- the geographical setting is described in Section 3;
- details on historical damage from coastal storms and protective works that have been undertaken are provided in Section 4;
- coastline hazards are defined in Section 5;
- approvals required for implementation of temporary protective works are described in Section 6, both for landowners and Council;



- roles and responsibilities of various authorities in coastal emergency management are outlined in Section 7;
- evaluation of potential emergency protection measures is undertaken in Section 8;
- a description of proposed Council actions before, during and after coastal storms is provided in Section 9 (also including discussion on criteria or thresholds to initiate actions);
- key contact details are provided in Section 10;
- consultation undertaken as part of the investigation reported herein is outlined in Section 11; and,
- references are provided in Section 13.

Sections 2 to 8 and Section 11 are deliberately brief as further information is provided in WorleyParsons (2012). The focus of the study is in Section 9.

This emergency action subplan should be reviewed and amended (if necessary) if any of the following events occur:

- if there is any review of local State Emergency Service (SES) sub plans;
- when Coastal Zone Management Plans are completed for any of the beaches in the study area; or,
- following a coastal erosion emergency event affecting the study area.



## **2. ACCOMPANYING DETAILED REFERENCE REPORT**

The document herein has an accompanying more detailed reference document (WorleyParsons, 2012). In WorleyParsons (2012), further details are provided on:

- the geographical setting of beaches in Warringah;
- historical storms that have affected the study area and protective works that have been undertaken;
- previous coastal studies related to the study area;
- national and international approaches to coastal erosion emergency management;
- coastal processes affecting beaches in Warringah;
- coastline hazards at Warringah's beaches, including delineation of Immediate and 2050 Hazard Lines;
- the NSW coastline management process;
- approvals required for implementation of protective works, for both Council and landowners;
- roles and responsibilities in coastal emergency management;
- potential emergency protection measures, including an evaluation in terms of cost, effectiveness, material sources, speed of placement, beach amenity, etc.;
- the risk of damage to structures adjacent to Warringah's beaches, with a property by property risk rating completed; and,
- consultation undertaken as part of the WorleyParsons (2012) study and the investigation reported herein.



### **3. GEOGRAPHICAL SETTING**

As noted in Section 1, the document herein covers all sandy beaches in Warringah. Rocky cliff/bluff areas, which may have particular combined coastal and geotechnical hazards, have not been considered.

In Warringah LGA, private development is located immediately landward of much of Collaroy-Narrabeen Beach (101 private lots with beach frontage) and the north-western portion of Fishermans Beach (14 private lots with beach frontage).

Key public assets located landward of Collaroy-Narrabeen Beach include four Surf Life Saving Clubs (North Narrabeen, Narrabeen, South Narrabeen and Collaroy). Along the south-eastern portion of Fishermans Beach, public assets include Long Reef Golf Club, car parking areas, a Warringah Surf Rescue building, and Long Reef Fishing Club Hut.

Dee Why - Long Reef Beach has public land landward of the beach along its entire length. Key public assets near the beach include Long Reef Surf Life Saving Club (SLSC) and Dee Why SLSC.

North Curl Curl and South Curl Curl Beach also have public land landward of the beach along their entire lengths. Key public assets near the beach include North Curl Curl SLSC and South Curl Curl SLSC with an adjacent café.

Freshwater Beach has public land landward, with the most significant development adjacent to the beach being Freshwater SLSC, which comprises two main structures. The most seaward structure is an older SLSC building constructed in the 1930's, while the landward structure is a newer SLSC built in 1987. When the newer SLSC building was constructed, it is understood that it was agreed that the older SLSC building would be "sacrificial" (that is, not meant to be protected if threatened due to coastal erosion), with the newer SLSC building designed to be fully functioning without the older SLSC building in place.

Some private land is also located close to Freshwater Beach, but not directly adjacent to the beach (including Pilu Restaurant), or in rocky cliff/bluff areas.

Refer to Section 2 of WorleyParsons (2012) for discussion on stormwater infrastructure located within the study area, and further information relating to land use, topography, bathymetry and seabed types, and subsurface conditions in the study area.



#### 4. HISTORICAL DAMAGE AND PROTECTIVE WORKS

Development at Collaroy-Narrabeen Beach has been damaged by coastal storms and/or emergency protective works have been implemented on numerous occasions, namely in 1920, 1925, 1944, 1945, 1967, 1974, 1998 and 2007. Most of the length of Collaroy-Narrabeen Beach south of Devitt Street at Narrabeen has existing protective works (see **Figure 1**), generally buried except at times of storms. As full details of these protective works may be unknown or uncertain, or they may be undersized and/or founded inadequately, future effectiveness of these protective works cannot be guaranteed.

Long Reef SLSC was threatened by inundation in 1974 storms, but has not been threatened since the establishment of a vegetated dune around the area, and stabilisation of the Dee Why Lagoon entrance.

Dee Why SLSC has no known protective works and is presumed to be on conventional foundations, and if so is at particular risk of damage from coastal erosion and inundation.

South Curl Curl SLSC has been threatened on numerous occasions, namely in 1946, 1974, 1986, 1998 and 2002. Engineered protective works were constructed seaward of South Curl Curl SLSC in 2006.

The older (seaward) Freshwater SLSC building was threatened by coastal erosion in 1974, and the older (possibly) and newer (likely) Freshwater SLSC buildings may be on piled foundations. There are buried protective works located within the dune to the north of the Freshwater SLSC buildings (and some discontinuous and poorly constructed works to the south).

