

## **APPENDIX 6**

# **Sustainability Assessment of Management Options**

## Sustainability Score Reference Sheet:

A	Is the strategy or action expected to significantly reduce a high risk?
B	Is there a clear and quantified statement about expected outcomes?
C	Certainty of science underlying the proposed management. Is there evidence that this strategy has delivered positive outcomes elsewhere?
D	Is the response robust in ongoing climate change conditions? Is it consistent with Council's climate change policy and the climate change framework provided by the NSW government?
E	Can progress be measured?
F	Is the response consistent with relevant legislation and policy?
G	Is Council able to afford the response on its own?
H	Will it attract external funding that is relevant to the scale of investment required?
I	Cost benefit (up-front costs and ongoing maintenance) – do high cost responses address high risks and are they predicted to achieve significant benefits?
J	Level of community support – is the community prepared to pay? Prepared to be involved?
K	Does the action achieve multiple benefits?
L	Overall Score
M	Sustainability Score

Overall Score	Sustainability Score
0 – 25	1
26 – 45	2
46 – 65	3
66 – 85	4
85 – 110	5

<b>Action</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K</b>	<b>L</b>	<b>M</b>
E1: Collect new LIDAR and aerial photography data at 5 yearly intervals; supplement with local detail immediately after major storm events.	5	5	10	10	10	10	1	5	10	5	10	81	4
E2: Create databases and systems for ongoing monitoring of implementation and outcomes, linked to other regional natural resource management and asset management systems.	5	5	10	10	10	10	10	1	5	10	10	86	5
E3: Integrate Coastal Emergency Response Management Plan with other elements of Council's DISPLAN	5	5	10	10	10	10	10	5	10	5	5	85	4
E4: Train Council staff in emergency response management and proactive asset management processes for coastal risk areas. This includes training of Authorised Officers for regulation of coastal protection works in Authorised Locations, in accordance with the Gazetted directions related to the Coastal Protection Act 1979 (as amended 2010).	5	5	10	10	10	10	5	5	5	10	5	80	4
E5: Enhance community awareness of coastal hazards and of emergency response management actions. Tools include regularly updated web pages that are accessible from Council's web site. This would include maps, resource reports, and links to new policies, information sheets, media coverage, information boards at beach access ways, information on rate notices.	10	10	10	10	10	10	10	5	10	10	10	105	5

<b>Action</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K</b>	<b>L</b>	<b>M</b>
E6: Introduce clauses in the Wyong LEP and DCP to restrict (generally prohibit) new development in immediate hazard zones	10	10	10	10	10	10	10	1	10	5	10	96	5
E7: Require removal of existing development within immediate coastal hazard zones, when the landward margin of the zone of wave impact is within 5 metres of the structure. Note that if structures collapse onto the beach during a coastal emergency, the landholder will be responsible for the cost of removing the rubble from the beach. As immediate coastal hazard zones migrate landward, this requirement would also apply to assets in the 2050 and 2100 coastal risk areas.	10	5	5	5	5	5	5	1	5	1	1	48	3
E8: Conduct dune stabilisation and revegetation works to encourage sand accretion and stabilisation of frontal dunes. These on-ground dune maintenance and stabilisation works will be conducted in accordance with Plans of Management for ocean frontage reserves managed by Council.	10	10	10	10	10	10	10	5	5	10	10	100	5
E9: Conduct (continue) beach nourishment using sand dredged from the entrance of Tuggerah Lake.	5	10	10	5	10	10	5	5	5	5	5	75	4
E10: Build temporary structural protection such as geotextile bag structures to protect existing public assets in immediate hazard zones, as a short term action prior to relocation. In the longer term, this action is modified to E26	10	10	5	5	10	10	5	5	5	10	5	80	4

<b>Action</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K</b>	<b>L</b>	<b>M</b>
E11: Permit private landholders to install temporary, short to medium term (maximum of ten years) structural protection such as sand filled geotextile bag structures, to protect existing private assets in immediate hazard zones, in accordance with Ministerial Guidelines and the Coastal Protection Act.	10	5	5	5	5	5	5	1	5	10	1	57	3
E12: Establish and maintain an asset register and maintenance program for major Council infrastructure such as stormwater systems and sewage pumping stations. See Also C45	5	5	5	10	10	10	10	1	10	5	10	81	4
E13: Conduct research into specific coastal process issues. Partner actions are E34, E61, and E68	10	10	10	5	10	10	5	5	5	5	5	80	4
E14: Involve community in data collection and record keeping through community NRM monitoring programs	5	5	10	5	10	10	5	5	5	10	10	80	4
E15: Conduct a regular technical review of the validity and effectiveness of management actions	5	5	10	10	10	10	5	1	5	1	1	63	3
E16: Conduct an implementation status review for the CZMP at intervals of 3 to 5 years.	5	10	5	10	10	10	10	1	5	5	10	81	4
E17: Report progress, achievements and new challenges to the community regularly and after each implementation status review	5	5	10	10	10	10	10	1	10	10	10	91	5
E18: Include clauses in the LEP and DCP to control the design and types of new development which are permitted within coastal risk areas for the 2050 and 2100 planning horizons.	10	10	10	10	10	10	10	1	10	10	10	101	5

