

Shoalhaven Heads Estuary Taskforce

Meeting Date: Monday, 20 November, 2017
Location: Jervis Bay Rooms, City Administrative Centre, Bridge Road, Nowra
Time: 4.00pm

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Agenda

1. **Apologies**
2. **Confirmation of Minutes**
 - Shoalhaven Heads Estuary Taskforce - 20 March 20171
3. **Declarations of Interest**
4. **Presentations**
 - Research Findings Shoalhaven River Sediment Transport – Rafael Carvalho
5. **Reports**
 - SH17.6 Update on Taskforce resolutions5
 - SH17.7 Shoalhaven Heads Estuary Task Force recommendations - report on financial and resourcing implications7
6. **General Business**

Membership

Clr Mitchell Pakes - Chairperson

All Councillors

Mr Gareth Ward MP (Nominee – Mr Paul Ell)

Ms Jessica Zealand

Mr Graeme Philpott

Mr Mike James

Mr Phil Guy

Mr David Lamb

Mr Bob Williamson

Mr Barry/Brian Allen

Mr Craig Peters

Mr Gerald Groom

Mr Stephen Short

Ms Robyn Flack

Quorum – Three (3): One (1) Councillor and Two (2) Community Members

Purpose

- Examine options for pursuing a partial or complete opening of Shoalhaven Heads
- Review Councils current Entrance and Estuary Management Plans for Shoalhaven Heads
- Report directly to Council

MINUTES OF THE SHOALHAVEN HEADS ESTUARY TASKFORCE

Meeting Date: Monday, 20 March 2017
Location: Jervis Bay Rooms, City Administrative Centre, Bridge Road, Nowra
Time: 4.04pm

The following members were present:

Clr Andrew Guile – Chairperson
Clr Amanda Findley
Clr John Wells
Clr Annette Alldrick
Brian Allen
Jessica Zealand
Phil Guy
David Lamb
Robyn Flack
Stephen Short

Others present:

Clr Patricia White
Clr Mitchell Pakes
Tim Fletcher – Director Planning, Environment and Development Group
Kelie Lowe – Environmental Services Manager
Greg Pullen – Economic Development Manager
Alasdair Stratton – Acting Unit Manager Natural Resources and Floodplain
Mir Abdus Subhan – Floodplain & Stormwater Quality Engineer
Ray Massie – Coast and Estuaries Officer

Apologies / Leave of Absence

An apology was received from Gerald Groom, Mike James

Confirmation of the Minutes

Recommendation

That the Minutes of the Shoalhaven Heads Estuary Taskforce held on Monday 12 December 2016 be confirmed.

RESOLVED (David Lamb / Clr Alldrick)

That the Minutes of the Shoalhaven Heads Estuary Taskforce held on Monday 12 December 2016 be confirmed.

CARRIED

Note:

The Committee raised a point in the previous minutes in relation to the address from the Mayor. In the second dot point it states that the State Government has not provided funding however the State Government has matched \$50,000 funding from Council for the WRL Study "Management Options for Improving Flows of the Shoalhaven River at Shoalhaven Heads".

The Committee feel they do have a united direction and they formed a focus group and have recommendations to put forward.

Declarations of Interest

Nil

PRESENTATIONS

SH17.1 Progress Update on Taskforce Resolutions

HPERM Ref:
D17/84318

Verbal Report – Staff provided a presentation in relation to catchment management projects and actions currently being implemented. These included:

- Review of the lower Shoalhaven River Floodplain Risk Management Study and Plan
- St Andrews Way
- Water Quality Monitoring and Aqua Data Portal
- Acid Sulphate Soil Project
- River Road Foreshore Sedimentation Options
- Discussions with Surf Club – Sand Movement

Recommendation (Clr Wells / Phil Guy)

Council:

1. Accept the offer from Parramatta Council for the two (2) Water Testing Buoys and the purchase price of \$10,000 be covered from the existing 2016/2017 Water Quality Budget
2. Consider funding allocation from the 2017/2018 Budget for maintenance of the Buoys at a cost of \$6,000

CARRIED

SH17.4 Verbal Update on Economic Development and Tourism

Greg Pullen – Economic Development Manager provided a verbal report on the economic assessment and process in relation to Grant funding.

Note: Clr Wells and Clr White left the meeting at 5.06pm

SH17.5 Review of Objectives

The Committee discussed ways forward and the objectives of the Committee. It was also noted that Part 2 of the Objectives remove the words “including a permanent opening”.

Recommendation (Jessica Zealand / Robyn Flack)

That the Shoalhaven Heads Estuary Taskforce review the Estuary Management Plan as it relates to Shoalhaven Heads and reports to the Shoalhaven Natural Resources and Floodplain Management Committee requesting the following change:

1. Estuary Management Plan Reflect Community Values

- a. Ensure the values of the Shoalhaven Heads community are adequately represented within the Estuary Management Plan.

CARRIED

Recommendation (Phil Guy / Stephen Short)

That Council receive and note these objectives as identified by the Committee and the General Manager report back on the financial and resourcing implications associated with the objectives outlined below:

1. Storm-water Management River Road (immediate)

- a. Redirect three storm-water outlets along River Road in front of the Hotel.