Historical coastal emergency management responses (and management measures to reduce the likelihood of emergencies) in Warringah can be summarised as:

- dumping of rock and other materials to prevent property damage during storms, particularly at Collaroy-Narrabeen Beach, mostly in the 1960's and 1970's;
- constructing some development on piles (a development requirement for major structures built since about 1997 in or seaward of the Immediate Zone of Reduced Foundation Capacity);
- construction of engineered protective works at Dee Why Beach and South Curl Curl Beach;
- removing development and resuming properties as a response to damaging storms (as occurred in 1946 in the vicinity of Jenkins Street at Collaroy Beach);
- dune restoration works to establish dune vegetation and additional sand storage; and,
- relocating assets landward to reduce coastline hazard threats, as occurred at Freshwater Beach with construction of a newer landward SLSC in 1987.

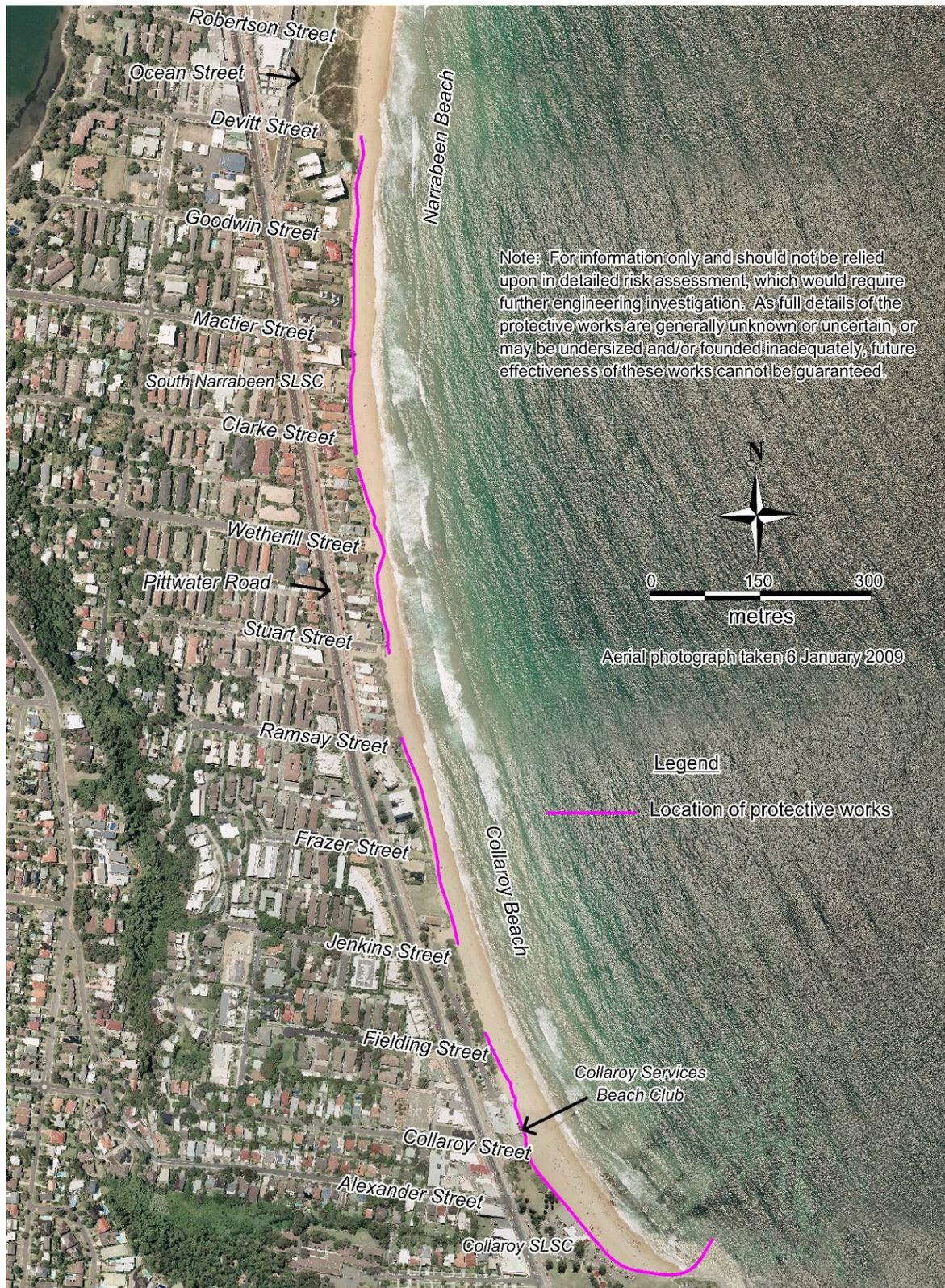


Figure 1: Extent of known protective works at Collaroy-Narrabeen Beach



## 5. COASTLINE HAZARDS

Immediate and Year 2050 coastline hazard lines for all beaches in the study area have been defined (at the landward edge of the Zone of Slope Adjustment), assuming an entirely sandy subsurface (that is, ignoring protective works and inerodible subsurfaces). The positions of the Immediate Hazard Line and 2050 Hazard Line for all beaches in the study area are shown in Section 7.10 of WorleyParsons (2012).

As discussed in WorleyParsons (2012), assuming an entirely sandy subsurface in the hazard definition is considered to be appropriate. The presence of protective works and piled development was accounted for in a risk assessment for structures adjacent to Warringah's beaches in WorleyParsons (2012).

