

# Woolgoolga to Ballina Pacific Highway upgrade

Macleans levee

Community Consultation Report

Roads and Maritime Services | June 2018



# Executive summary

The Woolgoolga to Ballina Pacific Highway upgrade will duplicate 155 kilometres to four lane divided road from about six kilometres north of Woolgoolga (north of Coffs Harbour) to about six kilometres south of Ballina. The project does not include the completed Devils Pulpit and Glenugie upgrades.

Roads and Maritime Services has engaged Pacific Complete, comprising Laing O'Rourke and WSP, to partner with the Pacific Highway Project Office to deliver the upgrade.

Maclean is located on the eastern bank of the Clarence River and is protected from flooding by the Maclean levee, which is owned and managed by Clarence Valley Council. Flooding over the town occurs when the levee is overtopped in specific large floods.

Detailed investigations have been carried out by the project team to assess the predicted flooding impact of the project on the township of Maclean.

To mitigate the predicted impact of the Woolgoolga to Ballina project, it is proposed to top up a low point of the levee by about 10 centimetres across a distance of about 500 metres. This section of the levee is made up of earth. Topping up this section would involve removing the top soil, bringing in more earth, compacting it and then replacing the grass. We have provided a picture of the section of the levee the project is proposing to top up.

The benefits of this approach include:

- Raising the levee's flood immunity from less than 20 year Average Recurrence Interval (ARI) to just above the 20 year ARI
- Removing any impact of the project and delivering a benefit (reduction in flood level) to Maclean up to the 40 year ARI event, with no impact for 50 and 100 year ARI events.

The Woolgoolga to Ballina project team invited community and stakeholder feedback on the proposed top up of the Maclean levee from 20 October to 20 November 2017.

Consultation activities during this time included:

- Distributing a community update and feedback form to about 1820 residents within Maclean
- Advertisements in local papers
- Email notification to registered stakeholders
- Two community information sessions at Maclean, on Wednesday 1 and 8 November, attended by about 13 people
- Staffed display at the Maclean community market on 11 November, attended by about 63 people.

We received feedback from nine people. Of the feedback received seven respondents supported the proposal, one was neutral and one objected.

Key matters raised included concerns the project would result in increased flooding in the Maclean area. This feedback and the project team's response is included in this report and will be made available to the public.

We thank everyone who provided comments and the community and stakeholders for considering the proposal.

The Woolgoolga to Ballina project team has decided to proceed with the proposed top up of the Maclean levee. This proposal has also been accepted by Clarence Valley Council.

We will continue to work with the community and stakeholders to mitigate and manage impacts of the work while we build the Woolgoolga to Ballina Pacific Highway upgrade.

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# 1. Introduction

The Australian and NSW governments are jointly funding the Woolgoolga to Ballina Pacific Highway upgrade. Roads and Maritime Services Pacific Highway Project Office and Pacific Complete are working together to deliver the project. The Woolgoolga to Ballina project will upgrade 155 kilometres of road.

When complete, the upgrade will:

- Reduce overall length from 180 kilometres to 167 kilometres, saving about 13 kilometres in travel distance
- Allow for a higher posted speed limit of up to 110 kilometres/hour
- Reduce travel time from 130 minutes to about 105 minutes, saving 25 minutes
- Reduce crash rates by an expected 27 percent due to divided carriageways
- Improve travel reliability through better flood immunity, fewer incidents and more readily available alternative routes.

Maclean is located on the eastern bank of the Clarence River and is protected from flooding by the Maclean levee, which is owned and managed by Clarence Valley Council. Flooding over the town occurs when the levee is overtopped in specific large floods.

Detailed investigations were carried out from late 2016 until recently to collect data to inform the Clarence River flood model and the flooding assessment. This included survey and mapping of about 3.8 kilometres of the Maclean levee system. The levee system has been developed over a long period of time and varies slightly in level. Over time there has also been some settlement which has meant there are some localised low points. This detailed survey identified where the low points are and what is needed to build them up to a minimum height.

The outcomes of the survey found the levee has low points of about 30 centimetres below what was previously thought over an area of about 500 metres. Figure 1 includes a map to show the location. It is possible the change in levee heights is the result of a combination of settlement over time and erosion during previous floods.

When we assessed the impacts of the project based on the 2012 model (used during the environmental assessment) and then against the 2017 survey data collected, the outcomes had changed in some cases.

