




MOLINO STEWART

ENVIRONMENT & NATURAL HAZARDS



Lake Macquarie
City Council

Lake Macquarie City Council



**Community and Stakeholder
Consultation Program for Lake
Macquarie Waterway Flood
Management Plan**

Report



Community and Stakeholder Consultation Program for Lake Macquarie Waterway Flood Management Plan

REPORT

for

Lake Macquarie City Council

by

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DECEMBER 2011

DOCUMENT CONTROL

Document Reference	0465 Lake Macquarie Consultation Report - final
Project	Community and Stakeholder Consultation Program for Lake Macquarie Waterway Flood Management Plan
Document Type	Final Report
Author	Molino Stewart Pty Ltd

REVISION HISTORY

Date	Version	Name	Comments
15/12/2011	1	E Armstrong	First draft for review

DOCUMENT APPROVAL

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1 INTRODUCTION

1.1 BACKGROUND

In NSW, local Councils have primary responsibility for flood risk management, with technical and financial support from the NSW Government. Lake Macquarie City Council has updated the assessment of flood risks for the Lake Macquarie waterway. The NSW Government required this review to include the effects of predicted sea level rise on lake levels and flooding.

It was envisaged that the review study and its recommendations may have direct and significant impacts on some lakeside property owners and residents, as well as on public foreshore activities and access. It is a requirement of NSW legislation that the Council consult with residents and other stakeholders, especially those directly affected, before adopting the final Lake Macquarie Waterway Flood Management Plan.

Council engaged consultants Molino Stewart Pty Ltd to help prepare and implement a stakeholder consultation plan associated with the public exhibition of the draft Flood Study and Plan. Methods used in the consultation plan included:

- Six community workshops with potentially flood-affected residents held at Toronto (2 November 2011), Argenton (3 November), Charlestown (5 November), Swansea (6 November), Morisset (6 November) and Belmont (8 November).
- A survey of residents' views relating to the attributes of Lake Macquarie.
- A survey that gauged residents' views on proposed flood risk management options.
- A web page on Council's website informing readers of the consultation process, providing links to the draft Flood Study and Plan, and providing opportunities to comment using the surveys and/or written submissions.

1.2 PURPOSE

This report compiled by Molino Stewart provides Lake Macquarie communities and Council with an independent analysis of all community responses to the draft Lake Macquarie Waterway Flood Study and Management Plan.

1.3 METHODOLOGY

In section 2, this report analyses responses from the following sources:

1. Community responses (received from the workshops and on-line) to the two surveys. The survey questions are provided in Appendix A.
2. Other community responses received during the workshops and through written submissions.

In section 3, some general conclusions are made by considering the results of this analysis.

2 FINDINGS

2.1 DEMOGRAPHICS

More than 90% of workshop participants were residents who own foreshore properties that are vulnerable to flooding and sea level rise. These owners were direct-mailed information about the draft Flood Study and Plan, and an invitation to attend the workshops.

The survey responses indicated that 84% of respondents own or live in a property that is likely to be affected by flooding. Only 6% lived more than 1km from the lake foreshore.

The survey results need to be considered as reflecting the views of this very specific group. Residents living elsewhere in the LGA and not directly affected by lake flooding, may have ranked some of the issues differently.

2.2 SURVEYS

Table 1 shows the number of responses obtained for both surveys over the six community workshops, as well as through the online survey. It also provides an indication of how many surveys were completed (an issue being that some respondents did not fill in all numbers 1 to 8 in the first survey).

The results shown in the subsequent tables were calculated based on all survey responses which were received from respondents.

2.2.1 Survey One

As shown in Appendix A, the first survey asked respondents to read through a list of eight factors which might be considered by Council when making decisions to manage the effect of floods and sea level rise. They were then asked to number each of the factors from 1 to 8. In the survey, 1 signified the 'most important' and 8 signified the 'least important' factor. However, for ease of analysis these values have been scored 'in reverse' so that 8 signifies the 'most important' and 1 the 'least important' factor.

The results obtained for Survey 1 from all six of the community workshops and online are shown in Table 2. In this table, the factors have been ranked according to the 'sum of responses' which is simply an addition of all of the responses obtained for each factor in all of the surveys. The highest 'sum of responses' signifies the factor with the highest importance scores and thus the best ranking. The 'most common response' has also been shown in Table 2 as a means of demonstrating where in the scale of 8 to 1 the factor was most commonly scored.