Ignoring protective works, an extensive length of development is at threat from the coastline hazards of erosion and recession along Collaroy-Narrabeen Beach. This is particularly the case south of Devitt Street, with most development (about 80%) seaward of the Immediate Hazard Line, and almost all development seaward of the 2050 Hazard Line in this region. Indeed, without the protective works being in place, much of the development south of Devitt Street would have been damaged in coastal storms in the past and would be expected to be damaged in the future (with the exception of development that may be adequately piled).

At Fishermans Beach, ignoring any potential inerodible subsurfaces that may exist in the active coastal zone, it is evident that the area between Florence Avenue and about 50m south of Ocean Grove is at particular risk.

Long Reef SLSC is well landward of the 2050 Hazard Line. At Dee Why Beach, the area immediately north of the seawall (including Dee Why SLSC) is at particular risk from coastline hazards.

At North Curl Curl Beach, ignoring protective works and rock in the active coastal zone, North Curl Curl SLSC is seaward of the Immediate Hazard Line (although is likely to be founded on rock). At South Curl Curl Beach, ignoring protective works, South Curl Curl SLSC is well seaward of the Immediate Hazard Line, as are parts of Carrington Avenue in the vicinity of the SLSC. At Freshwater Beach, the older SLSC is seaward of the Immediate Hazard Line.



## 6. APPROVALS REQUIRED FOR IMPLEMENTATION OF EMERGENCY PROTECTIVE WORKS

### 6.1 Approvals Required by Landowners

#### 6.1.1 Preamble

There are two options available for landowners considering construction of emergency coastal protective works at their property, namely either:

- undertaking temporary sand/sandbags “temporary coastal protection works” (as defined under Part 4c of the *Coastal Protection Act 1979*) at limited authorised locations, denoted herein as “Part 4c sand/sandbags TCPW”; or,
- installation of emergency or long term coastal protective works of any form based on *State Environmental Planning Policy (Infrastructure) 2007* (denoted as *SEPP Infrastructure* herein) and consideration of the Coastal Zone Management Plan (CZMP) for Collaroy-Narrabeen Beach and Fishermans Beach (Warringah Council 2014).

The approvals required for installing these works are described in Section 6.1.2 and Section 6.1.3 respectively.

It is emphasised that landowners must act well (generally months) in advance of a storm to consider implementing either of these works. It should also be noted that landowners are not permitted to install coastal protective works without following these procedures, and severe penalties may apply if they are not followed.

#### 6.1.2 “Part 4c Sand/Sandbags TCPW”

“Part 4c sand/sandbags TCPW” comprise either:

- sand-filled geotextile containers each of maximum 0.75m<sup>3</sup> filled volume stacked in a single layer up to 1.5m high (at a slope flatter than 34° from the horizontal, that is flatter than 1:1.5 vertical:horizontal); or,
- clean sand placed up to the crest on the seaward side of an eroding escarpment.

In Warringah LGA, “Part 4c sand/sandbags TCPW” can only potentially be undertaken at Collaroy-Narrabeen Beach and Fishermans Beach. However, “Part 4c sand/sandbags TCPW” are not recommended for use by these landowners due to various limitations, in particular that they are likely to be ineffective and difficult to install in an emergency, as discussed further in WorleyParsons (2012).

“Part 4c sand/sandbags TCPW” must be placed in accordance with the requirements of:

- Part 4c of the *Coastal Protection Act 1979*;
- the Code of Practice under the *Coastal Protection Act 1979* (OEH 2013a);
- the Guide to the Statutory Requirements for Temporary Coastal Protection Works (OEH 2013b) and,
- the document herein and related WorleyParsons (2012) reference document



### 6.1.3 Other Works (of any Form)

Based on *SEPP Infrastructure*, landowners can consider the installation of emergency or long term coastal protective works of any form. As consent is required for such works, Part 4 of the *Environmental Planning and Assessment Act 1979* applies. Therefore, before installing these general protective works it would be necessary for landowners to:

- undertake an environmental assessment; and,
- lodge a Development Application (DA) with a consent authority.

Where a certified CZMP is in place Warringah Council is the consent authority, or otherwise it is the NSW Coastal Panel.

Note that it is the general expectation of Council that any emergency or long term protective works implemented by landowners would be entirely on private land (that is, within their property boundaries).

### 6.2 Approvals Required by Warringah Council

Based on *SEPP Infrastructure*, coastal protection works (of any form) can be carried out by Council without consent on any land. Given this, Part 5 of the *Environmental Planning and Assessment Act 1979* applies to coastal protection works (emergency or long term) undertaken by Council, unless the works can be considered to be exempt development. Council would generally be the determining authority for these works.

If the works are not exempt development, before installing protective works it would be necessary for Council to:

- undertake an environmental assessment; and,
- (until a CZMP is in force on the land) notify the NSW Coastal Panel before carrying out the works and take into consideration any response received from the Coastal Panel within 21 days of the notification (unless the proposed works only comprise the placement of sand or sandbags, or only replacement, repair or maintenance of works is proposed).

A number of emergency works may be considered to be exempt development under *SEPP Infrastructure*, including emergency works undertaken by Council to protect roads and stormwater management systems, as long as the works are of minimal environmental impact and structurally adequate.



## **7. ROLES AND RESPONSIBILITIES IN COASTAL EMERGENCY MANAGEMENT**

### **7.1 Preamble**

The roles and responsibilities of the State Emergency Service (SES), Warringah Council, Office of Environment and Heritage, Bureau of Meteorology and NSW Police in coastal emergency management are described below briefly in turn. Further details are provided in WorleyParsons (2012).

