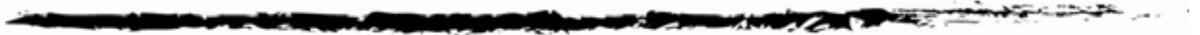




Environment,  
Climate Change  
& Water

Draft

Guide to the statutory requirements for  
emergency coastal protection works



## **Submissions invited**

Please send your submissions on this consultation draft by email to:

[coast.flood@environment.nsw.gov.au](mailto:coast.flood@environment.nsw.gov.au)

or by post to:

Executive Officer  
Waters, Wetlands and Coast Division  
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## **Closing date for submissions**

Submissions must be received by **5 pm, Friday 1 October 2010**.

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## **Note for consultation draft**

This document has been prepared to support the *Coastal Protection Act 1979* once amended by the *Coastal Protection and Other Legislation Amendment Bill 2010*, which is currently being considered by the NSW Parliament. The document refers to sections of the *Coastal Protection Act 1979* which this Bill proposes to include and/or amend. The section numbers in this draft are those in the Bill as introduced into Parliament.

This document has no statutory basis and current statutory requirements relating to the placement of sand or sandbags on beaches by landowners to reduce coastal erosion impacts should be followed. This may include requirements under the *Environmental Planning and Assessment Act 1979*, the *Crown Lands Act 1982*, the *Roads Act 1993*, the *Coastal Protection Act 1979*, the *Fisheries Management Act 1994* and the *Marine Parks Act 1997*. Details of these Acts can be found at [www.legislation.nsw.gov.au](http://www.legislation.nsw.gov.au).

# 1 Introduction

This guide has been prepared to assist beachfront landowners and/or people acting on their behalf to understand the statutory requirements for placing emergency coastal protection works. This document also provides guidance and advice to landowners to assist with placing these works.

The intent of emergency coastal protection works is to reduce the impacts of coastal erosion to a legally approved residential dwelling or commercial building under immediate threat from coastal erosion. A landowner or occupier is able to place these works under specified conditions for a single period of up to six months (longer if a development application is lodged for longer-term works) for a particular parcel of land. Landowners or occupiers have full responsibility and liability associated with placing these works.

These works can only be placed at specified locations along the NSW coastline where residential dwellings or commercial buildings at risk from erosion have been identified and there is no public road between the houses and the beach (see Section 4 for details).

During this period, the landowner or occupier should develop a longer-term approach to managing erosion risks to the property. These works are not intended to compromise longer-term management of coastal hazard threats or result in adverse off-site environmental impacts.

It is important to note that these works are likely to provide protection from wave action during relatively small storms or swells and may additionally coincide with king tide periods. They may also provide a nominal or limited degree of erosion protection during medium to large storm events; however, they are also likely to be damaged during such events.

The NSW Government's approach to landowner funded coastal protection works is to allow landowners to:

- place, maintain and remove emergency works in accordance with requirements under the *Coastal Protection Act 1979* and avoid the need for any approvals under other legislation – these allowable emergency works are relatively small-scale, must not result in off-site erosion impacts and can be readily removed
- apply to construct other types of coastal protection works of a larger scale or a longer duration than the emergency works. These works will need approvals under various Acts, including the *Environmental Planning and Assessment Act 1979*. The landowners will need to demonstrate that they can maintain the works and manage any off-site erosion impacts.

This guide summarises the legal requirements that apply to emergency coastal protection works under the Coastal Protection Act. Failure to follow these requirements when placing emergency coastal protection works is an offence under this Act and may result in penalties under the Act and/or an order to remove the works. The maximum penalty under this Act is nearly \$250,000 for an individual and nearly \$500,000 for a corporation.

For detailed information on the statutory requirements relating to emergency coastal protection works, refer to:

- the *Coastal Protection Act 1979* – available at [www.legislation.nsw.gov.au](http://www.legislation.nsw.gov.au)
- the 'Minister's Requirements under the *Coastal Protection Act 1979*', published in the *NSW Government Gazette* on [insert date when gazetted]
- any coastal erosion emergency action subplan prepared by the relevant local council. These plans are normally available on the council's website.

This guide was correct at the date of publication; however, the statutory requirements may have changed subsequently and these requirements take precedence over any information in this guide. For information on current legislation, see [www.legislation.nsw.gov.au](http://www.legislation.nsw.gov.au).

The structure of this guide is as follows:

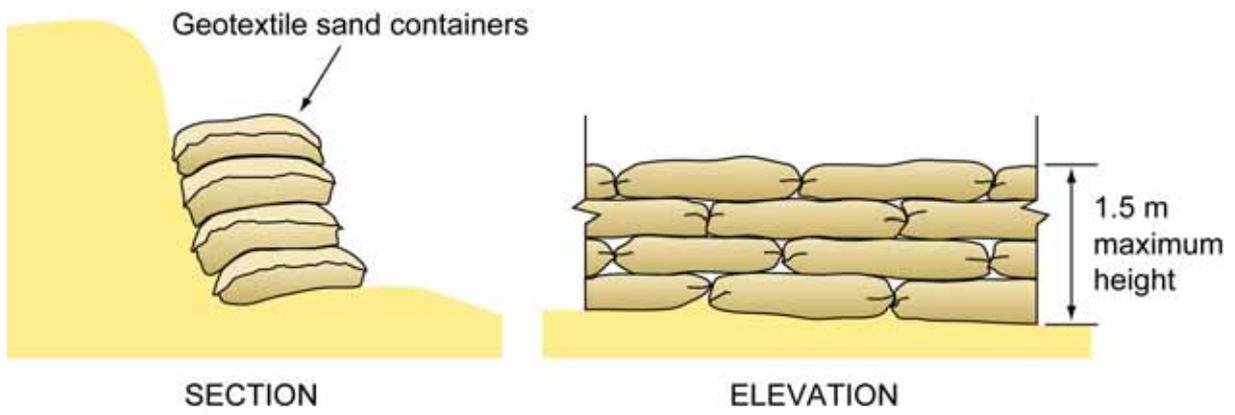
- Section 2 describes emergency coastal protection works.
- Section 3 provides information on how to obtain a certificate to place emergency works.
- Section 4 describes the circumstances when these works can be placed.
- Section 5 outlines the allowable use of public land for placing these works.
- Section 6 provides advice to landowners on preparing to place emergency works.
- Section 7 contains guidance on safety requirements during the placement of emergency works.
- Section 8 summarises other legal requirements that relate to placing the works.
- Section 9 provides information on other landowner options for emergency works.

## 2 Emergency coastal protection works

Emergency coastal protection works are sand, or fabric bags filled with sand, placed on a beach or a sand dune adjacent to a beach to reduce the impacts of coastal (or beach) erosion, where this threatens a residential or commercial building.

Four types or options for emergency coastal protection works are permitted. These works are listed below in order of declining ability to resist erosion. Further details are provided in Appendix A.

1. Geotextile sand container toe protection works (Type 1). These works involve filling large bags made from a geotextile fabric with sand and placing these bags at the toe (or bottom) of the erosion escarpment (see Figures 2.1 and 2.2), to a maximum height of 1.5 m. These bags weigh around 1,200 kg when filled with dry sand and are usually placed using machinery.
2. Placed sandbag toe protection works (Type 2). These works involve placing sandbags made from polypropylene fabric (not hessian) at the toe of the escarpment to make a low sandbag wall with a maximum height of 1.5 m. These are smaller bags than used for the Type 1 works and weigh approximately 18 kg when filled with dry sand. See Figure 2.3 for an illustration of these works.
3. Sandbag toe protection works (Type 3). This form of erosion protection is a variation of the Type 2 works. The difference is that there is no particular pattern in placing the works at the escarpment toe, as shown in Figure 2.4.
4. Beach nourishment (placed sand) (Type 4). This type of emergency coastal protection works involving placing imported sand (i.e. not sand from the beach or the dune) against the erosion escarpment (see Figure 2.5).

