



OUT16/18508

Chair
NSW Coastal Panel
c/- Office of Environment and Heritage
PO Box A290
SYDNEY SOUTH NSW 1232

Dear Chair

DEVELOPMENT APPLICATION COASTAL PROTECTION WORKS – 46 ARRAWARRA BEACH ROAD, ARRAWARRA

Thank you for the opportunity to comment on the above development application. I have provided below some background on Arrawarra Creek and its relevance to the Solitary Islands Marine Park (SIMP) zoning plan. I have also included a description of the concerns that the Department of Industry – Marine Parks (DoI) has with regards to this proposal.

Background

Arrawarra Creek is an Intermittently Closed Open Lake or Lagoon (ICOLL) and is one of the few ICOLL's within the SIMP that, from time to time, is mechanically opened. It is an important nursery and breeding ground for many commercial and recreational species.

Arrawarra Creek forms part of the Habitat Protection Zone of the SIMP. The SIMP is managed under the *Marine Estate Management Act 2014*, the *Marine Estate Management Regulation 2009* and the *Marine Estate (Management Rules) Regulation 1999*.

The objects of the Act are as follows:

- (a) to provide for the management of the marine estate of New South Wales consistent with the principles of ecologically sustainable development in a manner that:
 - (i) promotes a biologically diverse, healthy and productive marine estate, and*
 - (ii) facilitates:
 - economic opportunities for the people of New South Wales, including opportunities for regional communities, and
 - the cultural, social and recreational use of the marine estate, and
 - the maintenance of ecosystem integrity, and
 - the use of the marine estate for scientific research and education,**
- (b) to promote the co-ordination of the exercise, by public authorities, of functions in relation to the marine estate,*
- (c) to provide for the declaration and management of a comprehensive system of marine parks and aquatic reserves.*

The objects of the habitat protection zone are:

- (a) *to provide a high level of protection for biological diversity, habitat, ecological processes, natural features and cultural features (both Aboriginal and non-Aboriginal) in the zone, and*
- (b) *where consistent with paragraph (a), to provide opportunities for recreational and commercial activities (including fishing), scientific research, educational activities and other activities, so long as they are ecologically sustainable and do not have a significant impact on any fish populations or on any other animals, plants or habitats.*

Setting a Precedent

The stated purpose of the sea wall is “*to retain the site boundary and prevent coastal erosion caused by wave activity. The sites boundary has been eroded over time by coastal processes as can be seen in the site detail survey*”.

The current physical boundary of the site is fairly stable, being in part vegetated and consisting of coffee rock. It has not in recent times suffered from sudden erosive events. An exception was when some localised bank slumping occurred due to stormwater from the roof of one of the sites buildings waterlogging the soil.

It is important to note that the mouths of estuaries such as Arrawarra Creek are continuously changing. Their character at any one time depends on many factors including rainfall, berm height, ocean conditions, if the estuary is open to the ocean and where the opening has occurred.

When all this is taken into consideration the perception that the site is eroding quickly and needing protection is debatable.

The recent survey of the Mean High Water Mark (MHW) boundary that was commissioned by the site owners and confirmed by Crown Lands, locates the boundary up to 13 metres into Arrawarra Creek. The Dol believes this determination is incorrect and has raised the issue with Crown Lands ((Attachment 1).

Our main argument is that the area of Arrawarra Creek that has been encompassed by the surveyed MHW boundary, has during at least the last sixty years always been either inundated or dry creek bed, depending on what stage the ICOLL was at. It does not appear to have ever formed a permanent part of the dry land. As such, the Dol contends that it should not have been included as part of the site in the recent MHW boundary determination. Our position has been confirmed by historic aerial photographs of Arrawarra Creek, including those presented in the Statement of Environmental Effects on pages 24-26 of Appendix H.

Consideration of the above points indicates that the purpose of the proposed seawall may not primarily be to protect the site from coastal erosion. It appears that the primary purpose of the wall is to increase the land available at the site for development through reclamation, raising the level of the land above flood levels and protecting the proposed housing development from the potential effects of future coastal hazards.

If the current proposal for a seawall is granted consent it will set an unfavourable precedent. This precedent may be the catalyst for the owners of similar sites, that have marine or estuarine areas within their cadastral boundaries, to seek consent to build a seawall so that land located behind the wall can be reclaimed.

Effects on Stream Morphology

It is difficult to accurately predict the impact of a large seawall in this location. A general principle is that, if you create a hard wall you are most likely going to see erosion occur around the toe of the wall. In an estuary like Arrawarra Creek, that effect could result in the normally meandering stream channel moving to a more permanent location against the seawall.

It appears that this may have been the case after the small rock gabion wall was constructed along part of the sites boundary around about 1990. Observations and aerial photos taken since the rock gabion seawall was constructed seem to indicate that construction of the wall has resulted in changed stream flow and significant erosion of the coastal dunes located to the north of the walking bridge. A midden located in these dunes has been destroyed and the opening of the northern branch of Arrawarra Creek has been widened. The effect of this has been that the widened creek opening has increased the ability for waves to enter the creek which has in turn increased bank erosion for houses located in Ellem Close to the west of the bridge. These houses have subsequently found it necessary to construct walls along their properties.

The DoI is very concerned that the proposed seawall to be constructed around the entire surveyed MHWB boundary will have significant impacts on other areas of the Arrawarra Creek. Of particular concern is the proposal to build the seawall 13 metres out into what is currently Arrawarra Creek, as described in the precedent section above. However, the general impacts of changed wave deflection patterns could also have a significant impact on adjacent land.

Effects on Marine Biodiversity

The ecological assessment contained within the Statement of Environmental Effects is limited to terrestrial ecosystems and does not address the marine and estuarine environment. It is difficult to understand how the impacts of the proposed seawall can be fully determined when the impacts on the marine and estuarine environment have not been considered.

Replacing natural streambanks with artificial seawalls can have significant environmental consequences on species. Seawalls can change the natural habitat in many ways including changing hardness, surface texture, slope, microhabitats and hydrology. Changes in habitat type also lead to changes in species diversity and abundance, and these changes may not reflect the natural ecosystems of the area.

The proposed seawall is significantly different to the natural stream bank (coffee rock, overhanging trees and undercut banks) that is present over much of the site boundary and, if constructed, is likely to result in a significant change to habitat, species diversity and abundance.

Riparian vegetation plays a significant role in the natural functioning of an estuary. Construction of the seawall will require the removal of all the existing vegetation. It is noted that the E2 zone will be vegetated, however the location and type of vegetation proposed will not provide the creek with the same benefits, e.g. shading of the water, that the existing vegetation does. It will also take some time for the planted vegetation to mature and be capable of providing some of the benefits of the existing mature vegetation.

Another issue associated with the removal of the vegetation and development of the site for residential use is that, one of the attractions of living in a location such as Arrawarra

Creek is the view of the ocean and estuary. It is therefore unlikely that current and future residents will allow trees to impede their view and it is very likely that at least some of the planted trees will be removed. This will diminish the value of the proposed riparian vegetation and in turn the natural functioning of ecosystems in Arrawarra Creek.

CONCLUSION

Arrawarra Creek forms an important part of the SIMP and functions as a food source, nursery and breeding area for many marine and estuarine species. The site proposed for the seawall is located where an ICOLL meets the ocean. This is an area where the location of the water course continually changes within a defined break out zone and where water levels change according to local conditions such as beach berm height and local rainfall. The lower sections of estuaries are naturally in a continual state of flux and attempts to change or stabilise the landform will have other unintended impacts.

The Statement of Environmental Effects does not adequately address the likely impacts and changes the proposed seawall will have on surrounding areas and on the estuarine ecosystems.

After considering the information supporting the development application, and the significance and sensitivities of Arrawarra Creek, the DoI cannot support the proposal as presented in the Statement of Environmental Effects.

If you would like to discuss this matter further please contact David Greenhalgh on 02 6691 0604

Yours sincerely

A handwritten signature in black ink, appearing to read 'Nicola Johnstone', with a long horizontal flourish extending to the right.

Nicola Johnstone
Marine Park Manager
Solitary Islands Marine Park

6 May 2016

OUT15/24478

Mr David McPherson
Trade and Investment – Crown Lands
PO Box 2185
DANGAR NSW 2309

Attention: Mr David McPherson

Dear Mr McPherson

DEFINITION OF THE MHW M OF ARRAWARRA GULLY & ARRAWARRA CREEK

Thank you for your letter received on 19 June 2015, in response to my query regarding the definition of the Mean High Water Mark (MHW M) at Arrawarra Creek. In this letter you describe the process and legislation associated with defining a boundary. While I understand your interpretation of both common law and the provisions of the relevant legislation, I now offer the following comments.

Riparian Boundary Changes

While this letter is primarily about the interpretation of the Doctrine of Accretion and Erosion and whether the MHW M in Arrawarra Creek has moved in a gradual and imperceptible way, it is also important to acknowledge the dynamic nature of the lower reaches of estuaries. As you may be aware, the MHW M of untrained coastal estuaries and Intermittently Closed Open Lake Lagoons (ICOLLs) are subject to change. The rate of change is dependent on a number of factors including sea conditions, beach berm height, presence of vegetation and rainfall. The shoreline of ICOLLs are often not subject to the ebb and flow of tides, particularly when the beach berm builds up and the ICOLL is cut off from the ocean. Reopening occurs when the creek breaks through the beach berm, often following rain events or large seas.

The zone in which the estuary breaks through is often very wide, and the breakthrough point can be anywhere within the break out zone. The result of this is that the lower reaches of ICOLLs are in a continual state of flux. This is entirely natural and is essential for the natural functioning of the creek. It is therefore important that the natural changes in the lower reaches of estuaries are taken into consideration when interpreting guidelines and legislation for the determination of MHW M property boundaries.

Location of Cadastral Boundary

The main point of contention at Arrawarra Creek is that in one section of the Creek, your most recent survey undertaken in 2014, locates the MHW M approximately 14 metres offshore from the actual MHW M or shoreline. You note this survey is based on a previous survey undertaken in 1989. However, aerial photos available to me, dating back to 1943 and including 1989, show at no time during this period did the land extend out to the line of the current surveyed MHW M, or that permanent vegetation was ever present in this area.

Attached to this letter are three aerial photographs that support my position. The first image was taken in 1981, the second in 1989 and the third is a current image. The position of the current actual physical MHW M of Arrawarra Creek is represented by the yellow dotted line. The Crown Lands MHW M, as confirmed in 1989 and 2014, is represented by the solid red line. Both of the lines were sourced from the Plan of Subdivision produced in 2014 by Karl Heinz. The location of the lines on the attached photographs was achieved using landmarks present in all three images. The georeferencing was done by an independent person. You will note the MHW M did not extend into the Arrawarra Creek during these three periods (two of which coincide with Crown Land surveys).

Rock Gabion Wall Influencing Erosion

In your letter dated 19 June 2015, you note that the rock gabion wall constructed by the owners of the land at the time, may have been responsible for erosion of the land in question. The aerial photo, taken in 1989 and attached to this letter, shows that this is unlikely as the MHW M was not where the survey line indicates. In

addition it does not appear that the gabion wall was constructed at this time. It is therefore not possible for the gabion wall to have influenced the location of the MHWMM..

What are the Impacts?

The main impact associated with the 2014 MHWMM definition is that it reduces the ability for the Department of Industry (DoI) to effectively manage the habitat and waters of Arrawarra Creek in its entirety and in a way that is consistent with the objects of the Habitat Protection Zone of the Solitary Islands Marine Park (SIMP) (i.e. to provide a high level of protection for biological diversity, habitat, ecological processes, natural features and cultural features (both Aboriginal and non-Aboriginal) in the zone).

Up until 2014, and following your confirmation of the surveyed MWHM, the DoI has managed this section of Arrawarra Creek, to the actual MHWMM and tidal limits, as part of the SIMP. This is consistent with previous legal opinion of how the Doctrine of Accretion and Erosion should be interpreted. That is, if there has not been any substantial movement in the location of the creek bank other than natural, gradual and imperceptible change then the land covered by water becomes Crown Land and subsequently part of the SIMP.

The 2014 confirmation of the MHWMM by Crown Lands now enables the land owners to build a seawall along the surveyed MHWMM which is located 14 metres offshore of the actual or physical MHWMM. This provides the developer with additional land for the development of permanent houses. The impacts of a seawall extending into the current channel of Arrawarra Creek will no doubt have a significant impact on the creek and adjacent land through changed flow regimes and wave and current deflection. This determination also sets a precedent for other similar situations within the Solitary Islands Marine Park and other marine protected areas. This is to the detriment of the natural environment

What DoI would like to see happen

It is important that the dynamic nature of the mouths of estuaries, and the natural functioning of these sensitive areas, is taken into consideration when making determinations about the location of MHWMM boundaries. This consideration should ensure that the needs of the natural environment are catered for both now and into the future. In addition, any future MHWMM determinations that occur in a marine protected area should involve consultation with the managers of the marine protected area.

Specifically, as aerial photographs available to the DoI dating back to 1943, do not seem to provide any evidence the site in question has extended to the surveyed boundary, the DoI requests that the definition of the MHWMM boundary be revisited. It would seem appropriate that a new definition of the MHWMM boundary should follow the current actual MHWMM. Please contact David Greenhalgh on 6691 0604 if you would like to discuss this matter further.

Yours sincerely



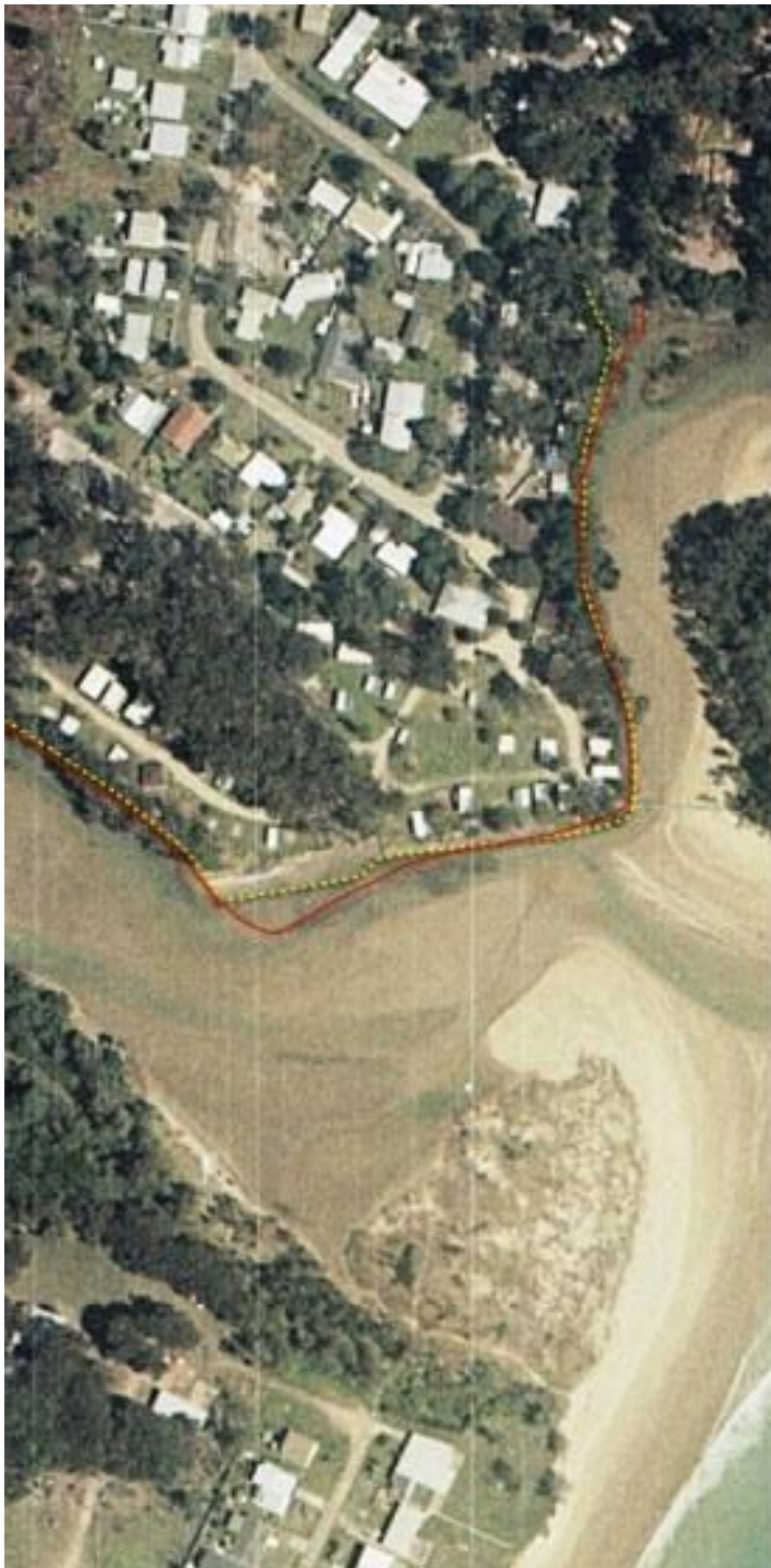
Nicola Johnstone
Marine Park Manager
Solitary Islands Marine Park

9 September 2015

Arrawarra Creek 1981



Arrawarra Creek 1989



Arwarra Creek Current