Landowners also have responsibilities if they want to install protective works as discussed in Section 7.7 (also refer to Section 6.1 for a description of the approvals process).

### **7.2 State Emergency Service**

The role of the SES in coastal erosion and inundation emergencies is essentially warning and evacuation of residents at risk, and lifting and/or relocating readily moveable household goods and commercial stock and equipment. The SES is not authorised to undertake coastal emergency protective works (such as placement of rocks or sand-filled geotextile containers) of any form.

### **7.3 Warringah Council**

The carrying out (or authorising and coordinating) of coastal emergency protective works is Warringah Council's role, if it chooses to undertake such measures to protect public assets from coastal erosion and inundation (assuming adequate environmental assessment had been carried out and the NSW Coastal Panel had been notified where relevant). Council does not consider it has a responsibility to protect private property.

In practice, typical tasks that Council may undertake (where required) before, during and after a coastal erosion/inundation event (including considering the need for and potentially implementing protective works on public land) would be as discussed in Section 9.

### **7.4 Office of Environment and Heritage**

The Office of Environment and Heritage (OEH) is the NSW government authority responsible for advising on coastal zone management.

### **7.5 Bureau of Meteorology**

The release of a "Unusually large surf waves expected to cause dangerous conditions on the coast" or "Abnormally high tides (or storm tides) expected to exceed highest astronomical tide" by the Bureau of Meteorology is the trigger adopted by the SES for involvement in a coastal erosion/inundation episode.

A "Unusually large surf waves expected to cause dangerous conditions on the coast" warning is issued if waves in the nearshore zone are forecast to exceed a significant wave height of 5m (irrespective of wave period) in the next 24 hours. A "Abnormally high tides (or storm tides) expected to exceed highest astronomical tide" warning is included if storm surge, wave setup or and/or outflow from river flooding are expected to raise ocean water levels significantly above Highest Astronomical Tide.

### **7.6 NSW Police**

The NSW Police Force is the agency responsible for:

- law enforcement and search and rescue;
- controlling and coordinating the evacuation of victims from the area affected by the emergency in conjunction with the combat agency; and,



- being the combat agency for terrorist acts.

Some members of the NSW Police may also be appointed as Emergency Operations Controllers.

Police would typically become involved in a coastal erosion event as follows:

- assisting the SES where required (for example controlling and coordinating evacuation) when the SES was acting in its Combat Agency role; or,
- if the SES was not mobilised, police may undertake or coordinate activities such as evacuation, barricading, removal of the contents of buildings and the like.

### **7.7 Private Landowners**

In essence, landowners must act well in advance of a coastal emergency, and prior to placement of any works must have:

- a certificate if “Part 4c sand/sandbags TCPW” are proposed on public land, or
- development consent for other types of works.

Landowners are not permitted to install coastal protective works without following these procedures, and penalties may apply if they are not followed.



**8. EVALUATION OF EMERGENCY PROTECTION MEASURES**

Refer to WorleyParsons (2012).



## 9. COUNCIL ACTIONS

### 9.1 Intended Protection Strategy for Public Assets

As noted in Section 6.2 and Section 7.3, Council can choose to undertake physical erosion protection measures to protect public assets from coastal erosion and inundation if considered to be appropriate (assuming adequate environmental assessment has been carried out and the NSW Coastal Panel has been notified where relevant), but is not necessarily obligated to do so. Council does not consider it has a responsibility to protect private property from coastal erosion and inundation hazards, and does not intend to do so.

At this point in time, Council is not authorised to and would therefore not install works to protect public assets in the study area, as environmental assessments of any potential works have not been undertaken. However, it is Council's intention to investigate the feasibility and appropriateness of undertaking such works in the future. This would include the following tasks:

- further detailed assessment of the level of risk to the asset;
- completion of a cost benefit assessment of the value of protection of the asset, to determine whether protection would be justified;
- assessment of insurance implications; and,
- if protection was found to be justified for a particular asset, an environmental assessment (Review of Environmental Factors) for these works would be completed.

The public assets at highest risk in the study area that would warrant the highest priority for completion of the above assessments comprise (from south to north):

- old Freshwater SLSC building (if it was decided that the building would not be sacrificial as intended when the new Freshwater SLSC was constructed);
- South Curl Curl SLSC (if existing engineered protective works were to fail);
- Dee Why SLSC;
- Long Reef Fishing Club hut (Fishermans Beach);
- Warringah Surf Rescue building (Fishermans Beach);
- car park north of Florence Avenue at Fishermans Beach;
- road reserves at Ramsay Street, Stuart Street and Wetherill Street at Collaroy-Narrabeen Beach (if existing protective works fail), noting that works at these locations may be exempt development and hence may require less rigorous environmental assessment and,
- stormwater outlets at all beaches in the study area (again noting that works at these locations may be exempt development, although it may not be appropriate or practical to attempt to protect such assets in an emergency).

If the environmental assessment process indicated that particular works would have an acceptably low environmental impact, the tasks that would need to be undertaken would include:

- completion of designs and methods of works for the intended protective actions, based on the specific materials to be employed, cost, minimal environmental impact and practical construction methods including consideration of any existing protective works, site access issues, etc.;
- developing a priority ranking of the order in which assets may be protected based on the relative cost benefit of protection, to guide actions when multiple assets may be at risk at a particular time and resources may not be available to protect all of these assets.



- pre-purchasing and stockpiling relevant resources (materials and plant and equipment) for use in emergencies; and,  
  
identifying appropriate personnel that would place any emergency works (internal and/or external) and ensuring appropriate training or understanding of requirements for these personnel in advance of an emergency.