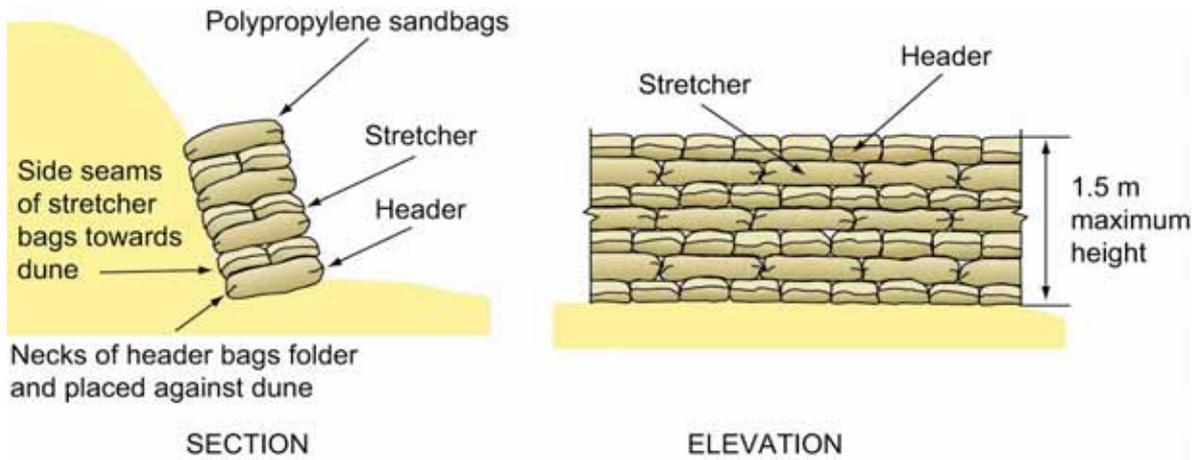


**Figure 2.1 – Geotextile sand container toe protection works (Type 1)**

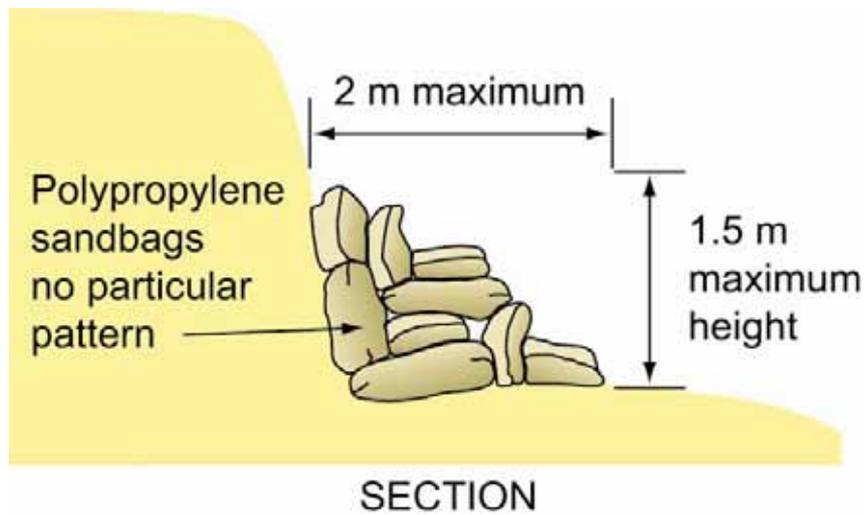


**Figure 2.2 – Geotextile sand container coastal protection works at Byron Bay**

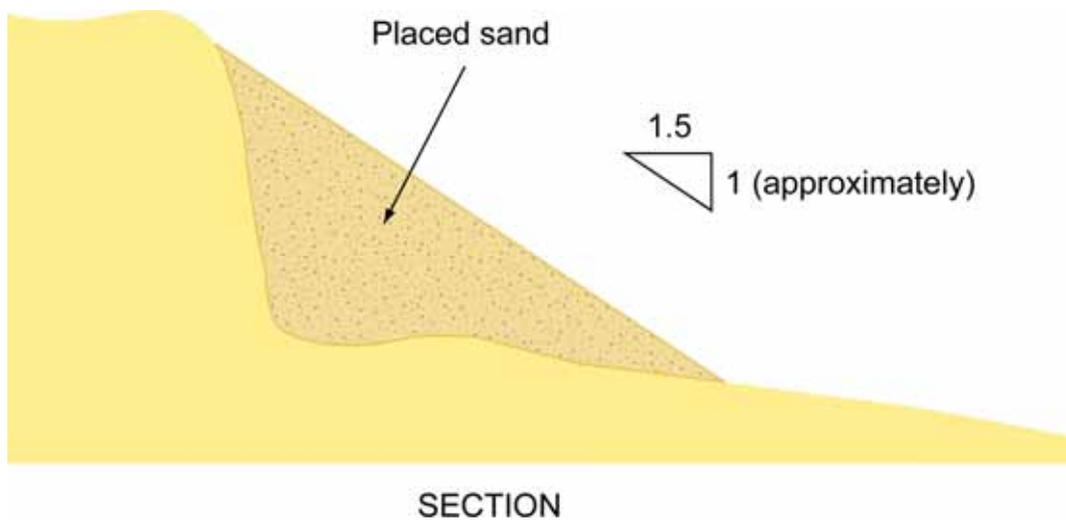
[Photo – M Sharpin, DECCW]



**Figure 2.3 – Placed sandbag toe protection works (Type 2)**



**Figure 2.4 – Sandbag toe protection works (Type 3)**



**Figure 2.5 – Beach nourishment (placed sand) (Type 4)**

No other material can be placed as emergency coastal protection works under the Coastal Protection Act. The Act specifically excludes placement of rocks, concrete, construction waste or other debris. It is a breach of the Act to place any of these materials; significant penalties apply and an order may be issued requiring this material to be removed at the expense of the person who placed it. These materials are not permitted as emergency works, as without adequate and site-specific consideration they may present a public safety risk, may exacerbate erosion of beaches and adjacent land, and are difficult to remove.

Property owners are responsible for the construction, management and maintenance of emergency coastal protection works, along with the management of adverse off-site impacts caused by the works (such as end scour or increased erosion), and remediation of the site following the removal of works. Maintenance includes replacing bags that have been dislodged or split and removing any bags that have washed onto beaches away from the works.

Landowners are also responsible for ongoing public safety risks associated with these works. It is recommended that all landholders seek insurance coverage which extends to all emergency protection works before initiating any form of emergency coastal protection.

The Act includes powers enabling an authorised officer of some public authorities (e.g. local councils and DECCW) to issue an order requiring the works to be removed or modified if they are, in the officer's opinion:

- causing or likely to cause increased beach erosion, or
- limiting or likely to limit public access to a beach or headland, or
- posing or likely to pose a threat to public safety.

### **3 Applying for a certificate to place works**

A landowner or occupier must apply for a certificate to place emergency coastal protection works from an emergency works authorised officer from the local council or the Department of Environment, Climate Change and Water. The authorised officer is likely to inspect the site where the works are to be placed while considering the application for the certificate. Once a certificate is obtained, the works can be lawfully placed and there is no requirement to obtain approvals under other legislation which would otherwise apply.