The results of this survey show that community involvement in Council's decision making regarding flooding and sea level rise is the most important factor for consideration according to the respondents.

The second and third most important factors were the protection of the value of private property and the provision of compensation where property usability or value is negatively impacted. This high ranking is probably, at least in part, a reflection of the demographics of the respondents who are predominantly owners of affected properties (see section 2.1).

The least important factor was that Council should conserve foreshore wetlands threatened by flooding and sea level rise.

As also shown in Table 2, each of the eight factors listed in the survey had been developed in relation to the categories of the 'quadruple bottom line' (Social, Economic, Environmental and Governance) that are used in sustainability planning. Table 2 shows that one of the 'Governance' choices ('Council should involve local residents in decisions about managing flooding and sea level rise in their community') was viewed as the most important factor for consideration by respondents.

Table 3 provides a summary of the popularity of the quadruple bottom line categories. This table shows the distribution of responses from Table 2 between the four categories of Governance, Economic, Social and Environmental. As in Table 2, the categories have been ranked with the highest numbers first as these represent the greatest number of high importance responses (numbers close to and including 8).

From Table 3, 'Governance' has been identified as the category with the greatest importance to the respondents, followed by 'Economic', 'Social', and 'Environment'.

Table 1: Number of responses obtained for each of the two surveys at the six community workshops and online including the number of incomplete or complete surveys.

	Toronto		Argenton		Charlestown		Swansea		Morisset		Belmont		Online		Total
	Survey 1	Survey 2	Survey 1	Survey 2	Survey 1	Survey 2	Survey 1	Survey 2	Survey 1	Survey 2	Survey 1	Survey 2	Survey 1	Survey 2	
Incomplete	26	16	17	7	4	2	25	22	14	14	33	24	28	29	261
Complete	45	55	15	25	7	9	32	35	41	41	32	41	26	25	429
Total	71	71	32	32	11	11	57	57	55	55	65	65	54	54	690

Table 2: Relative importance of each factor to be considered in council decision making shown by the sum of responses, ranking and most common response also including categorisation of options as either 'Governance', 'Economic', 'Social' or 'Environmental' from Survey 1 based on results from all surveys

Category	Option	Sum of all Responses	Ranking	Most Common Response
<i>Governance</i>	Council should involve local residents in decisions about managing flooding and sea level rise in their community	1958	1 st	8
<i>Economic</i>	Council should protect the value of private foreshore properties in flood hazard areas and in areas affected by sea level rise	1593	2 nd	8
<i>Economic</i>	Property owners should receive some compensation if they can't re-develop or if they have to move because of increased flood risk or rising sea levels	1494	3 rd	8
<i>Environmental</i>	The environmental effect of foreshore flood protection works should be considered equally with the protection of property	1460	4 th	7
<i>Social</i>	Council should maintain foreshore access and foreshore recreation areas in the face of rising sea levels	1373	5 th	8
<i>Social</i>	Costs of protection works and property modification should be shared by the whole community	1353	6 th	3
<i>Governance</i>	Council should rely on Federal and NSW Government policy when planning for flooding and sea level rise	1160	7 th	3
<i>Environmental</i>	Council should conserve foreshore wetlands threatened by flooding and sea level rise	1106	8 th	1

Table 3: Ranking of quadruple bottom line categories by total sum of responses according to the data shown in Table 2 based on results from all surveys

Category	Sum of all Responses	Ranking
<i>Governance</i>	3,118	1 st
<i>Economic</i>	3,053	2 nd
<i>Social</i>	2,726	3 rd
<i>Environmental</i>	2,566	4 th

2.2.2 Survey Two

Survey 2 involved respondents reviewing a list of 16 possible management measures which could be used by Government, Council, businesses, residents and property owners to reduce the risks from lake flooding and permanent inundation. For each management measure, the respondents were asked to show their support by selecting from 'strongly agree', 'agree', 'neither', 'disagree' or 'strongly disagree' choices (see Appendix A).

Table 4 summarises the results of Survey 2. The percentage values shown were determined by excluding all 'neither' results and then grouping both 'strongly agree' and 'agree' responses into an 'in agreement' grouping and similarly grouping 'disagree' and 'strongly disagree' into 'in disagreement'. The percentage distribution of responses between these two groups was then determined.