Note that Council does not intend to protect relatively minor assets such as dune fencing, lifeguard sheds and the like, as this would not be practical and is not considered to be warranted. That stated, where possible lifeguard sheds would be moved landward to prevent damage from beach erosion if required. Fencing and accessways would be repaired or replaced as required.

Lists of potential actions that Council may undertake before, during and after a coastal erosion emergency are provided in Section 9.3, 9.4 and 9.5 respectively. Prior to this, a brief discussion on potential criteria/thresholds for action is provided in Section 9.2. In Section 9.6, the responsibility structure within Council in relation to coastal erosion emergencies is outlined.

Council would undertake actions to warn the public of and/or reduce the risks associated with storm damage and severe beach erosion hazards. All Council units would have a responsibility to document records of decisions made and the reasoning in making those decisions (before, during and after coastal erosion emergencies).

## **9.2 Criteria/Thresholds for Action**

The stages in a coastal erosion emergency can be delineated as follows:

- monitoring and pre-storm activities;
- standby;
- mobilisation;
- stand-down; and,
- restoration and clean-up.

It is considered that a prescriptive set of trigger conditions that would be used to initiate Council actions in relation to coastal erosion emergencies are impractical to stipulate. This is because such conditions would be exceedingly complex to devise, and would still be unlikely to cover every situation<sup>1</sup>. Examples of complexities include variability in storm conditions (wave height and period, wave direction, water level), state of the tide, antecedent conditions, forecasts, existing protective works, and existing structure types (in particular foundations). In the case of protective works and foundations, there may also be unknowns regarding the nature of the works.

A more practical approach is considered to be to apply expert engineering judgement at times of storms to assess when to initiate particular actions as required. That stated, this approach relies on regular monitoring of environmental conditions and beach behaviour, and seeking appropriate advice when required. Beachfront residents or other community members may also provide early warning to Council of coastal erosion emergencies.

In monitoring the extent of erosion (proximity of the erosion escarpment to an asset and rate of movement), signs of impending slope instability such as distortions to structures, ground depressions and tension cracks should also be assessed, as well as forecast environmental conditions.

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<sup>1</sup> There is also no single quantitative parameter, such as an offshore significant wave height of a certain magnitude, minimum beach width of a certain value, or distance from an erosion escarpment which can be adopted as the trigger for imminent damage to an asset since there are a combination of many factors involved.



### 9.3 Before a Storm

The following actions have already been undertaken by Council:

- informing the community of the council's intended erosion emergency responses under its emergency action subplan, as per the document herein and WorleyParsons (2012);
- identifying areas where landowners may install "Part 4c sand/sandbags TCPW" and any applicable site-specific requirements for those works; and,
- preparing up-to-date contact details for key personnel (see Section 11);

These actions would be updated where required if circumstances change.

The following actions would be undertaken (as necessary and as resources permit) by Council before a storm:

- monitoring beach erosion and weather<sup>2</sup>, wave and water level conditions and forecasts;
- ensuring sufficient warning signage and barricades are available for use if required (for example to close off damaged and potentially dangerous beach access points);
- provision of information and advice to affected beachfront landowners and the wider community; and,
- consulting with the SES and other relevant agencies such as OEH.

Monitoring is the key to maximising warning time, preparedness and predictive capability in regard to emergency coastal erosion events.

Monitoring of physical environmental conditions could include weather conditions (measurements, warnings and forecasts), wave forecasts (height and direction), water level (tidal) predictions, real time wave data (height, period and direction), real time water level data (including consideration of elevated water levels due to storm surge), and beach behaviour (extent of erosion, beach width, understanding of historical beach behaviour at times of storms).

In a potential emergency event, it would be expected that beach areas would be inspected at least daily, particularly at high tide, where resources permit.

Council is also intending to consider the need to develop a communications strategy to keep affected communities informed during an erosion emergency, and developing the strategy if required.

### 9.4 During a Storm

Actions undertaken during an erosion emergency should be managed by Council officers who clearly understand the subplan and know the roles and responsibilities of key personnel. As further discussed in WorleyParsons (2012):

- no actions undertaken should impede, conflict or overlap with those of response agencies such as the SES;
- actions should focus on the safety of personnel; and,
- a communication strategy needs to be in place during an erosion emergency. Council actions

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<sup>2</sup> Besides considering coastal storm activity (low pressure systems, wind etc.), rainfall may affect groundwater conditions and stormwater outlets and their surrounds (for example).



during a storm would include (as necessary and as resources permit):

- regular monitoring of environmental conditions and beach behaviour;
- assessing the need for barriers and safety signage to be erected at damaged and potentially dangerous beach access points, to minimise risk to public safety;
- erecting barricades and safety signage;
- monitoring unauthorised coastal protection works;
- opening slip-rail gates at authorised beach access locations if “Part 4c sand/sandbags TCPW” are to be installed, and issuing certificates if required;
- seeking coastal and geotechnical engineering advice;
- seeking advice from OEH staff;
- supporting the SES;
- releasing information to the media; and,
- provision of information and advice to beachfront landowners and the wider community.

An information dossier (Patterson Britton & Partners, 2005) is available to assist in assessing the extent of protective works at Collaroy-Narrabeen Beach between Collaroy Services Beach Club and Devitt Street. This is designed to be able to be used in the field during emergency management situations. Relevant information on all coastal beach properties in Warringah is also included in WorleyParsons (2012).