A certificate may be issued unconditionally or subject to conditions specified by the authorised officer, and requires the payment of a fee determined by the Minister.

The certificate is valid for two (2) years from the date of issue and the landowner or occupier may place the works at any time during this period.

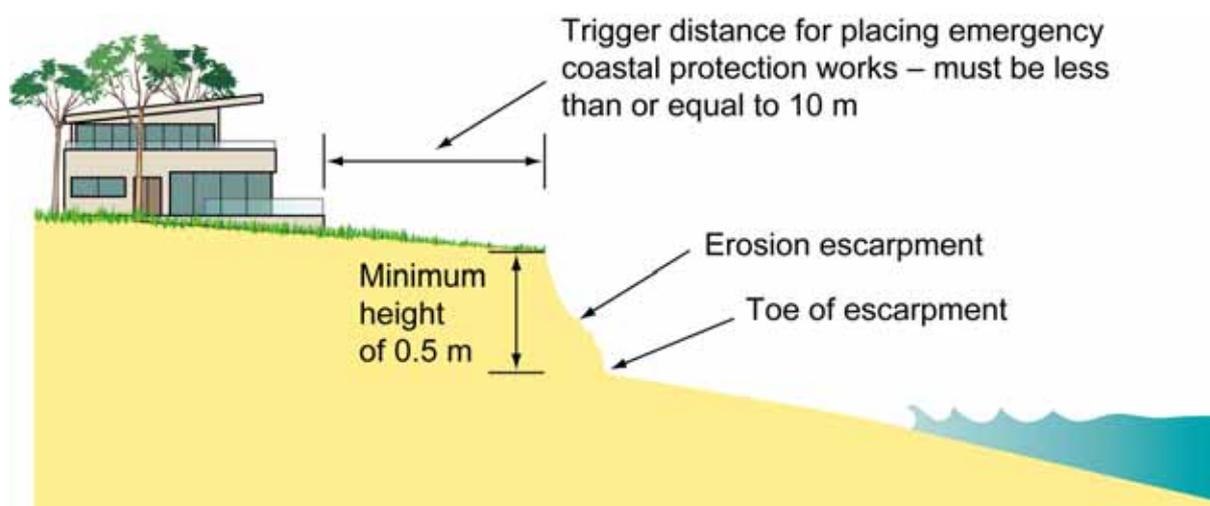
### **4 Placing emergency coastal protection works**

Emergency coastal protection works can only be placed at the locations noted in Table 1. Specific requirements may apply at each of these locations – see Appendix B for details.

The works can only be placed by or on behalf of a landowner or occupier to protect a lawfully erected building. Under normal circumstances, the works can only be placed when the building (or most seaward part of an external wall) is within 10 m of the landward extent of the top of a sand dune erosion escarpment (see Figure 4.1 and Appendix C). This distance must be confirmed in writing by a registered land surveyor or an authorised officer under the Coastal Protection Act before the works can be placed.

**Table 1 – Authorised locations for emergency coastal protection works**

<b>Authorised locations</b>
Belongil Beach, Byron Bay
Basin Bay/Beach, Mona Vale
Bilgola Beach, Bilgola
Brooms Head, north of the outlet from Cakora Lagoon
Collaroy Beach, Collaroy
Hargraves Beach, Noraville
Narrabeen Beach, Narrabeen
North Entrance Beach, The Entrance (North)
Mollymook Beach, Mollymook
Pearl Beach, Pearl Beach
Wamberal Beach, Wamberal
Wooli Beach, Wooli