2. River Road Erosion Control Works (immediate)

- a. Undertake urgent remedial work from Matt Black's report and create a sand buffer along River Road to reinforce erosion control works and provide a recreational space around foreshores.
- b. Further consideration to be given to moving the channel further out from the bank. Create a sand buffer along River Road to reinforce erosion control works and provide a recreational space around foreshores.

3. Trial Geotechnical Groynes (medium)

- a. Design and commission groyne system into ocean at entrance to direct flow at the next flood event by producing an entrance design using the groyne system illustrated in WRL Report 2015.
- b. The design to include a dune care works programme that compliments the groyne system and encourages a narrower entrance that scours deeper rather than wider entrance during a flood event.

4. Dredge or Dragline Programme (medium)

- a. Investigate alternative boating channels to help protect foreshore sand buffers by providing a more direct access to main river basin.
- b. Around Holiday Haven Caravan Park and River Road foreshore to provide wider bank buffers and restore clean sand, water recreation and boating with better water depth

5. Pursue Commercial Dredging (long term)

- a. Options in the Shoalhaven River of Old Man Gut and Kurrajong Island that can offset the cost of maintenance dredging in the basin at Shoalhaven Heads.

6. Submerged wall or groyne System at O'Keefes Point (long term)

- a. Investigate placing a groyne or groynes along the river bank near O'Keefe's point deflecting flow from Berry's Canal towards Shoalhaven Heads.

CARRIED

REPORTS

SH17.2 Membership - Resignation from Allan Richardson and Application from Carole Cassidy**HPERM Ref:
D17/59969****Recommendation (Item to be determined under delegated authority)**

That Council

1. Accept the resignation of Mr Allan Richardson
2. Write to Mr Richardson to thank him for his contribution to the Taskforce.
3. Appoint Ms Carole Cassidy as a community member of the Shoalhaven Heads Estuary Taskforce
4. Write to Ms Cassidy to notify her of her appointment and invite her to all future meetings.

It was noted that the form should include additional criteria in relation to technical expertise and or background that would contribute to the Committee.

RESOLVED (Stephen Short / Robyn Flack)

That the Committee accept the resignation from Allan Richardson and defer other applications until after the community drop in session on 9 April 2017.

CARRIED

SH17.3 Outcome - Representations to Local Members - Funding - Shoalhaven Heads Estuary Taskforce Objectives**HPERM Ref:
D17/37183****Recommendation (Item to be determined under delegated authority)**

That the report regarding the results of representations made to Federal and State Local Members requesting support to source funding for the Shoalhaven Heads Taskforce objectives be received for information.

RESOLVED (Clr Guile / Amanda Findley)

This matter be deferred and reported back to the next meeting.

CARRIED

Note:

The Chairperson and the Committee acknowledged that this will be Tim Fletcher's last meeting and thanked him and his staff for his contributions and commitment to the Committee.

There being no further business, the meeting concluded, the time being 6.23pm.

Clr Guile
CHAIRPERSON

SH17.6 Update on Taskforce resolutions

HPERM Ref: D17/375925

Group: Planning Environment & Development Group
Section: Environmental Services

Attachments: 1. Business Case - Grant Application - Regional Growth - Environment & Tourism Fund - Shoalhaven Heads - River Road Foreshore Precinct (under separate cover) [⇒](#)
2. River Road Foreshore - Assessment of Coastal Management Options - WRL technical report (under separate cover) [⇒](#)

Purpose / Summary

The purpose of this report is to provide an update on progress on past resolutions from the Taskforce as requested by one of the Taskforce community members.

Recommendation (Item to be determined under delegated authority)

That the Taskforce receive the report for information.

Options

1. Receive the report for information.
2. Alternative recommendation.

Implications: Unknown

Background

Phil Guy, a community representative on the Taskforce, requested Council to provide an update on the following matters. Council's response is contained below.

1. Status of previous adopted recommendations from the SHET.

Separate report prepared and included in this business paper.

2. Status of Grant application for remedial works at River Rd embankment.

Expression of interest (EOI) to the Restart NSW Regional Growth – Environment and Tourism Fund was successful with Council invited to lodge a full grant application.

Locale Consulting was engaged to assist Council officers in preparing documents for full grant application. The grant application included community consultation to inform detailed project design including foreshore protection works, foreshore access infrastructure and upgrade to stormwater outlets referred to in item 4. A copy of the business case lodged as part of the grant application is contained in attachment 1.

The grant application referenced the '*River Road Foreshore, Shoalhaven Heads: Assessment of Coastal Option, Final Draft August 2017*' prepared by Water Research Laboratory (WRL). The recommended option from the WRL assessment was a rock seawall. The construction costings for the grant application are based on this recommendation,

however it is important to note that the final option will require detailed design and this will be informed by community consultation.

3. Status of proposed grant application for dredging and shore nourishment as recommended within the Matt Blacka report.

No dredging was proposed as part of the Restart NSW Regional Growth – Environment and Tourism Fund. As detailed in the separate report contained in this business paper, dredging would require significant separate environmental assessment, licences and approvals and was outside the scope of the application.

Council has however included in the grant application a beach scraping and beach nourishment component. The business case document describes this in more detail (attachment 1). Council has already commenced investigations and surveys to assess sourcing sand from the management of the dry notch at Shoalhaven Heads in accordance with the Shoalhaven River Entrance Management Plan.

In regard to dredging for navigation purposes, Council's Asset Management Section have advised that Shoalhaven Heads is serviced with 3 boat launching ramps. Alternative boat launching ramps in Wharf Road and Hay Avenue provide good access into the river for deep hulled trailerable boats. It is unsustainable for all boat ramps and navigation channels to be maintained to be able to cater for all boat/trailer combinations in all-weather/tidal/river conditions." Council has applied for funding from the Better Boating Now (Round Two) Program for upgrading the Wharf Road boat ramp and if successful will provide a much improved facility reducing demand of the River Road facility.

4. Status of funded stormwater redirection works at River Rd embankment.

Investigations have commenced. Stormwater improvements included in grant application scope of works.

5. Status of the revision of the Shoalhaven Heads entrance management plan

Council has engaged Consultants Cardno (NSW/ACT) Pty Ltd to undertake the Lower Shoalhaven River Floodplain Risk Management Study and Plan, which includes the review of the current entrance management policy. Completion of this study and plan is anticipated mid-2020 at this point of time. Assessment of the entrance policy according to Cardno's project program will be undertaken early 2019 following then by community consultation in June 2019.

Community Engagement

A community engagement component was included as part of the Shoalhaven Heads River Road Foreshore Precinct grant application.

Financial Implications

Delivery of the Shoalhaven Heads River Road Foreshore Precinct project will rely upon grant funding to deliver to the full project scope. The project is estimated to cost \$1.7 million.

Risk Implications

There is a financial risk that the actual construction costs could significantly increase compared to the estimated costs due to level of activity in the development industry and cost of sourcing materials.

The risk implications for the grant project have been included in the documents to support the grant application.

SH17.7 Shoalhaven Heads Estuary Task Force recommendations - report on financial and resourcing implications

HPERM Ref: D17/262657

Group: Planning Environment & Development Group

Purpose / Summary

On 28 March 2017, Council passed the following two resolutions to receive a report on the financial and resourcing implications on the recommendations of the Shoalhaven Heads Estuary taskforce as follows:

Resolution One - MIN17.275

That the Shoalhaven Heads Estuary Taskforce review the Estuary Management Plan as it relates to Shoalhaven Heads and reports to the Shoalhaven Natural Resources and Floodplain Management Committee requesting the following change:

1. **Estuary Management Plan Reflect Community Values**

- a. *Ensure the values of the Shoalhaven Heads community are adequately represented within the Estuary Management Plan.*

Resolution Two – MIN17.276

That Council receive and note these objectives as identified by the Committee and the General Manager report back on the financial and resourcing implications associated with the objectives outlined below:

1. **Storm-water Management River Road (immediate)**

- a. *Redirect three storm-water outlets along River Road in front of the Hotel*

2. **River Road Erosion Control Works (immediate)**

- a. *Undertake urgent remedial work from Matt Black's report and create a sand buffer along River Road to reinforce erosion control works and provide a recreational space around foreshores.*
- b. *Further consideration to be given to moving the channel further out from the bank. Create a sand buffer along River Road to reinforce erosion control works and provide a recreational space around foreshores.*

3. **Trial Geotechnical Groynes (medium)**

- a. *Design and commission groyne system into ocean at entrance to direct flow at the next flood event by producing an entrance design using the groyne system illustrated in WRL Report 2015.*
- b. *The design to include a dune care works programme that compliments the groyne system and encourages a narrower entrance that scours deeper rather than wider entrance during a flood event.*

4. Dredge or Dragline Programme (medium)

- a. *Investigate alternative boating channels to help protect foreshore sand buffers by providing a more direct access to main river basin.*
- b. *Around Holiday Haven Caravan Park and River Road foreshore to provide wider bank buffers and restore clean sand, water recreation and boating with better water depth*

5. Pursue Commercial Dredging (long term)

- a. *Options in the Shoalhaven River of Old Man Gut and Kurrajong Island that can offset the cost of maintenance dredging in the basin at Shoalhaven Heads.*

6. Submerged wall or groyne System at O’Keefe’s Point (long term)

- a. *Investigate placing a groyne or groynes along the river bank near O’Keefe’s point deflecting flow from Berry’s Canal towards Shoalhaven Heads*

Recommendation (Item to be determined under delegated authority)

1. That Council receive the report on financial and resource implications of the Shoalhaven Heads Estuary Taskforce recommended objectives for information; and
2. Council continue to work with the Shoalhaven Heads community to develop River Road Foreshore Precinct to address coastal erosion, as per the options identified in the Draft NSW Water Research Laboratory Assessment of Coastal Management Options.

Options

1. As recommended.

Implications – The review of the Shoalhaven River Estuary Management Plan would need to be undertaken as part of the new NSW Coastal Management Act under the NSW coastal reforms. Council has applied for the Restart NSW Regional Infrastructure – Environment and Tourism Fund grant for the River Road coastal foreshore protection works.

2. Not support the recommendation.

Implications – Without external funding assistance, Council is unable to fund River Road Foreshore Protection project within its current budget. This would lead to a loss of reserve, road and public utility infrastructure and community recreational values along River Road.

Background

Each of the resolutions actions/objectives has been examined using the following criteria to access economic, social and environmental impacts and resources required to achieve them.

1. Breakdown of the tasks or works required to achieve the objective
2. What community and staffing resources would be required for the work/task
3. Timeframe
4. Economic cost to undertake the task

These have been presented in a table format below and was provided to Councillors at a Councillor briefing on 8 June 2017.

1. Ensure the values of the Shoalhaven Heads community are adequately represented within the Estuary Management Plan

This resolution would require a review of the of the Shoalhaven River Estuary Management Plan (SREMP) which would take two (2) years, excluding time need to secure funding, and cost an estimated \$120,500, details outlined below in Figure 1:

Tasks/Work Required	Resources Required	Timeframe (months)	Estimated Cost
Seek approval from State Government Agencies to review the Shoalhaven River EMP	Existing staff, engage a project officer to engage/consult to comply with new CMP guidelines	3	\$5,000
Seek funding to review the SREMP from NSW OEH	Council officers and SHET	12	\$5,000 to prepare application (\$20,000 to \$120,000 grant amount depending on OEH requirements, surveys & assessments required)
If grant funding successful continue to tender process for review of SREMP	Council officers and OEH	3	\$3,000
Selection of successful of tender consultant	Council officers and SHET	1	\$2,000
Undertake review and collect any necessary data required	Successful consultant	12	\$80,000
Finalise Draft Review for Community/stakeholder and agency consultation and SHET	Consultant and staff	6	\$20,000
Collate all submissions on draft review	Staff	2	\$3,000
Report to SHET/Council	Staff	1	\$2,000
Adoption of the review	Council	2	\$500
Total time and cost		3.5 years	\$120, 500

Figure 1: Breakdown of task, timeframe & cost for the review of the Shoalhaven River Estuary Management Plan (SREMP)

2. Stormwater Management River Road (immediate) - Redirect three stormwater outlets along River Road in front of the Hotel.

Part to (2) of the resolution was to re-design and construct stormwater to consolidate the existing three (3) stormwater outlets into two (2) outlets along River Rd, the table outlines the process. Cost estimated at \$345,000 over 21 months.

Stage/s	Tasks/Work Required	Resources Required	Timeframe (months)	Estimated Cost
Survey/Design	Stormwater drainage survey/assessment of storm water catchments to access volumes/flows/condition of storm water drains	Stormwater engineer/surveyors	3	\$5,000
	Preparation of design (based on surveys) to incorporate onto the River Rd erosion revetment works	Stormwater engineer/designer	6	\$20,000
Approval/s	Preparation of Review of Environmental Factors (REF) for stormwater works (this will incorporate both the erosion revetment and storm water works)	Consultant	3	\$10,000
Work	Tender stormwater and erosion works and selection	Staff	3	\$5,000
	Undertake stormwater/erosion revetment work	Civil Engineering Company	6	\$300,000
Maintenance	Rehabilitation? Maintenance	Staff/Contractor	On-going	\$5,000
Total time and cost			21 months	\$345,000

Figure 2: Breakdown of stages, task, time and costs for stormwater management at River Rd

3. Stormwater Management River Road (immediate):

- Undertake urgent remedial work from Matt Black's report and create a sand buffer along River Road to reinforce erosion control works and provide a recreational space around foreshores.
- Further consideration to be given to moving the channel further out from the bank. Create a sand buffer along River Road to reinforce erosion control works and provide a recreational space around foreshores.

The following table gives a breakdown of the task, cost and timeframe for the erosion control works and is based on the final draft *River Road Foreshore, Shoalhaven Heads: Assessment*

of *Coastal Management Options*, prepared by Water research Laboratory (WRL), UNSW. The cost, without beach nourishment and dredging, is estimated at \$1,052,000 over 3 years and up to 5 years if a cost benefit analysis is required in accordance with the draft NSW Coastal Manual.

Stage/s	Tasks/Work Required	Resources Required	Timeframe (months)	Estimated Cost
Study	Preliminary scoping study to assess geomorphological process in relation to the proposal	Consultant with geomorphological expertise	3	\$15,000
Study/report	If study determines that the proposal is feasible proceed to undertaking a cost benefit analysis	Economist	3	\$50,000
	Preparation of costings and options report	Consultant	12	\$25,000
Consultation	Consultation with community/stakeholders/agencies on options report	Staff	3	\$5,000
	Finalise preferred option based on feedback	Staff and SHET	2	\$2,000
Approvals	Preparation of Review of Environmental Factors (REF) for project	Consultant	6	\$65,000
	Seek Approvals and license from State Govt agencies (NSW OEH, NSW Crown Lands, NSW DPI Fisheries, NSW NPWS)	Staff	6	\$5,000
Works	Project detail design	Consultant	12	\$80,000
	Project tender process	Staff	3	\$5,000
	Undertake project works	Civil Engineering/dredging Company	12	\$500,000
Maintenance	Monitoring/Maintenance/Rehabilitation of project	Contractor/Staff	On-going	\$300,000
Total time and cost			5 yrs.	\$1,052,000

Figure 3: Breakdown of stages, task, timeframe and costs of foreshore erosion remediation and dredging/sand nourishment options

4. Trial Geotechnical Groynes (medium)

- Design and commission groyne system into ocean at entrance to direct flow at the next flood event by producing an entrance design using the groyne system illustrated in WRL Report 2015.
- The design to include a dune care works programme that compliments the groyne system and encourages a narrower entrance that scours deeper rather than wider entrance during a flood event.

The design and costings of the multiple groyne system was based on information from an assessment of the entrance examined by Posford et al (1977) outlined in the report prepared

by the UNSW Water Research Laboratory (MHL) titled “Management Options for Improving Flows of the Shoalhaven River at Shoalhaven Heads, Gilmore W.C, Ruprecht E and Rayner D S. It is important to also note that the part b of this resolution is not in accordance with the adopted Shoalhaven Entrance Management Policy.

Stage/s	Tasks/Work Required	Resources Required	Timeframe months	Estimated Cost
Pre-project studies/assessment & consultation	Review the Shoalhaven River Flood Risk Management Plan and the Entrance Management Policy to include data on flood modelling for the semi-permanent river entrance opening	Staff and Flood engineer	12	\$80,000
	Community consultation on the entrance management policy and flood risk management plan	Council staff, community, stakeholders, State Govt agencies	6	\$5,000
	Develop project brief in consultation with government agencies and community for options report	Staff and SHET	6	\$10,000
	Detailed design study to access/confirm efficiency of a constructed entrance and to insure there would be no adverse effects on estuary health as a result of a constructed entrance	Coastal engineer or Environmental Scientist	12	\$250,000
	Undertake cost benefit analysis	Economist	6	\$100,000
	Scoping report on the options for a constructed entrance (rock or geobags) as per Posford (1977) scoping design	Coastal Engineer	6	\$100,000
	Consultation with stakeholders/community on options/CBA for groynes	Staff	6	\$10,000
Proceed to based on results of consultation/options selected Approvals	Environmental assessments – EIS or REF	Consultant	12	\$100,000

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Stage/s	Tasks/Work Required	Resources Required	Timeframe months	Estimated Cost
	Seek approvals from state government - NSW Crown Land License (Dredge), NSW DPI Fisheries (Permit to Harm), NSW Office of Environment and Heritage (Threatened Species and Permit to dredge), NSW Roads and Maritime Service and Environment Australia (Shorebird Protection & Migratory Agreements)	Local, State and Federal Government Staff & Ministers	12	\$50,000
If environmental assessment concludes that project should proceed without major constraints and approval from state and federal government are obtained then proceed to development application stage				
Development application	Prepare a DA for the project to the State Joint Regional Planning Panel	Staff and consultants	12	\$80,000
If DA is approved by the JRPP proceed to design and construction stage				
Design and Construction	Detailed design based on the option/s selected	Coastal Engineer	12	\$150,000
	Community consultation on final design with community and stakeholders	Staff & SHET	3	\$10,000
	Modifications to design in response to community or agency comments	Coastal Engineer	3	\$10,000
	Preparation of tender for groyne construction + associated dredging of entrance	Staff	3	\$5,000
	Tender selection process	Staff and Councillors	3	\$3,000
	Construction of groyne and semi-permanent entrance opening as per the 1977 Posford design with 2 x 200m and 6 x 160m groynes based on an estimated costs of \$35,000/linear metre	Civil & Environmental Engineering Contractor	12	\$47,600,000
	Undertake dune restoration works	Environmental contractor	3	\$500,000
Maintenance	Undertake maintenance	Contractor/staff	On-going	\$1,500,000

Stage/s	Tasks/Work Required	Resources Required	Timeframe months	Estimated Cost
	of groyne, river entrance (as per reviewed entrance management policy) and the dune restoration work			
Total timeframe and cost of project			3.3 yrs.	\$50,563,000

Figure 4: Breakdown of stages, tasks, resources and cost required for construction of groynes at Shoalhaven River entrance

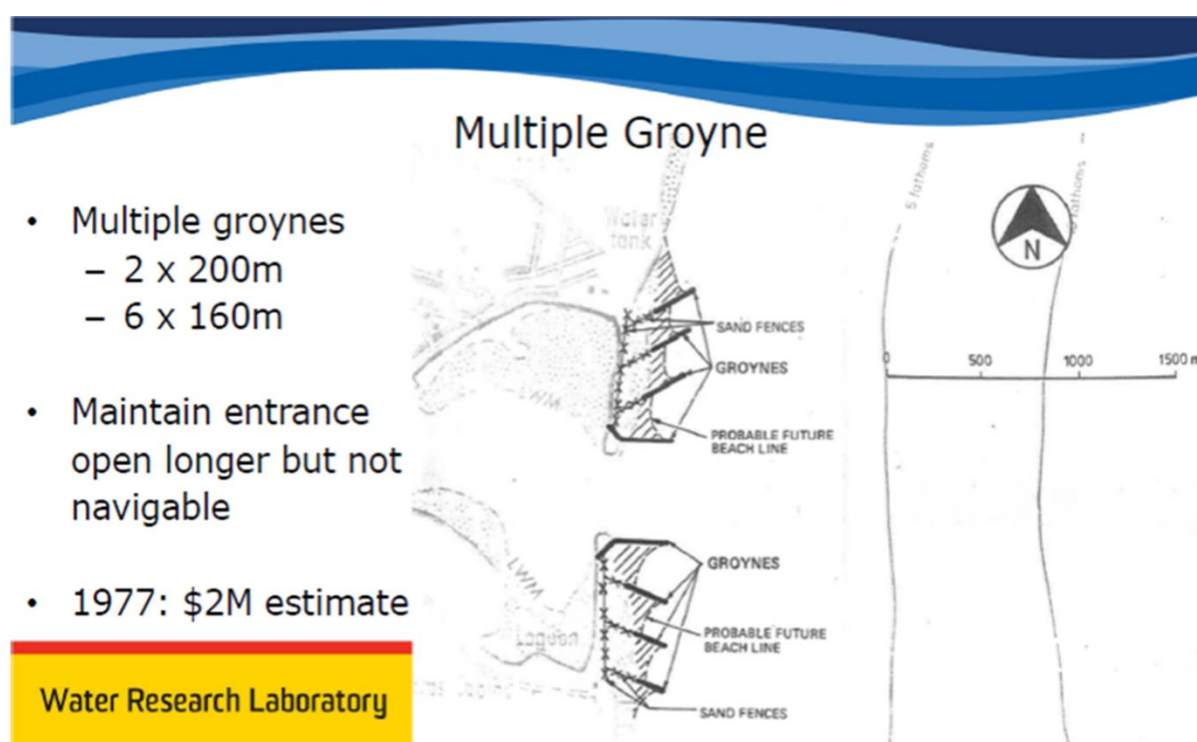


Figure 5: Diagram of Posford (1977) multiple groyne system

5. Dredge or Dragline Programme (medium)

- Investigate alternative boating channels to help protect foreshore sand buffers by providing a more direct access to main river basin.
- Around Holiday Haven Caravan Park and River Road foreshore to provide wider bank buffers and restore clean sand, water recreation and boating with better water depth



Figure 5: Map showing proposed dredged navigation channel and proposed dredged sand bar to provide wider bank buffer

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Stage/s	Tasks/Work Required	Resources Required	Timeframe mths	Estimated Cost
Project studies, assessment and consultation	Develop project brief in consultation with government agencies and community for options report	Local & State Government Staff	3	\$10,000
	Preliminary scoping study to assess feasibility of project geomorphologically	Geomorphologist	6	\$50,000
	Undertake an economic cost benefit analysis for the dredging project	Economist	6 - 12	\$100,000
	Investigations, costings and design options for selection of navigation channel for dredging and sand nourishment of Northern shoreline of river	Coastal Engineer	12	\$100,000
	Consultation with stakeholders/community on options/costings for dredging /sand nourishment	Staff & SHET	3	\$5,000

Stage/s	Tasks/Work Required	Resources Required	Timeframe mths	Estimated Cost
Proceed to environmental assessment/approval based on result of consultation				
Project Approvals	Environmental assessment – Review of Environmental Factors or Environmental Impact Statement (EIS/REF)	Environmental consultant	12	\$1,000,000
	Seek approvals from state government - NSW Crown Land License (Dredge), NSW DPI Fisheries (Permit to Harm) and NSW Office of Environment and Heritage and NSW Roads and Maritime Service.	Staff	12	\$20,000
If environmental assessment concludes project to proceed and approval granted				
Project Design and Implementation	Detailed design based on the option/s selected	Coastal Engineer	6	\$100,000
	Community consultation on final design with community and stakeholders	Staff	3	\$15,000
	Modifications to design in response to community or agency comments	Coastal Engineer	2	\$10,000
	Preparation of tender for dredging and nourishment and selection of	Staff	6	\$5,000
Design and implementation	Undertake project works - dredging of navigation channel and sand nourishment of northern foreshore of based on design and REF	Dredging contractor	12	\$500,000
Maintenance	On-going dredging of navigation channel and	Dredging contractor	Following extreme	\$150,000

SH17.7

Stage/s	Tasks/Work Required	Resources Required	Timeframe mths	Estimated Cost
	sand nourishment on an annual basis or as or following		weather events	
Total timeframe and costs			5yrs 11mths	\$2,065,000

Figure 6. Breakdown of stages, tasks, resources, timeframe and cost for investigation of dredging for boating channel and sand buffer.

Estimated annual cost (this is only estimated annual cost as there are many variables that would effect on-going dredging cost such as weather events. It is estimated that it would cost approximately \$650,000 annually.

6. Pursue Commercial Dredging (long term)

a. Options in the Shoalhaven River of Old Man Gut and Kurrajong Island that can offset the cost of maintenance dredging in the basin at Shoalhaven Heads.

80% of the proposed project site is located on SEPP 14 Wetland and is zoned Environmental Conservation - E2 under the Shoalhaven SLEP 2014. The clearing, infilling, dredging, drilling or construction of levees on this areas is not permitted without consent from Shoalhaven Council and the NSW Department of Planning and Environment

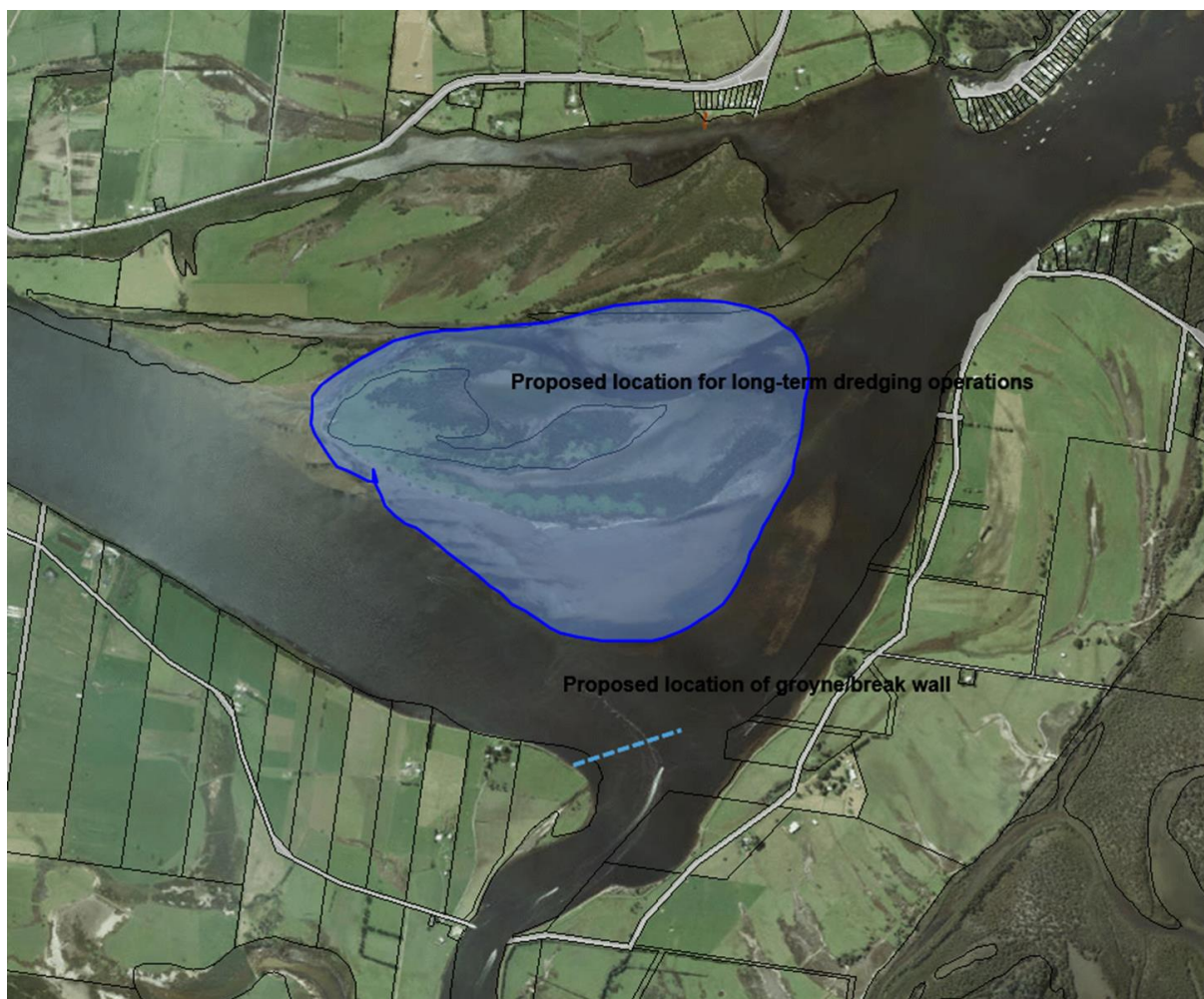


Figure 7: Map showing proposed commercial dredging location and groyne break wall

Stage/s	Tasks/Work Required	Resources Required	Timeframe mths	Estimated Cost
Project studies, assessments	Coast benefit analysis on feasibility of dredging	Economist	6	\$100,000
	Survey and modelling study to assess the impact on estuary health of hydrology/tidal movements on the estuary	Coastal Engineer/Geomorphologist	6	\$250,000
If cost benefit analysis and modelling/studies conclude that commercial dredging is viable proceed				
Consultation	Develop project brief in consultation with government agencies and community for options report	Staff and consultants	6	\$20,000
	Consultation with stakeholders/community on options/costings for dredging	Staff and SHET	3	\$40,000
Based on brief and preferred option chosen move to approval stage				
Approval	Preparation of an Environmental Impact Statement (EIS) for projects	Environmental consultant/scientist	12	\$2,000,000
	Seek approvals/licence from State Governments agencies - NSW Department of Planning and Environment (SEPP 14 Wetland), NSW Crown Lands (Dredging License), NSW Office of Environment and Heritage (Estuary & EEC), NSW Roads and Maritime Service (Navigation), NSW DPI Fisheries (Marine Vegetation & Fish Habitat) Commonwealth	Local & State Government Staff	12	\$200,000
If EIS recommends that commercial dredging can proceed and all state government approval are given				
Development Application	Submit Development Application for consent by Shoalhaven Council and NSW Department of Planning and Environment	Staff and consultants	24	\$25,000
If Development Application is approved move to implementation stage				
Contract and tender	Preparation of commercial dredging/sand supply contract (incorporate maintenance dredging	Local and State government staff	6	\$50,000

Stage/s	Tasks/Work Required	Resources Required	Timeframe mths	Estimated Cost
	within the river mouth area to maintain navigation channel and sand nourishment of River Rd frontage) for approval by Shoalhaven Council			
	Tender preparation, and selection process for commercial dredging	Local and state government	3	\$50,000
	Award tender and contract to commercial dredging/sand supply company	Council and state government	2	\$5,000
Monitoring	On-going monitoring of dredging project site and estuary to access impacts of dredging on estuary health (which would be part of the approval and consents)	Staff/Consultants	On-going	\$500,000
Total costs and timeframe			6.6yrs	\$3,240,410

Figure 8: Breakdown of stages, tasks, resources, timeframe and cost of commercial dredging on the Shoalhaven River

7. Submerged wall or groyne System at O’Keefe’s Point (long term)

a. Investigate placing a groyne or groynes along the river bank near O’Keefe’s point deflecting flow from Berry’s Canal towards Shoalhaven Heads

Note: That the modelling undertaken by WRL in the 2015 study “Modelling Options for Improving Flows at the Shoalhaven River at Shoalhaven Heads”, indicated that the modelling a constriction flow scenario via the construction of a groyne would create a large eddy near the mouth of Berry’s Canal.

Stage/s	Tasks/Work Required	Resources Required	Timeframe mths	Estimated Cost
Studies/ Reviews and Consultation	Cost benefit analysis on feasibility of groyne	Economist	6	\$100,000
	Survey and modelling study to access the impact on estuary health of the estuary, flooding and tidal movement	Coastal Engineer/Environmental Scientist	24	\$250,000
	Review of the Lower Shoalhaven River Flood Study Report/Plan to determine the effects of a groyne on flooding	Flood Engineer	12	\$80,000
	Review of the Shoalhaven River	Flood Engineer	12	\$80,000

Stage/s	Tasks/Work Required	Resources Required	Timeframe mths	Estimated Cost
	Entrance Management Plan for Flood Mitigation due to changed flooding dynamics from the construction of the groyne			
	Community/Stakeholder consultation for Flood Risk and Entrance Management Plans	Staff	6	\$10,000
Outcomes of cost benefit analysis, modelling/study and river flood and entrance management plans access that the project is feasible proceed				
Options Report	Report on investigations, costings and design options for construction of the groyne	Coastal/Flood Engineer	12	\$150,000
	Consultation with community, stakeholders, state government agencies on options	Staff	6	\$10,000
The outcomes of the report and consultation will determine how the project will proceed				
Approval	Preparation of and Environmental Impact Statement (EIS) for the project	Environmental Scientist	18	\$100,000
	Seek approvals from State government agencies NSW Crown Lands , NSW Office of Environment and Heritage, NSW Roads and Maritime Service (Navigation), NSW DPI Fisheries (Marine Vegetation & Fish Habitat)	Local and State Government Staff	12	\$50,000
If REF concludes that project can proceed and all state government approvals are granted proceed to development application				
Development application	Preparation of detailed surveys and design	Coastal Engineer	12	\$200,000
	Prepare and submit a development application for assessment	Staff and consultants	12	\$75,000

Stage/s	Tasks/Work Required	Resources Required	Timeframe mths	Estimated Cost
If DA is approved				
Project implementation	Preparation and tender selection process for the construction of the groyne	Staff and consultants	6	\$35,000
	Construction of the 260 metres groyne at O'Keefe's Point	Civil Engineering Construction Company	12	\$9,100,000
	Commissioning of the groyne	Staff/Contractor	1	\$5,000
	Rehabilitation	Environmental Contractor	6	\$100,000
Maintenance	Maintenance of groyne (this would be an annual cost or after weather events)	Contractor/Staff	Annually	\$150,000
Total cost and timeframe of project			7.3 years	\$10,495,000

Figure 9: Breakdown of stages, task, resources, timeframe and costs for the construction of the submerged groyne/wall at O'Keefe's Point

Community Engagement

All parts five (5) parts of the resolutions will require extensive community consultation, with several of Council Flood Risk Management Plans, Entrance Management Policy and the Estuary Management Plan requiring review and changes. The Proposals for dredging, erosion control and groyne construction at O'Keefe's Point and the river mouth requiring extensive community consultation in the development stages.

Policy Implications

The Shoalhaven River Entrance Management Policy is being undertaken as part of the update the lower Shoalhaven River flood study. The review of the Shoalhaven River Estuary Management Plan would need to be undertaken, as part of the Coastal Management Program and identified in the coastal scoping study.

Financial Implications

The financial cost for implementing and on-going maintenance for the five (5) resolutions would be approximately \$69,000,000. As previously stated, the review of the Shoalhaven River Estuary Management Plan, would need be done as part of the Shoalhaven Coastal Management Program, required under the Stage 2 Coastal Management Act reforms. This would have financial implications given the size and complexity of the Shoalhaven River Estuary Management Plan.

Risk Implications

The actions within these resolutions pose a high risk to short and long term health of the Shoalhaven River Estuary ecological health. They also would also pose a high social and financial risk to the community and Council both with the upfront and on-going maintenance costs associated with the implementation of the objectives.