## **9.5 After a Storm**

Council actions after a storm would include (as necessary and as resources permit), noting that adverse conditions can persist for many days after the peak of a storm, particularly if a beach remains in an eroded state:

- continuing temporary safety fencing and associated warning signage;
- continuing to maintain a communication strategy warning of the dangers of any persisting high, unstable or near-vertical erosion escarpments drying out and collapsing without notice (in high-use public areas, the Council may consider collapsing these escarpments with machinery);
- cleansing the beach of debris and other inappropriate materials;
- remedial works to restore safe beach access;
- assessing the structural integrity of any exposed infrastructure, buildings and other assets and taking appropriate action;
- repairing or replacing damaged infrastructure, such as roads, stormwater pipes, dune fencing and beach accessways;
- rehabilitation of damaged dune vegetation;
- beach scraping, beach sediment recycling (particularly at Collaroy-Narrabeen Beach) and/or sand nourishment to restore beach amenity and assist in improving public safety;
- monitoring the performance and impact of any coastal protection works;
- ensuring “Part 4c sand/sandbags TCPW” are implemented in accordance with certificate



conditions and OEH (2013);

- maintaining photographic and written records of events (including an inventory of any damage and photographs and measurements of exposed protective works) and decision making processes;
- monitoring unauthorised coastal protection works and enforcement of penalties under the Coastal Protection Act 1979 (this may also be undertaken before and during a storm);
- replenishing any emergency materials and supplies for use in any future erosion events;
- seeking financial assistance from the NSW (and Federal) government to restore damaged infrastructure; and,
- critically reviewing the subplan to ensure it achieved its performance objectives and revising it to address any identified shortcomings.

If through the environmental assessment process it is found that protective works would be acceptable for some or all of the above or other assets (also taking NSW Coastal Panel comment into consideration), it is recommended that Council:

- completes a cost benefit assessment of the value of protection of the relevant assets, to determine whether protection would be justified;
- completes designs and methods of works for protective actions that it is intended to undertake (where justified), based on the specific materials to be employed, cost, minimal environmental impact and practical construction methods including consideration of any existing protective works, site access issues, etc.; and,
- develops a priority ranking of the order in which assets may be protected based on the relative cost benefit of protection, to guide actions when multiple assets may be at risk at a particular time and resources may not be available to protect all of these assets. As part of the above, consideration of the cost benefit and intention to protect or not protect the older Freshwater SLSC should be made.

If through the above assessment process it was found that protection of some assets was intended if required, it would then be necessary for Council to:

- pre-purchase and stockpile relevant resources (materials and plant and equipment) for use in emergencies; and,
- identify appropriate personnel that would place any emergency works (internal and/or external) and ensure appropriate training or understanding of requirements for these personnel in advance of an emergency.



**9.6 Responsibility Structure within Warringah Council**

Responsibilities of the various units within Council before, during and after coastal erosion emergencies are as listed in **Table 1**. In a significant emergency requiring coordination across multiple units, Council's General Manager may assume that coordination role.

All Council units would have a responsibility to document records of decisions made and the reasoning in making those decisions (before, during and after coastal erosion emergencies).

**Table 1: Responsibilities of various units within Council in coastal erosion emergencies**

Functional Unit	Responsibilities
Natural Environment	<ul style="list-style-type: none"> <li>• completing a cost benefit assessment of the value of protection of relevant assets, to determine whether protection would be justified (in consultation with Property and Commercial Development Unit);</li> <li>• completing environmental assessments for locations at which new or upgraded protective works may be undertaken, if required;</li> <li>• completing designs and methods of works for protective actions that it is intended to undertake (if required);</li> <li>• developing a ranking of the order in which assets may be protected (in consultation with Property and Commercial Development Unit), if required;</li> <li>• if found that protection of some assets would be justified, purchasing and stockpiling relevant resources for use in emergencies and identifying appropriate personnel that would place any emergency works;</li> <li>• implementing protective works (if above studies undertaken and NSW Coastal Panel notified)</li> <li>• carrying out sustainable planning and management of the coastal zone;</li> <li>• preparing Coastal Zone Management Plans, including arrangements for emergency management of coastal erosion;</li> <li>• consulting with the SES and other relevant agencies when developing emergency management arrangements;</li> <li>• providing the SES with copies of coastal hazard and management studies to assist with emergency planning and operational intelligence systems;</li> <li>• monitoring unauthorised coastal protection works (in consultation with Compliance Unit);</li> <li>• ensuring sufficient safety signage is available to be erected at short notice;</li> <li>• monitoring physical environmental conditions (weather, wave data, water level data, beach behaviour);</li> <li>• triggering standby and mobilisation for installation of protective works, as required (if appropriate assessments have been undertaken);</li> <li>• engaging experienced coastal and geotechnical engineer where required to provide advice;</li> <li>• seeking advice from OEH staff as required providing technical advice on emergency works;</li> <li>• maintaining a register of coastal protection works at properties;</li> <li>• assessing the need for safety signage and barricades to be installed to minimise risk to public safety;</li> <li>• opening sliprail gates at authorised beach access locations if "Part 4c sand/sandbags TCPW" are to be installed;</li> </ul>



Functional Unit	Responsibilities
Natural Environment	<ul style="list-style-type: none"> <li>• rehabilitation of damaged</li> <li>• dune vegetation; beach scraping, beach sand recycling and/or sand nourishment to restore beach amenity after a storm;</li> <li>• maintaining photographic records;</li> <li>• preparing report on any emergency works installed, if required;</li> <li>• assessing and issuing (where appropriate) "Part 4c sand/sandbags TCPW" certificates submitted by landowners, and maintaining a register of certificates issued;</li> <li>• ensuring "Part 4c sand/sandbags TCPW" are implemented in accordance with certificate conditions and OEH (2013).</li> </ul>
Community and Safety Services	<ul style="list-style-type: none"> <li>• monitoring physical environmental conditions;</li> <li>• ensuring sufficient safety signage is available;</li> <li>• assessing the need for safety signage and barricades to be installed.</li> </ul>
Marketing and Communications	<ul style="list-style-type: none"> <li>• considering need to develop a communications strategy to keep affected communities informed during an erosion emergency, and developing strategy if required;</li> <li>• releasing information to the media;</li> <li>• provision of information and advice to beachfront landowners and wider community.</li> </ul>
Roads, Traffic and Waste	<ul style="list-style-type: none"> <li>• erecting barricades and safety signage if required;</li> <li>• undertaking protective works at roads (assuming environmental assessments have been undertaken), in consultation with Natural Environment Unit and Parks, Reserves and Foreshores Unit;</li> <li>• repairing damage to roads;</li> <li>• repairing damaged stormwater infrastructure in consultation with Natural Environment Unit;</li> <li>• cleansing the beach of debris and other inappropriate materials.</li> </ul>
Parks, Reserves and Foreshores	<ul style="list-style-type: none"> <li>• assisting the Natural Environment Unit in considering the need for and potentially implementing protective works;</li> <li>• erecting barricades and safety signage if required;</li> <li>• restoring damaged dune fencing and beach accessways in consultation with Natural Environment Unit;</li> <li>• remedial works to restore safe beach access.</li> </ul>
Compliance	<ul style="list-style-type: none"> <li>• enforcement of the Coastal Protection Act 1979 (monitoring unauthorised coastal protection works) in consultation with Natural Environment Unit;</li> </ul>
Strategic Planning	<ul style="list-style-type: none"> <li>• updating Section 149 certificates to include information on properties with "Part 4c sand/sandbags TCPW".</li> </ul>
Property and Commercial Development	<ul style="list-style-type: none"> <li>• completing a cost benefit assessment of the value of protection of relevant assets, to determine whether protection would be justified (in consultation with Natural Environment Unit);</li> <li>• developing a priority ranking of the order in which assets may be protected, if required (in consultation with Natural Environment Unit);</li> <li>• where possible and safe to do so, moving lifeguard sheds landward if it is likely a shed would be damaged during a period of beach erosion.</li> </ul>



Table 1 outlines the responsibility structure within Council, which would remain the same whether the SES was or was not mobilised.

It should also be noted that if the SES was mobilised, Council has a Local Emergency Management Officer (LEMO). A LEMO is appointed under Section 32 of the *State Emergency and Rescue Management Act 1989*, in which it is stated that “A council is to provide executive support facilities for the Local Emergency Management Committee and the Local Emergency Operations Controller in its area. The principal executive officer is to be known as the Local Emergency Management Officer”.

In the Manly, Warringah and Pittwater Local Government Areas, the Local Emergency Operations Controller (also known as LEOCON) is a Senior Member of the Police Service stationed in the Manly, Warringah and Pittwater area. The functions of the LEOCON are described in Section 31 of the *State Emergency and Rescue Management Act 1989*.



## 10. KEY CONTACT DETAILS

- State Emergency Service (SES), telephone 132 500  
Local Controller: Mr Wayne Lyne (mobile 0412 656 484)
- Local Emergency Operations Controller (LEOCON)
  - Police Service Local Area Commander, telephone 9971 3399 (Dee Why Police Station)
  - alternate LEOCON: Manly Police, telephone 9977 9499
- Local Emergency Management Officer (LEMO) at Warringah Council is Mr Ross Picard, telephone 9942 2527, facsimile 9942 2448 and mobile 0419 684 084
- Deputy LEMO is Mr Tony Walmsley (telephone 9942 2761, mobile 0407 403 754)
- Warringah Council general switch telephone 9942 2111 and website <http://www.warringah.nsw.gov.au>
- Warringah Council units:
  - Office of the General Manager: Mr Rik Hart (General Manager), telephone 9942 2327;
  - Natural Environment Unit: Mr Craig Morrison (Senior Environment Officer, Coast), telephone 9942 2718, mobile 0419 264 645;
  - Roads, Traffic and Waste Unit: Mr Ross Picard (Team Leader Roads Drainage Maintenance and Construction), telephone 9942 2527, mobile 0419 684 084;
  - Parks, Reserves and Foreshores Unit: Mr Scot Hedge (Team Leader Business Development), telephone 9942 2724, mobile 0417 486 955;
  - Compliance Unit: Mr Rodney Piggott (Manager, Regulation and Enforcement), telephone 9942 2489, mobile 0419 998 024;
  - Community and Safety Services Unit: Mr Clint Rose (Coordinator Beach Services), telephone 9942 2644, mobile 0408 469 150;
  - Property and Commercial Development Unit: Mr Adam Vine (Group Manager Business and Enterprise Risk), telephone 9942 2684, mobile 0407 247 876;
  - Strategic Planning Unit: Mr Peter Robinson (Group Manager Strategic Planning), telephone 9942 2768, mobile 0437 034 739; and,
  - Marketing and Communications Unit: Mr Graham Middleton (Group Manager Marketing and Communications), telephone 9942 2590, mobile 0418 261 601.
- Office of Environment and Heritage (Coastal Management Unit) local representative: Mark Moratti, telephone 9895 5056



## **11. CONSULTATION**

As described in more detail in WorleyParsons (2012), extensive consultation has been undertaken with Warringah Council, OEH, the SES and Bureau of Meteorology staff.