We have reduced the predicted impact in the river at the Maclean levee from about 2.5 centimetres to about 1.5 centimetres in the 1 in 100 year Average Recurrence Interval (ARI) by:

- Increasing waterway openings within the catchment
- Increasing the length of the new bridge over the Clarence River at Harwood to about 1.5 kilometres
- Designing the piers of the new bridge over the Clarence River at Harwood to line up with the existing bridge's piers.

With these refinements included, the project is still predicted to have departures from the objectives at a 20 year ARI event. This would mean a small increase in the river level would cause more floodwater to overtop the levee low points over a distance of about 500 metres.

To mitigate the predicted impact of the Woolgoolga to Ballina upgrade, it is proposed to top up the low point of the levee by about 10 centimetres across a distance of about 500 metres. This section of the levee is made up of earth. Topping up this section would involve removing the top soil, bringing in more earth, compacting it and then replacing the grass. Figure 1 shows the section of the levee the project is proposing to top up.

The benefits of this approach include:

- Raising the levee's flood immunity from less than 20 year ARI to just above a 20 year ARI
- Removing any impact of the project and delivering a benefit (reduction in flood level) to Maclean up to the 40 year ARI event, with no impact for the 50 and 100 year ARI events.

**Figure 1 – Maclean levee top up**



## 2. Consultation approach

### 2.1. Consultation objectives

We consulted with the community and stakeholders on the proposal to:

- Inform the community about the proposed temporary and permanent flooding mitigation measures
- Seek feedback for the Woolgoolga to Ballina project team to consider prior to implementation.

### 2.2. How consultation was done

Community and stakeholders were encouraged to provide feedback via the community information session, staffed pop-ups displays at markets, online, mail, email or phone.

Consultation was carried out from 20 October to 20 November 2017. Community updates were delivered to about 1820 residential and business properties inviting feedback on the proposal (Appendix A). Table 1 provides details on additional consultation activities carried out during this period.

**Table 1 – Types of engagement**

Date	Type of engagement	Number of people and organisations
20 October	Community update and reply paid feedback form	1820 distributed to township of Maclean
	Website update including online survey	
	Email notification	447 sent – 450 opens
20 October	Advertisement – Coastal views	
21 October	Advertisement – Grafton Daily Examiner	
25 October	Advertisement – Clarence Valley Review	
25 October	Advertisement – Grafton Daily Examiner	
27 October	Advertisement – Coastal views	
28 October	Advertisement – Grafton Daily Examiner	
1 November	Community information session, Maclean Civic Centre, Maclean	7 community members
1 November	Advertisement – Clarence Valley Review	
1 November	Advertisement – Grafton Daily Examiner	
3 November	Advertisement – Coastal views	
10 November	Advertisement – Coastal views	

Date	Type of engagement	Number of people and organisations
8 November	Community information session, Maclean Civic Centre, Maclean	6 community members
11 November	Staffed pop-up display - Maclean Community Market, Main Car Park, Maclean	63 community members

### 2.3. Key stakeholder consultation

Clarence Valley Council is the lead agency responsible for flood management in the Clarence Valley. Consultation with Clarence Valley Council has been ongoing since project inception and has included a number of meetings and presentations throughout the flood mitigation development. The justification for the proposed work on the Maclean levee was submitted to Clarence Valley Council and the proposed mitigation and concept design submitted on 30 June and 14 November respectively. Clarence Valley Council has accepted the proposed mitigation.

## 3. Consultation summary

### 3.1. Overview

We received comments from nine people. Of the responses received:

- Seven respondents provided general support for the proposal
- One respondent was neutral
- One respondent was not supportive of the proposal.

Key matters raised included concerns the project would result in increased flooding in the Maclean area.

Table 2 outlines the feedback received and the project team's responses.

### 3.2. Independent verification

Flood management specialist consultants WMAwater were approved by the NSW Department of Planning and Environment to review flood modelling and assessment outputs developed by the upgrade team.

WMAwater has been involved throughout development and as the project has moved from design to construction they will continue to provide advice and make recommendations to the project team.

WMAwater were consulted on the proposed mitigation measure for the Maclean levee and has raised no objections.

### 3.3. Feedback and Roads and Maritime's responses

The Woolgoolga to Ballina project team has provided responses to all feedback received on this proposal. All comments have been considered to help the Woolgoolga to Ballina team make decisions on this proposal.