As shown in Table 4, for the 16 possible management measures nine obtained greater than 90% of responses in the 'in agreement' category. These measures included improvement of rescue services (98% in agreement), construction and maintenance of protection works (97% in agreement), education of people about risks, preparation and response options (97% in agreement), improvement of the flood warning system (97% in agreement), and maintenance of foreshore parkland and reserves for public use (96% in agreement).

A further five management measures obtained 75% to 83% of responses in the 'in agreement' category.

Two management measures received the lowest number of responses in the 'in agreement' category. These were: design and construction of buildings which can be re-locatable in the future (58% in agreement), and construction of a barrier between the lake and ocean to reduce the effects of king tides and ocean storm surge on the lake (42% in agreement).

Table 5 shows the possible management measures provided in Survey 2 ranked according to the average response obtained for each measure across all surveys. The

possible responses were numbered 5-Strongly agree, 4-Agree, 3-Neither, 2-Disagree and 1-Strongly disagree. As such, the measures with the highest ranking are the ones with an average response closest to 5 (strongly agree) indicating the greatest number of respondents who would like the option to be included in future management measures.

The possible management measure with highest average was the construction and maintenance of protection works such as drains, levees and sea walls (average response of 4.45). Other highly ranked management measures included: education of people about risks, preparation and response options (average response of 4.29), improvement of rescue services (average response of 4.29), planning and construction of new urban infrastructure and services above predicted flood levels (average response of 4.26), reduction of property damage by imposition of development conditions (average response of 4.22) and improvement of the flood warning system (average response of 4.19).

The two management measures with the lowest averages were the design and construction of re-locatable buildings (average response of 3.16), and construction of a barrier between the land and ocean to reduce the affects of king tides and ocean storm surge on the lake (average response of 2.87).

As shown in Table 6, the greatest number of 'Strongly agree' responses were obtained for: the construction and maintenance of protection works such as drains, levees, and sea walls, the improvement of rescue services and the education of people about the risks, preparation and response options.

The most 'Neutral' (undecided) responses were obtained for: the design and construction of relocatable buildings, the prevention of flooding of existing buildings by sealing all entry points and the building of a barrier between the lake and the ocean to reduce the effects of kind tides and ocean storm surge into the lake.

The design and construction of relocatable buildings and the building of a barrier between the lake and the ocean to reduce the effects of kind tides and ocean storm surge into the lake

received the most 'strongly disagree' responses, with the addition of the notification of prospective buyers and developers of foreshore properties of the risk of flooding and sea level rise by a notification on property information certificates (Section 149 Certificates).

Table 4: Percentage distribution of results as either 'in agreement' or 'in disagreement' obtained for each possible management measure to be utilized by Government, Council, businesses, residents and property owners from Survey 2 based on results from all surveys.

Possible flood risk management measure	In Agreement	In Disagreement
<i>Improving rescue services to help people in an emergency</i>	98 %	2 %
<i>Constructing and maintaining protection works such as drains, levees, and sea walls</i>	97 %	3 %
<i>Educate people about the risks of flooding and sea level rise, and how to prepare for and respond to a flood</i>	97 %	3 %
<i>Improve flood warning systems</i>	97 %	3 %
<i>Maintain current levels of foreshore parkland and reserves for public recreation and events</i>	96 %	4 %
<i>Construct buildings from flood resistant materials to reduce the damage costs</i>	95 %	5 %
<i>Planning to construct new urban infrastructure and services above predicted flood levels</i>	95 %	5 %
<i>Reducing the risk of flood damage to property by imposing development conditions such as raised floor heights and foreshore set-backs</i>	94 %	6 %
<i>Identifying ways to decide when land becomes unsuitable for current or proposed future use due to permanent inundation</i>	94 %	6 %
<i>Notifying prospective buyers and developers of foreshore properties of the risk of flooding and sea level rise by a notification on property information certificates (Section 149 Certificates)</i>	83 %	17 %
<i>Prevent flooding of existing buildings by sealing all entry points (only suitable for brick, slab on ground buildings)</i>	81 %	19 %
<i>Protect and rehabilitate saltmarsh and wetlands around the lake foreshore</i>	80 %	20 %
<i>Protect property from flooding and sea level rise by allowing owners to build seawalls and to fill their properties</i>	78 %	22 %
<i>Raise the levels of existing houses (only suitable for non-brick buildings on piers)</i>	75 %	25 %
<i>Design and construct buildings to be re-locatable so they can be removed from hazard areas in future</i>	58 %	42 %
<i>Build a barrier between the lake and ocean to reduce the effects of king tides and ocean storm surge on the lake</i>	42 %	58 %

Table 5: Ranked average response obtained for inclusion of each possible management measure to be utilized by Government, Council, businesses, residents and property owners from Survey 2.