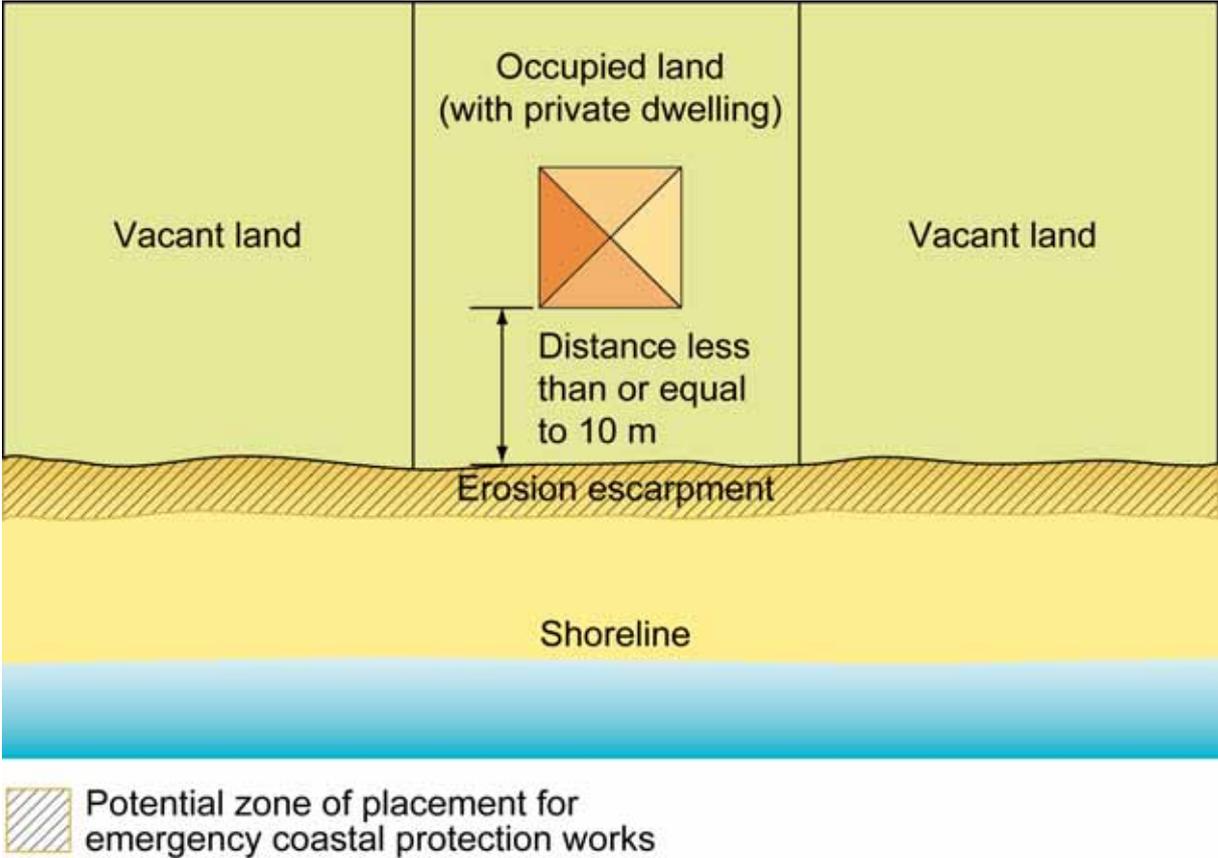


**Figure 4.1 – Trigger distance for placing emergency coastal protection works**

The works may extend to land on which a building could be lawfully erected, if zoned residential and is adjacent to land on which the building that meets the trigger criteria is located – see Figure 4.2. Note that permission must be obtained from the landowner of adjoining private property before entering or doing any works on this land.

The works cannot be placed if any form of coastal protection currently exists (e.g. a seawall) seaward of the dwelling, unless the landowner can provide certification from a professional engineer that any existing works will provide a lower degree of erosion protection than emergency coastal protection works. The works are also not permitted for the protection of vegetated or hardstand land areas or other structures and infrastructure (for example, freestanding garages, pools, sheds, laundries, outside toilets, gardens, verandas and landscaping works).

Additional requirements for placing emergency coastal protection works may be contained in the local council’s coastal erosion emergency action subplan.



**Figure 4.2 – Placement of emergency coastal protection works on adjacent property**

Any landowner or occupier can only place emergency coastal protection works once for any land parcel. Any works placed on land by or on behalf of the landowner or occupier, who at any time has previously placed other emergency coastal protection works on that land, are not emergency coastal protection works for the purpose of the Coastal Protection Act and can be classified as illegal structures under this and other Acts.

Once construction has commenced works are only allowed to remain in place for a maximum period of six (6) months. However, if a landowner or occupier lodges a development application for additional or more permanent protection structure(s) during this time, the works can remain until the application is determined.

To aid landowners and occupiers in deciding when to place these works, the following information may be of assistance:

- For the NSW coast, the majority of severe storm events have occurred during and around the winter period (June-August).
- Other periods of increased likelihood of erosion impacts may occur around rarer astronomical events such as king tide cycles (about twice a year), which if combined with storm events have the potential to further increase erosion impacts.

It is recommended that planning and implementation of emergency protection works begin prior to the period scheduled for placing the works, to ensure adequate time to obtain the necessary materials and suitable contractors to install the works (see Section 6 for more information).

An authorised officer may inspect the works at any time after they have been placed, to check that they comply with the requirements under the Coastal Protection Act. If the works do not comply with these requirements, the authorised officer may issue an order to modify or remove the works. The authorised officer may also issue an order if the works are, in the officer's opinion:

- causing erosion of the beach or adjacent land
- causing a public safety risk, or
- impeding beach access.

It is an offence under the Act to fail to comply with such an order. A public authority may also carry out the actions specified in the order (e.g. removal of the works) and recover the costs from the landowner through court action.

## 5 Using public land

Where practical, emergency coastal protection works are to be located on private land. However, where this is not practical, the works may be located on public land (e.g. a beach) or a road reserve located on a beach or sand dune adjacent to a beach, where there is no physical road in the road reserve.

It is acknowledged that site constraints on private land may prevent access for relevant machinery (where necessary) to place the works. In these circumstances, access will be permitted to the site via public land using designated beach access points for the purpose of accessing the site for construction, removal, or remediation of adverse off-site impacts relating to emergency coastal protection works. Landowners or their contractors may both occupy and use public land for the purpose of placing and maintaining emergency coastal protection works without obtaining a lease, licence or permit, provided they have taken all practical measures to:

- avoid placing works on public land, and
- avoid damage to assets and vegetation, and
- minimise risks to the public on public land, and
- maintain reasonable public access (including access for local and public authorities) to and through the beach concerned.