**Table 2 – Community and stakeholder feedback**

Category	Summary of issue	Project team response
<b>Flooding</b>	Project would result in increased flooding at Maclean levee and the levee would be compromised in events under a 1 in 20 ARI	<p>The project has a minor flood level impact in the river channel adjacent to the levee of less than three centimetres. This impact is addressed by topping up the lowest points on the levee by 10 centimetres. This will improve the levee’s ability to protect Maclean from specific floods.</p> <p>The project will not block any major floodways. The floodway behaviour has been assessed using detailed flood modelling which identifies where the high flows leave the main river channels, where these flows distribute across the floodplain and where these flows recede back into the main channels after a flood event.</p> <p>The modelling has been used to establish the position and size of cross drainage infrastructure required to allow these flow paths to continue to operate with minimal impact. Between Byrons Lane and the Maclean interchange there are five bridges and about 25 large culvert banks provided in the design to allow the current floodways to operate with minimal impact.</p> <p>The project will not compromise Maclean levee and will improve the current situation and provide increased flooding protection to Maclean as a result of the proposed work to top up the levee.</p>
	Who would be responsible for compensation should the Maclean levee not provide protection in events lower than a 1 in 20 event	<p>The project team is not changing the flood characteristics of the levee. The project team is topping up the levee to mitigate the impacts of the project. Clarence Valley Council is the asset owner and is responsible for the ongoing maintenance and overarching function of the flood mitigation network in the Clarence Valley including the Maclean levee.</p>
	Project would result in increased flooding at Maclean levee. Suggests the increase as a result of the project would be in metres not centimetres.	<p>The project will not block any major floodways. The floodway behaviour has been assessed using detailed flood modelling which identifies where the high flows leave the main river channels, where these flows distribute across the floodplain and where these flows recede back into the main channels after a flood event.</p> <p>The modelling has been used to establish the position and size of cross drainage infrastructure required to allow these flow paths to continue to operate with minimal impact. As an example, for the Maclean to Iluka Road section of the project, the total waterway area provided by the proposed bridges and culverts banks adds up to more than six kilometres of waterway width to allow the current floodways to operate with minimal impact. This is why the project has only centimetres of impact rather than metres of impact on the flood levels.</p>

## 4. Decision

We thank those who provided comments and the community and stakeholders for considering the proposal.

Feedback and comments were considered by the project team and included in an assessment submitted to Roads and Maritime for determination.

Clarence Valley Council accepted the proposal in August and the concept design in November 2017.

The proposed mitigation measure to top up sections of the Maclean levee was approved for construction by Roads and Maritime in June 2018.

## 5. Next steps

Construction activities on the Maclean levee are planned to start in mid to late 2018 and will take about four weeks to complete weather permitting.

During the next phase of the project we will continue to keep the community informed of progress.

The community are encouraged to contact the project team directly should they have any questions or would like any further information about the project.

For more information, please contact us on 1800 778 900, email [W2B@pacificcomplete.com.au](mailto:W2B@pacificcomplete.com.au) or visit the project website at [www.rms.nsw.gov.au/W2B](http://www.rms.nsw.gov.au/W2B).

## Appendix A – consultation materials

- Advertisement
- Project update and feedback form





## Roads and Maritime Services

### Woolgoolga to Ballina Pacific Highway upgrade

The Australian and NSW governments are jointly funding the \$4.36 billion Woolgoolga to Ballina Pacific Highway upgrade. Roads and Maritime Services Pacific Highway Project Office and Pacific Complete are working together to deliver the project.

The project is committed to assessing potential flooding impacts related to the building and operation of the upgrade and addressing community and industry concerns about flooding.

We are proposing to top up some localised areas of the earth levee near Maclean to reduce the predicted impacts of the project.

You are invited to provide feedback on this proposal online, in person, over the phone or in writing. To have your say please submit your feedback by **20 November 2017**.

