

MEMORANDUM

To: SGS Planning and Economics
From: Nick Lewis
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Copy:
Project Name: Scamander River Hazards Adaptation Plan
Reference: 251099_MN_MO_CO_0001A
Reviewed by: Paul Prenzler, Principal Coastal Engineer

Subject: Coastal Hazard Mitigation Pathways for Dune Street, Scamander.

1 Introduction

This memorandum presents a range of potential coastal hazard mitigation options in the vicinity of Dune Street, Scamander and is produced as part of the Scamander River Hazard Adaptation Plan. Dune Street is subject to different coastal hazards which vary in their risk. The hazards, which include, river flooding, foreshore erosion and coastal inundation, are generally expected to exacerbate into the future.

The options presented herein are for project information purposes to inform options assessment only and aim to describe options ranging from minor to major (both capital work and hazard mitigation effectiveness). The cost estimates presented are approximations only and based on experience with similar projects. Cost estimates are not based on formal quantities and cost rates from detailed designs.

The memo should be read in conjunction with other project deliverables, namely the *Coastal Hazard Assessment* report (Moffatt & Nichol, 2025) and *No Regret Options* Memo (Moffatt & Nichol, 2025).

Three broad conceptual options are described indicatively, in an order of increasing capital works and expected hazard mitigation, including:

- Pathway 1: Low nature-based solution, such as a Living shoreline, to address erosion in the short term;
- Pathway 2: A revetment hybrid seawall to address longer term erosion and small wave runup bund to mitigate some coastal inundation; and
- Pathway 3: A revetment seawall and flood mitigation levee to address erosion, coastal inundation and river flooding in the long term.

A summary of the three pathways is provided below for convenience.



Option	Description (metres addressed / needed)	Hazards addressed	Cost per linear metre	Effect on natural values
1	Low nature-based solution / living shoreline (60m)	Foreshore erosion in short term, holding the current shoreline and protecting dune street and road reserve to say 2030.	\$2,000 to \$3,000	Largely retains current natural values and provides some additional habitat. Does not protect from loss of values into future.
2	Rock revetment hybrid seawall and small wave runup bund (250m)	Foreshore erosion mitigated to 2050, protecting reserve. Some coastal inundation mitigation.	\$5,000	Natural foreshore modified (replaced with rock), but some areas protected.
3	Rock revetment and Levee (450m)	Foreshore erosion, coastal inundation, river flooding mitigated to 2100.	\$15,000, plus drainage and pumping	Natural foreshore lost and natural values significantly modified, including aesthetics.

2 Hazard Mitigation Options

2.1 Option 1: Living Shoreline Foreshore erosion protection

Option	Description	Hazards addressed	Cost per linear metre	Metres addressed / needed
1	Living shoreline	Foreshore erosion in short term	\$2,000 to \$3,000	60m

Objective and effectiveness

The foreshore fronting Dune Street is actively eroding. Due to the dynamic nature of the river, sand flats and ICOLL channels, the foreshore has changed location (moved toward Dune Street) significantly in recent years (particularly since 2015). The current foreshore is currently only meters away from the road.

A living shoreline or soft protection could be implemented. The buffer between the road and foreshore could be planted out. The measure would likely need to include a hybrid rock/vegetation protection.

This option would seek to address erosion hazard only, however thick vegetation planting at the road reserve may attenuate some wave runup. The option would be a short term measure and being a non-engineered solution, its effectiveness and design life unpredictable. However, it would be expected that the erosion would be mitigated in the location implemented until at least 2030.

Whilst this foreshore is within the window of historical and future dynamic channel alignment, the previous foreshore prior to development comprised dunes and sandy foreshore. Restoring this habitat whilst protecting the foreshore is not considered to significantly impact other processes. It was therefore included in the list of 'no regret measures' (see separate memo, Moffatt & Nichol, 2025).

The option would not be expected to materially change the character of the foreshore and would create/restore habitat.



Description

A living shoreline or soft protection could be implemented to address the immediate erosion processes along a 60m length of foreshore fronting Dune Street (refer **Figure 1**). An example of a living shoreline including planting is provided below in **Figure 2**. The living shoreline would promote natural habitat such as sedges and saltmarsh and involve some regrading.

The buffer between the road and foreshore could be planted out. The measure would likely need to include a hybrid rock/vegetation protection, but could also include geo-bags or rock bags. Planting would be consistent within the approach, regardless. In addition, it is proposed that dune stabilization be undertaken to the north, fronting the SLSC.

Cost

This measure has a typical cost of \$2,000 to \$3,000 per linear metre. With the option proposed to be implemented over a nominal 60 m.



Figure 1: Suggested extent (60m) of foreshore for implementation of Option 1.



Figure 2: Example of living shoreline for foreshore erosion protection and habitat restoration. Location: Wagonga Inlet, Narooma, NSW. Photo courtesy of Nick Lewis

2.2 Option 2 - Hybrid seawall and wave runup bund

Option	Description	Hazards addressed	Cost per linear metre typ.	Metres addressed / needed
2	Rock revetment hybrid seawall and small wave runup bund	Foreshore erosion in medium term, some coastal inundation	\$5,000	250m

Objective and effectiveness

A more involved option than Option 1 to provide increased foreshore erosion protection (compared to Option 1) over a longer timeframe (into the medium term) and across a longer stretch of foreshore, and some mitigation from coastal inundation, namely the impacts of wave runup. The option would aim to provide as much habitat as practical within and behind the erosion protection seawall/revetment to create a hybrid seawall.

The option would be expected to mitigate erosion into the medium term, say to 2050, across the whole Dune Street foreshore. The natural value of the foreshore would be modified / lost (replaced with rock) however the option would protect from erosion and retain the road, reserve and dunes fronting the SLSC.

Description

The option proposed includes a rock revetment hybrid seawall to address coastal erosion. The option comprises a more robust erosion protection, compared to Option 1 and extended across a greater length (250m) (refer **Figure 3**). As a minimum, the protection would run in front of Dune Street where erosion is currently occurring and wrap around the foreshore to link in with the existing rock revetment at Foreshore Reserve, to a total length of 250m. An example of a hybrid revetment is presented in **Figure 4**.

It is proposed that to provide some protection from coastal inundation (wave runup) when overtopping of the Dune Street road occurs, a small wave runup bund be constructed in the lee of the rock wall (in the road reserve), or on the west of the road fronting properties. Such a bund could be earth filled to say 500mm high and grassed, or alternatively a robust timber fence. The bund would likely cause drainage issues, which would need to be addressed. Alternative to the bund, there could be alterations made to the property boundary fences to make them more resilient to wave runup.

The option would change the character of the current foreshore, from a relatively natural foreshore, to an engineered rock foreshore, albeit with some vegetation incorporated.



Cost

Although varying depending on the amount of rock used, this measure has a typical cost of \$5,000 per linear metre, with the option proposed to be implemented over a nominal 250m.



Figure 3: Suggested extent (250m) of foreshore for implementation of Option 2.



Figure 4: Example of hybrid seawall for foreshore erosion protection and habitat incorporation. Location: Claydon Reserve, Kograh, NSW. Photo courtesy of Nick Lewis



2.3 Option 3 - Rock revetment and Levee

Option	Description	Hazards addressed	Cost per linear metre	Metres addressed / needed
3	Rock revetment and Levee	Foreshore erosion, coastal inundation, river flooding	\$15,000	450m

Objective

To mitigate and protect against foreshore erosion in the long term, as well as coastal inundation and river flooding in the medium to long term.

The option would be expected to mitigate erosion into the long term, say to 2075, across the whole Dune Street foreshore and around to the bridge abutment. The option would be expected (could be engineered) to provide protection against extreme inundation and river flooding events, such as 1 in 100 year magnitude plus impacts of climate change to 2100.

The option would significantly change the character and aesthetics of the current foreshore, from a relatively natural foreshore to an engineered rock foreshore. In addition, the levee would restrict access and views. However the option would protect from erosion and retain the road, reserve and dunes fronting the SLSC into the long term.

Description

The option proposes a rock revetment hybrid seawall, similar in nature to Option 2, although higher and likely less vegetation. A levee is proposed to provide the river flood and coastal inundation protection needed, expected to be raised above the current road level at Dune Street by approximately 1.5m. To allow for River flooding and coastal inundation, the levee would need to link in with the higher ground at the bridge abutment (north) and higher ground south west of Dune Street (Hobden Street). Due to the damming effect of the levee, there would need to be stormwater drainage improvements and also maybe pumping. The drainage issues created would exacerbate into the future as stormwater outlets are inundated more regularly (or permanently) by ocean water.

Cost

Such approaches have a typical cost of \$15,000 per linear meter for the revetment and levee. No estimate has been made for the pumping solution or drainage improvements, although it would be reasonable to allow \$1,500,000 for drainage improvements and pumping system.



Figure 5: Suggested extent (450m) of foreshore for implementation of Option 3.



Figure 6: Example of rock revetment and raised levee for coastal inundation protection. Example incorporates additional timber wave overtopping wall atop the levee. Location: Thames, New Zealand. Photo courtesy of Nick Lewis