Two public forums have also been held (in August 2010 and June 2011), and a previous version of the investigation reported herein was placed on public exhibition from 25 May to 27 June 2011.

A total of 18 written submissions were received in response to the public exhibition and June 2011 public forum, as discussed in WorleyParsons (2012).



## 12. CONCLUSIONS

A coastal erosion emergency action subplan for beaches in Warringah has been completed as set out herein and with a supporting reference document (WorleyParsons, 2012).

In Warringah LGA, private development is located immediately landward of much of Collaroy-Narrabeen Beach (101 private lots with beach frontage) and the north-western portion of Fishermans Beach (14 private lots with beach frontage).

Key beachfront public assets in Warringah LGA include 9 Surf Life Saving Clubs, Long Reef Golf Club, a Warringah Surf Rescue building, Long Reef Fishing Club Hut, and roads and stormwater infrastructure.

Development in Warringah LGA has been damaged by coastal storms and/or emergency protective works have been implemented on numerous occasions, particularly at Collaroy-Narrabeen Beach, Dee Why Beach, South Curl Curl Beach and Freshwater Beach. There are extensive existing protective works south of Devitt Street at Collaroy-Narrabeen Beach (of variable standard, with full details of the works generally unknown), and engineered protective works at Dee Why Beach and South Curl Curl Beach. Future effectiveness of these protective works cannot be guaranteed, although note that the engineered works at Dee Why and South Curl Curl are substantial.

The Immediate and 2050 Hazard Line has been defined at all beaches in Warringah, calculated ignoring protective works and any inerodible subsurfaces. Most of the beachfront development south of Devitt Street at Collaroy-Narrabeen Beach is seaward of the Immediate Hazard Line. At Fishermans Beach, the area between Florence Avenue and about 50m south of Ocean Grove is at particular risk. At Dee Why Beach, the area immediately north of the seawall (including Dee Why SLSC) is at particular risk from coastline hazards. At South Curl Curl Beach (ignoring protective works), South Curl Curl SLSC is well seaward of the Immediate Hazard Line. At Freshwater Beach, the older SLSC is seaward of the Immediate Hazard Line.

There are two options available for landowners considering construction of emergency coastal protective works at their property, namely either:

- undertaking temporary sand/sandbags “temporary coastal protection works” (as defined under Part 4c of the *Coastal Protection Act 1979*) at limited authorised locations, denoted herein as “Part 4c sand/sandbags TCPW”; or,
- installation of emergency or long term coastal protective works of any form based on *SEPP Infrastructure*.

In the study area, “Part 4c sand/sandbags TCPW” are permitted for private lots with beach frontage at Collaroy-Narrabeen Beach and Fishermans Beach. However, “Part 4c sand/sandbags TCPW” are not recommended for use by these landowners due to various limitations.

Before installing general *SEPP Infrastructure* protective works it would be necessary for landowners to undertake an environmental assessment and lodge a Development Application (DA) with a consent authority. Where a certified CZMP is in place Warringah Council is the consent authority or otherwise it is the NSW Coastal Panel.

Based on *SEPP Infrastructure*, coastal protection works (of any form) can be carried out by Council without consent. Given this, Part 5 of the *Environmental Planning and Assessment Act 1979* applies to coastal protection works (emergency or long term) undertaken by Council, unless the works can be considered to be exempt development.

If the works are not exempt development, before installing protective works it would be necessary for Council to:

- undertake an environmental assessment; and,



- (until a CZMP is in force on the land) notify the NSW Coastal Panel before carrying out the works and take into consideration any response received from the Coastal Panel within 21 days of the notification (unless the proposed works only comprise the placement of sand or sandbags, or only replacement, repair or maintenance of works is proposed).

A number of emergency works may be exempt development under *SEPP Infrastructure*, including emergency works undertaken by Council to protect roads and stormwater management systems, as long as the works are of minimal environmental impact and structurally adequate.

At this point in time, Council is not authorised to and would therefore not install works to protect public assets in the study area, as environmental assessments of any potential works have not been undertaken. However, it is Council's intention to investigate the feasibility and appropriateness of undertaking such works in the future.

Council does not consider that it has a responsibility to protect private property from coastal erosion and inundation hazards, and does not intend to do so.

Council's intended actions before, during and after coastal erosion emergencies have been described in Section 9.3, 9.4 and 9.5 respectively.



### 13. REFERENCES

Office of Environment and Heritage [OEH] (2011), *Coastal Zone Management Guide Note, Emergency Action Subplans*, 978 1 74293 300 9, OEH 2011/0631, July

Office of Environment and Heritage [OEH] (2013a), *Code of Practice under the Coastal Protection Act 1979*, OEH 2013/0637, ISBN 978 1 74359 271 7 August

Office of Environment and Heritage [OEH] (2013b), *Guide to Statutory Requirements for Temporary Coastal Protection Works*, OEH 2013/0637, ISBN 978 1 74359 272 4 August

Patterson Britton & Partners (2005), "Collaroy/Narrabeen Beachfront Property Information Dossier", April

Warringah Council (2014), *Coastal Zone Management Plan for Collaroy-Narrabeen Beach and Fishermans Beach*, as adopted October 2014

WorleyParsons (2012), *Coastal Erosion Emergency Action Subplan for Beaches in Warringah, Reference Document*, Issue No. 6, 29 February, for Warringah Council