Possible flood risk management measure	Average Response	Rank
<i>Constructing and maintaining protection works such as drains, levees, and sea walls</i>	4.4471	1 st
<i>Educate people about the risks of flooding and sea level rise, and how to prepare for and respond to a flood</i>	4.2919	2 nd
<i>Improving rescue services to help people in an emergency</i>	4.2872	3 rd
<i>Planning to construct new urban infrastructure and services above predicted flood levels</i>	4.2568	4 th
<i>Reducing the risk of flood damage to property by imposing development conditions such as raised floor heights and foreshore set-backs</i>	4.2222	5 th
<i>Improve flood warning systems</i>	4.1886	6 th
<i>Construct buildings from flood resistant materials to reduce the damage costs</i>	4.0896	7 th
<i>Identifying ways to decide when land becomes unsuitable for current or proposed future use due to permanent inundation</i>	4.0671	8 th
<i>Maintain current levels of foreshore parkland and reserves for public recreation and events</i>	4.0282	9 th
<i>Notifying prospective buyers and developers of foreshore properties of the risk of flooding and sea level rise by a notification on property information certificates (Section 149 Certificates)</i>	3.8571	10 th
<i>Protect property from flooding and sea level rise by allowing owners to build seawalls and to fill their properties</i>	3.6952	11 th
<i>Protect and rehabilitate saltmarsh and wetlands around the lake foreshore</i>	3.6523	12 th
<i>Prevent flooding of existing buildings by sealing all entry points (only suitable for brick, slab on ground buildings)</i>	3.5864	13 th
<i>Raise the levels of existing houses (only suitable for non-brick buildings on piers)</i>	3.4966	14 th
<i>Design and construct buildings to be re-locatable so they can be removed from hazard areas in future</i>	3.1637	15 th
<i>Build a barrier between the lake and ocean to reduce the effects of king tides and ocean storm surge on the lake</i>	2.8681	16 th

Table 6: Top three response obtained for ‘Strongly agree’, ‘Neutral’ and ‘Strongly disagree’ for each possible management measure to be utilized by Government, Council, businesses, residents and property owners from Survey 2 based on all surveys.

Top Three possible flood risk management measures for “Strongly agree”	
<i>Constructing and maintaining protection works such as drains, levees, and sea walls</i>	170 of 1432 “Strongly Agree” responses
<i>Improving rescue services to help people in an emergency</i>	134 of 1432 “Strongly Agree” responses
<i>Educating people about the risks of flooding and sea level rise, and how to prepare for and respond to a flood</i>	131 of 1432 “Strongly Agree” responses
Top Three possible flood risk management measures for “Neutral”	
<i>Designing and constructing buildings to be re-locatable so they can be removed from hazard areas in future</i>	76 of 634 “Neutral” responses
<i>Preventing flooding of existing buildings by sealing all entry points (only suitable for brick, slab on ground buildings)</i>	73 of 634 “Neutral” responses
<i>Building a barrier between the lake and ocean to reduce the effects of king tides and ocean storm surge on the lake</i>	64 of 634 “Neutral” responses
Top Three possible flood risk management measures for “Strongly Disagree”	
<i>Building a barrier between the lake and ocean to reduce the effects of king tides and ocean storm surge on the lake</i>	38 of 169 “Strongly Disagree” responses
<i>Notifying prospective buyers and developers of foreshore properties of the risk of flooding and sea level rise by a notification on property information certificates (Section 149 Certificates)</i>	27 of 169 “Strongly Disagree” responses
<i>Designing and constructing buildings to be re-locatable so they can be removed from hazard areas in future</i>	20 of 169 “Strongly Disagree” responses

2.3 OTHER RESPONSES

Members of Lake Macquarie communities provided other (non-survey) responses to the draft Flood Study and Plan through:

- Questions of clarification in the community workshops
- Facilitated small group discussion during the workshops
- Issues particularly stressed by workshop participants using post-it notes 'parked' on a whiteboard
- Written submissions received by Council.