Where there is no certified emergency action subplan for the area where works are to be placed, all of the following conditions are to be met:

- Where authorised access routes are blocked by a gate or similar structure, prior arrangements are to be made with the relevant public authority to unlock the gate to utilise the access routes.
- Any damage to assets on public land is to be rectified to the satisfaction of the relevant public authority within thirty (30) days.

- The location where the works are being placed and any associated earthmoving equipment or other vehicle operated for the purpose of placing or maintaining the works is to be surrounded by an effective safety fence until the placement or maintenance is complete.
- Public safety risks from the use of earth moving equipment and other vehicles involved in placing the works are to be minimised.

The landowner will be responsible for ensuring the safety of the public in these areas when using public land to access the site for emergency coastal protection works. The landowner will also be responsible for remediating any public land areas damaged as a result of accessing the site.

Landowners who use public land for placing works are to notify the council<sup>1</sup> and the Land and Property Management Authority<sup>2</sup> (LPMA) in writing as soon as practical after use of public land has commenced and no later than seven (7) days.

## 6 Landowner preparations

Emergency coastal protection works may be required during an emergency storm erosion situation which could develop very quickly, often with limited advanced warning (days). Although emergency coastal protection works cannot be guaranteed to protect a dwelling-house during an emergency storm erosion event, the property owner's level of preparedness to implement works may prove the difference between the relative level of success achieved in stemming the erosion threat. Where beachfront property owners are likely to meet requirements for undertaking such works (see Section 4), it is strongly recommended that all reasonable measures are taken in advance to limit potential time delays, including:

- pre-purchasing and stockpiling of relevant resources (such as geotextiles, sandbags, sand) on the landowner's property
- gathering knowledge of relevant plant and equipment suppliers who are aware of requirements for placing the works, and
- ascertaining the accessibility of appropriate personnel to undertake relevant works.

Storm events can occur with limited warning and not all ocean storm events will result in significant beach erosion. Generally, more substantial beach erosion episodes can be expected when large ocean wave events coincide with high elevated ocean water levels (particularly spring tide conditions). In particular, significant beach erosion could be anticipated when the significant offshore wave height approaches 5 m, is directed onshore and coincides with predicted tides higher than 1.8 m (Fort Denison).

Although tide predictions are known well in advance, forecasting of storms and associated ocean wave conditions are generally only available with a reasonable accuracy some 2–4 days in advance. Weather forecast windows are typically no more than 180 hours (7.5 days) in advance. These are available from the United States National Oceanic and Atmospheric Administration Wave Watch III forecast model. The Australian Bureau of Meteorology<sup>3</sup> issues forecasts from wave modelling up to 48 hours (2 days) in advance. It should be noted that these forecasts for wave and water level conditions typically improve as the forecast window is reduced. Wind and wave direction are also important in determining erosion impacts.

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<sup>1</sup> For council contact details, see [www.dlg.nsw.gov.au](http://www.dlg.nsw.gov.au). Notifications should be addressed to the council's General Manager.

<sup>2</sup> To contact the LPMA, call 1300 052 637 or visit [www.lands.nsw.gov.au/contact\\_us](http://www.lands.nsw.gov.au/contact_us)

<sup>3</sup> Bureau of Meteorology forecasts are available at [www.bom.gov.au](http://www.bom.gov.au)

## 7 Safety requirements during installation

There are significant safety risks associated with the placement, and to a lesser extent maintenance and removal of, emergency coastal protection works. To minimise safety risks, the following safety requirements must be followed when installing emergency coastal protection works:

- No materials or equipment are to be placed on the dune landward of the erosion escarpment for a distance from the erosion escarpment of at least 1.5 times the height of the escarpment (e.g. if the escarpment is 2 m high, no material or equipment is to be placed within 3 m of the landward side of the erosion escarpment).
- A safety fence must be installed around the location (as defined above) and personnel must not use this area while placing the works.
- Excavation of the escarpment is not permitted, with the exception of minimal adjustments for the purposes of horizontal placement and stability when placing protection works (see Appendix A).
- All construction equipment is to be operated by experienced and appropriately trained personnel.

The placement of the works is required to be carried out in a manner that minimises the likelihood of subsidence or collapse of the erosion escarpment. Should any significant collapse of the escarpment occur, all work is to cease until the escarpment is stable. If the escarpment is greater than approximately 2 m high, then any works are to be placed against the escarpment with particular care.

If a significant collapse of an escarpment greater than 2 m in height occurs, the works are to be suspended immediately. Works may only be resumed once the landowner provides a report to the authorised officer who issued the certification for the emergency coastal protection works. The report must be prepared by a professional engineer and state that there is a low likelihood of failure of the escarpment.

When placing emergency coastal protection works under the conditions that erosion is either imminent or reasonably likely to be imminent, the following criteria apply:

- Works must be placed within 3 hours either side of low tide.
- Works must not be placed when the Bureau of Meteorology has issued a severe weather warning for large waves or damaging surf.

If works are placed when erosion is occurring, they must be placed in accordance with the requirement specified by a senior police officer and professional engineer.