To meet with the project team and discuss the proposal in person, drop in any time:

**When:** Wednesday 1 November, 1pm - 3pm,

**Where:** Maclean Civic Centre, 50 River Street, Maclean.

**When:** Wednesday 8 November, 1pm - 3pm,

**Where:** Maclean Civic Centre, 50 River Street, Maclean.

**When:** Saturday 11 November, 8am - 12pm,

**Where:** Maclean Community Market, Centenary Drive, Main car park near Bowling Club, Maclean.

**For more information** call 1800 778 900 (dial 1), email [W2B@Pacifocomplete.com.au](mailto:W2B@Pacifocomplete.com.au) or visit [rms.nsw.gov.au/W2B](http://rms.nsw.gov.au/W2B)





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# Glenugie to Devils Pulpit hydrological mitigation report update - Maclean levee

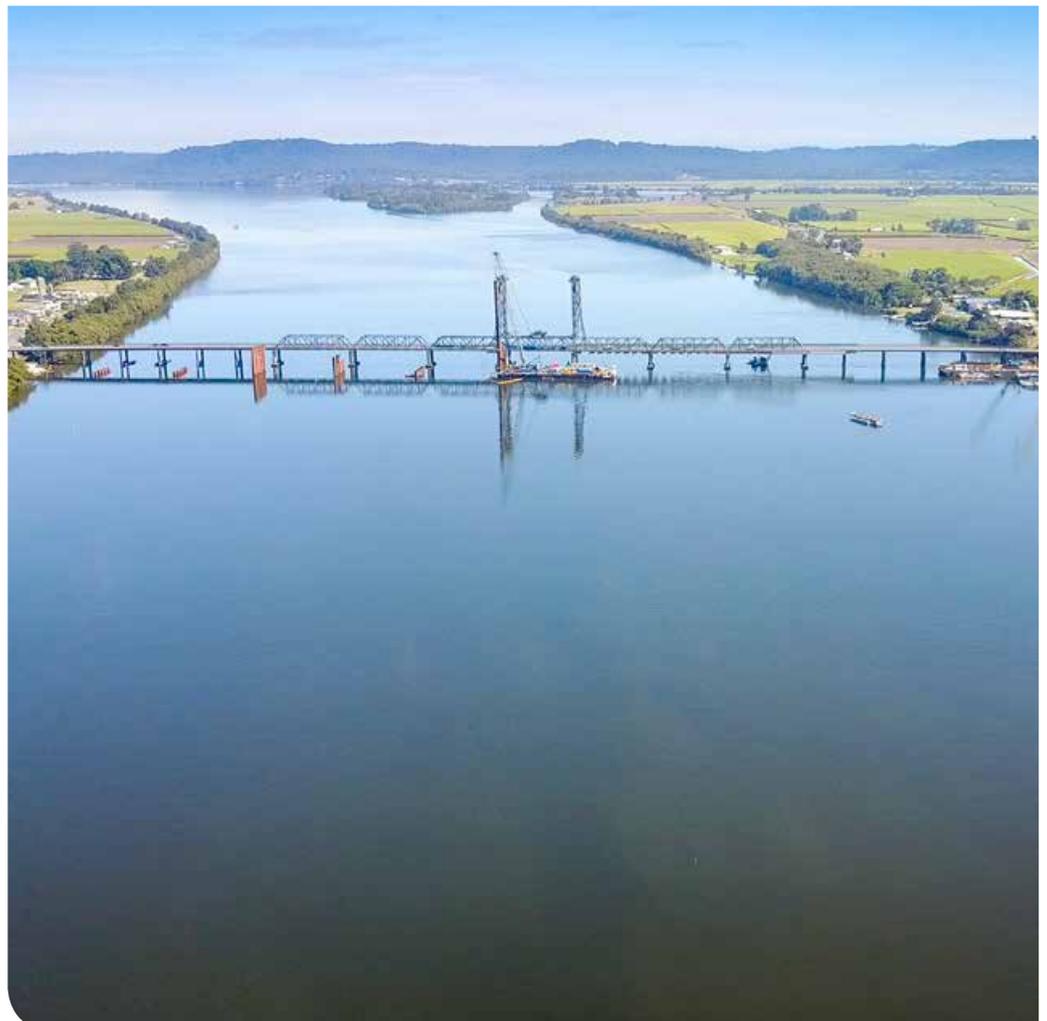
## Woolgoolga to Ballina community update - October 2017

Roads and Maritime Services

The Australian and NSW governments are jointly funding the \$4.36 billion Woolgoolga to Ballina Pacific Highway upgrade. Roads and Maritime Services Pacific Highway Project Office and Pacific Complete are working together to deliver the project.

### In this update

- Investigating and assessing flooding
- Background
- Maclean levee
- Frequently asked questions
- Have your say
- Next steps



Panorama of Harwood bridge facing west



## Investigating and assessing flooding

Roads and Maritime Services is committed to assessing potential flooding impacts related to the building and operation of the upgrade and addressing community and industry concerns about flooding. As part of this we have considered the following in our assessment:

- Different land uses
- Flood management objectives including potential increase in flood level, duration of flooding, velocity of water flow and direction of water flow
- River channel size and shape, rainfall, tidal movements, levee heights and land fall
- Landowner and key stakeholder feedback.

We have also calibrated the model against actual events which occurred in 1980, 1996, 2001 and 2013 and looked at over 170 different engineering options to further reduce the impacts of flooding from the project.

The hydrological mitigation report is the technical report which demonstrates how we have addressed the project's flood management objectives, assessed flooding and the steps we have taken to mitigate and manage impacts to meet the project's Conditions of Approval. A copy of this document is available on our website [rms.nsw.gov.au/W2B](http://rms.nsw.gov.au/W2B)

## Background



## Maclean levee

Maclean is located on the eastern bank of the Clarence River and is protected from flooding by the Maclean levee. Flooding over the town occurs when the levee is overtopped in specific large floods.

## Detailed levee investigations

Detailed investigations were carried out from late 2016 until recently to collect data to inform the Clarence River flood model and the flooding assessment. This included survey and mapping of about 3.8 kilometres of the Maclean levee system. The levee system built in 1975 has been developed over a long period of time and varies slightly in level. Over time there has also been some settlement which has meant there are some localised low points. This detailed survey identified where the low points are and what is needed to build them up to a minimum height.

## Our findings

The outcomes of the survey found the levee has low points of about 30 centimetres below what was previously thought particularly over an area of about 500 metres. We have provided a map to show the location. It is possible the change in levee heights is the result of a combination of settlement over time and erosion during previous flooding.

When we assessed the impacts of the project based on the 2012 model (used during the environmental assessment) and then against the 2017 survey data collected, the outcomes had changed in some cases.

## Reducing the flooding impact through design

We have reduced the predicted impact in the river at the Maclean levee from about 2.5 centimetres to about 1.5 centimetres by:

- Increasing waterway openings within the catchment
- Increasing the length of the new bridge over the Clarence River at Harwood to about 1.5 kilometres
- Designing the piers of the new bridge over the Clarence River at Harwood to line up with the existing bridge's piers.

With these refinements included, the project is still predicted to have departures from the objectives at a 20 year ARI event. This would mean a small increase in the river level would cause more floodwater to overtop the levee low points over a distance of about 500 metres.

To mitigate the predicted impact of the Woolgoolga to Ballina project, it is proposed to top up the low point of the levee by about 10 centimetres across a distance of about 500 metres. This section of the levee is made up of earth. Topping up this section would involve removing the top soil, bringing in more earth, compacting it and then replacing the grass. We have provided a picture of the section of the levee the project is proposing to top up.

The benefits of this approach include:

- Raising the levee's flood immunity from less than 20 year ARI to just above the 20 year ARI
- Removing any impact of the project and delivering a benefit (reduction in flooded area) to Maclean up to the 40 year ARI event, with no impact for the 50 and 100 year ARI events.

Clarence Valley Council is the lead agency responsible for flood management in the Clarence Valley. This work is proposed on the levee to improve the existing flood immunity and is being carried out in consultation with Council.

## Temporary management solution for during construction

While we carry out the environmental assessment and finalise the detailed design for the levee top up, we've prepared a temporary management solution. In the event of a flood warning we will raise the levee along the lowest

section by about 10 centimetres with sand bags. This will provide the same level of protection as the permanent mitigation proposed. This temporary management solution was developed and agreed with both the NSW State Emergency Service and Clarence Valley Council.

Change in flood level impact		
ARI	2012 model	2017 survey data
5 year	No change from existing condition	No change from existing condition
20 year	No change from existing condition	Departure from objectives (>5cm)
50 year	Departure from objectives (>5cm)	Compliant impact (<5cm)
100 year	Compliant impact (<5cm)	Compliant impact (<5cm)

Change in duration of impact		
ARI	2012 model	2017 survey data
5 year	No change from existing condition	No change from existing condition
20 year	No change from existing condition	Departure from objectives (>5% increase)
50 year	Departure from objectives (>5% increase)	Compliant impact (<5% increase)
100 year	Compliant impact (<5% increase)	Compliant impact (<5% increase)



Piling work in the Clarence River and Yamba interchange

Figure 1 Maclean levee area to be topped up



Laying rock for new diversion roads near Iluka Road

## Frequently asked questions

### Will the project increase flooding?

The project will result in a minor compliant increase in the river levels at Maclean. The predicted increase is about 1.5 centimetres in the river.

### Why are Roads and Maritime not improving the flood immunity for Maclean further?

On balance the flood management objectives set in the project's Conditions of Approval have been met, and a reduction on the impacts originally identified during the environmental impact statement has been achieved.

The proposed topping up of the levee will comply with the project's flood management objectives. The Clarence River floodplain is highly sensitive and if the levee is raised more than necessary to offset the project, this will result in additional water being held in the river and may result in additional impacts up and downstream of Maclean.

### Why are you only raising one section of the levee?

The section of the levee proposed to be raised would provide Maclean with a 20 year ARI flood immunity (which is an improvement on the current flood immunity) and would provide compliance with the project's flood management objectives. No other sections will need to be raised to achieve these objectives. The functional design of the levee needs to be maintained, raising the levee would potentially change this.

### What about properties not protected by the levee?

Surveys to measure the ground and property flood heights have been carried out on properties outside of the levee system. The flood modelling predicts all other impacts outside of the levee will be compliant with the flood management objectives and be less than a five centimetre increase. For more information about the predicted impact at your property please see the Glenugie to Devils Pulpit hydrological mitigation report on Roads and Maritime's website [rms.nsw.gov.au](http://rms.nsw.gov.au).

Flood management objectives		
Objective	Houses and cane farm land	Grazing, forested and other rural lands
Flood levee	Less than 5 centimetre increase	Less than 25 centimetre increase
Flood duration	No more than 5 % increase	No more than 10 % increase
Flood velocity	<b>Houses:</b> low hazard for children that is less than 0.4 metres squared per second	Velocities to remain below 1 metre per second where currently below this figure An increase of not more than 20% where existing velocity is above 1 metre per second
	<b>Cane farms:</b> less than 1 metre per second where currently below this	An increase of not more than 20% where existing velocity is above 1 metre per second
Flood direction	No change to the direction of watercourses or the direction of flood flows except for directly around floodway openings like culverts and bridges and where flow has to be temporarily diverted for construction activities	

Where we have a **compliant impact**, this means we predict the impacts to be under or up to the above limits. A **departure from the objectives** means the predicted impact is more than the above limits.

### How do we measure flooding events?

All floods vary depending on rainfall intensity, the land form and the existing heights of the river system. Typical information collected and assessed relating to flooding includes floodplain ground levels, river channel bed levels, river flow estimates and average rainfall. This information is then calibrated against flood models.

Floods are measured on the likelihood of an event occurring over a period of time. A 100 year ARI flood has a one percent chance of occurrence in any one year. This probability is based on past flood events which are used to predict future events. A 20 year ARI flood has a five percent chance of occurrence in any one year.

### What is flood immunity?

Flood immunity refers to the level at which land is protected from a flood event, or the flood event for which the land will remain dry.

## Have your say

We value your feedback and welcome all comments on the proposed top of up localised areas of the Maclean levee. To have your say please complete the attached form and return it to us by 20 November 2017:

**Email:** [W2B@pacificcomplete.com.au](mailto:W2B@pacificcomplete.com.au)

**Post:** Woolgoolga to Ballina upgrade  
PO Box 546,  
Grafton NSW 2460

**Web:** Online survey at [rms.nsw.gov.au/W2B](http://rms.nsw.gov.au/W2B)

## Maclean levee next steps



## Meet the project team

To meet with the project team and discuss the proposal in person, drop in any time:

- 1pm – 3pm, Wednesday 1 November, Maclean Civic Centre, 50 River Street, Maclean
- 1pm – 3pm, Wednesday 8 November, Maclean Civic Centre, 50 River Street, Maclean
- 8am – 12pm, Saturday 11 November, Maclean Community Market, Centenary Drive, Main car park near Bowling Club, Maclean.

## Contact us:

- ☎ 1800 778 900 (toll free)
- @ [W2B@pacificcomplete.com.au](mailto:W2B@pacificcomplete.com.au)
- 🌐 [www.rms.nsw.gov.au/w2b](http://www.rms.nsw.gov.au/w2b)
- ✉ 21 Prince Street, Grafton NSW 2460



Laying geofabric for new diversion roads on Chatsworth Island

**We thank you for your patience during this important work.**



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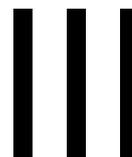
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