All of these responses were analysed and broadly categorised into 'General Issues' (section 2.3.1) and those pertaining to the 'Possible Management Measures' (section 2.3.2) including those referred to in section 2.2. Each of these two broad categories of responses were then sub-categorised as below.

2.3.1 General issues

The most common general responses and concerns related to scepticism regarding climate change, lake level rise and sea level rise; the costs and value of foreshore properties; possible compensation for loss of property values and development potential; drainage issues relating to blockages, sewerage and efficiency; and existing gaps in knowledge.

a) Sea level rise and Climate Change scepticism

Climate change, sea level and lake level rise scepticism was a common theme throughout many of the survey responses. It seemed to stem either from perceived lack of undeniable proof or from the fact that no change has been observed through personal experience of respondents.

Some of the responses regarding climate change, sea level and lake level rise scepticism were:

- "Just as many scientist believe that sea level rise won't happen"

- "Some papers suggest that sea level rise was higher 100 years ago than what it is today"
- "No evidence of 3 mm rise per year"
- "It (climate change) cannot be proved"
- "There is no guarantee that it will happen"
- "CSIRO is funded by government to scare everyone about climate change so that they can up taxes".

Some people also called for more information and data to be made publically available so that the members of the public could see when and where observations had been recorded and verify the data themselves. Respondents reported that given more information on the sources of the data they might be more accepting.

Some questions were also raised regarding the reliability of the modelling which was used to determine the impacts of these changes.

b) Impact on Property Cost and Values

Cost was another common concern present in the responses obtained. Respondents were uncertain regarding the impact that new flood levels would have on insurance premiums, council rates, difficulties in selling properties, as well as monetary losses relating to compulsory acquisition and tenure of permanently inundated land.

The responses included:

- "Banks already want to know how flood affected a property is before lending money and new flood levels are likely to reduce the number of buyers"
- "Who should have to pay for compulsory acquisition and land?"
- "Will rates drop when housing prices drop?"

Concerns relating to potential reduced property values and increased difficulty in selling properties as a result of sea level projections were strongly evident. There was also a common desire for property specific information to be made available so that respondents could determine the exact risk on their property and act accordingly.

Some responses were:

- “Reduced land values from flood risk and inability to sell”
- “Impact of high water mark on retention of property ownership”
- “Will there be different impacts on inland properties?”

c) Compensation

Many of the concerns regarding general costs and impacts on property values were also related to the question of possible compensation for any losses incurred.

Some responses were:

- “Compensation for restricted use of land”
- “If property prices go down will rates be less?”
- “Need for economic support to manage the issues and reduce losses”
- “Compensation to property owners for reduced property value”.

d) Drainage

Drainage issues were also identified by many of the respondents and related to the need to maintain and improve drainage facilities.

Many respondents suggested that the drains in the area are too small to cope with large rainfall events and have blockages which make them overflow. The drainage ability of creeks and rivers was also said to need improving and obstructions and overgrowth hinder the passage of water.

Some responses were:

- “Council has been made aware of drainage clogged with grass and dirt but nothing has been done”
- “Drainage of creeks also needs to be improved to increase flow”

e) Sewerage

Some drainage concerns also related to the management of sewerage in flood events and the risk of overflowing into homes.

f) Impact on Roads and Access

There was some mention of the impact that flooding would have on roads and access to properties during evacuation, for example; flood water blocking the Pacific Highway.

g) Gaps in Information

i) Public education campaign

Several of the concerns raised related to a lack of available information about flooding, climate change and possible sea level rise. When asked about a possible public education campaign, some people stated that it would be “helpful” while others suggested that more information needed to be included on climate change but Council should be careful not to scare people.

It was also suggested that advertisements for Council information events need to be more widespread as not all residents are likely to read the paper.

ii) S 149 Certification

Some respondents stated that they were unaware of S 149 certification restrictions and requested that the information be made more available in plain English. The more common concern was the impact that the S 149 certificate would have on property values and how it would be enforced.

Some people who were sceptical of climate change and water level rise suggested that the certification should not be enforced until climate change is proven science.