## 8 Other legal requirements

As noted in Section 1, the failure to place emergency coastal protection works in accordance with the requirements under the *Coastal Protection Act 1979* is an offence. This may also result in penalties for a breach of the *Environmental Planning and Assessment Act 1979*, for development without consent, and a breach of the *Crown Lands Act 1989* for unauthorised use of Crown land if the works are located on Crown land.

All other relevant statutory requirements apply for placing, maintaining and removing emergency coastal protection works, including:

- the *Environmental Planning and Assessment Act 1979*, particularly in relation to approvals required for the removal of trees to create access for placing emergency coastal protection works

- the *Occupational Health and Safety Act 2000*, ensuring that the placement of the emergency coastal protection works does not present a safety risk. The landowner or any persons carrying out works on their behalf have responsibilities under this Act relating to safe work practices and safe workplaces. This is particularly important given the potential risks from placing these works
- the *State Emergency and Rescue Management Act 1989*, including powers allowing a police officer to direct a person to leave or not enter a specified danger area in an emergency. This may include an area where emergency coastal protection works are being or intended to be placed. These directions must be followed, which may impact on the placement of these works.

A police officer may also direct the taking of safety measures in an emergency, including the removal of material presenting a public safety risk or interfering with the operations of emergency services. This may include the removal or modification of emergency coastal protection works.

## 9 Other coastal protection works by landowners

Landowners may consider applying for development consent under the *Environmental Planning and Assessment Act 1979* for constructing other coastal protection works. This may include options such as:

- a second or further use of sandbags by a landowner or occupier who has already placed emergency coastal protection works once for a particular property
- the use of sand or sandbags that differ from those allowable under the Act
- the use of sandbags for longer than permitted as emergency works, or
- longer-term hard engineering works such as seawalls.

The landowner will need to satisfy the consent authority that suitable arrangements will be in place to maintain the works and manage any off-site erosion impacts.

If a development application is lodged while emergency works are in place, they do not need to be removed until the development application is determined.

Further information on the development application process is available on the Department of Planning's website at [www.planning.nsw.gov.au](http://www.planning.nsw.gov.au).

# Glossary

<b>Term</b>	<b>Meaning</b>
Authorised officer	A person who is appointed as an authorised officer under section 7 of the <i>Coastal Protection Act 1979</i>
Beach	The area of unconsolidated or other readily erodable material between the highest level reached by wave action and the place where tidal or lake waters reach a depth of 10 metres below Australian Height Datum
Coastal protection work	Activities or works to reduce the impact of coastline hazards on land adjacent to tidal waters and includes seawalls, revetments, groynes and beach nourishment
Department	The Department of Environment, Climate Change and Water NSW
Director General	The Director General of the Department
Erosion escarpment	The eroded seaward face of a sand dune located landward of the location of the proposed works, where the seaward face of the dune is at or steeper than the natural angle of repose of dry sand (1 vertical to 1.5 horizontal or 34° to the horizontal) and is more than 0.5 m high where the works are to be placed
Geotextile sand container	A pillow shaped container made from synthetic geotextile fabric used to house and restrict the movement of sand
Professional engineer	A person register by the National Engineering Registration Board as a professional engineer in the civil engineering general area of practice or the equivalent registration under the Queensland <i>Professional Engineers Act 2002</i>
Public land	Crown land within the meaning of the <i>Crown Lands Act 1989</i> or land within a reserve as defined in Part 5 of that Act, or land owned or under the care, management or control of a council or a public authority, but does not include any land reserved under the <i>National Parks and Wildlife Act 1974</i> or land acquired under Part 11 of that Act
Relevant local council	In relation to emergency coastal protection works and coastal protection works, means: if the works are within the area of a council—that council, or if the works are not within the area of any council—the council whose area is nearest to the works  Note: Certain beaches in New South Wales are Crown land and not within the boundaries of any local council area.
Residential building	A building (such as a dwelling-house or residential flat building) that is solely or principally used for residential purposes
Revetment	A facing of geotextile containers or sandbags to form a wall with the purpose of protecting land or structures from erosion
Rock grab	An excavator attachment which generally consists of a pair of grab tines (or jaws) that can be used to move and manipulate rocks or other heavy and/or awkward objects
The Act	The <i>Coastal Protection Act 1979</i>
Works	Emergency coastal protection works

## Appendix A – Construction advice

Construction advice is provided below which may assist in placing emergency coastal protection works in accordance with the requirements under the Act. This is general advice and may need to be varied to account for local situations.

### Geotextile sand container toe protection works (Type 1)

To undertake this option, the following resources will normally be required:

- 0.75 m<sup>3</sup> geotextile containers
- sand to fill geotextile containers (imported and in accordance with any material specifications gazetted in the Minister's Requirements)
- filling frame
- hand held sewing machine
- excavator (25–30 tonne) to fill and place (with modified rock grab) filled geotextile containers.

