

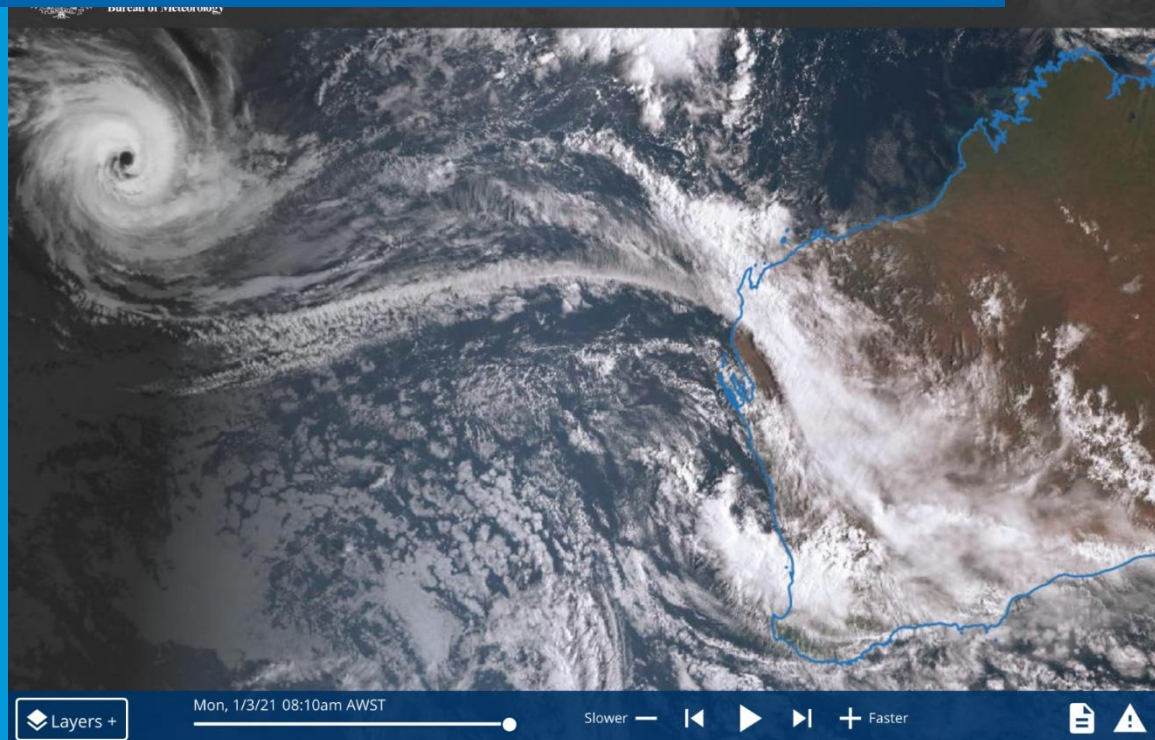
Shire of Menzies

DRFAWA

Damage Assessment and Scope of Works Report

AGRN962 Storm, Heavy Rain and associated Flooding in the Midwest and Southwest Land Division (1 - 5 March, 2021).

Cost Estimate Rev 0.0 Version 7 – Report Version 1



DOCUMENT CONTROL

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Core Business Australia Busselton Office Unit 6 / 71 Kent Street Busselton WA 6280 Postal Address PO Box 797 Busselton WA 6280 P: 1800 001 776 E: admin@corebusiness.net.au	Document: Damage assessment and Scope of Work Report AGRM962 for the Shire of Menzies.
	Project Director: Bruce Iorimer Project Manager: Shaun Millen Cost Estimator: Shaun Millen Cost Review: Bruce Iorimer Report Author: Shaun Millen Date: 13 August 2021
	Synopsis: This document provides details of the damage assessment and cost estimate to repair essential public assets in the Shire of Menzies as a result of heavy rainfall under DRFAWA activated event AGRN962

DISTRIBUTION SCHEDULE

Version No.	Date	Distribution	File Name
Version 1	August 24 2021	Damage Assessment Report Ver 1 & Cost Estimate Rev 0.0 Ver 7 for DFES review	930 Menzies AGRN962 Damage Assessment Scope of Works Report (Rev 0.0) Ver 1.docx

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Government of **Western Australia**
Department of **Fire & Emergency Services**



Damage Assessment

Storms and Heavy Rain Associated with Flooding in the South West Land Division and Adjacent Goldfields (1 to 5 March 2021).

AGRN962.

Shire of Menzies.

Goldfields - Esperance Region Western Australia.

August 13 2021

Certification:

I hereby certify that, based on visual inspection of damaged assets, and advice provided by the Shire of Menzies, that the description of asset damage provided herein and in the supplied Cost Estimate Revision 0 is accurate, and that the described damage was caused by the Heavy Rainfall and Associated Flooding – Shire of Menzies (1 to 5 March 2021) disaster event (AGRN 962).

Damage Assessor	Bruce Lorimer & Shaun Millen	Managing Director Senior Civil Engineer, Core Business Australia		
Cost Estimator	Shaun Millen	Senior Civil Engineer, Core Business Australia		
Approved by:	Bruce Lorimer	Managing Director, Core Business Australia		

Authorised by:

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Approved By:	Brian Joiner	Chief Executive Officer, Shire of Menzies		

Signed:

Brian Joiner
Chief Executive Officer
Shire of Menzies

Definitions

All definitions are included in the DRFAWA guidelines document. Key definitions referred to in the document are provided below.

Eligible disaster	A natural disaster or terrorist act for which:
	<ul style="list-style-type: none"> • A coordinated multi-agency response was required, and • State expenditure exceeds the small disaster criterion [currently \$240,000]
Eligible undertaking	A body that:
	<ul style="list-style-type: none"> • Is one of the following <ul style="list-style-type: none"> ○ A department or other agency of a state government, or ○ Established by or under state legislation for public purposes (for example, a local government) and • In the operation of the asset provides services free of charge or at a rate that is 50% or less of the cost to provide those services
Essential public asset	An asset which must be a transport or public infrastructure asset of an eligible undertaking which, the state considers and the department agrees, is an integral part of a state’s infrastructure and normal function of a community.
Essential Asset Function Framework	<p>The Essential Public Asset Function Framework must be used to determine the pre-disaster function of an essential public asset. The function of an essential public asset is the main factor in assessing whether reconstruction will provide the same pre-disaster function.</p> <p>The pre-disaster function of an essential public asset must be determined in order to establish the estimated reconstruction cost.</p>
Natural disaster	A natural disaster is one, or a combination of the following rapid onset of events: bushfire, earthquake, flood, storm, cyclone, storm surge, landslide, tsunami, meteorite strike, or tornado.

1.0 Introduction

Pursuant to subclause 1.1.1 of the emergency disaster arrangements of 2018 notification has been given by Department of Fire and Emergency Services (DFES) that the storm event of March 1st to 5th 2021 is eligible for funding as a natural disaster, "Storm and flood", (AGRN962). The event is described as follows:

- *The lower part of the State experienced heavy rainfall and flooding 1-5 March 2021 due to a persistent trough near the west coast combined with a moist, unstable air mass flowing from the north.*
- *A broad cloud band extended from the tropics north of Exmouth down the west coast. The trough had some isolated moderate falls on 1 March 2021, with the heaviest and most widespread rainfall occurring on the 3 March throughout much of the western part of the South West Land Division (SWLD), It progressed into the southern two-thirds of the SWLD, with most of the heavier falls in the Mid West and Central Wheat Belt recorded on the 3 March and had largely contracted out of the west-central part of the State by the 4 March.*
- *Areas in the South West which had not received much rainfall earlier in the week saw quite substantial falls during the 4 and 5 March.*

This document has been produced for the assessment and review of damage to essential public assets (EPAs) as a result of the declared natural disaster. The assets listed in this report meet the definition of an essential public asset, defined in the DRFAWA, Clause 1.1.1 as:

- *'An asset which must be a transport or public infrastructure asset of an eligible undertaking which, the state considers and the department agrees, is an integral part of a state's infrastructure and normal functioning of a community.'*

This document details the assessment of the damage and a scope of works for recommended repair to EPAs to their pre-disaster function that the Shire of Menzies will undertake and claim reimbursement for the repair works through the Disaster Recovery Funding Arrangements Western Australia (DRFAWA).

1.1 Location

Figure 1 below shows the location of the Shire of Menzies and the rainfall within the region for the event notification period.

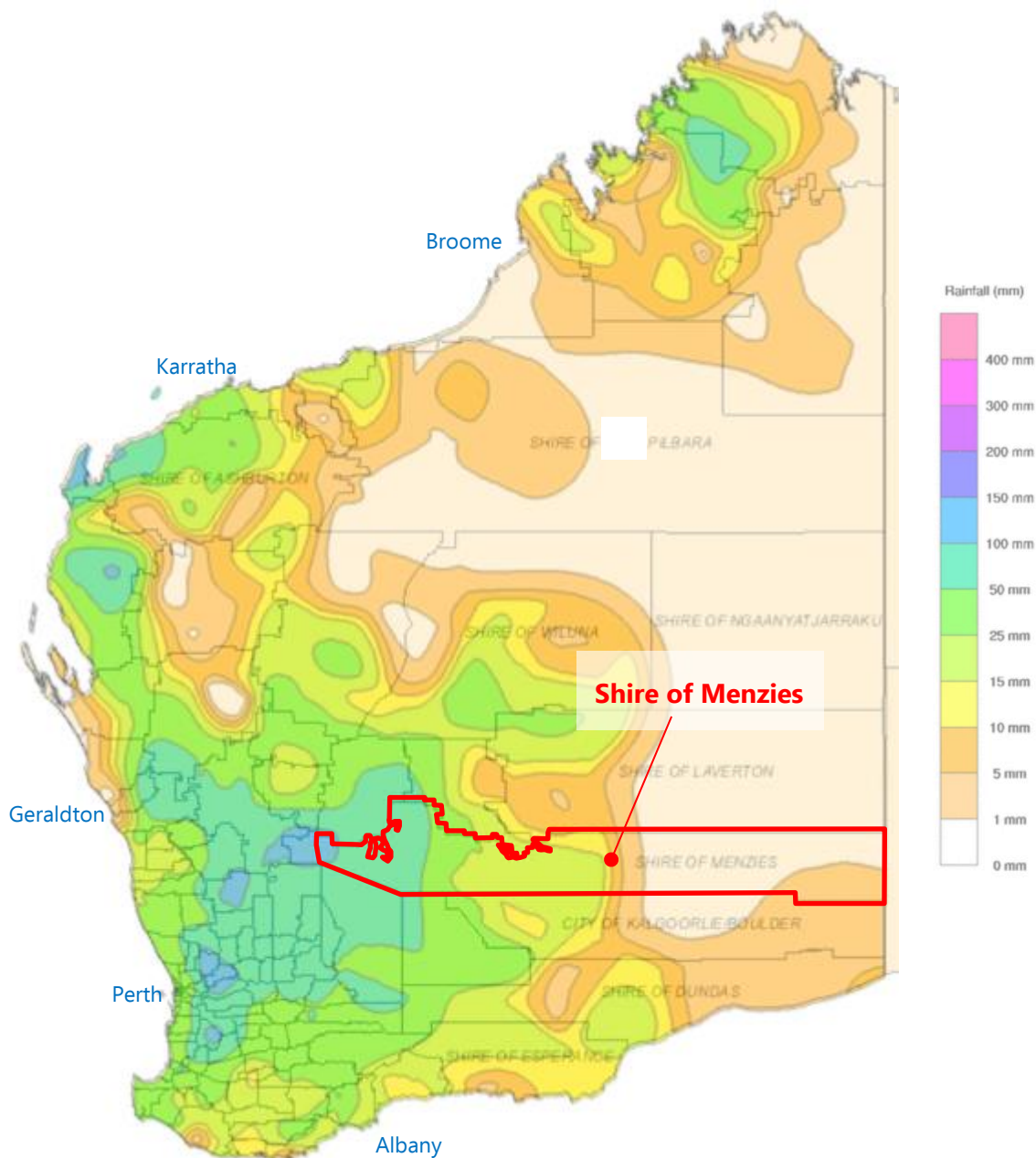


Figure 1: Rainfall for the Shire of Menzies 1st to 5th March 2021(Source BoM website)

1.2 Eligibility

The following is an extract of the proclamation notification:

- Pursuant to clause 5.1 of the Disaster Recovery Funding Arrangements (DRFA) (the Arrangements 2018), issued by the Commonwealth Government Department of Home Affairs. The State Government will provide financial assistance to those people who have been affected through joint State and Commonwealth disaster relief and recovery arrangements.
- For the purposes of the DRFAWA this event will be referred to as '**Storm, Heavy Rainfall and Associated Flooding in the Mid West and Wheatbelt (1-5 March 2021)**'.

For Local Governments & State Government Agencies – Clean-up costs and the restoration or replacement (to pre-disaster function) of essential public assets including local road damage. State road restoration is through Main Roads Western Australia. Only costs incurred that are 'additional' costs, and are directly related to the event, will be eligible for reimbursement.

1.3 Time Limit on Claims

The allowable time limit for eligible claims expires on 30 June 2023.

1.4 Approach

The Shire engaged the services of Core Business Australia (CORE), under WALGA's Preferred Supplier Panel, to assist the Shire with damage assessment, cost estimation of repair works, procurement of repair contractors, project administration and supervision of works.

The Shire carried out Emergency Works to reopen severely affected roads however missed the opportunity to complete Immediate Works therefore this associated EAPR Cost Estimate has been prepared and submitted to DFES. The Shire will complete the work using the Shire's Road Grading and Minor Work contractor.

CORE undertook a detailed damage assessment of damaged EPAs, prepared a Scope of Works to repair the identified EPAs to pre disaster functionality / utility and prepared an EPAR Cost Estimate.

It is important to note that while the Scope of Work and Cost Estimate is considered to be representative of the likely cost to repair, there is still potential for cost variance due to unforeseen conditions or circumstances.

If actual cost is likely to significantly exceed estimated cost, efforts will be made to review the cost estimate, however it must be stressed that it is not always practicable or cost effective to do this as often the cost of demobilising and remobilising contractors can be more than the cost of repairing the additional scope.

2.0 Event Overview

A broad cloud band extended from the tropics north of Exmouth down the west coast. The trough had some isolated moderate falls on 1 March 2021, with the heaviest and most widespread rainfall occurring on the 3 March throughout much of the western part of the South West Land Division (SWLD).

It progressed into the southern two-thirds of the SWLD, with most of the heavier falls in the Mid-West and Central Wheat Belt recorded on the 3 March and had largely contracted out of the west-central part of the State by the 4 March.

Heavy rainfall was experienced across the western portion of the Menzies Shire from Goodlands in the west south of Paynes Find with lighter falls in a line east of Kalgoorlie and Leonora. Location and recorded rainfall is shown at Figure 2 and confirms heavy falls in the western portion of Menzies Shire around Goodlands, Beacon and Bonnie Rock.

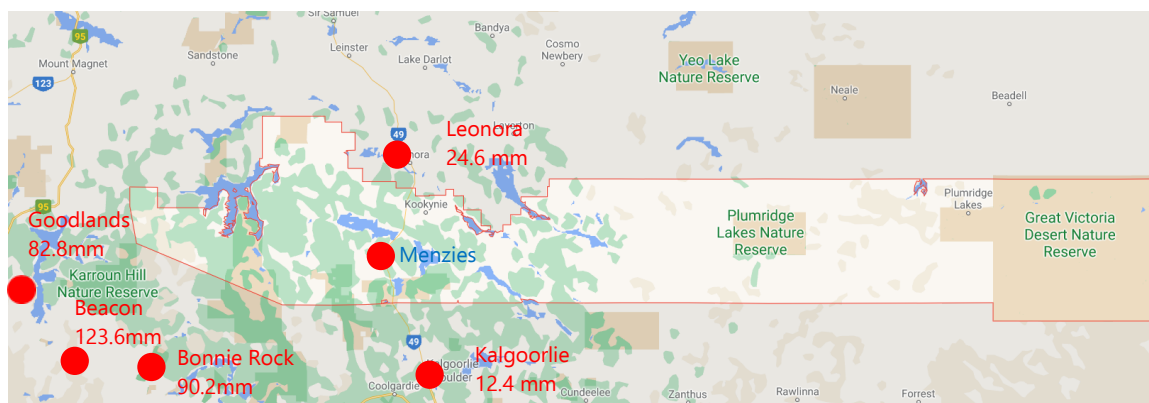


Figure 2: Rainfall Distribution, Menzies shire (Source: Google Maps and BoM website)

Daily rainfall recorded for the period ending the 5th of March, 2021 from Department of Primary Industries and Regional Development (DPIRD) sites across the central wheatbelt are shown at Figure 3, Figure 4, Figure 5, below. Additionally, the satellite image (Figure 6) of the 1 March 2021 shows the cloud band to the north that eventually triggered the event.

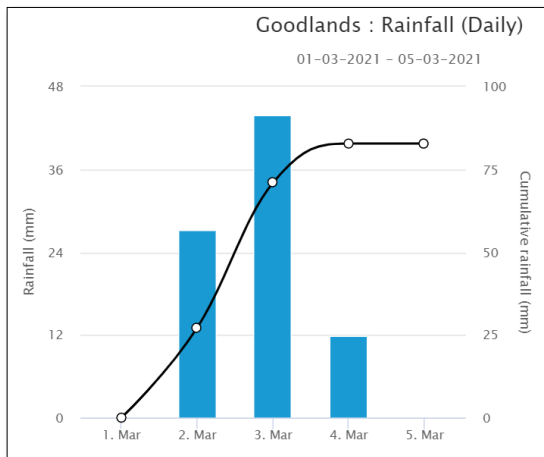


Figure 3: Goodlands Rainfall

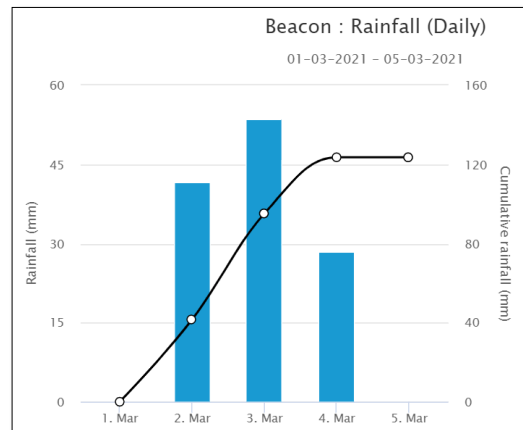


Figure 4: Beacon Rainfall

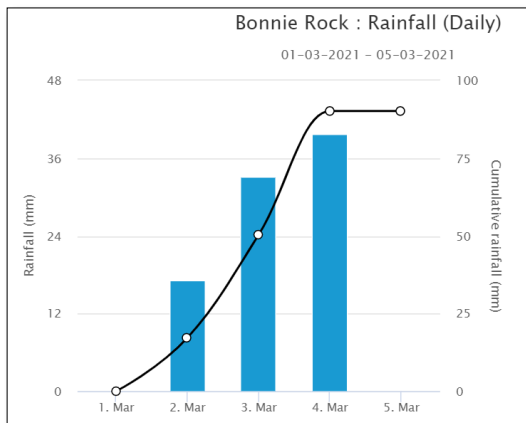


Figure 5: Bonnie Rock Rainfall

#Source: DPIRD website “weather.agric.wa.gov.au”

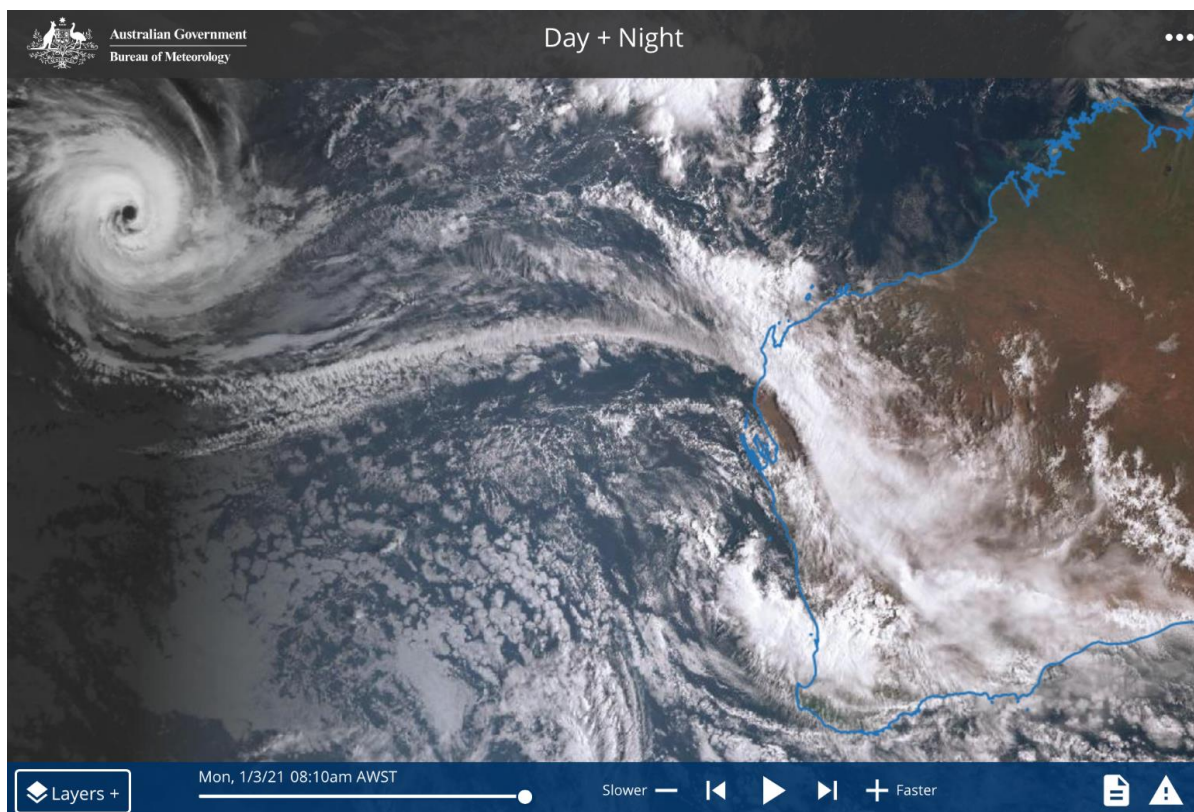


Figure 6: Satellite Image 1st March,2021 (Source BoM website)

2.1 Time and Date

The data collected indicates that rainfall occurred over a three day period with the rain falling on the 2nd, 3rd and 4th of March 2021.

2.2 Asset Description and Damage Summary

The existing road network has been graded and shaped to accommodate drainage flows along the road edge with wide roadside drains located along each side of the road. Runoff onto land adjacent to the carriageway is facilitated via cut drains that have been constructed where required dependent on the longitudinal grade of the road section.

The cut drains are constructed to reduce ponding of stormwater and grade from the roadside away from the road carriageway from the drain invert to daylight. Along the road there are several locations where stormwater crosses from one side of the road to the other and at these locations the road is generally constructed to a higher standard. These sections are generally spot gravelled.

The event which saw between 50 to 100mm of rain over a three-day period has caused many roadside drains and cut drains to silt up and works are required to remove this silt to ensure the drainage network operates effectively and efficiently. Additionally, there are number of road sections where medium to major scour to the roadside drains, batters, shoulders, and drainage crossings has occurred and works to reinstate and reshape the road and drain is required.

2.3 Assessment Summary

Immediately after the event, the Shire of Menzies assets affected by the event were inspected by Shire Officers. The roads inspected and those requiring a detailed assessment are listed within Table 1. The detailed damage assessment was carried out by CORE, over the period of March 8 and 9 2021. A summary of the assessment is shown within section 4.0 of this report.

3.0 Damage Assessment

3.1 Assessment method

A roof mounted high resolution (2.7k) camera with geo location was used to capture evidence of the flood damage. Using the metadata contained within the geo located video, post processing of the video was then undertaken to watermark the Road Number, Road Name, Straight Line Kilometrage (SLK), Latitude, Longitude, Vehicle Speed, Date & Time of the video capture. Approx. 670 photos were extracted from the video to further evidence the damage sections and link these to the cost estimate.

The damage and the photos was then detailed in the DFES supplied EPAR cost estimate spreadsheet where the unit rates input for the listed standard remediation methods to obtain a base construction estimate.

All photos are stamped with the road name, number, slk and are listed and numbered within the '*Damage Pickup*' section of the cost estimate spreadsheet.

3.2 Pre-Disaster Condition

The video evidenced the damage along each road and at each damaged section of road a photo (after photo) of the damage was taken. Additionally, a photo at 180° (before photo) was taken as close as possible to the damaged section to evidence what the undamaged section of road looked like immediately prior to the event.

Section 4.0 summarises the post and pre-disaster evidence by road in 10km sections. Video and photos are supplied separately to support the summary information and complete the package of information required to evidence road damage for individual roads.

3.3 Assets Damaged

The DFES supplied cost estimate spreadsheet "*930 Shire of Menzies AGRN962 Rev 0 Cost Estimate (Ver 4)*" is attached and provides the detail for each damaged section. Table 1 lists the roads that sustained damage as a result of AGRN962 event.

Table 1: List of Roads that sustained damage as a result of the AGRN962 event.

Road No.	Road Name	Asset Damage	Assessed Extent
6090007	Menzies North West Rd	105 km	SLK 0.0 to 191.42
6090008	Evanston Menzies Rd	30 km	SLK 51.73 to 156.61
6090013	Riverina- Snake Hill Rd	33 km	SLK 0.0 to 35.71

4.0 Pre-Disaster Evidence Summary By Road

4.1 6090007 Menzies North West Road

The Menzies Northwest Road extends, (shown Figure 7) from the Menzies townsite to the local government boundary at SLK 191.42 which delineates the Menzies and Sandstone shires. Photos shown below are extracts of the Video taken during the site visit.

456 post damage photos have been compiled from the Menzies Northwest Road video and each photo has been given a unique file name. For the Menzies Northwest Road the following naming convention was used:

Men San slk 166.36 p408

- **Men San** - (shortened road name)
- **Slk** - (Straight Line Kilometre)
- **166.36** - (MRWA slk)
- **P** - (short for photo)
- **408** - (photo Number)

The photos in the tables below provide an example of the damage for each 10km section of road.

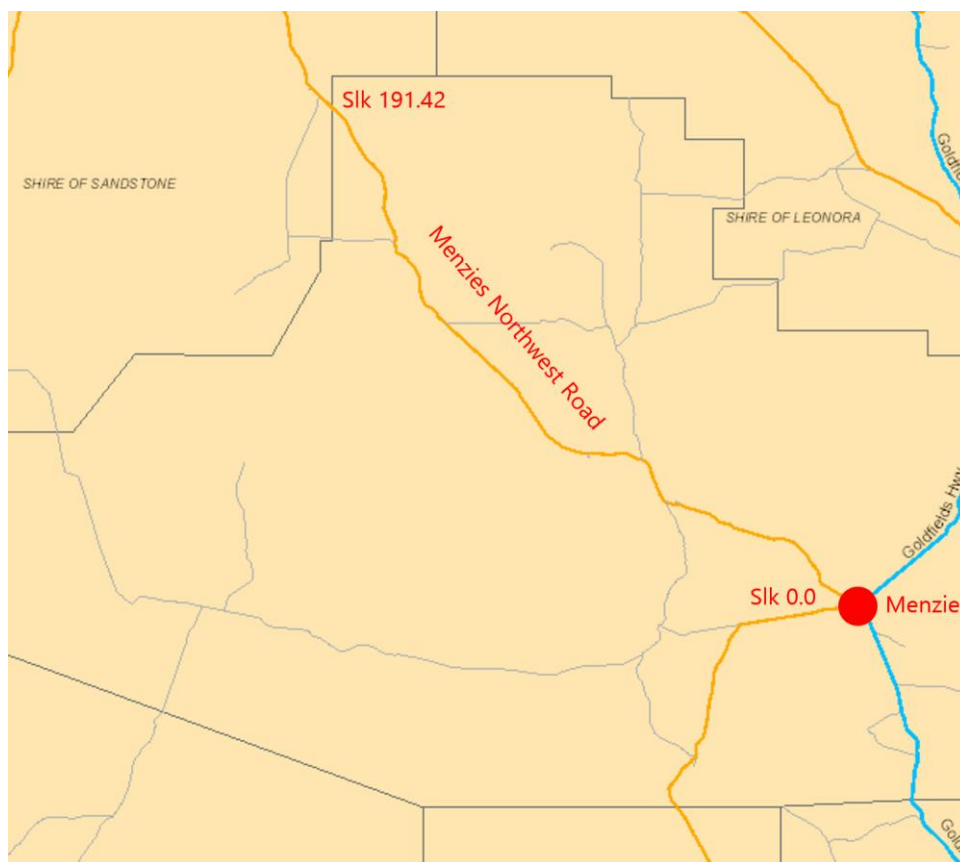


Figure 7: Menzies Northwest Road

SLK 0 -10

180° Pre-damage Photo (Before)



Post Damage Photo (After, Photo 4)



SLK 10 - 20

180° Pre-damage Photo (Before)



Post Damage Photo (After, Photo 24)



SLK 20 - 30

180° Pre-damage Photo (Before)



Post Damage Photo (After, Photo 68)



SLK 30 - 40

180° Pre-damage Photo (Before)



Post Damage Photo (After, Photo 84)



SLK 40 - 50

180° Pre-damage Photo (Before)



Post Damage Photo (After, Photo 109)



SLK 50 - 60

180° Pre-damage Photo (Before)



Post Damage Photo (After, Photo 130)



SLK 60 - 70

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 165)



SLK 70 - 80

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 178)



SLK 80 - 90

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 184)



SLK 90 - 100

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 204)



SLK 100 - 110

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 235)



SLK 110 - 120

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 247)



SLK 120 - 130

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 258)



SLK 130 - 140

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 285)



SLK 140 - 150

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 326)



SLK 150 - 160

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 349)



SLK 160 - 170

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 406)



SLK 170 - 180

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 421)



SLK 180 - 190

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 430)



SLK 180 - 190

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 430)



4.2 6090008 Evanston Menzies Road

The Evanston Menzies Road extends west from the Menzies townsite to the Lake Barlee Road and services the north and south connections to the Yilgarn and Sandstone shires. Photos shown below are extracts of the video taken during the site visit which commence at the newly constructed realigned section of Evanston Menzies Road near Riverina Snake Hill Road Slk 56.35 and extend to Lake Barlee Road Slk 156.61.

82 post damage photos have been compiled from the Evanston Menzies Road video and each photo has been given a unique file name which ends in a number. For the Menzies Evanston Road the following naming convention was used:

Eve Men slk 58.57 p2

- ***Eve Men*** - (shortened road name)
- ***Slk*** - (Straight Line Kilometre)
- ***58.57*** - (MRWA slk)
- ***p*** - (short for photo)
- ***2*** - (photo Number)

The photos in the tables below provide an example of the damage for each 10km section of road.

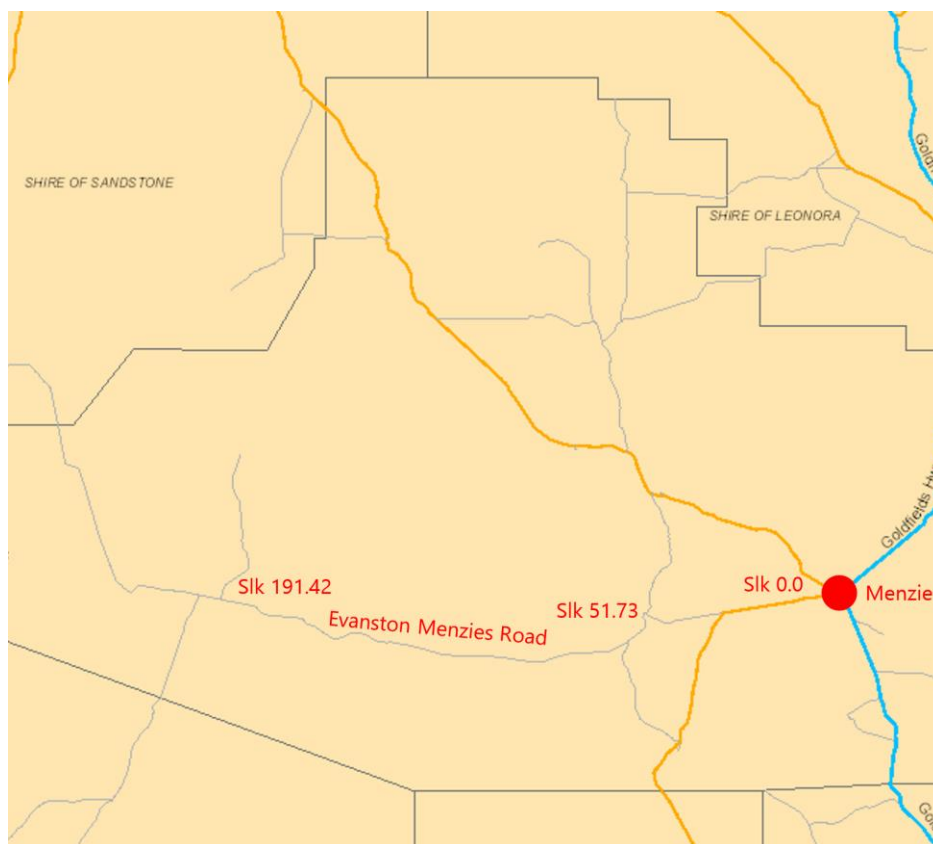


Figure 8: Menzies Evanston Road

SLK 50 - 60

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 2)



SLK 60 - 70

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 18)



SLK 70 - 80

180° Pre-damage Photo (Before)



**Post Damage Photo (After Photo 31)
NB: Reinstatement works underway**



SLK 80 - 90

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 38)



SLK 90 - 100

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 53)



SLK 100 - 110

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 60)



SLK 110 - 120

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 71)



SLK 120 - 130

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 76)



4.3 6090008 Riverina Snake Hill Road

The Riverina Snake Hill Road extends north from the Evanston Menzies Road connecting to the Menzies Northwest Road. Photos shown below are extracts of the video taken during the site visit which commence at the newly constructed realigned section of Evanston Menzies Road at the intersection of Riverina Snake Hill Road Slk 0.0 finishing at the intersection of Menzies Northwest Road Slk 34.90.

140 post damage photos have been compiled from the Riverina Snake Hill Road video and each photo has been given a unique file name which ends in a number. For the Riverina Snake Hill Road the following naming convention was used:

Snake slk 32.0 p126

- **Snake** - (shortened road name)
- **Slk** - (Straight Line Kilometre)
- **32.04** - (MRWA Slk)
- **p** - (short for photo)
- **126** - (photo Number)

The photos in the tables below provide an example of the damage for each 10km section of road.

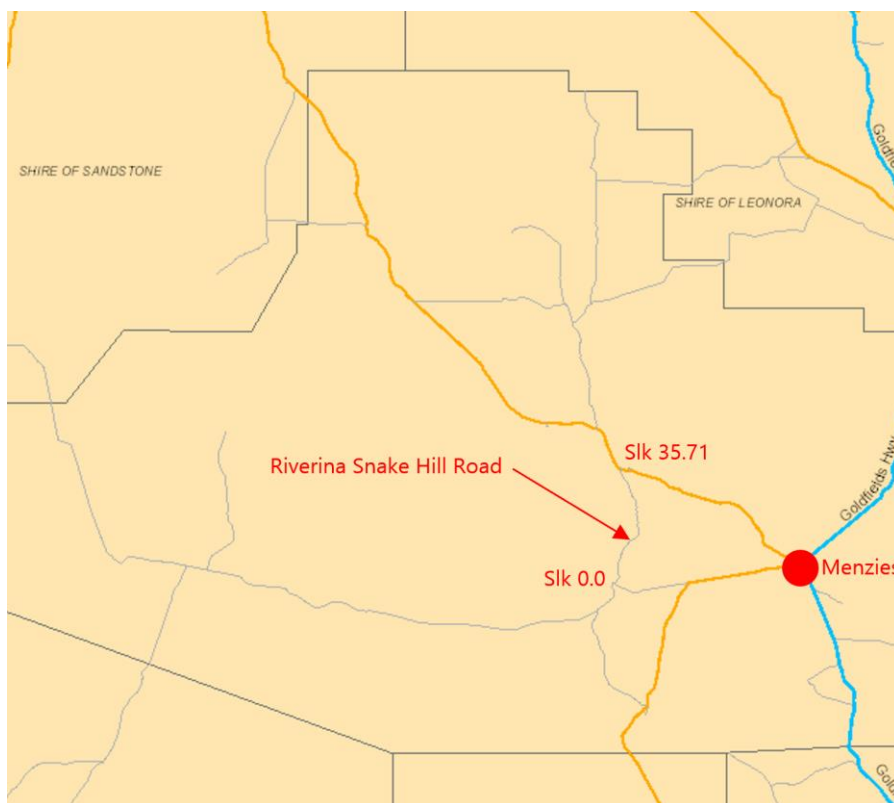


Figure 9: Riverina Snake Hill Road

SLK 0 - 10

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 16)



SLK 10 - 20

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 39)



SLK 20 - 30

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 76)



SLK 30 - 40

180° Pre-damage Photo (Before)



Post Damage Photo (After Photo 76)



5.0 Road Inventory Data

5.1 6090008 Evanston Menzies Road

Road inventory data not available.

5.2 6090013 Menzies Northwest Road

Road inventory data not available.

5.3 6090013 Riverina- Snake hill Road

Road inventory data not available.

6.0 Additional Disaster Related Photo Evidence

Photos and video detailing damage along affected roads is provided separately, via a flash drive, and serves to provide additional evidence of road damage and help with any assessment related enquiries.

7.0 Cost Estimate

Refer the DFES supplied cost estimate spreadsheet amended by Core staff, ***“930 Shire of Menzies AGRN962 Rev 0 Cost Estimate (Ver 7)”*** for base construction and project management costs.

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