Some responses included:

- “Some people are unaware of S 149 restrictions”
- “Shouldn’t be put down until proven science”
- “S 149 needs to be made more available and transparent”
- “Concern about the Impact of changes to S 149 on property values”
- “How S 149 will be judged, based on area or specific contours of property”

iii) Need Specific Property Data

There was a common trend of respondents requesting that accurate data relating to flooding levels for specific private properties be made available.

iv) Other gaps in information

Other gaps in information were reflected by questions and responses including:

- “Is the affect of atmospheric pressure on lake level being considered?”
- “What is the affect of sea level rise on silt ponds around lake?”
- “There is a lack of information on Belmont Lagoon”
- “Unknown impact of sea level rise on Swansea”
- “Uncertainties regarding general implications for people with properties on the lake foreshore”
- “Council needs to have a clear plan that residents can work with to make their own decisions”
- “How long will the projected flood levels be accurate?”
- “How are housing constraints likely to change in the future?”

2.3.2 Possible management measures

a) Flood Warning and Evacuation

Some residents expressed a desire to have local area flood response plans as well as improved warning systems, possibly incorporating an extension of the Early Warning Network.

Some respondents also requested the installation of appropriate signing and routes for emergency evacuation as well as preparation of a ‘check sheet’ for preparing flood safe homes.

b) Alterations to Lake and Swansea Channel hydrology

Some respondents suggested making alterations to the lake and its inlet.

Suggestions for this kind of management measure included:

- “Deepen channel to let more water out of lake”
- “Reducing the water in the lake by pumping into the ocean”
- “Dredging of the lake sediments to increase water holding capacity”
- “Widening Swansea channel to let stormwater out but with system to prevent ocean water coming in”

c) Sea Walls

The idea of using sea walls as a management option was met with mixed responses from those responding. Responses were largely linked to a lack of information regarding what type of sea wall would be used, how much it would cost and who would maintain it, and the impact that sea walls would have on private properties and foreshore access.

Responses included:

- “Where sea walls will be constructed? Public or private land?”
- “Would not support a vertical wall – sloping rocks would be okay”
- “It is the only option for some properties such as in Fennell Cres where they are 30cm from overtopping”
- “We need more studies on sea walls”
- “How would it impact public amenities such as walking tracks and lake access as well as private properties?”
- “Who owns and maintains the seawall?”
- “Can they be constructed by individual property holders?”
- “What are the risks associated with sea walls?”
- “Sea wall options should be made available and cost should be subsidised”

d) Increased Floor Heights

Increasing floor heights was a well received management option. Respondents suggested that it is a good idea if people can afford it and that it should be enforced for new buildings.

One criticism was that increased floor heights to the “50 year flood height would be okay but that 2.36m is too high”.

e) Raised Houses

The management measure of raised houses was also well received but responses included more concern for the cost of doing so and requested that funding should be made available.

Other concerns included:

- “Roads should be raised as well so that houses can still be accessed”
- “Privacy issues need to be considered as raised homes can look down into lower ones”
- “What is the cost and legal requirement of raising houses?”
- “What council permission is required to raise existing houses?”

f) Set buildings on the highest part of the block and away from the shoreline

Respondents generally considered this to be a good idea, and it was noted that when combined with floor level controls this management measure would provide residents with some flexibility.

One person commented that setting buildings back on the block would be general knowledge and should not need to be enforced, whereas another suggested that new building codes should reflect this idea.

g) Flood Proof Buildings

The option of flood proofing buildings was met with mixed responses from respondents.

Some suggested that:

- “It would be difficult for residential properties”
- “It should only be used as a last resort”
- “Flood proofing perimeters of house blocks would be a good idea”
- “Not worth it”

h) Levees and protection works, enlargement of the channel, building a barrier at the entrance and building a dam in the catchment

All of these options were met with mixed responses but were generally considered to be not viable, have too much impact on private properties or public amenities, and be too costly and/or not effective enough.

i) Voluntary purchase of properties

Some respondents believed that voluntary purchase of land should be available as a possible management measure.

j) Other suggested management measures

Other suggested management measures included:

- “Maintaining vegetation should be considered as a means of slowing down runoff and increasing infiltration”
- “Restrict development in flood affected areas”
- “Land swapping to relocate industries”
- “Addition of a storm surge barrier”
- “Possibility of putting water into groundwater”
- “Allowance for people to fill in their land to be above flood height rather than build their house above ground”
- “Possible use of mangroves etc to reduce flooding”
- “Pumps to remove water from the lake and empty it into the ocean”