Filling of geotextile containers should be done using a filling frame and excavator. Empty geotextile containers are typically purchased as an open 'pillow' which is sealed shut on three of its four sides. The container is placed in a filling frame and filled with sand using an excavator. Once filled, the container is sewn closed using a hand held sewing machine. Geotextile container suppliers can supply filling frames and site sewing machines and provide advice on their use.

Geotextile containers should be filled as close as possible to 100% full for maximum hydraulic stability. The containers are to be placed (where practical) in a single layer stretcher bond pattern, with the long axis of the container placed against the escarpment and perpendicular to the direction of wave action. If possible, a double-layer of geotextile containers should be placed seaward of the bottom course of the revetment.

Filled containers are to be placed by using a modified rock grab on the excavator. The rock grab is modified in such a way as to limit the stress on the geotextile containers during the lifting operation. Minimal excavation of the beach is acceptable to ensure the geotextile containers can be placed horizontally. It is not necessary to have a geotextile underlayer between the containers and the backing slope for these short-term emergency works, or for the geotextile fabric to be vandal resistant, as the works are only temporary. All works are to be limited to a maximum height of 1.5 m.

### Placed sandbag toe protection works (Type 2)

To undertake this option, the following resources will normally be required:

- unfilled polypropylene sandbags with ties
- purpose-built mechanical filling machine or cement truck (preferred option)
- hand-filling device, such as a length of 200 mm pipe or a bucket (alternative option)
- sand to fill sandbags (imported and in accordance with any material specifications gazetted in the Minister's Requirements)
- excavator to place filled sandbags.

Filling of sandbags should be undertaken with either the assistance of a mechanical filling machine or a hand-filling device. Empty plastic sandbags are also purchased as an open 'pillow' sealed shut on three of its four sides. Sandbags are then filled in situ and tied shut.

Sandbags used in all protection works are required to be of a nominal weight of no more than 18 kg when filled with dry sand.

It is recommended that sandbags be filled to only two-thirds of their capacity and under no circumstance should they be overfilled. This allows for overlap, which assists in locking sandbags together. Once each sandbag has been filled with sand, it is to be tied shut using a pre-existing tie sewn into the top of the sandbag. It should be noted that filling of sandbags by hand is arduous and time consuming; therefore filling by machines is preferred, particularly when operating under limited time constraints.

Once sandbags are filled they are lifted and placed at the toe of the escarpment by either an excavator or by hand. The sandbag revetment is to be made using alternate courses of 'headers' and 'stretchers' against the escarpment toe – this brickwork format is known as *English bond*. 'Headers' are sandbags placed end-on to the direction of wave attack, with the neck facing away; 'stretchers' are placed side-on, with the seam opposite the direction of wave action.

The bottom course of sandbags are to be laid as 'headers', with the necks folded over and facing away from the direction of wave attack. A double-layer of sandbags should be placed seaward of the bottom two courses of the revetment. Minimal excavation may be undertaken to set the bottom course of sandbags on a level platform to improve stability. Works are to be limited to a maximum height of 1.5 m.

### **Sandbag toe protection works (Type 3)**

To undertake this option, the following resources will be required:

- unfilled polypropylene sandbags with ties
- purpose-built mechanical filling machine or cement truck (preferred option)
- hand-filling device, such as length of 200 mm pipe or a bucket (alternative option)
- sand to fill sandbags (imported and in accordance with any material specifications gazetted in the Minister's Requirements).

Sandbags are to be filled and sealed (tied shut) in accordance with the procedures outlined in above for Type 2 works. The filled sandbags are lifted and dropped into place manually (by hand) at the toe of the escarpment. As these works are considered ad-hoc, there is no recommended placement pattern. The placed bags are not to exceed 1.5 m in height.

The more sandbags that can be dropped into the toe area of the escarpment, the greater the likelihood that coastal erosion might be reduced or limited; however, there is no guarantee as to the level of protection that can be provided.

### **Beach nourishment (Type 4)**

To undertake this option, the following resources will be required:

- sand to nourish the beach (imported and in accordance with any material specifications gazetted in the Minister's Requirements)
- excavator or tip truck.

Sand is to be placed adjacent to the dune escarpment to act as a buffer against erosion. Sand may be tipped onto the slope by a truck or progressively placed by an excavator from below or seaward of the escarpment.

## Appendix B – Site-specific requirements

The emergency coastal protection works must be placed in accordance with the requirements in the following table, in addition to other requirements under the Act and any applicable emergency action subplan.

Authorised locations	Authorised beach access*	Exclusion areas*
Belongil Beach, Byron Bay		
Basin Bay/Beach, Mona Vale		
Bilgola Beach, Bilgola		
Brooms Head, north of the outlet from Cakora Lagoon		
Collaroy Beach, Collaroy		
Hargraves Beach, Noraville		
Narrabeen Beach, Narrabeen		
North Entrance Beach, The Entrance (North)		
Mollymook Beach, Mollymook		
Pearl Beach, Pearl Beach		
Wamberal Beach, Wamberal		
Wooli Beach, Wooli		

\* **Note for consultation draft:** These details will be developed in consultation with relevant councils and the Land and Property Management Authority during the consultation period of the draft Minister's Requirements.

**Appendix C – Example erosion escarpment feature**