<b>Action</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K</b>	<b>L</b>	<b>M</b>
E19: Use clauses in the LEP and DCP to identify appropriate development in coastal risk areas; to prohibit certain development in coastal risk areas (2050 and 2100; to require timed consents linked to the coastal risk period and to allow for mandatory demolition in certain circumstances.	10	10	10	10	10	5	10	1	10	5	10	91	5
E20: Use zoning and other planning measures to provide for retreat (landward migration) of important ecological communities, where possible.	10	10	5	10	10	10	10	1	10	5	10	91	5
E21: Prepare a schedule with trigger points for action, for relocation of existing community infrastructure and public assets to outside coastal risk areas.	10	10	10	10	10	10	1	5	10	5	10	91	5
E22: Locate new surf club facilities outside coastal risk areas for appropriate planning horizons (linked to asset life and public safety).	10	10	10	10	10	10	5	5	5	5	5	85	4
E23: Design surf club buildings and other structures for retreat during erosion emergencies or in accordance with long term erosion triggers	10	10	5	5	10	10	5	5	5	5	5	75	4
E24: State or local government buy back of private ocean frontage land within coastal risk areas	5	5	5	5	5	1	1	5	5	1	1	39	2
E25: Update emergency response procedures and post storm refurbishment for longer term coastal recession risks	5	5	5	10	10	10	10	1	5	5	5	71	4

<b>Action</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K</b>	<b>L</b>	<b>M</b>
E26: Build and maintain sea walls to protect existing public assets that are vulnerable in the 2050 and 2100 planning horizons. This action would only be used for major assets with a long asset life, whose function will not be compromised by other aspects of climate change or changing community requirements.	10	5	10	10	10	10	1	5	5	5	5	76	4
E27: Permit the construction and maintenance of sea walls to protect existing private assets affected by coastal recession (2050 and 2100 coastal risk planning periods), with development consent.	10	10	5	5	10	10	1	1	5	5	1	63	3
E28: Review the entrance management strategy and dredging management plan for The Entrance channel to maximise sustainable beach nourishment now and as sea level rises. The first review will focus on maximising the benefits of sand placement for dune stability. After the research described in E13 is conducted, Council will review and revise the dredging program over time, as necessary.	5	10	10	10	10	10	5	5	5	5	5	80	4
E29: Establish a user pays framework for coastal protection works including sea walls and beach nourishment.	5	5	5	5	10	5	5	1	10	5	5	61	3
E30: Strengthen vegetation communities on dunes by preparing, implementing (including monitoring effectiveness) vegetation management plans that include species selection, planting, weed removal, fencing etc.	10	10	5	5	10	10	5	5	5	10	10	85	4

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E31: Implement a system of tradable or transferable development rights for coastal land	5	10	5	5	5	5	1	1	5	1	1	44	2
E32: Where feasible, establish conservation agreements for high value ecological communities in reserve areas that are vulnerable to climate change and other medium to long term threats	5	10	5	5	10	10	10	5	5	10	10	85	4
E33: Notify all landholders within the 2050 and/or 2100 coastal risk area of hazards affecting their property, using notation on s149 certificates	10	10	10	10	10	10	10	1	10	10	10	101	5
E34: Train Council staff about long term coastal recession risks and Council's approved strategy for managing these risks.	5	5	10	10	10	10	5	5	10	5	10	85	4
E35: Conduct research into specific coastal process issues: Use LiDAR data and other information to refine models for safe community egress during coastal emergencies and communicate new warning and egress models to affected residents. Parter action to E13	5	10	10	10	10	10	5	5	5	5	5	80	4
E36: Data collection and record keeping This action is redundant												0	1
E37: Contribute to the development of modelling techniques for coastal hazards	5	5	10	10	5	10	1	5	5	5	10	71	4
E38: Update coastal hazard assessments with new modelling techniques and with new sea level rise parameters and new baseline data (DTM using new LiDAR data)	5	10	10	10	10	10	5	5	5	10	10	90	5



Action	A	B	C	D	E	F	G	H	I	J	K	L	M
N/A39: Technical review (already in Action E15) This action is redundant												0	1
N/A40: Review at approximately 3 yearly intervals (align with other Council reporting processes) by Council Coastline Management Committee This action is redundant												0	1
N/A41: Report progress, achievements and new challenges to the community This action is redundant												0	1
N42: Use zoning requirements in the LEP to control and restrict future development in areas likely to be inundated by oceanic waters within the 2050 and 2100 planning horizons. This action is redundant (see N62)												0	1
N43: Advise occupiers of property that is affected by coastal inundation risks by adding a notation on s149 certificates for the property and by direct communication, e.g. with rate notices, letters. Combine this with information about emergency response procedures in the event of inundation	10	10	10	10	10	10	10	1	10	10	10	101	5
N44: Use beach nourishment or beach scraping to reinforce dunes and to maintain dune crest height above 7 metres at affected locations (potentially 8 metres at North Entrance)	10	10	5	5	10	10	5	1	5	10	5	76	4

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C45: Develop and maintain an asset data base for all coastal access infrastructure, including GIS information about location, and data on condition, materials, context, when last maintained, extent of usage, known safety incidents.	5	10	10	10	10	10	5	1	5	10	10	86	5
R46: Maintain a close working relationship with surf clubs and Surf Life Saving Australia in relation to beach patrols, beach safety information and beach environment information. Surf clubs also have a role in emergency response activities and their activities (such as major surf carnivals) also contribute to tourism income.	10	5	5	5	10	10	10	5	10	10	10	90	5
R47: Work with community groups, DECCW, L&PMA and I&I to plan routes for a coastal walk extending the full length of Wyong Shire and for a 'Mountains to the Sea' walk connecting the coastline to the escarpment.	5	5	10	5	10	10	1	5	5	10	10	76	4
R48: Liaise with NSW Maritime Authority, NSW Marine Rescue and recreational and commercial fishers about the safety and suitability of ocean boat launching ramps and associated facilities (particularly the Cabbage Tree Harbour ramp) and identify any necessary upgrades to current facilities or need for additional safe facilities in the Shire.	5	10	5	5	10	10	1	5	5	5	5	66	4

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R49: As per E21, E22, E23 Investigate options for retreat of surf club infrastructure over time, as the coastline is affected by recession. This action is redundant												0	1
R50: Develop a design theme for coastal information, interpretation and safety signage.	5	10	5	10	10	10	5	5	5	10	10	85	4
R51: Support Landcare/Coastcare/Bushcare activities that restore and maintain native vegetation on coastal dunes	5	10	10	10	10	10	5	10	5	10	10	95	5
R52: Review access ways to and within high profile foreshore and headland reserves and provide disabled access	5	10	10	5	10	10	5	5	5	10	10	85	4
R53: Conduct regular (for instance, every three years) surveys of beach users in relation to satisfaction with facilities and services.	5	5	10	5	10	10	5	5	5	5	5	70	4
R54: Upgrade shade and picnic facilities at high profile beaches, consistent with a Master Plan for each site.	5	10	5	5	10	10	5	5	5	10	10	80	4
R55: Review off leash dog exercise areas in terms of compliance and feedback from users and make changes as necessary to minimise negative impacts on other users and values.	1	5	5	5	10	10	10	1	5	10	1	63	3
E56: Continue the role of the Tuggerah Lakes Estuary, Coastline and Floodplain Management Committee as a forum for community/agency/council liaison and review of natural resource values and natural hazards in the council area.	5	5	10	5	10	10	10	1	10	10	10	86	5

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E57: Identify sand sources which may be used for emergency coastal protection works, either by private landholders or by Council. Ensure necessary approvals are in place to access this sand.	10	10	10	10	10	5	5	5	5	1	5	76	4
E58: Continue to work with SES, DECCW and Geoscience Australia to refine understanding of tsunami risks and appropriate warning and emergency response mechanisms. Incorporate best available information into local scale disaster management planning.	10	5	10	5	5	10	5	5	5	5	10	75	4
E59: Liaise with SES and DECCW about shared training and coordinated management of coastal emergencies	5	5	5	10	10	10	5	5	10	5	10	80	4
E60: Keep Tuggerah Estuary, Coastline and Floodplain Management Committee informed of progress in implementing the CERMP and of any significant changes to supporting information, hazard assessment etc, including (for instance) new research on tsunami incidence or tools to predict and alert communities to coastal storm behaviour	5	5	5	10	5	10	10	1	5	10	10	76	4
E61: Conduct research into specific coastal process issues: Investigate off shore sand supplies for beach nourishment (feasibility studies for the Central Coast, including locations with need, quantity, quality, transport and storage, cost and policy issues). Partner action to E13 and E57	5	10	5	10	10	1	1	1	1	1	5	50	3

<b>Action</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K</b>	<b>L</b>	<b>M</b>
N62: Reference maps showing areas affected by coastal inundation in the Wyong LEP. Amend the Wyong LEP and DCP to require development applications in areas affected by coastal inundation to take the inundation hazard into account.	10	10	10	10	10	10	10	1	10	10	10	101	5
N63: Use 'soft' engineering and land management options to maintain or increase dune heights at affected locations in the short to medium term. This action is redundant -See N44												0	1
E64: Investigate sources of sand suitable for beach nourishment at sites at risk of coastal inundation and/or recession in the medium to long term – e.g. for the 2050 planning period. This action is redundant/is a general version of E61												0	1
N65: Maintain a data base with information about coastal inundation episodes, including dates, context, photographs, impacts and response.	5	5	10	10	10	10	10	1	5	10	5	81	4
E66: Maintain the sea wall along the southern side of The Entrance Channel, to be safe and effective with higher sea level.	10	10	10	10	10	10	5	5	5	10	10	95	5
E67: Establish a detailed monitoring program to clarify how sand placed on North Entrance Beach is redistributed and (sediment budget) and to support amendments that would provide more effective sand retention to buffer against major storm bite.	10	10	10	10	10	10	5	5	5	5	5	85	4

<b>Action</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K</b>	<b>L</b>	<b>M</b>
E68: Conduct research into specific coastal process issues: First priority: Model hydrodynamic and sediment budget changes in the Entrance channel as sea level rises. Further research is also necessary to clarify the relationship between lake flood levels, coastal recession and oceanic inundation hazards at Lakes Beach area. Partner action to E13	10	10	10	10	10	10	1	5	5	5	10	86	5
G69: Amend/Replace Council's LEP and DCP 77 to reference currently identified coastal geotechnical hazard areas (for immediate, 2050 and 2100 planning periods). No new development will be approved within immediate geotechnical hazard areas. Development applications within geotechnical hazard areas for longer planning periods must be accompanied by a detailed geotechnical assessment by a qualified geotechnical practitioner; i.e. a practitioner accredited by the Australian Geomechanics Society.	10	10	10	10	10	10	10	1	10	10	5	96	5
G70: Review stormwater drainage systems in the vicinity of geotechnical hazard areas to ensure that they do not discharge runoff into areas where it could trigger a landslide. This applies to both council stormwater systems and stormwater systems on private property.	10	5	10	10	5	5	5	5	5	10	5	75	4

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G71: Review Plans of Management for all coastal reserves in coastal risk areas (geotechnical), both for Crown Reserves and for Council community land. Ensure that each Plan of Management takes geotechnical hazards into account.	10	5	10	5	10	10	10	5	5	5	5	80	4
G72: Review Plans of Management for all coastal reserves in coastal risk areas (geotechnical), both for Crown reserves and for Council community land. Ensure that each Plan of Management takes geotechnical hazards into account. Same as G71												0	1
G73: Repeat LiDAR surveys of the coast at approximately 5 year intervals. Analyse high resolution digital terrain data at 5 yearly intervals to identify any changes in the terrain of areas affected by geotechnical hazards. See also E01.	5	5	10	10	10	10	1	5	5	5	10	76	4
G74: Make Australian GeoGuides, published by the Australian Geomechanics Society, available on Council's web site, as reference material on good practice for landowners and Council.	5	5	10	10	10	10	10	1	10	10	5	86	5
E75: Support programs and activities which reduce risks to breeding success of protected shore birds, such as Little Tern.	10	10	10	5	10	10	5	5	5	5	1	76	4

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R76: Prepare and/or review of Plans of Management and Master Planning for the main recreational beaches and coastal reserves of Wyong Shire. Upgrade shade and picnic facilities at high profile beaches (R9), in accordance with these Plans of Management. Identify priority asset and infrastructure works for public reserves in accordance with these Plans of Management.	5	5	10	5	10	10	5	5	5	10	10	80	4
C77: Develop a project with the Darkinjung Local Aboriginal Land Council to document stories of Aboriginal attachment to the Wyong coastline – spiritual, social and cultural. With the Land Council and other Aboriginal groups, identify information that could be used in interpretative material about the coastline and identify locations where this information would add to community appreciation of the values of the coastline	5	5	10	5	10	10	5	10	5	10	10	85	4
C78: With the Darkinjung Local Aboriginal Land Council and other Aboriginal community groups, identify Aboriginal sites on coastal land managed by Council, record current condition and threats and include appropriate protection measures in Plans of Management for coastal reserves in Council's management.	10	10	10	5	5	10	5	5	5	5	10	80	4



Action	A	B	C	D	E	F	G	H	I	J	K	L	M
C79: In conjunction with L&PMA, review Plans of Management for Crown coastal holiday parks (such as Toowoon Bay, Norah Head, and Crown leases at Sun Valley and Blue Lagoon) and Crown Reserves such as Norah Head, to ensure that climate change hazards are recognised and that the impact of climate change and sea level rise on the recreational, visual and social values of these reserves and leases is managed for the benefit of the community.	10	10	10	10	10	10	5	5	5	5	5	85	4