3 CONCLUSIONS

From all responses received in relation to the draft Lake Macquarie Waterway Flood Study and Management Plan, the following general conclusions can be made:

- Residents would like to be included in decisions relating to management of flooding and sea level rise.
- Economic considerations such as the protection of the value of private property and the provision of compensation where property usability or value is negatively impacted are very important to potentially flood-affected residents.
- Residents want local-scale flood modification measures such as drains, levees and sea walls to be used by Council to manage flood risk, but were not supportive of 'big' projects such as dams and entrance barriers.
- Response modification measures (e.g. community education and improved warning systems) and property modification measures are also favoured to manage flood risk and sea level rise impacts.
- A relatively high proportion of residents are sceptical about climate change and the resultant sea level projections.
- Many residents are concerned about the possible impact of sea level projections on their property values.
- Residents want Council to provide more and clearer information to them about flooding, climate change and sea level rise, and keep them up-to-date with the latest information.

APPENDIX A

Have your say – flooding and sea level rise survey

Please take a few minutes to complete this simple survey. The results of the survey will help us decide which issues and management actions are most important to Lake Macquarie residents. The survey results are anonymous.

Lake Macquarie Waterway Flood Study and Risk Management Plan – issues survey

Which suburb is your property in? _____

Tick a box

Do you own or live in a property near the lake foreshore that is likely to be affected by flooding or sea level rise? Yes No

How far from the lake foreshore do you live?

- Within 100 metres of the lake foreshore
- Within 1 kilometre of the lake foreshore
- Further than 1 kilometre from the lake foreshore

Male Female

AGE: less than 20 20 – 40 40 – 60 over 60

Issues in managing floods and sea level rise in Lake Macquarie

When making decisions to manage the effects of floods and sea level rise in Lake Macquarie, Council has to weigh many factors. Some of the factors are listed below. Please indicate which factors YOU think should be most important in Council's considerations by numbering them from 1-8.

1 = MOST IMPORTANT 8 = LEAST IMPORTANT

We suggest you read all the factors before you indicate your order

- Council should maintain foreshore access and foreshore recreation areas in the face of rising sea levels
- Council should protect the value of private foreshore properties in flood hazard areas and in areas affected by sea level rise
- Council should conserve foreshore wetlands threatened by flooding and sea level rise
- Council should involve local residents in decisions about managing flooding and sea level rise in their community
- Costs of protection works and property modifications should be shared by the whole community
- Property owners should receive some compensation if they can't re-develop or if they have to move because of increased flood risk or rising sea levels
- Council should rely on Federal and NSW Government policy when planning for flooding and sea level rise
- The environmental effect of foreshore flood protection works should be considered equally with the protection of property

Please circle the statement that best describes your level of agreement or disagreement:

Government, Council, businesses, residents, and property owners will have to act to reduce the risks from lake flooding and permanent inundation. Management measures should include...						
1.	Notifying prospective buyers and developers of foreshore properties of the risk of flooding and sea level rise by a notification on property information certificates (Section 149(2) Certificates)	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
2.	Constructing and maintaining protection works such as drains, levees, and sea walls	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
3.	Improving rescue services to help people in an emergency	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
4.	Reducing the risk of flood damage to property by imposing development conditions such as raised floor heights and foreshore set-backs	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
5.	Planning to construct new urban infrastructure and services above predicted flood levels	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
6.	Protect property from flooding and sea level rise by allowing owners to build seawalls and to fill their properties	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
7.	Educate people about the risks of flooding and sea level rise, and how to prepare and respond to a flood	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
8.	Raise the levels of existing houses (only suitable for non-brick buildings on piers)	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
9.	Prevent flooding of existing buildings by sealing all entry points (only suitable for brick, slab on ground buildings)	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
10.	Construct buildings from flood -resistant materials to reduce the damage costs	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
11.	Protect and rehabilitate saltmarsh and wetlands around the lake foreshore	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree

12. Build a barrier between the lake and ocean to reduce the effects of king tides and ocean storm surge on the lake	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
13. Improve flood warning systems	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
14. Design and construct buildings to be re-locatable so they can be removed from hazard areas in future	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
15. Identifying ways to decide when land becomes unsuitable for current or proposed future use due to permanent inundation	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
16. Maintain current levels of foreshore parkland and reserves for public recreation and events	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree