INVERELL
SHIRE COUNCIL

BUSINESS PAPER

Civil and Environmental Services Committee Meeting

Wednesday, 12 February 2020

INVERELL SHIRE COUNCIL

NOTICE OF CIVIL AND ENVIRONMENTAL SERVICES COMMITTEE MEETING

6 February, 2020

A Civil and Environmental Services Committee Meeting will be held in the Committee Room, Administrative Centre, 144 Otho Street, Inverell on Wednesday, 12 February, 2020, commencing at **9.00 AM**.

Your attendance at this Civil and Environmental Services Committee Meeting would be appreciated.

Please Note: Under the provisions of the Code of Meeting Practice the proceedings of this meeting (including presentations, deputations and debate) will be webcast. An audio recording of the meeting will be uploaded on the Council's website at a later time. Your attendance at this meeting is taken as consent to the possibility that your voice may be recorded and broadcast to the public.

I would like to remind those present that an audio recording of the meeting will be uploaded on the Council's website at a later time and participants should be mindful not to make any defamatory or offensive statements.

P J HENRY PSM

GENERAL MANAGER

Agenda

Ethical Decision Making and Conflicts of Interest

A guiding checklist for Councillors, officers and community committees

Ethical decision making

- Is the decision or conduct legal?
- Is it consistent with Government policy, Council's objectives and Code of Conduct?
- What will the outcome be for you, your colleagues, the Council, anyone else?
- Does it raise a conflict of interest?
- Do you stand to gain personally at public expense?
- Can the decision be justified in terms of public interest?
- Would it withstand public scrutiny?

Conflict of interest

A conflict of interest is a clash between private interest and public duty. There are two types of conflict:

- ***Pecuniary*** – regulated by the *Local Government Act 1993* and Office of Local Government
- ***Non-pecuniary*** – regulated by Codes of Conduct and policy. ICAC, Ombudsman, Office of Local Government (advice only). If declaring a Non-Pecuniary Conflict of Interest, Councillors can choose to either disclose and vote, disclose and not vote or leave the Chamber.

The test for conflict of interest

- Is it likely I could be influenced by personal interest in carrying out my public duty?
- Would a fair and reasonable person believe I could be so influenced?
- Conflict of interest is closely tied to the layperson's definition of 'corruption' – using public office for private gain.
- Important to consider public perceptions of whether you have a conflict of interest.

Identifying problems

1st Do I have private interests affected by a matter I am officially involved in?
2nd Is my official role one of influence or perceived influence over the matter?
3rd Do my private interests conflict with my official role?

Local Government Act 1993 and Model Code of Conduct

For more detailed definitions refer to Sections 442, 448 and 459 or the *Local Government Act 1993* and Model Code of Conduct, Part 4 – conflictions of interest.

Disclosure of pecuniary interests / non-pecuniary interests

Under the provisions of Section 451(1) of the *Local Government Act 1993* (pecuniary interests) and Part 4 of the Model Code of Conduct prescribed by the Local Government (Discipline) Regulation (conflict of interests) it is necessary for you to disclose the nature of the interest when making a disclosure of a pecuniary interest or a non-pecuniary conflict of interest at a meeting.

A Declaration form should be completed and handed to the General Manager as soon as practible once the interest is identified. Declarations are made at Item 3 of the Agenda: Declarations - Pecuniary, Non-Pecuniary and Political Donation Disclosures, and prior to each Item being discussed: The Declaration Form can be downloaded at Declaration Form

Quick Reference Guide

Below is a legend that is common between the:

- Inverell Shire Council Strategic Plan;
- Inverell Shire Council Delivery Plan; and
- Inverell Shire Council Operational Plan.

1 APOLOGIES

2 CONFIRMATION OF MINUTES

RECOMMENDATION:

That the Minutes of the Civil and Environmental Services Committee Meeting held on 13 November, 2019, as circulated to members, be confirmed as a true and correct record of that meeting.

MINUTES OF INVERELL SHIRE COUNCIL
CIVIL AND ENVIRONMENTAL SERVICES COMMITTEE MEETING
HELD AT THE COMMITTEE ROOM, ADMINISTRATIVE CENTRE, 144 OTHO STREET, INVERELL
ON WEDNESDAY, 13 NOVEMBER 2019 AT 9.00 AM

PRESENT: Cr Di Baker (Chair), Cr Paul Harmon (Mayor), Cr Mal Peters and Cr Neil McCosker.

IN ATTENDANCE: Cr Anthony Michael (Deputy Mayor), Cr Jacki Watts, Cr Kate Dight and Cr Paul King OAM.

Paul Henry (General Manager), Brett McInnes (Director Civil & Environmental Services), Scott Norman (Director Corporate & Economic Services), Anthony Alliston (Manager Development Services), Justin Pay (Manager Civil Engineering) and Michael Bryant (Manager Environmental Engineering).

1 APOLOGIES

COMMITTEE RESOLUTION

Moved: Cr Paul Harmon
Seconded: Cr Neil McCosker

That the apology for personal reasons received from Cr Berryman be accepted and leave of absence granted.

CARRIED

2 CONFIRMATION OF MINUTES

COMMITTEE RESOLUTION

Moved: Cr Paul King OAM
Seconded: Cr Jacki Watts

That the Minutes of the Civil and Environmental Services Committee Meeting held on 9 October, 2019, as circulated to members, be confirmed as a true and correct record of that meeting.

CARRIED

3 DISCLOSURE OF CONFLICT OF INTERESTS/PECUNIARY AND NON-PECUNIARY INTERESTS

Nil

4 PUBLIC FORUM

Gundi Rhoades – Climate Change

Dr Rhoades addressed Council on the science and implications of climate change. She is an advocate for action on climate change and works with local schools and community groups to this end. She urged Council to act locally to address this global issue.

At 9.28am, Alex Wrobel - Inverell Polocrosse Club, sought to address the Committee in Closed Committee.

At 9.29am the Chairperson offered the opportunity to members of the public to make representations as to whether any part of the Committee Meeting should not be considered in Closed Committee. There was no response.

PROCEED INTO CLOSED COMMITTEE

COMMITTEE RESOLUTION

Moved: Cr Paul Harmon
Seconded: Cr Mal Peters

That Council proceeds into Closed Committee, the time being 9.29am.

That the matter be referred to Closed Comittee for consideration as the matters and information are:

d(i) commercial information of a confidential nature that would, if disclosed prejudice the commercial position of the person who supplied it.

On balance the public interest in preserving the confidentiality of the information outweighs the public interest in openness and transparency in Council decision-making by discussing the matter in open meeting; and all reports and correspondence relevant to the subject business be withheld from access to the media and public as required by section 11(2) of the Local Government Act, 1993.

CARRIED

PROCEED OUT OF CLOSED COMMITTEE

COMMITTEE RESOLUTION

Moved: Cr Paul Harmon
Seconded: Cr Neil McCosker

That Council proceeds out of Closed Committee into Open Committee the time being 9.50am.

CARRIED

5 DESTINATION REPORTS

5.1 INVERELL SHIRE COMMUNITY PARTICIPATION PLAN S18.6.66

COMMITTEE RESOLUTION

Moved: Cr Paul Harmon
Seconded: Cr Mal Peters

That the Committee recommend to Council that:

1. The Inverell Shire Community Participation Plan 2019 be adopted; and

2. *The adopted Inverell Shire Community Participation Plan 2019 be published on the NSW planning portal by 1 December, 2019.*

CARRIED

5.2 ROAD CLOSURE - VENENTIAN CARNIVAL S28.23.1/12

COMMITTEE RESOLUTION

Moved: Cr Paul Harmon
Seconded: Cr Mal Peters

That the Committee recommend to Council that:

1. *Captain Cook Drive be closed for the Venetian Carnival between the Byron Street Roundabout and entrance to Pasterfield car park between the hours of 4.00pm and 10.00pm on Saturday, 7 December 2019; and*

2. *The cost associated with the road closure being considered as a donation.*

CARRIED

5.3 GUIDELINES FOR THE SAFE DESIGN OF STORMWATER INLETS S14.18.6/12

COMMITTEE RESOLUTION

Moved: Cr Mal Peters
Seconded: Cr Paul Harmon

That the matter be referred to Closed Committee for consideration as the matters and information are:

e information that would, if disclosed, prejudice the maintenance of law.

On balance the public interest in preserving the confidentiality of the information outweighs the public interest in openness and transparency in Council decision-making by discussing the matter in open meeting; and all reports and correspondence relevant to the subject business be withheld from access to the media and public as required by section 11(2) of the Local Government Act, 1993.

CARRIED

5.4 INVERELL POLOCROSSE CLUB S15.8.25/12

COMMITTEE RESOLUTION

Moved: Cr Mal Peters
Seconded: Cr Paul Harmon

That the matter be referred to Closed Committee for consideration as the matters and information are:

d(i) commercial information of a confidential nature that would, if disclosed prejudice the commercial position of the person who supplied it.

On balance the public interest in preserving the confidentiality of the information outweighs the public interest in openness and transparency in Council decision-making by discussing the matter in open meeting; and all reports and correspondence relevant to the subject business be withheld from access to the media and public as required by section 11(2) of the Local Government Act, 1993.

CARRIED

5.5 INVERELL SHIRE COUNCIL DRAFT DROUGHT MANAGEMENT PLAN S32.18.1

COMMITTEE RESOLUTION

Moved: Cr Mal Peters
Seconded: Cr Paul Harmon

That the Committee recommend to Council that:

1. *the Draft Inverell Shire Council Drought Management Plan be adopted;*

2. *following the adoption of the Draft Drought Management Plan by Council permanent water conservation measures during daylight saving be introduced, including a community awareness campaign; and*

3. *Council delegate authority to the Mayor and General Manager to apply and ease / lift water restrictions in accordance with the adopted Drought Management Plan, and during an unplanned emergency such as a system failure.*

CARRIED

5.6 TOMS DRIVE REHABILITATION FUNDING ALLOCATION S4.11.16/11

COMMITTEE RESOLUTION

Moved: Cr Neil McCosker
Seconded: Cr Mal Peters

That the Committee recommend to Council that $350,000 from the Roads to Recovery budget vote be allocated to the rehabilitation of the existing 921m sealed section of Toms Drive.

CARRIED

6 INFORMATION REPORTS

COMMITTEE RESOLUTION

Moved: Cr Paul Harmon
Seconded: Cr Mal Peters

That the information reports be received and noted

CARRIED

6.1 WORKS UPDATE S28.21.1/12

6.2 STATE SIGNIFICANT DEVELOPMENT APPLICATION (SSD-9348) - BONSHAW SOLAR FARM, BRUXNER WAY, BONSHAW NSW S18.6.52/06

7 CONFIDENTIAL MATTERS (COMMITTEE-OF-THE-WHOLE)

At 10.08am, the Chairperson offered the opportunity to members of the public to make representations as to whether any part of the Committee Meeting should not be considered in Closed Committee. There was no response.

COMMITTEE RESOLUTION

Moved: Cr Paul Harmon
Seconded: Cr Mal Peters

That Committee proceeds into Closed Committee to discuss the matters referred to it, for the reasons stated in the motions of referral.

CARRIED

COMMITTEE RESOLUTION

Moved: Cr Paul Harmon
Seconded: Cr Mal Peters

That Committee proceeds out of Closed Committee into Open Committee.

CARRIED

Upon resuming Open Council at 10.27am, the Chairperson verbally reported that the Committee had met in Closed Committee, with the Press and Public excluded, and had resolved to recommend to Council the following:

7.1 INVERELL POLOCROSSE CLUB S15.8.25/12

That the Committee recommend to Council that Council request a further report detailing the various aspects of the proposal from the Inverell Polocrosse Club.

7.2 GUIDELINES FOR THE SAFE DESIGN OF STORMWATER INLETS S4.11.16/11

That the information be noted.

ADOPTION OF RECOMMENDATIONS

COMMITTEE RESOLUTION

Moved: Cr Paul Harmon
Seconded: Cr Mal Peters

That the recommendations of Closed Committee be adopted.

CARRIED

The Meeting closed at 10.30am.

3 DISCLOSURE OF CONFLICT OF INTERESTS/PECUNIARY AND NON-PECUNIARY INTERESTS

4 PUBLIC FORUM

5 DESTINATION REPORTS

5.1 PETITION / LETTER FOR DECLARATION OF CLIMATE EMERGENCY

File Number: **S11.8.9 / 20/1969**

Author: **Paul Henry, General Manager**

SUMMARY:

A group of residents are calling on Council to declare a Climate Emergency.

RECOMMENDATION:

A matter for the Committee.

COMMENTARY:

On 14 January, 2020 11 letters (a form letter; an example is attached) and a petition signed by 24 persons was delivered to Council 'wanting' Council to declare a Climate Emergency.

The petition is detailed below for Councillors information. It should be noted that the 11 correspondents also signed the petition.

The petition states:

'We can no longer argue the science surrounding climate change and the catastrophic impacts it presents to human. Being in a rural area, we will be most affected by such changes that we are already experiencing with severe drought and erratic catastrophic bushfires that are claiming lives, native flora and fauna and people properties. We want the Inverell council to join the 70+ councils (including Armidale and Glen Innes) in Australia in declaring a climate emergency. We want them to commit to tackling the issue and creating an action plan for our local area'.

The letter and petition calls on Council to tackle the 'issue' and prepare an 'action plan' for the local area.

A. Responses by Adjoining Councils

The correspondence makes reference to declarations made by adjoining Councils. For Councillors reference the following resolutions were adopted:

i) Armidale Regional Council – 23 October 2019

'a) That Council acknowledge our local and global communities are facing a climate emergency that requires urgent action by all levels of government; that human-induced climate change represents a great threat to humanity, civilisation and other species; and that, to prevent the most catastrophic outcomes, societies including local councils, need to take urgent action.

b) That Council therefore declares that we are in a 'Climate Emergency'.

c) That a report be prepared by February 2020, with input from a working group of the Environmental Sustainability Advisory Committee and the community, on current initiatives and additional future actions that can be undertaken in the short, medium and long term to:

1. Reduce greenhouse emissions aiming, by 2030, for no additional contribution from our region to the global temperature rise,

2. Adapt to current and anticipated climate change impacts,

3. Reduce atmospheric concentrations of greenhouse gases, e.g. Sequester and store carbon in trees and soils.

d) That Council encourages other local governments (that have not already done so) to take similar action to reduce greenhouse emissions and protect our climate.

e) That Council lobbies State and Federal Governments for urgent action to reduce greenhouse emissions and protect our climate'.

ii) Glen Innes Severn Council – 26 September 2019

'*1. That Council declares a climate emergency and commits to a more sustainable future for our community.*

2. That Council's General Manager be requested to convene a workshop of Councillors and Senior Staff with a view to examining what a climate emergency means in the context of Glen Innes Severn and from there develop a Climate Emergency Plan for the Glen Innes Severn Council area'.

B. Inverell Shire Council Environmental Sustainability Plan

In 2009 Council adopted an Environmental Sustainability Plan, attachment 2. This action plan proposed that Council undertake a range of activities in the following areas:

i) Enhanced Biodiversity
ii) Sustainable Water Use
iii) Improved Waste Management
iv) Responsible Use of Resources

In accordance with the principles of this Plan, a significant number of projects have been undertaken including (not an exhaustive list):

- Installing solar power on Council buildings with the highest power use e.g. Council Administration Building, Inverell Works Depot, Library, Tourist Centre etc.
- Many activities to capture material from the waste stream that can be recycled and not go into landfill
- Stop hazardous materials being put into landfill
- Installing solar/wind street lights
- River clean up works that removes exotic plant species/weeds and replant with native species to improve biodiversity and habitat
- Use recycled materials on projects whenever possible
- Upgrade to LED lighting in the Inverell Shire Library

The latest initiative is the December, 2019 decision to sign a contract for the second and final stage of the LED Streetlight replacement program. The contract is worth $256K.

RISK ASSESSMENT:

Nil

POLICY IMPLICATIONS:

Nil

CHIEF FINANCIAL OFFICERS COMMENT:

Nil

LEGAL IMPLICATIONS:

Nil

ATTACHMENTS:

1. **Climate Emergency Declaration Letter**
2. **Environmental Sustainability Plan**

Inverell Shire Council
144 Otho St, Inverell, 2360.

Dear Inverell Shire Council,
I am writing to the Inverell Shire Council to ask it to consider the merit of declaring a climate emergency. As of September 21, 2019 over 1000 councils across twenty countries have declared a climate emergency. This includes 71 councils across Australia which represents about 27% of the population. The entire state of South Australia has declared. Our neighbours in Armidale, Glen Innes Severn, Clarence Valley, and Lismore have all declared.

What we are asking for is that Inverell Shire Council take a leadership role in responding to the climate emergency. A role where it strives to encourage, educate and mitigate warming impacts by reducing emissions within the municipality by maximising the use of Councils limited resources. Solar powering of the town library is an excellent example of this approach along with numerous examples of solar and wind powered public lighting.

Local Government has long been the bastion of democracy in this country and more often than not the drivers of key policy. By declaring a climate emergency Councils key roles would be;

- To drive action upstream by lobbying the state government to follow suit and provide additional resources locally.
- Encourage other councils to support and collaborate.
- Drive action downwards through education, mitigation and resilience building.
- Inwards by educating staff from the General Manager down to fully equip them for future action.

The climate emergency has resulted from humans putting additional greenhouse gases in our atmosphere. These have heated our planet and at current levels are already a true disaster on a global scale. Unless removed, these gases will result in a level of global warming that will be catastrophic for humanity and much of the world's remaining ecosystems.

I ask Inverell Shire Council to join the 71 other councils across Australia in declaring a climate emergency as it would give Inverell Shire Council an opportunity to be a leader in this issue driving a response at its own pace instead of being a follower.

I look forward to your response and action on this matter.

Name: _____ Date: _____

Address: _____

_____

Signature:

Printed on 100% Recycled Paper

INVERELL SHIRE COUNCIL

Environmental Sustainability Plan

Adopted 28 July 2009 (Res 133/09)
Reviewed April 2018

ENVIRONMENTAL SUSTAINABILITY PLAN

Introduction

Inverell Shire Council is committed to the protection and enhancement of the environment that sustains our Community. This environment is being impacted by changes in climatic conditions and the need to consider how Council can protect the environment is now more evident.

Council's commitment to protecting the environment extends beyond the environment protection imperative that is contained in the *Local Government Act* 1993 (NSW). It is a reflection of this Council's growing sense of responsibility of the environment and the need to display leadership in the stewardship for this precious resource that we all share. Stewardship of the environment can be demonstrated through Council's day to day practices and strategic planning.

Inverell Shire Council believes that for a community to be sustainable requires a healthy community, a healthy economy and a healthy environment. These three notions are inexorably linked – a healthy environment is the cornerstone which underpins a community's ability to develop economically and socially.

This plan outlines Council's environmental sustainability journey. It identifies four (4) focus areas and outlines the actions to be undertaken by Council to enhance these focus areas. While Council cannot legislate to address the root causes of climatic change, it can take steps to protect our environment and address the impacts of a changing climate.

The Action Plan will be reviewed each year and a comprehensive review undertaken every four (4) years. The Plan is proposed as a framework for community involvement in the sustainability journey.

Background

Recently, the Australian Local Government Association adopted the 'Climate Change ALGA Position Paper and Discussion Document', which outlined Local Government's place in addressing Climate Change. The document encourages Council's to prepare for climate change, protect its assets, adapt to localised conditions and protect the environment.

A. Convention on Climate Change

The driver for management of climate change at the global level is the United Nations Framework Convention on Climate Change (UNFCCC), an international treaty formulated in 1992. The prime goal of UNFCCC is to manage atmospheric greenhouse gas concentrations at a level that will 'prevent dangerous human interference with the climate system'. Currently 195 countries (referred to as parties) have ratified UNFCCC.

In 1997 the Kyoto Protocol was added to the UNFCCC. The Protocol embeds the principle that countries have 'common but differentiated responsibilities'. The

Protocol recognises developed countries, compared to developing countries, have traditionally been the major source of anthropogenic emissions of greenhouse gas (GHG) emissions to atmosphere.

The major feature of the Kyoto Protocol is that it sets legally binding targets for 37 industrialised countries and the European community for reducing GHG emissions. These amount to an average of 5% against 1990 levels over the five-year period 2008-2012. Australia's target under the Kyoto Protocol is to limit GHG emissions to 8% above the 1990 level.

A key component of the Kyoto Protocol is that countries are able to use 'market based mechanisms' covering mitigation actions in developed and developing countries to meet their emission reduction commitments. Currently 193 countries, including Australia but with notable exception of USA, have ratified the Kyoto Protocol.

The major distinction between the Protocol and the Convention is that while the Convention encouraged industrialised countries to stabilize GHG emissions, the Protocol commits them to do so.

The work of developing, implementing and monitoring the progress on the UNFCCC and the Kyoto Protocol is directed by annual meetings of countries, called Conference of Parties (COPs), who have ratified the Treaties. For example the meeting of countries in Copenhagen in December 2009 will be known as COP 15, the 15th meeting of countries who have ratified the UNFCCC.

Outcomes from recent COPs have focussed on progressing high road climate policy. Outcome of COP 13 (held in Bali, Indonesia in December 2007) saw agreement on a comprehensive process to implement a shared vision for long term cooperation, up to and after 2012, by developed and developing countries to reach an agreed and adopted (binding) decision at COP 15 scheduled for Copenhagen, Denmark, in December 2009. The shared vision was to be constructed consistent with principle of 'common but differentiated responsibilities and respective capabilities, and taking into account social and economic conditions'.

B. Australian Government Response to Climate Change

Australia's climate change policy is evolving, consistent with processes detailed in UNFCCC and the Kyoto Protocol supplemented further by other initiatives such as the Carbon Farming Initiative. Australia's evolving policy for climate change will in all likelihood settle on a mixture of regulatory requirements and incentive programs to offset carbon emissions. For the regulatory component current Australian Government policy calls for the interim carbon price on GHG emissions from nominated industries transferring into a cap and trade system to manage mandated GHG emission target. The Carbon Pollution Reduction Scheme developed by the Australian Government this year continues to provide frameworks for GHG management.

Australia will release official projections of its GHG emissions annually.

C. Likely Impacts

Little information is available on the likely specific impacts of a changing climate on the New England North West, however the State Government indicates that Inland NSW could experience:

- More 'hot' days per year
- Less 'cooler days per year
- Less rainfall per annum, and
- A higher fire danger

These likely impacts were used to inform this Environmental Sustainability Plan.

Table 1: Some possible impacts of climate change

Area of concern	Aspect of climate change	
	Temperature and evaporation	Rainfall and storms
Environment and public infrastructure	» increased risk of fires leading to severe damage to vegetation and wildlife and quality of water supplies » increased evaporation reducing water supplies and water quality through, for example, blooms of blue-green algae from increased nutrient concentrations » drier soil leading to less vegetation and an increase in turbid runoff following rainfall events » changes in distribution of plant and animal species resulting in less biodiversity » putrescible waste rotting more rapidly and requiring more servicing » outdoor venues requiring more shade	» increased erosion leading to pest and weed invasion » increased change of contaminants and pollutants being carried by stormwater » erosion of watercourses leading to poor water quality for aquatic species and drinking water supplies » increased flooding of roads leading to washouts » increased damage to utilities including water supply, sewers and communications
Society	» heat waves resulting in dehydration and heat stress among vulnerable sections of the community, such as the elderly » outdoor sporting events needing to be rescheduled	» increased erosion leading to poor aesthetics and recreational amenity » increased overflow of stormwater channels leading to flooding of private property » increased safety risks from flash flooding and flying debris » storm damage leading to problems and delays in the supply of goods
Economy	» more expense involved in keeping buildings cool	» increased maintenance costs from damage to public buildings from wind, hail etc » damage to vineyards, crops and other aspects of the landscape leading to less tourism and significant impacts on agriculture
Council governance	» Changes to working hours and provision of heat-protective clothing for outdoor staff » More strain on emergency services such as fire fighting » A need to reassess risks to council	» need for buildings designed and built to appropriate standards to reduce liability » provision of increased resources for emergency response » a need to reassess risks to council

Source: NSW Department of Environment and Climate Change

ENVIRONMENTAL SUSTAINABILITY PLAN

'Inverell Shire Council is committed to the challenge of sustaining our local environment. Council will continue to seek partnerships in this endeavour and request support for our mitigation and adaptation actions'

Cr B Johnston OAM
Mayor

1. IMPLEMENTATION

Council has identified four (4) key policy areas that impact on its commitment to sustaining our environment. These are:

i) Water Management
ii) Biodiversity
iii) Waste Management
iv) Energy Management

This plan proposes activities that either mitigate the impacts of changing climatic conditions or changes/adapts Council activities to respond to the changed circumstances.

1.1 Water Management

The possible impacts of climate change and the increased demand for a quality water supply by the community requires that water management be a key issue for Council.

Predicted reduced rainfall and higher evaporation rates will place pressure upon our water resources. Stormwater and sewerage treatment have an impact on local waterways and rivers and require action to protect the quality of these assets.

Considering these factors, the following management principles will be utilised by Council:

- consider water usage as a key indicator of land use management in both rural and urban settings,
- seek long term positive outcomes from water management activities in a changing climate,
- implement programs that seek behavioural change in water use that results in a reduced demand for water.

1.2 Biodiversity

Biodiversity is the systematic interaction of all life forms (plants, animals and micro organisms) and it is this interaction that is essential to sustain our communities. Our involvement with this ecosystem should be conducted in a manner that ensures the long term health of the ecosystem.

A healthy, biodiverse environment is necessary to maintaining water quality, air quality, soil formation and plant regeneration. Human activities that seek to facilitate the operation of this biodiverse environment will result in a more comfortable place to work, live and visit.

Considering these factors, the following management principles will be utilised by Council:

- consider vegetation as a key indicator of catchment health and land use

management

- protection of remnant vegetation, retention and improvement of wildlife corridors and protection of wetlands and key focus areas.
- Foster behavioural change in vegetation and biodiversity management across the community.
- Include fire management and weed control as part of vegetation and biodiversity management planning.

1.3 Waste Management

All human activities generate waste. Appropriate management of this waste stream is necessary to ensure air and water quality; and non-degradation of habitat for flora and fauna.

These imperatives suggest that a philosophy of 'avoidance, re-use and recycling' should characterise our approach to waste management.

Considering this philosophy, the following management principles will be utilised by Council:

- foster behavioural changes in generating solid waste,
- encourage reuse and recycling to reduce consumption of resources and minimise transport costs,
- Promote accounting for environmental costs in Council activities.

1.4 Energy Management

Human activity affects the amount of greenhouse emissions entering the atmosphere. The level of these emissions is a source of concern due to the impact on weather patterns and our biodiversity.

Council is a major consumer of energy. The practices adopted by Council can reduce energy usage, reduce costs and promote alternative energy sources.

In consideration of the impact greenhouse emissions have on the environment, the following energy management principles are to be utilised:

- Foster behavioural change in energy use across the community
- Maximise use of energy efficient products and processes in Council activities.

2. ACTION PLAN

2.1 WATER MANAGEMENT

	Action	Outcome	Timeframe
2.1.1	Mitigation		
	Develop strategies to implement 'best practice' for management of Council's water schemes	• Strategies are adopted and met	Ongoing
	Monitor and report on water usage	• Potable water use is monitored and can meet demands	Ongoing
2.1.2	Adaptation		
	Implement the Floodplain Risk Management Strategies and Plan	• The community is educated on the objectives of the plan • Regular reviews are conducted to ensure Council's response to emergency events will be effective	Ongoing Ongoing
	Incorporate principles of sensible water use designs in development guidelines	• Developers and builders incorporate water sensitive urban designs in developments	Ongoing
	Incorporate water conservation and appropriate plant species in public open spaces	• Potable water use in open spaces assets is minimised	Ongoing

2.2 BIODIVERSITY

	Action	Outcome	Timeframe
2.2.1	Mitigation		
	Increase native vegetation cover on Council reserves	• Conduct tree planting day events • Native habitats are conserved and maintained • Number of conservation reserves are increased	Annually Ongoing Ongoing
	Enhance ecological quality of rivers and waterways	• Reduce waste in stormwater • Observe sediment control measures on Council worksites	Ongoing Ongoing
	Enhance Terrestrial and aquatic ecosystems	• Partnerships are established with organisations seeking to improve ecosystems • Projects to enhance ecosystems are funded annually • Weed Management Plan is prepared annually and implemented	Ongoing Ongoing Ongoing
2.2.1	Adaptation		
	Continue to advocate for additional funding for control of weeds of national importance	• Existing allocations are maintained and increased	Ongoing

2.3 WASTE MANAGEMENT

	Action	Outcome	Timeframe
2.3.1	Mitigation		
	Review Council's kerbside waste collection strategy and implement enhancements	• A waste strategy is implemented • Volume of waste to landfill is reduced • Recycling rates are increased	2010/11 Ongoing Ongoing
	Advocate to have a greater range of products recycled to stop going to landfill	• Increase range of material that can be placed in recycle crate • Chemical/Paint Clean Up held annually	Ongoing
	Promote the need for container deposit legislation	• The State Government implements a CDS program	Ongoing
2.3.2	Adaptation		
	Promote the minimisation of plastic bag use and packing	• Volume of plastic bags in landfill is reduced	Ongoing

2.4 ENERGY MANAGEMENT

	Action	Outcome	Timeframe
2.4.1	Mitigation		
	Reduce Carbon Footprint	• Conduct energy audits of Council's major energy consuming facilities – one per year	2010/11 and ongoing
	Apply ecologically sustainable development design principles in new or refurbished Council facilities	• ESD design principles incorporated in building codes	Ongoing
2.4.2	Adaptation		
	Promote energy conservation	• Council's energy consumption is reduced	Ongoing

5.2 DRAINAGE UPGRADE - BUNDARRA ROAD ADJACENT TO RACECOURSE

File Number: **S4.11.16/12 / 20/3587**

Author: **Justin Pay, Manager Civil Engineering**

SUMMARY:

Council's Delivery Plan 2017-2021 identified the project to complete an investigation study into the creation of wetlands behind the Racecourse and Cameron Park to address stormwater in the low lying area along Tingha Road (Bundarra Road). This report is intended to update Council on the progress of this project.

RECOMMENDATION:

That the Committee recommend to Council that;

(a) The Flooding Assessment Report be received, noted and the recommendations be adopted;

(b) Detailed engineering design work be completed on the report recommendations, with the design to include; pavement reconstruction, drainage considerations and tree replacement;

(c) A future report be presented to Council providing costing's for the drainage, road rehabilitation and tree replacement to allow funding allocation; and

(d) That the findings of the report be presented to the management committee of Pioneer Village for their information and action.

COMMENTARY:

Council's Delivery Plan 2017-2021 identified the project to complete an investigation study into the creation of wetlands behind the Racecourse and Cameron Park to address stormwater in the low lying area along Tingha Road (Bundarra Road).

A consulting engineer has been engaged to complete the study and works have been ongoing for over eighteen (18) months. The final report was finalised at the end of 2019.

Background

Council engaged consulting engineer Mr Peter Atkinson to complete the investigation study and he has presented the Bundarra Road Drainage Issue - Flooding Assessment Report. Attachment 1 is a copy of the report for the information of the Committee. The report discussed the issues associated with the drainage catchment and identifies options to improve the drainage in the area adjacent to the Racecourse, Showgrounds, Pioneer Village and Cameron Oval.

The report is split into four (4) parts which deal with different segments of the catchment area. For the report, calculations have been based on Average Recurrence Intervals (ARI) of five (5) years and ten (10) years. It is noted in the report that: *"for the assessment of likely flooding of this localised site, the ARI would not exceed an ARI of 10 years before inundation of the site and major surrounding areas would occur. For this reason, the scope of the initial flood extent investigation will be limited to an ARI of 5 and 10 years."* This is consistent with Council's standard practice when designing drainage structures, where it is either too costly or impractical to provide structures that cater for more significant events.

The report presents calculations of rainfall intensity and predicted overland flows, it also presents data on the existing drainage reticulation in the urban environment associated with the study area. Individual catchment assessment is presented in the report in order to identify inflow/outflow impacts associated with individual drainage structures within the catchment.

Key Findings

Wetlands

Section 3.3 of Part D discusses the feasibility of construction of a wetland behind the Racecourse and Cameron Park:

"The land between the western side of the racecourse and oval generally slopes towards the river with a grade difference of several metres from the rear of the oval to mean river level.

The retention of any reasonable body of water in the region between the oval/ racecourse and the river would require either a large positive projection levee or a zero projection wetland basin.

A levee bank would rely solely on rainfall runoff in normal years to retain water needed for a wetlands rather than a grassed area that would suffer wet/ dry variation and not support wetland birds and vegetation.

The zero projection wetland would require a very significant excavation to lower the ground level to below the mean level of the river to allow inflow thru infiltration or inflow west of the racecourse and oval.

Secondly, in order to construct a bund or wetland basin in this region, Council must be prepared to re-build it after every flood. This wetland reserve when retaining water would at best duplicate the river precinct when there is naturally formed wetlands typical of this area already existing on the banks and river. In order to get enough water to be retained in wetlands, there would have to be a depth of about 3 metres to allow for evaporation etc."

The conclusion of Part D notes:

"The construction of a wetlands reserve between the south-west of the race course and south of the oval is not practical given the seasonal variation in river levels and the gradient between the racecourse and the river."

Drainage Improvements

The report indicates that the existing pipe culvert drainage structures on Armstrong Street, Rifle Range Road and Bundarra Road are sufficient for five (5) and ten (10) year ARI events. Importantly, the outflow characteristics from these structures need to be improved to prevent afflux (an increase in water level that can occur upstream of a structure, such as a bridge or culvert, that creates an obstruction in the flow).

On the last page of Part B a summary diagram is provided which presents the suggested drainage upgrades at this location, they include:

- Construction/improvements to the drainage running parallel to Bundarra Road and the racecourse, moving water to the south.
- Construction of a diversion bank where the above drain meets the existing out flow from the culvert that crosses Bundarra road (from Rifle Range Road)
- Significant improvement to the existing drain that runs perpendicular to Bundarra Road
- Improvements to the overland drainage in the area adjacent to the 'Home Straight" of the Racecourse.
- Modifying the existing concrete causeway that crosses Cameron Street.

In short, improving the above down stream drainage system will allow water to drain away quicker, alleviating flooding pressure and ensuring that Bundarra Road (and nearby properties) do not become inundated during a ten (10) year ARI event.

Pioneer Village and Showgrounds

Part C of the report discusses the Pioneer Village and Showgrounds. It notes that the existing Council drainage infrastructure is adequate for a ten (10) year ARI event. It does note that maintenance of this drainage system needs to be improved in order to provide a sufficient level of service.

The report discusses internal flooding/drainage at the Pioneer Village:

"Given the assessment above which concludes that the cross drainage under Bundarra Road is adequate for an ARI 10 year rainfall event providing that the outlets currently operating are maintained to a high standard, i.e. grass kept short and silting removed when required, the outflow from the Pioneer Village will not create an afflux on the eastern side of Bundarra Road.
The reason that localized flooding occurs within the Pioneer Village precinct is the size of the internal cross road drainage and the poor standard to which the drainage has been maintained.
The location of the existing 100 mm diameter pipes is considered suitable, however the size of pipe used is prone to silting due to the low flow available and this creates localized afflux within the Village. Without a comprehensive survey of the area available, the recommendation for the drainage upgrade will be based on replacing the existing culverts with 220 RCP pipes and increasing the depth of gravel pavement within the Village to direct flow through the new culverts.
This will assist in maintaining flow through the culverts and reduce the general flooding in the grounds by re-contouring the catchment area to direct flow to the new culverts more efficiently."
It is recommended that this information be provided to the management committee of the facility so that adequate maintenance be undertaken and consideration given to required upgrade works.

Cameron Oval/Medora Street

The report assesses the impacts of the overland flow pre-oval upgrade and post-oval upgrade. It concludes that for the most part the oval upgrade has not increased the potential for flooding at the site. It does note that the existing concrete drain perpendicular to Medora Street has the potential to over top in an intense rain fall event. This localised flooding can be overcome by extending the concrete lined drain 25m further west.

Draining of the depression that was created adjacent to Medora Street during the construction of the oval is subject to further survey and design work. This work will be completed in conjunction with the survey and design for the upgraded drainage noted above.

Bundarra Road Pavement/Trees

Whilst not covered in the Bundarra Road Drainage Issue - Flooding Assessment Report the condition of the pavement of segments 110-115 of Bundarra Road is of significant concern. This section of Bundarra Road runs from approximately the entry to Pioneer Village to the south for approximately 1.1km. The roughness, rutting and pavement failures in this section of road have caused a hazard for some time. Staff are undertaking frequent maintenance work in order to keep the road safe and Road Hazard signage is in place to mitigate against the risk of the existing hazard. The pavement has reached the end of its useful life and requires rehabilitation.

Council asset management staff are currently in the process of completing the Road Asset Revaluation. Condition assessment of the entire road network is well underway and contractors ARRB have been engaged to complete the sealed road assessment, including laser profileometer survey. While the complete data set for this assessment is not yet available, ARRB have provided Council with data for Bundarra Road. The roughness and rutting readings for segment 110-115 are high. The traffic volume on this section of road is the highest of any Council controlled road (approximately 4000 vehicles per day). The high roughness, rutting and significant traffic volume coupled with the significant ongoing maintenance cost combine to present this section of road as a high priority for rehabilitation.

It is intended that bulk earthworks associated with the road rehabilitation would also improve localised drainage in the area adjacent to Bundarra Road. Coupled with the recommended drainage improvements, this would contribute to alleviating the "swamp" effect in the area that is typical during times of prolonged wet weather.

The avenue of Claret Ash trees adjacent to Bundarra Road on the entrance to Inverell are decaying and require replacement. There are a number of factors that limit available planting space and as such the species of replacement tree needs to be carefully considered. The most appropriate time for replacing these trees would be at the time of road reconstruction and drainage upgrade. It is intended that during the engineering design for the rehabilitation of the road suitable replacement species and planting location be identified.

Conclusion

A comprehensive study of the rainfall, runoff, flooding and existing drainage has been presented in the Bundarra Road Drainage Issue - Flooding Assessment Report, it is recommended that Council receive and note this information. A number of drainage upgrade works have been included in the report, it is recommended that detailed engineering design be completed and a further report be presented to Council in order to allocate funds to these works.

Given that significant drainage work is proposed at the location, and that this section of road requires rehabilitation, economies of scale can be achieved if the two (2) projects (drainage and road rehabilitation) are completed concurrently. As such it is recommended detailed engineering design be completed for the rehabilitation of Segments 110-115 of Bundarra Road. This design is to include replacement of the avenue of trees as well as further bulk earthworks to improve drainage for land adjacent to the road.

Potential funding sources for these works include:

- Regional Roads REPAIR Program
- Urban Drainage Reconstruction
- Causeways and Culverts Reconstruction
- BLOCK Grant Supplementary

RISK ASSESSMENT:

NIL

POLICY IMPLICATIONS:

NIL

CHIEF FINANCIAL OFFICERS COMMENT:

Detailed design work can be funded from the 2019/20 budget. The recommended potential funding sources relate to future budgets and will be considered as part of the 20/21 budget process.

LEGAL IMPLICATIONS:

NIL

ATTACHMENTS:

1. Bundarra Road Drainage Issue - Flooding Assessment Report

Inverell Shire
Bundarra Road Drainage Issue
Flooding Assessment Report: Part A

Prepared for: Inverell Shire Council
2 December 2019

Document/Report Control Form

File Location Name:	
Project Name:	Bundarra Road Drainage Issue- Flooding Assessment
Project Number:	(OP-5753)
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01	2/12/2019	001	Peter Atkinson	Justin Pay	

Table of Contents

Forward

Drainage Assessment Report:

This report has been prepared in four parts:

- Part A: Regional Rainfall Intensity and Runoff Assessment
- Part B: Drainage Assessment of the Racecourse and Bundarra Road South from The Showground
- Part C: Historical Village Drainage Interaction with Bundarra Road Cross Drainage, and
- Part D: Drainage Considerations for the Sports Oval to River.

Abbreviations

ISC	Inverell Shire Council
ARI	Average Recurrence Interval
Tc	Time of Concentration
MRD	Median Rainfall Duration
EPA	Environmental Protection Agency
ARR	Australian Rainfall and Runoff Publication
BOM	Bureau of Meteorology
AEP	Annual Exceedance Probability (1/ARI %)
RCP	Reinforced Concrete Culvert
RCBC	Reinforced Concrete Box Culvert

1. Introduction

1.1. Project overview

Bundarra Road borders the racecourse and adjoining low lying areas to the south of Inverell. Development of the racecourse and sub-division of adjoining land has resulted in a hardening of the landscape resulting in higher rainfall runoff and lower retention of overland flow in low to moderate frequency storms.

As a consequence of the changes in topography and land usage, Bundarra Road flood immunity has been altered resulting in more frequent inundation affecting the access and amenity of the race course and surrounding areas.

1.2. Project objectives

The primary objective of this report is to determine the rainfall characteristics and potential flooding patterns through the analysis of available flood data. Analysis of previous flood records, the use of current rainfall intensity (RI) data and time of concentration (Tc) for various average recurrence intervals (ARI) will provide the data necessary to assess available rainfall retention capability, drainage infrastructure for flood water discharge to the river and regrading of Bundarra Road to improve flood immunity.

1.3. Purpose of this Options Report

The purpose of this report is to document the options available for the containment and management of flood water in longer ARI events and the upgrading of Bundarra Road to increase accessibility during a range of rainfall and flood events

This assessment report is intended to be retained and updated throughout the various detailed design stages of the project, forming a comprehensive record of the detailed design development. Further detail and a record of significant changes will be provided at each report revision.

2. Rainfall and Flooding Assessment

2.1. Assessment of Previous Flood Events

The assessment of the impact of a rainfall event on the site relies on the history of flooding in Inverell as there are no detailed flood studies of this specific area for low flow events. The categorization of local flooding for very low ARI events has not been undertaken, therefore the assessment will rely on interpolation of major flood events recorded between 1874 and 1997.

The use of rainfall intensity and ARI data will provide the data to determine catchment drainage requirements but do not give the data to determine rainfall duration and net rainfall on a specific area.
The determination of rainfall intensities and subsequent Tc assessments are available through standardized ARR data for this specific area with a recording station located at **29.775 S 151.125 E** * near the Inverell Showground adjacent to the assessment area.

In order to assess likely durations of rainfall over the specific catchment area, historical data has been retrieved as a guide. The following table extracted from Bureau of Meteorology (BOM) data shows rainfall totals and rainfall durations for major flood events during the last 145 years of Inverell's rainfall records.

Statistics Rainfall	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years		Plot	Map
Mean rainfall (mm)	96.7	83.4	65.1	43.3	47.9	49.7	50.0	44.4	49.5	67.7	73.9	99.6	765.0	121	1874 1997		
Highest rainfall (mm)	266.2	313.1	209.8	218.8	212.3	186.9	174.1	158.4	238.0	207.7	278.0	312.7	1235.4	124	1874 1997		
Date	1962	1955	1894	1988	1921	1920	1984	1888	1970	1954	1917	1970	1921				
Lowest rainfall (mm)	3.7	0.5	2.0	0.0	0.0	1.4	0.0	0.0	0.0	7.4	0.3	5.6	422.3	124	1874 1997		
Date	1901	1903	1898	1998	1957	1902	1940	1991	1893	1945	1897	1941	1915				
Decile 1 rainfall (mm)	36.0	10.0	10.1	3.6	8.1	11.3	12.7	6.2	7.0	21.0	10.6	26.4	529.0	123	1874 1997		
Decile 5 (median) rainfall (mm)	88.5	69.8	51.7	34.5	39.9	39.8	43.8	36.8	40.4	55.0	72.3	89.9	750.8	123	1874 1997		
Decile 9 rainfall (mm)	195.8	169.4	142.0	82.7	99.3	101.9	101.1	95.4	95.0	135.0	124.4	174.1	988.1	123	1874 1997		
Highest daily rainfall (mm)	120.6	145.0	100.0	101.9	86.9	90.8	81.3	97.0	81.7	87.0	92.5	110.7	145.0	123	1874 1997		
Date	22 Jan 1946	11 Feb 1975	01 Mar 1994	10 Apr 1879	31 May 1921	13 Jun 1885	04 Jul 1874	13 Aug 1952	14 Sep 1970	12 Oct 1926	06 Nov 1988	21 Dec 1973	11 Feb 1976				
Mean number of days of rain	6.7	7.6	6.8	5.2	6.7	6.7	7.0	6.6	6.4	7.0	8.0	8.6	84.0	123	1874 1997		
Mean number of days of rain ≥ 1 mm	7.6	6.4	5.6	4.3	4.7	5.4	5.4	5.2	5.2	5.7	6.7	7.5	70.7	123	1874 1997		
Mean number of days of rain ≥ 10 mm	3.1	2.4	2.1	1.4	1.6	1.7	1.6	1.4	1.7	2.3	2.9	3.2	25.0	123	1874 1997		
Mean number of days of rain ≥ 25 mm	1.2	0.9	0.6	0.4	0.5	0.5	0.4	0.4	0.4	0.6	0.7	1.0	7.6	123	1874 1997		

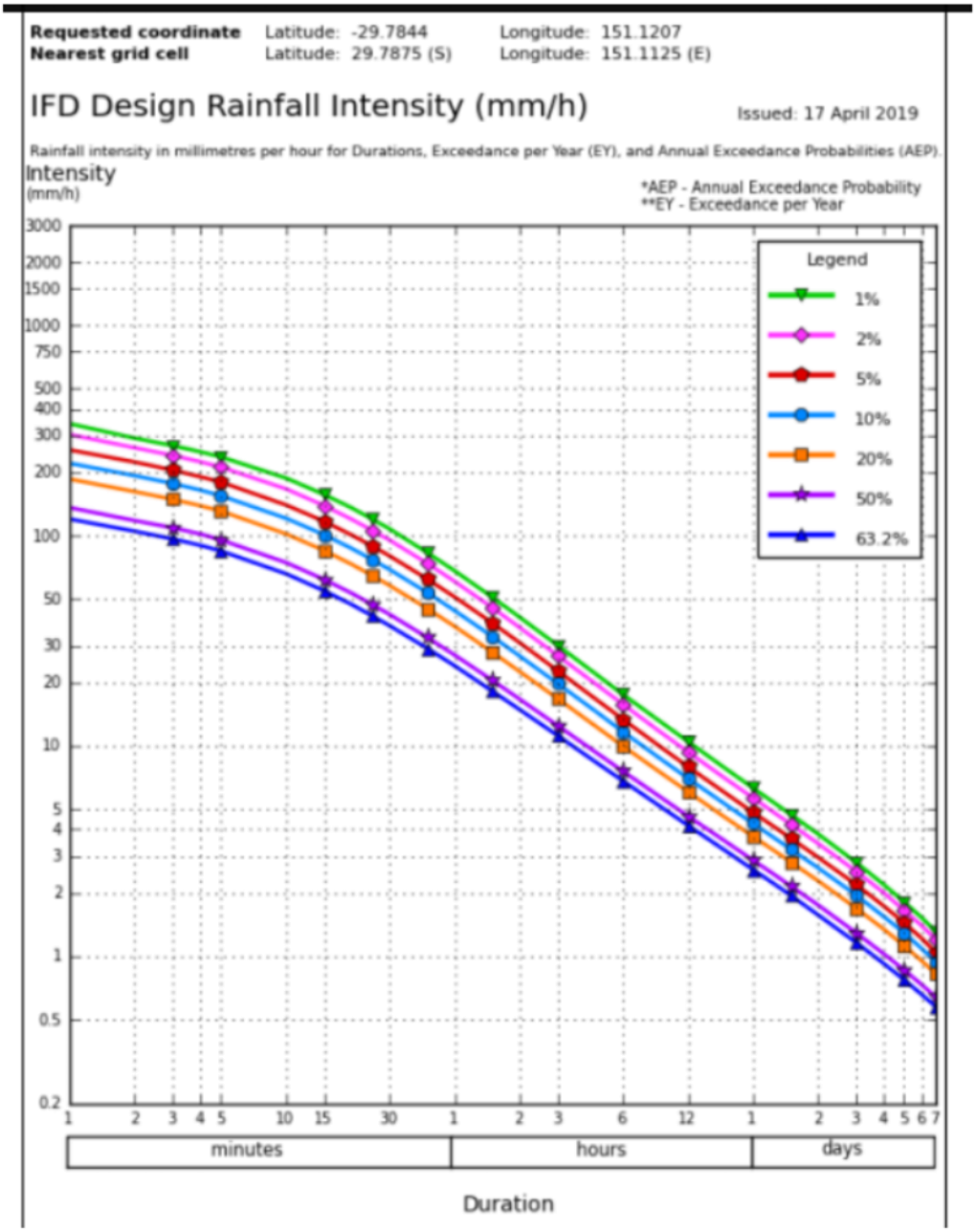
Although the chart is not specifically for high frequency rainfall events (ie ARI 5 and 10), the recorded flood events closely relate to major flooding that has occurred in Inverell over the last 145 years. The flood events shown in the chart are for flood events significantly exceeding the ARI periods being considered in this assessment, however it indicates that the duration of the peak rainfall event was generally in the order of one day or less, with the exception of the rainfall event in 1976 where the peak rainfall of over 25mm per day was recorded for 7.6 days. This result can be discarded as the rainfall most likely fell over a series of days within the month with separate rainfall events.

Of more significance is the rainfall data showing the peak rainfall occurring over a single rainfall event with the highest daily rainfall between 61mm over 0.4 days and 92mm over 0.7 days. Given that these rainfall events represent significant flood events with ARI intervals in excess of 50 year return periods, it would suggest that the duration of a rain event using the ARI 5 rainfall data would be reasonably in the order of 0.5 days.

2.2. Assessment of Rainfall Intensities and Time of Concentration

2.2.1. Calculation of Tc and RI using existing rainfall data

As previously mentioned, a permanent weather recording station is located in close proximity to the Bundarra site. From weather recordings and statistical analysis provided by the BOM, the following RI and AEP charts have been produced for the site.



For very small catchments like the Inverell racecourse site, the Tc is generally adopted to be 5 minutes.

For the assessment of the likely flooding of this localized site, the ARI would not exceed an ARI of 10 years before inundation of the site and major surrounding areas would occur. For this reason, the scope of the initial flood extent investigation will be limited to an ARI of 5 and 10 years.

From the graph above, rainfall intensities of 130mm and 170 mm are calculated for AEP 20% and AEP 10% for ARI 5 and ARI 10 (AEP%=1/ ARI) year events respectively with a Tc of 5 minutes. This gives a total rainfall of 11mm within the 5 minute Tc period for an ARI 5 and 14mm within the 5 minute Tc for an ARI 10 before outflow commences.

2.2.2 Assessment of outflow for Tc = 5 min

The peak outflow from the site without retention levelling can be derived from the formula Q=kcIA. (ref Dept Transport and Main Roads Qld).

Rational Method (Metric)

Q=KCIA

Q = Peak Discharge m3/ sec

K= Conversion factor (cms-hr/ha-mm)

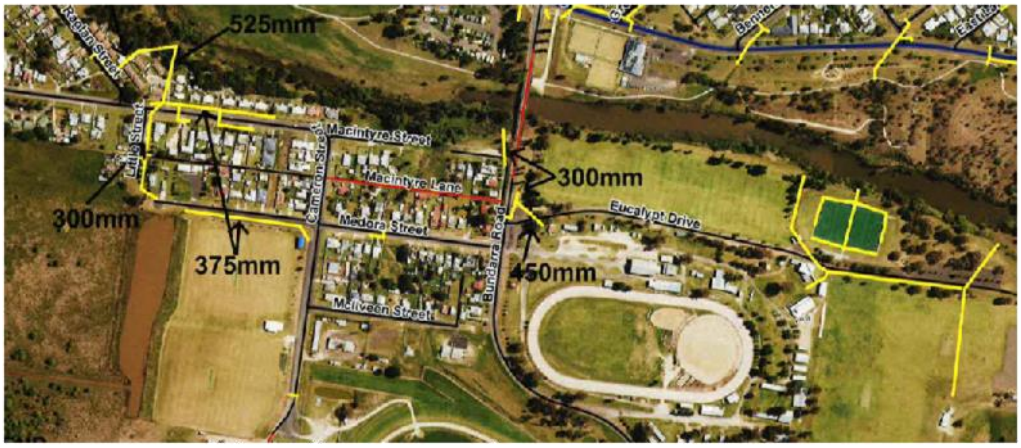
I = Rainfall Intensity (mm/hr)

A= Drainage Area - ha

- The areas of the local catchment including the race course and the low lying area adjacent to the race course has been divided into 6 segments including separate assessments for runoff from the roadway and race course track.
- As a proportion of the site is hardened and semi hardened with clearing and ground development including the race track and access roads, the runoff coefficient are detailed for each segment in the following paragraph.
- Intensity (I) for a Tc of 5 minutes has been calculated in the previous paragraph.
- K conversion factor =0.00278
- Runoff coefficient for flat grassed areas with heavy soil = 0.15
- Runoff coefficient for roadways and race course track = 0.6
- Runoff coefficient for racecourse grassed area = 0.20

Land Use	C	Land Use	C
		Lawns:	
		Sandy soil, flat, 2%	0.05 - 0.10
Business:		Sandy soil, avg., 2-7%	0.10 - 0.15
Downtown areas	0.70 - 0.95	Sandy soil, steep, 7%	0.15 - 0.20
Neighborhood areas	0.50 - 0.70	Heavy soil, flat, 2%	0.13 - 0.17
		Heavy soil, avg., 2-7%	0.18 - 0.22
		Heavy soil, steep, 7%	0.25 - 0.35
		Agricultural land:	
		Bare packed soil	
		*Smooth	0.30 - 0.60
		*Rough	0.20 - 0.50
Residential:		*Cultivated rows*	
Single-family areas	0.30 - 0.50	*Heavy soil, no crop	0.30 - 0.60
Multi units, detached	0.40 - 0.60	*Heavy soil, with crop	0.20 - 0.50
Munti units, attached	0.60 - 0.75	*Sandy soil, no crop	0.20 - 0.40
Suburban	0.25 - 0.40	*Sandy soil, with crop	0.10 - 0.25
		Pasture	
		*Heavy soil	0.15 - 0.45
		*Sandy soil	0.05 - 0.25
		Woodlands	0.05 - 0.25

2.2.2. Existing Drainage Reticulation



2.2.3. Runoff Assessment for Individual Segments

The runoff for individual segments of the catchment area are contained in parts B to D of this report.

2.2.4. Assessment of Total ARI 5 and 10 Rainfall

If there is sufficient density of continuously rainfall gauges that have recorded a number of rainfall events, using this data to derive alternative (non-uniform) design spatial patterns may be considered. However catchments with areas up to and including 20 km^2 are sufficiently small that there is little available data to derive a spatial pattern. For these catchments, it is usually acceptable to adopt a uniform spatial pattern. (reference ***Aust rainfall and runnoff).***

From the historical data contained in paragraph 2.1 of this report, generally the duration of a major flood event does not exceed 1 day and in most cases, the duration of a flooding rainfall event is in the order of 0.5 days.

In the event of a duration of 0.5 of a day, intensities are in the order of 12mm/hr and 15mm/hr for ARI 5 and 10 respectively. Rainfall over the area of the race course using the long term rainfall duration of 0.5 days results in a total volume of rainfall of 12 hours x 12mm or 144mm and 12 x 15mm or 180mm.

As the maximum intensity rainfall does not occur for the full duration of the rain event, it is reasonable to predict that 50% of the rainfall during the assessment duration occurs at 15% of the peak rainfall intensity. A hyetograph of the recorded rainfall is not available, therefore this assessment is derived from the area under a standard distribution curve with a 5% deviation relative to the peak probability.

This will translate to a total rainfall for the estimated duration of the rain event of 82mm (72*0.15 + 72mm) for an ARI 5 and 103mm (90* 0.15+ 90) for an ARI 10 return period. It should be noted that these results are not significantly different to the historical data for high flow events.

The contour plan in the following report parts indicates that the effective catchment area (A) for the site is 110 ha

Inverell Shire
Bundarra Road Drainage Issue
Flooding Assessment Report: Part B

Prepared for: Inverell Shire Council

Document/Report Control Form

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01	24May 2019	001	Peter Atkinson	Justin Pay	

1. Abbreviations

ISC	Inverell Shire Council
ARI	Average Recurrence Interval
Tc	Time of Concentration
MRD	Median Rainfall Duration
EPA	Environmental Protection Agency
ARR	Australian Rainfall and Runoff Publication
BOM	Bureau of Meteorology
AEP	Annual Exceedance Probability (1/ARI %)
RCP	Reinforced Concrete Culvert
RCBC	Reinforced Concrete Box Culvert

2. Introduction

1.1. Project overview

Bundarra Road Road borders the racecourse and adjoining low lying areas to the south of Inverell. Development of the racecourse and sub-division of adjoining land has resulted in a hardening of the landscape resulting in higher rainfall runoff and lower retention of overland flow in low to moderate frequency storms.

As a consequence, the changes in topography and land usage, Bundarra Road flood immunity has been altered resulting in more frequent inundation affecting the access and amenity of the race course and surrounding areas.

1.2. Project objectives

The primary objective of this report is to determine the rainfall characteristics and potential flooding patterns through the analysis of available flood data. Part B of this report analyses the drainage hydrology for the section of the area to the east and south of Bundarra Road

1.3. Purpose of this Options Report

The purpose of this report is to document the options available for the containment and management of flood water in longer ARI events and the upgrading of the Bundarra Road area to increase accessibility during a range of rainfall and flood events

This assessment report is intended to be retained and updated throughout the various detailed design stages of the project, forming a comprehensive record of the detailed design development. Further detail and a record of significant changes will be provided at each report revision.

3. Rainfall and Flooding Assessment

3.0 Flood Routing Assessment: Racecourse South

3.1 Individual Catchment Assessment

The assessment of flood and overland flows in the area being assessed needs to be broken up into regions depending on the origin of the flood water and the route taken to enter the river west of the Old Bundarra Road Intersection with MacIntyre Street.

The overland flow at the racecourse site watersheds at a point halfway along Tingha Road adjacent to the midpoint of the racecourse and this is the location where the assessment has been divided.

Although the area indicated in the aerial view extends outside the area of control by the Inverell Shire Council and Racecourse, catchment areas affecting the drainage around the race course is directly related to the catchment area shown. The total area of the catchment on the southern end of the racecourse is 141 hectares with approximately 103 hectares on the eastern and southern end of the racecourse as indicated on the aerial view below directly contributing to the flow over the causeway on the access road to the south west of the race course.

3.2 Existing Drainage Assessment Under Bundarra Road

Rainfall runoff from the east of Tingha Road is contained by the road embankment with limited capacity longitudinal and cross drainage culverts under Tingha Road regulating the flow into the racecourse precinct. Containment of overland flow to the east of Tingha Road contributes to the mitigation of peak flows.

3.2.1 Segment 1: Pioneer Village to Rifle Range Road: 300 dia RCP under Armstrong Road

Longitudinal drainage southwards between the Pioneer Village and Rifle Range Road consists of a 300 mm diameter reinforced concrete pipe culvert under Armstrong Street which has been assessed as having a nominal capacity before overtopping.

Photo Segment 1

The catchment area for the rainfall runoff for the segment north of Armstrong Road is assessed at 6.1 ha. The resulting runoff along Tingha Road under the culvert under Armstrong Road is:

Runoff coefficient C= 0.15
Area Segment 6.1 ha
K= 0.00278
I=130mm for ARI 5 and 170mm ARI 10
Q5 = 0.33 m3/sec
Q10 = 0.43 m3/sec

The culvert under Armstrong Road is a 300mm diameter reinforced concrete pipe culvert. The estimated flow through this culvert operating under headwater control will be 1.5 metres per second based on the gradient available in the table drain to prevent tail water controlling flows. This culvert has a terminal capacity of 0.11 cubic meters per second which would indicate that the crossing over Armstrong Road flows at very low rainfall events.

3.2.2 Segment 2: Pioneer Village to Rifle Range Road: 2x 1200 x 300 RCBC under Tingha Road

The catchment area south of Armstrong Road for this culvert is shown below. Total flow through the Segment 2 culvert includes flow north of Armstrong Road and runoff from the area below:

Photo Segment 2

The area of this segment is 19.44 hectares. Flow rates at the outlet are calculated below.

Area 19.44 ha
Runoff coefficient C= 0.20
K= 0.00278
I=130mm for ARI 5 and 170mm ARI 10
Q5 = 1.4 m3/sec
Q10 = 1.83m3/sec

3.2.3 Cross Highway Flow Assessment

The first cross road drainage south of Armstrong Street consists of two 1200 mm x 300mm RCBC's approximately 160 metres north of Rifle Range Road as shown in the attached aerial view.

Photo Segment 2 Drainage Path

Longitudinal drainage between the Armstrong Street cross drainage and Rifle Range Road flows to the two 1200mm x 300mm reinforced concrete box culverts which transfer water westwards across the Tingha Road towards the southern end of the racecourse and on to the McIntyre River. The very limited cross drainage at this location between Rifle Range Road and Armstrong Street results in rapid afflux and eventual overtopping of Tingha Road.

3.2.3 Segment 3: Rifle Range Road South:

The assessment of rainfall runoff from Segment 3 is detailed below:

Photo Segment 3

Area 46.33 ha

Runoff coefficient C= 0.20

K= 0.00278

I=130mm for ARI 5 and 170mm ARI 10

Q5 = 3.348 m3/sec

Q10 = 4.37 m3/sec

3.2.4 Flow Path Segment 3 (3x 1200 x 450 RCBC) under Tingha Road

Longitudinal flow on the eastern side of the Tingha Road from the area further south in the designated area flows northwards to Rifle Range Road where it is diverted west by Rifle Range Road and enters the cross road drainage through the 3 x 1200 x 450 RCBC's.

Photo Segment 3 Flow Path

3.2.5 Effective retention volume areas for drainage under Bundarra Road

Segment	Area ha	Runoff Coefficient	Rated 100% Runoff areas
1	6.1	.5	3.35
2	19.44	.15	2.91
3	46.33	.2	9.27
Total	118.38		15.52
Segment	Area ha	Runoff Coefficient	Q for ARI 10
1	6.1	.5	0.43

2	19.44	.15	1.83
3	46.33	.2	4.37
Total	118.38		6.63 cu m/ sec

3.3 Bundarra Road Cross Drainage and Retention Assessment

For all sections south of the Pioneer Village (segments 1,2 and 3) on the eastern side of the Tingha Road, water flow is controlled by the capacity of the two 1200 x 300 RCBC's at Armstrong Street and three 1200mm x 450mm RCBC's at Rifle Range Road before crossing the Tingha Road into the racecourse precinct.

Flow through the cross-road culverts will initially operate under headwater control and be limited to a maximum flow velocity of less than 2.4 metres per second given the condition of the culverts and the limited scour evident at the culvert outlet.

Headwater control will operate as the dominate control until the outlet submerges and at this stage, overtopping of the Tingha Roadway would occur. Tail water control at these locations is controlled by the condition of the outfall with no defined drainage path and limited access to the flow path for maintenance resulting in long grass and silt build up. This would effectively reduce the working capacity of the culverts to approximately 1.1 metres per second based on a submerged outlet and poor dissipation of rainfall runoff around the southern end of the racecourse.

On the basis that the cross flow prior to overtopping would be limited to a through culvert velocity of 1.1 metres per second, and the available drainage cross sectional area of the two sets of culverts totals 2.34 square metres, the discharge into the racecourse area in total is 2.56 cubic metres per second. Over an eight hour period, this equates to a potential 73288 cubic metres of runoff passing through the two culverts into the southern area of the racecourse.

The area for retention of rainfall runoff behind the Tingha Road embankment between the Pioneer Village entrance north of Armstrong Street and Rifle Range Road has been assessed as approximately 17.6 hectares which provides a temporary retention of 79200 cubic metres of rainfall runoff based on a maximum depth of water against the roadway embankment of 900mm before overtopping the roadway.

Photo Retention Area East of Bundarra Road

Assessment of effective rainfall runoff when calculating outlet velocities relies on an infiltration coefficient, however the worst case for flood assessment is a rain event after a previous period of rain which leaves the catchment area saturated. In order to assess the impact of this eventuality, the runoff resulting from rainfall for the 5 and 10 year return period has been assessed based on 0% infiltration.

The area of the catchment for these two cross road culverts is approximately 55.56 hectares which results in runoff for an ARI 5 rainfall event of 45559 cubic metres of water based on 82 mm over an 8 hour period as determined in Part A is calculated, which does not exceed the cross road capacity of the two culverts of 73228 cubic metres.

For an ARI 10 rain event, the area of the catchment for these two cross road culverts is approximately 55.56 hectares. In an ARI 10 rainfall event, a total runoff of 57226 cubic metres of water based on 103 mm over an 8 hour period as determined in Part A is calculated, which does not exceed the cross road capacity of the two culverts of 73228 cubic metres. However, this is based on the conditions upstream of the culvert set and relies on headwater control.

The subsequent assessment of tailwater control will affect the capacity of these culverts with the current outlet conditions and would cause overtopping of the Tingha Road due to tailwater control, ie rainfall runoff cannot drain past the race course quickly enough to avoid backwater overtopping the road.

Without modification of the outlet around the race course to accommodate the cross road flow and runoff from the western side of the racecourse, it is estimated that approximately 1.62 metres of water in a sufficiently long duration rainfall event could back up at the outlet of the cross road culverts before effective outflow to the south of the racecourse would occur given normal conditions of the racecourse perimeter, ie long grass and flat gradient

3.4 Drainage Design Southern End of the Racecourse

3.4.1 The total inflow from the eastern side of Bundarra Road around the southern end of the racecourse in an ARI 5 year rain event totals 45559 cubic metres with an inflow of 2.56 cubic metres per second and for an ARI 10 year rain event, 73228 cubic metres with the same inflow, noting that inflow is regulated by the culvert capacity under Bundarra Road.

3.4.2 Segment 4 Western Side of the racecourse between Armstrong Road and Rifle Range Road

The area on the western side of the racecourse between Armstrong Road and the culverts at Rifle Range Road is 1.1 hectares. The runoff from this area is 0.08 cum/ sec for a 5 year ARI and 0.1 cum / sec for an ARI of 10 years.

Photo Segment 4

Runoff from this area which adds to the drainage from the Armstrong Road culvert is calculated below:

Area 1.1 ha Runoff coefficient C= 0.20 K= 0.00278 I=130mm for ARI 5 and 170mm ARI 10 Q5 = 0.08 m3/sec Q10 = 0.10 m3/sec

3.5 Open Drain Design Between Bundarra Road and Racecourse:

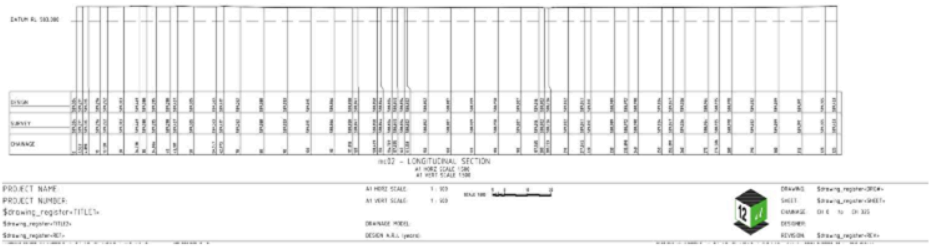
3.5.1 From the initial entry point adjacent to the 2 x 1200mm x 300 RCBC between Armstrong Road and Rifle Range Road, the inflow through the culvert is restricted to 0.8 cubic metres per second due to the culvert capacity.

The design of the drain along the front of the racecourse to the intersection with the Racecourse Road intersection drains the under road flow from Armstrong Road and the rainfall runoff from segment 4.

The required drain capacity to prevent afflux is calculated using Manning's equation. The slope of the drain has been determined from the long section provided by ISC survey.

From the survey attached at Annex B, the gradient from the Armstrong Street culvert to the southern corner of the racecourse precinct from chainage 0 to chainage 325 is RL 589.453 to RL 589.304, ie a fall of 149mm over a distance of 325 metres (ie 0.045%).

In order for water to run in an open drain with a Mannings n value of 0.03, a hydraulic gradient of 0.5% would be considered a minimum. This requires the difference in height of headwater at the drain inlet and outlet to be 1.625 metres.



Mannings roughness coefficients

Description	Coefficient (η)
Earth channel	
Fairly regular section	0.022
Irregular section with pools, slight channel meander	0.037
Gravelly channel	
Fairly regular section	0.025
Irregular section with pools, slight channel meander	0.040
Stony, cobbles channel	
Fairly regular section	0.035
Irregular section with pools, slight channel meander	0.050
Some grass or weeds, little or no brush	
Fairly regular section	0.030 – 0.035
Irregular section with pools, slight channel meander	0.045 – 0.050
Dense growth of weeds, little or no brush	
Fairly regular section	0.035 – 0.050
Irregular section with pools, slight channel meander	0.050 – 0.065
Some weeds, light brush on banks	
Fairly regular section	0.035 – 0.050
Irregular section with pools, slight channel meander	0.050 – 0.065
Some weeds, heavy brush on banks	
Fairly regular section	0.050 – 0.070
Irregular section with pools, slight channel meander	0.065 – 0.085

Maximum permissible velocities for various materials

Surface Material	Permissible Velocity (m/s)
Sand	0.4
Sandy loam	0.5
Silty loam	0.6
Fine gravel	0.8
Stiff clay	1.2
Coarse gravel	1.2
Grass mixtures	0.8 – 1.5
Jute matting	1.5 – 1.8
Grass: Couch, Bent, Fescue	1.5 – 2.2
Grass: Kikuyu	1.8 – 2.5
Stones 150 mm	2.5 – 3.0
Stones 300 mm	4 - 5
Gabions/Reno mattresses	4 - 6

Mannings Formula

$$V = \frac{R^{2/3} S^{1/2}}{\eta}$$

$$Q = A \times V$$

V Velocity
R Hydraulic radius
S Energy gradient (Slope)
η Roughness coefficient
Q Unit discharge
A Cross-sectional area of flow

3.5.2 Drain Assessment: Racecourse from Armstrong Road (segments 1, 2 and 4)

The basis of the drainage design is that the open channel at the inlet is wide enough to accommodate the under road flow at this location but will back up unless an adequate outflow is provided. As the drain along the racecourse truncates, a sufficient hydraulic gradient must be maintained for the water to flow in the channel at the western end of the racecourse by providing the modified outlet to allow for the inflow.

Based on these parameters, the outlet velocity would be 0.36 metres/ sec which is a very low velocity. From the parameters above, with a Mannings n of 0.03, and a hydraulic gradient of 0.5%, the drain base dimension at the outlet around the western end of the racecourse needs to be 3 metres for maintenance and the height of the drain sides need to be 1.475 metres (1.625 m – 0.15 m) to contain the runoff to a depth to obtain the required hydraulic gradient. The invert level of the drain therefore needs to be excavated to RL 587.930 (RL 589.304 – 1.475) at the outlet.

From the outflow formula, the cross sectional area of the drain is 3.72 m2 and at a velocity of 0.357 m/ sec, the available outflow is 1.32 cubic metres / sec which exceeds the capacity requirements for the ARI 5 and 10 year floods. (para 3.4.1)

The design of the channel requires the inlet invert base level to be at natural ground level with a 1.0 metre bench between the channel and the racecourse at Chainage 0, ie the intersection with the drain from Rifle Range Road. The channel to transfer the water to the southern corner of the racecourse requires the inlet invert level of the drain to be RL 587.930 with a 1 metre high bench between the drain and the racecourse transitioning into the 1.475 excavation at the southern end of the racecourse to form the channel banks. The drain requires a base width of 3 metres and a bank height of 1.625 metres (which includes the excavation depth) to have the required capacity.

3.5.3 Inflow from Rifle Range Road (Segments 3)

The drain from Rifle Range Road to the intersection of the Armstrong Road drain enters the drainage system to the south of the race course along the western boundary of the race course property. The junction of the two drainage systems combines the Armstrong Street and Rifle Range Road flows and generates a total flow of 6.64 Cumec. .

The existing drain that runs to the river along the southern boundary of the racecourse at this junction is approximately 8 metres wide and 1 metre deep. Given the required hydraulic gradient required to ensure flow from the Armstrong Street culvert, the drain at the junction with the Rifle Range Road culvert will have an invert level of RL 587.829 to match the drain along the eastern side of the racecourse.

The combined flow into the drain at this junction from rainfall runoff east of the Bundarra Road is approximately 6.64 cu m/ sec. The drain dimension at this location to accommodate the inflow from the combined inlets is

Segment	Area ha	Runoff Coefficient	Q for ARI 10
1	6.1	.5	0.43
2	19.44	.15	1.83
3	46.33	.2	4.37
4	1.1	.2	0.1
Total	119.48		6.64 cu m/ sec

3.5.4 Drain requirement for Segments 1 to 4

From Mannings formula with a total inflow at the inlet of 6.64 cumec, slope of 0.5% to ensure drainage and an n value of 0.03, and a maximum stream velocity of 1.5 m/sec, the required drain dimension at the inlet requires a hydraulic radius of 6.4. The depth of drain at the drain junction is 1.65 requiring a base width of 4.35 metres.

3.5.5 Total Inflow South of the Racecourse: Segment 5

Rainfall from the southern adjoining properties will contribute approximately 18.2 cu m/ sec for an ARI of 10 years based on an area of 38.5 hectares.

Area 38.5 ha

Runoff coefficient C= 0.20

K= 0.00278

I=130mm for ARI 5 and 170mm ARI 10

Q5 = 13.9 m3/sec

Q10 = 18.2 m3/sec

The inflow from the southern property needs to enter the drain at the causeway on the south west corner of the racecourse so as not to increase flows into the drain for the length of the drain.

The causeway at this location is a concrete structure with an invert level approximately 1200mm below the road level and has three 450 mm dia anti-ponding culverts in the base. The hydraulic gradient from the intersection of the two drainage systems at Bundarra Road to the causeway once again needs to be maintained at 0.5% in order to prevent afflux in the drain which would affect the operation of the rifle Range road culvert and Armstrong Street culvert.

The inflow from the property to the south of the racecourse needs to be contained on the property generating the flow. This can be facilitated by constructing a 1 metre high diversion bank to the south of the drain from Rifle Range Road culvert to the causeway where it would outlet at the eastern side of the causeway to prevent afflux in the adjoining property and avoid cutting the access road to the south.

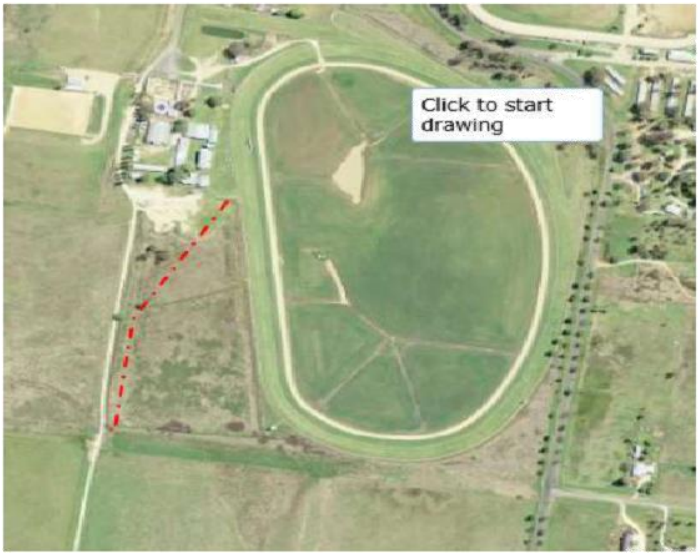
3.5.6 Outflow from the Racecourse Precinct

The area to the south west of the racecourse also contributes to the flow at the causeway intersection and ultimately causes potential afflux to the Bundarra Road crossing.

Segment 6

Area 5.38 ha
Runoff coefficient C= 0.20
K= 0.00278
I=130mm for ARI 5 and 170mm ARI 10
Q5 = 2.08 m3/sec
Q10 = 2.7 m3/sec

The flow path for this catchment is via an existing drain running along the road to the west of the racecourse and overflowing the causeway.



Segment 6 Flowpath

3.5.7 Causeway Outflow to River

The flow from the causeway to the river has infinite capacity as the drainage path is open ground over an extensive area. The total flow under and over the causeway from rainfall on segments 1 to 6 in an ARI 10 year event totals 27.54 cumec.

The length of the drain from Bundarra Road to the causeway is 506 metres. The hydraulic gradient of 0.5% requires a fall in the drain of 2.5 metres resulting in a drain invert level at the causeway of RL 585.430 (587.930 – 2.5)

The culvert configuration to accommodate this outflow based on retaining an outlet velocity of 1.5 m/sec equates to 18.6 sq mtrs. Flow depth at this level in an open drain would be 1.65 metres, however accommodating all the flow in culverts under the road would require an expensive bank of culverts.

The option for the causeway would be to install 4 x 900 mm dia culvert pipes at the invert level and allow the remaining flow to cross a causeway to a depth of 500mm. The causeway overtopping area would be in the order of 16 m2, or a length of approximately 32 metres at a level of RL 586.66

4.0 Summary Diagram

Inverell Shire
Bundarra Road Drainage Issue
Flooding Assessment Report: Part C

Prepared for: Inverell Shire Council

Document/Report Control Form

File Location Name:	
Project Name:	Bundarra Road Drainage Issue- Flooding Assessment
Project Number:	(OP-5753)
Revision Number:	01

Revision History

Revision #	Date	WVR #	Prepared by	Reviewed by	Approved for Issue by
01	24May 2019	001	Peter Atkinson	Justin Pay	

1. Abbreviations

ISC	Inverell Shire Council
ARI	Average Recurrence Interval
Tc	Time of Concentration
MRD	Median Rainfall Duration
EPA	Environmental Protection Agency
ARR	Australian Rainfall and Runoff Publication
BOM	Bureau of Meteorology
AEP	Annual Exceedance Probability (1/ARI %)
RCP	Reinforced Concrete Culvert
RCBC	Reinforced Concrete Box Culvert

2. Introduction

1.1. Project overview

Bundarra Road Road borders the racecourse and adjoining low lying areas to the south of Inverell. Development of the racecourse and sub-division of adjoining land has resulted in a hardening of the landscape resulting in higher rainfall runoff and lower retention of overland flow in low to moderate frequency storms.

As a consequence, the changes in topography and land usage, Bundarra Road flood immunity has been altered resulting in more frequent inundation affecting the access and amenity of the race course and surrounding areas.

1.2. Project objectives

The primary objective of this section of the report is to determine the flooding and rainfall runoff characteristics of the Pioneer Village facility on the north eastern segment of the study area.

1.3. Purpose of this Options Report

The purpose of this report is to document the options available for the containment and management of flood water in longer ARI events and the upgrading the drainage within the Pioneer Village precinct of Bundarra Road to increase accessibility during a range of rainfall and flood events.

This assessment report is intended to be retained and updated throughout the various detailed design stages of the project, forming a comprehensive record of the detailed design development. Further detail and a record of significant changes will be provided at each report revision.

3. Rainfall and Flooding Assessment

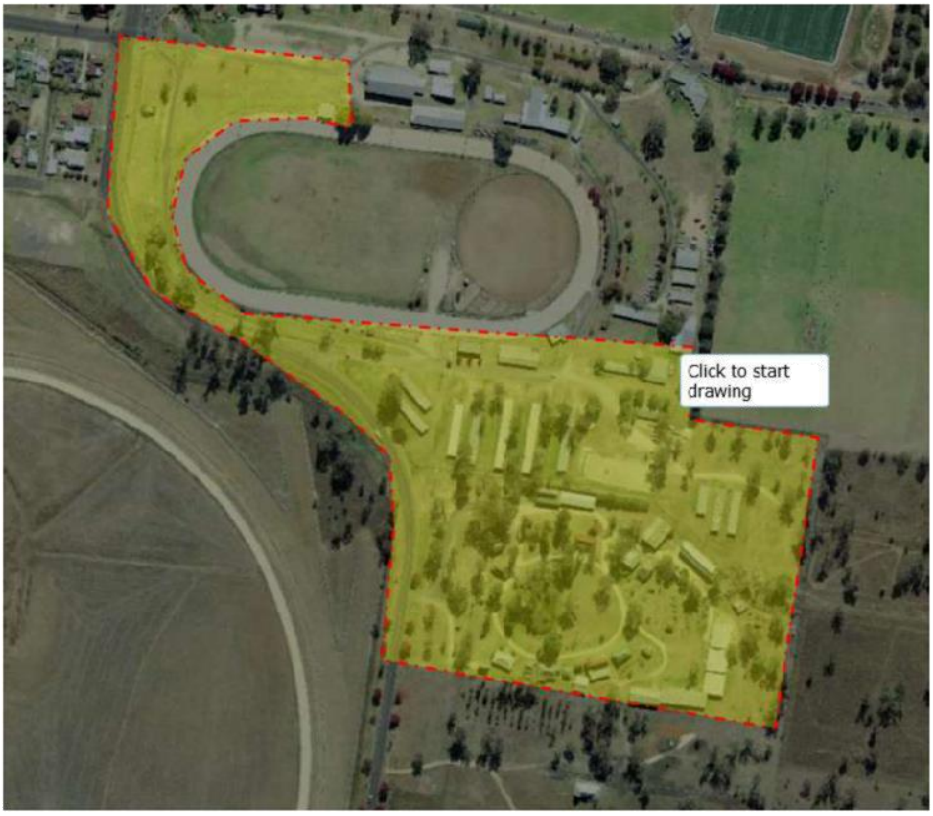
3.0 Flood Routing Assessment: Pioneer Village

3.1 Individual Catchment Assessment

The assessment of flood and overland flows in the area being assessed needs to be broken up into two regions, the Pioneer Village precinct and the area bordering the trotting track to the north of the Village.

The overland flow from the Pioneer Village site watersheds at a point adjacent to the entry to the racecourse and this is the location and the water from the trotting track passes under the Bundarra Road opposite the buildings housing the lapidary club.

The areas affecting rainfall runoff at this site are demonstrated in the attached aerial photo. The total area of the catchment at this segment is 8.3 hectares.



3.2 Existing Drainage Assessment Under Bundarra Road

Rainfall runoff from the east of Bundarra Road is contained by the road embankment with limited capacity longitudinal and cross drainage culverts under Bundarra Road regulating the flow into the racecourse precinct to the south. Containment of overland flow to the east of Bundarra Road contributes to the mitigation of peak flows but contributes to afflux in the general area..

3.2.1 Segment 1: Pioneer Village to the Trotting Track Entrance :2 x 300 dia RCP under Bundarra Road Road

Longitudinal drainage northward from the Pioneer Village across Bundarra Road into the racecourse area to the north of the racecourse consists of a 2 x 300 mm diameter reinforced concrete pipe culvert under Bundarra Road which then enters a wide channel running between the lapidary building and the racecourse embankment. The 2 x 300 dia RCP's are considered to be the flow control for the north eastern segment.

Photo Segment 1 Pioneer Village Area

The catchment area for the rainfall runoff for segment 1 at the pioneer Village is assessed at 5.6 ha. The resulting runoff from the Pioneer Village to the 2 x 300 RCP under Bundarra Road is :

Runoff coefficient C= 0.40
Area Segment 5.6 ha
K= 0.00278
I=130mm for ARI 5 and 170mm ARI 10
Q5 = 0.78 m3/sec
Q10 = 0.1.03 m3/sec

The culvert under Bundarra Road is a 2 x 300mm diameter reinforced concrete pipe culvert. The estimated flow through this culvert operating under headwater control will be 1.5 metres per second based on the gradient available in the table drain to prevent tail water controlling flows. This culvert has a terminal capacity of 0.22 cubic meters per second which would indicate that the culvert has capacity to transfer all rainfall runoff from the Village in an ARI 10 year event.

3.2.2 Segment 2: Pioneer Village to Trotting Track Entrance

The catchment area for the segment 2 is shown below. The Segment 2 area contributing to the flow through the culvert under Bundarra Road runs from the diversion bank to the north of the Pioneer Village culvert to the northern end of the trotting track and allows for rainfall flow back into the annulus of the trotting track through a 450 x 300 RCBC.

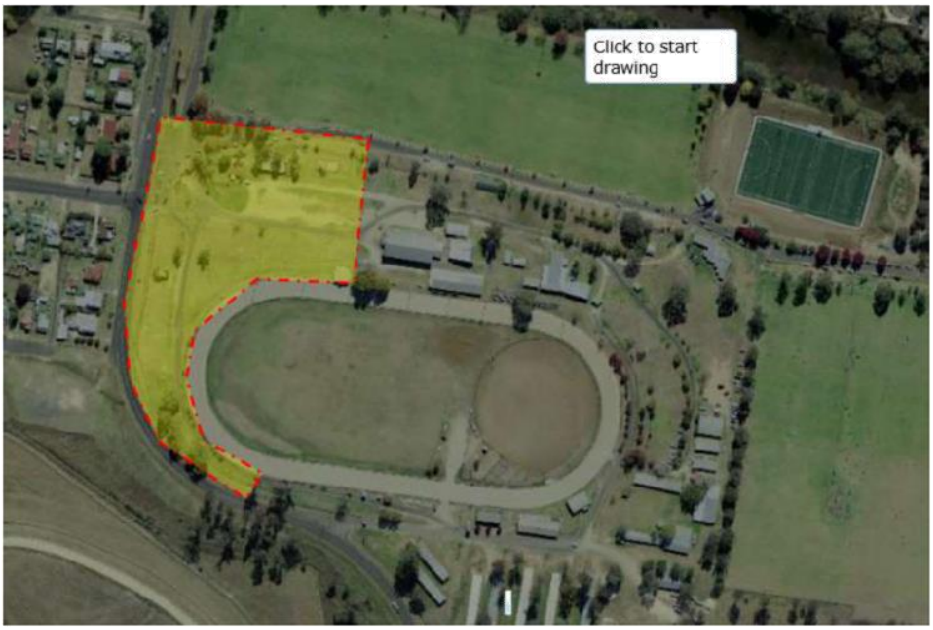


Photo Segment 2

The area of this segment is 2.7 hectares. Flow rates at the outlet are calculated below.

Area 2.7 ha

Runoff coefficient C= 0.20

K= 0.00278

I=130mm for ARI 5 and 170mm ARI 10

Q5 = .195 m3/sec

Q10 = 0.255m3/sec

3.2.3 Cross Highway Flow Assessment

Allowing for a velocity through the cross highway of 1.5 metres / sec, the capacity of the culvert under Bundarra Road servicing this area is 0.24 cu m/ sec which will accommodate the under highway flow combined with an estimated flow into the trotting track of 0.3 cum /sec

4.0 Flooding Within Pioneer Village.

Given the assessment above which concludes that the cross drainage under Bundarra Road is adequate for an ARI 10 year rainfall event providing that the outlets currently operating are maintained to a high standard, ie grass kept short and silting removed when required, the outflow from the Pioneer Village will not create an afflux on the eastern side of Bundarra Road.

The reason that localized flooding occurs within the Pioneer Village precinct is the size of the internal cross road drainage and the poor standard to which the drainage has been maintained.

The location of the existing 100 mm diameter pipes is considered suitable, however the size of pipe used is prone to silting due to the low flow available and this creates localized afflux within the Village.

Without a comprehensive survey of the area available, the recommendation for the drainage upgrade will be based on replacing the existing culverts with 220 RCP pipes and increasing the depth of gravel pavement within the Village to direct flow through the new culverts.

This will assist in maintaining flow through the culverts and reduce the general flooding in the grounds by re-contouring the catchment area to direct flow to the new culverts more efficiently.

Inverell Shire
Bundarra Road Drainage Issue
Flooding Assessment Report: Part D

Prepared for: Inverell Shire Council

Document/Report Control Form

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Table of Contents

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2. Introduction

2.1 Project overview

Bundarra Road borders the racecourse and adjoining low lying areas to the south of Inverell. Development of the racecourse and sub-division of adjoining land has resulted in a hardening of the landscape resulting in higher rainfall runoff and lower retention of overland flow in low to moderate frequency storms.

As a consequence, the changes in topography and land usage, Bundarra Road flood immunity has been altered resulting in more frequent inundation affecting the access and amenity of the race course and surrounding areas.

2.2 Project objectives

The primary objective of this section of the report is to determine the flooding and rainfall runoff characteristics of the oval bordering Medora Street and any changes to the runoff characteristics at the western end of Medora Street.

2.3 Purpose of this Options Report

The purpose of this report is to document the options available for the retention of flows at the western end of Medora Street to avoid impacts on adjoining properties.

This assessment report is intended to be retained and updated throughout the various detailed design stages of the project, forming a comprehensive record of the detailed design development. Further detail and a record of significant changes will be provided at each report revision.

3. Flood Routing Assessment Medora Street Oval Precinct

3.1 Individual Catchment Assessment

The assessment of flood and overland flows in the area being assessed needs to be compared to the changes from pre-existing conditions to the current development of the sports and recreation oval.

Flow from the streets surrounding the oval have been upgraded to provide sealed streets with reticulated kerb and channel drainage integrated with culverts directing flow to the river. The area affecting rainfall runoff at this site is demonstrated in the attached aerial photo.

3.2 Existing Drainage Assessment Medora Street Oval

Rainfall runoff from the Medora Street Oval is contained by the street drainage reticulation and runoff from the oval to the west and from there, overland flow to the river.

Flow directly generated from the oval does not impact the drainage in Medora Street other than the very localized catchment from the oval batters at the western end of Medora Street.

Outlet conditions at the end of Medora Street consist of a concrete lined outflow channel exiting into an open unlined diversion drain. This drain then flows into overland flow into the adjoining river.

Reticulation from the oval is via standard concrete kerb and channel system to provide above ground flow. The new system provides a similar reticulation system to the original outflow in that it is all above ground relying on overflow from the oval area to be contained in the gutter system.

The impact of the new construction is that the water flow is more efficient due to the lower mannings N of the kerb and channel compared to the old open unlined drainage that ran alongside the Medora pavement.

Detailed survey and design will be required in order to determine the most appropriate option for draining the depression that was created during the oval upgrade.

3.3 Drainage Assessment for Flood Basin/ Wetland Reserve

The land between the western side of the racecourse and oval generally slopes towards the river with a grade difference of several metres from the rear of the oval to mean river level.

The retention of any reasonable body of water in the region between the oval/ racecourse and the river would require either a large positive projection levee or a zero projection wetland basin.

A levee bank would rely solely on rainfall runoff in normal years to retain water needed for a wetlands rather than a grassed area that would suffer wet/ dry variation and not support wetland birds and vegetation.

The zero projection wetland would require a very significant excavation to lower the ground level to below the mean level of the river to allow inflow thru infiltration or inflow south-west of the racecourse and oval .

Secondly, in order to construct a bund or wetland basin in this region, Council must be prepared to re-build it after every flood. This wetland reserve when retaining water would at best duplicate the river precinct when there is a naturally formed wetlands typical of this area already existing on the banks and river. In order to get enough water to be retained in a wetlands, there would have to be a depth of about 3 metres to allow for evaporation etc.

4.0 Conclusion

The levelling of the oval area and contouring of the embankments would significantly slow the outflow from the area compared to the original undeveloped site.

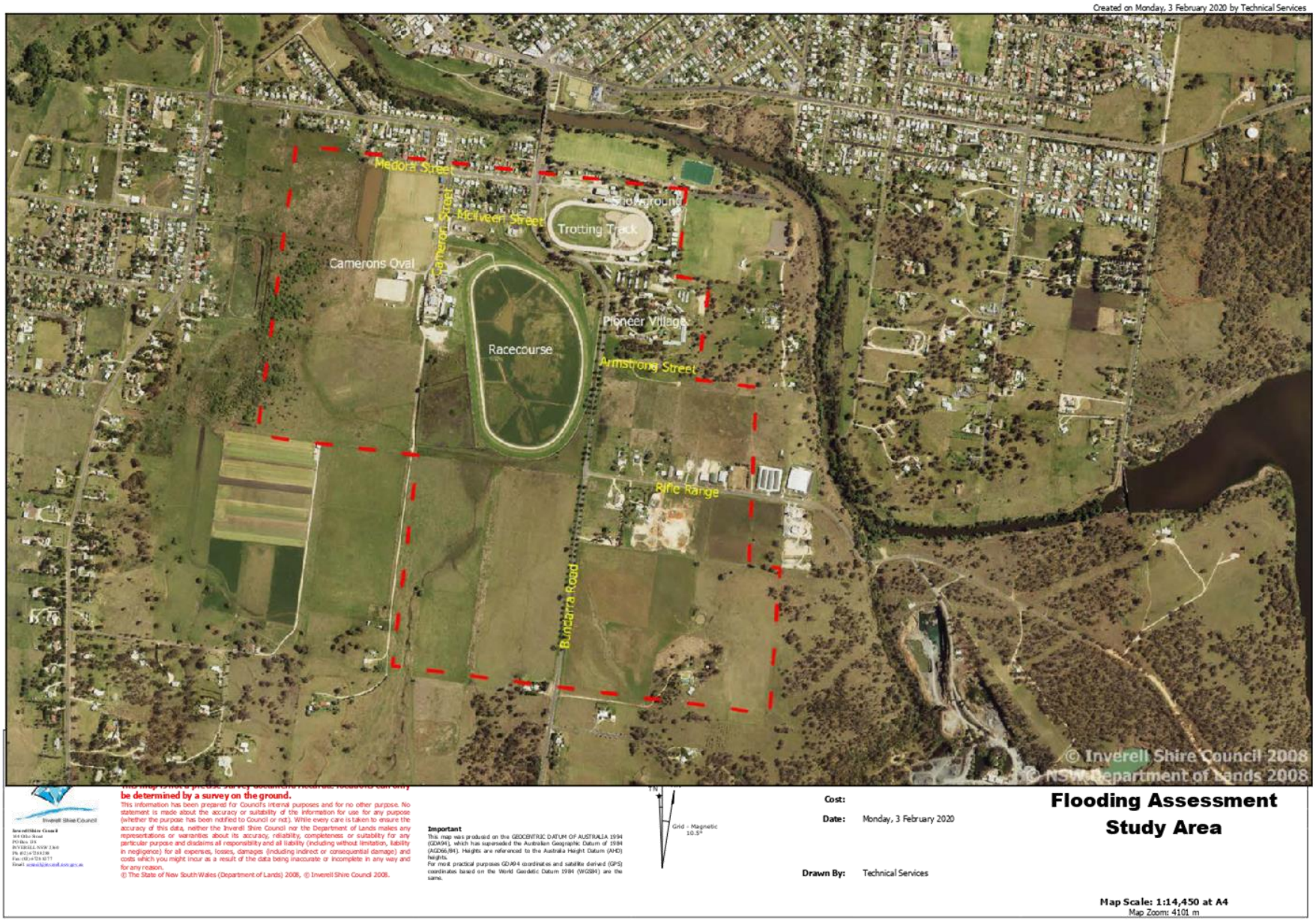
The retention of full vegetation would not significantly reduce the time of concentration from the oval and the net result of flattening the area and retaining vegetation would have a negligible difference to the original site where the vegetation was more riparian but constantly sloped.

The potential for local overtopping of the Medora Street reticulation however does exist at the transition from the open concrete lined drain to the unlined drain at the river end of Medora Street.

The rainfall runoff from the street will have a much shorter time of concentration resulting in higher arrival velocities at the outlet resulting in a potential localized backup of water as the outlet velocity is reduced through the grass lined outlet.

To alleviate the potential for local flooding affecting residents adjoining this section of Medora Street, it is recommended that the concrete lined drain be extended another 25 metres to provide an outlet at a lower level to the end of the street reticulation and provide an outlet further into the over land flow region thus reducing the potential for localized afflux at the transition point.

The construction of a wetlands reserve between to the south-west of the race course and south of the oval is not practical given the seasonal variation in river levels and the gradient between the racecourse and the river.


Created on Monday, 3 February 2020 by Technical Services
Medora Street
McIlveen Street
Cameron Street
Camerons Oval
Trotting Track
Showground
Racecourse
Pioneer Village
Armstrong Street
Rifle Range
Bundarra Road
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be determined by a survey on the ground.
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Important
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For most practical purposes GDA94 coordinates and satellite derived (GPS) coordinates based on the World Geodetic Datum 1984 (WGS84) are the same.
TN
Grid - Magnetic
10.5°
Cost:
Date: Monday, 3 February 2020
Drawn By: Technical Services
Flooding Assessment
Study Area
Map Scale: 1:14,450 at A4
Map Zoom: 4101 m

5.3 ROADS TO RECOVERY - ADDITIONAL FUNDING ALLOCATION

File Number: **S4.11.16/12 / 20/3589**

Author: **Justin Pay, Manager Civil Engineering**

SUMMARY:

On 6 November 2019, the Federal Government announced $138.9M additional Roads to Recovery funding in the 2020 calendar year for the 128 Local Government Areas eligible for the Drought Communities Programme Extension. Inverell Shire Council will receive $1,402,055 of this funding. The Committee is requested to allocate this funding.

RECOMMENDATION:

That the Committee recommend to Council that the additional $1,402,055 Roads to Recovery funding be allocated as follows:

- *Sealed Road Heavy Patching - $500,000*
- *Concrete Culvert/Causeway replacement/upgrade - $500,000*
- *Gravel Resheeting - $402,055*

COMMENTARY:

On 6 November 2019, the Federal Government announced $138.9M additional Roads to Recovery funding in the 2020 calendar year for the 128 Local Government Areas eligible for the Drought Communities Programme Extension. Inverell Shire Council will receive $1,402,055 of this funding.

The additional funding will be available over the 2019/2020 and 2020/2021 financial years, with approximately half of the total $1,402,055 being available each year.

Current drought conditions have led to significant movement and cracking of the subgrade under the sealed road network. It is critical that Council keep up with required heavy patching on the sealed road network, in order to prevent moisture ingress. Council will be presented with significant failures when the drought breaks if we do not undertake adequate maintenance.

Dry conditions provide a good opportunity for works to be completed on our drainage infrastructure. A number of concrete structures on the Council road network have reached the end of useful life and require replacement.

When wet weather does return, the unsealed road network will require significant capital replacement. The recent extensive period of dry weather has depleted unsealed pavement depths due to dust loss and this has been exacerbated by Council's inability to complete regular maintenance due to lack of available water.

In order to address the above issues it is proposed that the additional funding be allocated to programs that Council traditionally fund from Roads to Recovery, including:

- Sealed Road Heavy Patching - $500,000
- Concrete Culvert/Causeway replacement/upgrade - $500,000
- Gravel Resheeting - $402,055

Individual projects under the above programs will be adopted from Council's Asset Management System. Priority will be given to projects that can be completed in accordance with the Roads to Recovery funding conditions. Availability of resources (gravel and water) will be a major contributing factor.

It is anticipated that local contractors will be utilised for the majority of the Culvert/Causeway replacement works. This will go some way to stimulating the economy whilst relieving pressure from the works program.

RISK ASSESSMENT:

Nil

POLICY IMPLICATIONS:

Nil

CHIEF FINANCIAL OFFICERS COMMENT:

Nil

LEGAL IMPLICATIONS:

Nil

ATTACHMENTS:

Nil

5.4 CROWN ROAD REQUEST - ADJACENT TO GILGAI SCHOOL

File Number: **S4.11.16/12 / 20/3590**

Author: **Justin Pay, Manager Civil Engineering**

SUMMARY:

Council has received a request from Crown Lands regarding a section of Crown Road adjacent to Gilgai School. The request has been made for this section of Crown Road to be transferred to the control of Council. The Committee is requested to make a determination.

RECOMMENDATION:

That the Committee recommend to Council that the section of Crown Road as presented in Attachment 2 be transferred to Council, on the provision that:

i) Known hazards associated with trees be addressed prior to transfer;

ii) Any future upgrade of this section of road be subject to grant funding or contribution from the Department of Education;

iii) The maintenance classification of the road be Urban Minor; and

iv) Council apply for relevant grant funding in order to improve road safety at the location.

COMMENTARY:

Access to the bus zone at Gilgai Public School has been a matter of concern for a number of years. A report was presented to the Committee in March 2019 outlining concerns at the time; a copy of the report is presented in Attachment 1 for the information of the Committee. At the time of that report the Department of Education had put measures in place to mitigate the issues. Since March 2019 no further issues relating to the bus zone were raised with Council, by the school or the Department.

During the school holidays in December 2019 Council was approached by staff from Crown Lands, with a request that the parcel of Crown Road adjacent to the school be transferred to Council control. Attachment 2 includes a map showing the parcel of land in question, highlighted in yellow. This request was instigated by the acting principal of the school contacting Crown Lands and raising concerns about the traffic flow and conflict between vehicles and pedestrians at the location. Crown Lands would not commit to undertaking physical works at the location, their suggestion was that the Crown Road be transferred to Council.

Attachment 3 is a copy of Council's Management Policy, Crown Roads – Transfer to Council for the Committees attention.

In assessing this request matters to note include:

- Council has undertaken maintenance of this section of road in the past. In 2010, Council applied for and was successful in gaining funding to upgrade the bus turn around area at the location.
- Council records indicate that no maintenance of the road has been completed since 2010.
- The proposed transfer is in the public interest, with potential upgrade of the road leading to increased safety for vulnerable road users.
- Any works to upgrade this section of road to provide safety improvements would come at considerable costs. The terrain and geology of the site provide significant barriers to construction works. Also environmental assessment of the site would be required given the local characteristics.

- Council would be required to budget for ongoing maintenance costs if the road is transferred.
- The school recently provided an Arborist report to Council requesting that a number of dangerous trees be removed. A number of trees are on this parcel of Crown Road, the cost associated with removing these trees would become Council's responsibility if the road was transferred to Council.

Whilst ongoing maintenance cost associated with this section of road would be relatively minor, cost associated with upgrading the road to improve safety would be significant. It is likely that pavement widening, the construction of car parking spaces and the provision of pedestrian facilities would be required to adequately improve safety at the site. It is likely that various stakeholders would lobby Council to complete these safety upgrades if the road was Council's responsibility.

While there is a significant public interest in improving safety on this section of road, it is highly unlikely that the Department of Education or Crown Lands will take action to upgrade the road to improve safety. As such, Council accepting the transfer of this section of Crown Road would be the only outcome that would potentially lead to increased safety at the site.

In order to mitigate Council's financial risk associated with taking control of this section of road, a number of conditions could be placed on the transfer:

- Known hazards associated with trees be addressed prior to transfer.
- Any future upgrade of this section of road be subject to grant funding or contribution from the Department of Education.
- The maintenance classification of this section of road be Urban Minor.

The above maintenance classification is consistent with similar roads in the area and would limit Council's future maintenance costs whilst providing an adequate level of service.

It is recommended that Council accept the transfer of this parcel of Crown Road in order to facilitate improvements in road safety. It is recommended that the transfer be contingent on the above conditions in order to mitigate Council's financial risk and that Council actively seek grant funding opportunities to improve road safety at the location.

RISK ASSESSMENT:

Road user safety issues exist with this section of road. Hazards associated with dangerous trees have been identified. Council would become responsible to manage these risks if the road is transferred.

POLICY IMPLICATIONS:

Councils Management Policy – Road Hierarchy would need to be updated if the road is transferred to Council control. A maintenance classification would need to be determined.

CHIEF FINANCIAL OFFICERS COMMENT:

Nil

LEGAL IMPLICATIONS:

Nil

ATTACHMENTS:

1. **Report presented to March 2019 Committee**
2. **Map of Crown Road**
3. **Management Policy - Crown Roads - Transfer to Council**

MINUTES OF THE ORDINARY MEETING OF INVERELL SHIRE COUNCIL HELD IN THE COUNCIL CHAMBERS, ADMINISTRATIVE CENTRE, 144 OTHO STREET, INVERELL ON WEDNESDAY, 27 MARCH, 2019 COMMENCING AT 3 PM.

SECTION C
COMMITTEE REPORTS

CSO-P 1. CIVIL & ENVIRONMENTAL SERVICES COMMITTEE MEETING MINUTES – 13 MARCH 2019 S4.11.16/11

12/19 RESOLVED (Baker/Peters) that:

i) The Minutes of the Civil & Environmental Services Committee Meeting held on Wednesday, 13 March, 2019, be received and noted; and

ii) The following recommendation of the Civil & Environmental Services Committee be adopted by Council.

iii) That item #2: DA-156/2018 – Dual Occupancy – 43 Brae Street, Inverell DA-156/2018 be considered separately.

MINUTES OF THE CIVIL & ENVIRONMENTAL SERVICES COMMITTEE MEETING HELD IN THE COMMITTEE ROOM, 144 OTHO STREET, INVERELL ON WEDNESDAY, 13 MARCH, 2019, COMMENCING AT 9.00 AM.

SECTION E
INFORMATION REPORTS

5. GILGAI PUBLIC SCHOOL TRAFFIC ISSUE - BUS ZONE S30.14.1

RESOLVED (Harmon/Berryman) that the items contained in the Information Reports to the Civil & Environmental Services Committee Meeting held on Wednesday, 13 March, 2019, be received and noted.

ITEM NO:	5.	**FILE NO**: S30.14.1	
DESTINATION 5:	The communities are served by sustainable services and infrastructure		**S**
SUBJECT:	**GILGAI PUBLIC SCHOOL TRAFFIC ISSUE - BUS ZONE**		
PREPARED BY:	Justin Pay, Manager Civil Engineering		

SUMMARY:

In December 2018 a meeting was held between Department of Education representatives and Council representatives to discuss an ongoing safety issue with conflict between pedestrians and vehicles at the Gilgai Public School bus zone. The education department have since put measures in place to mitigate the risks.

COMMENTARY:

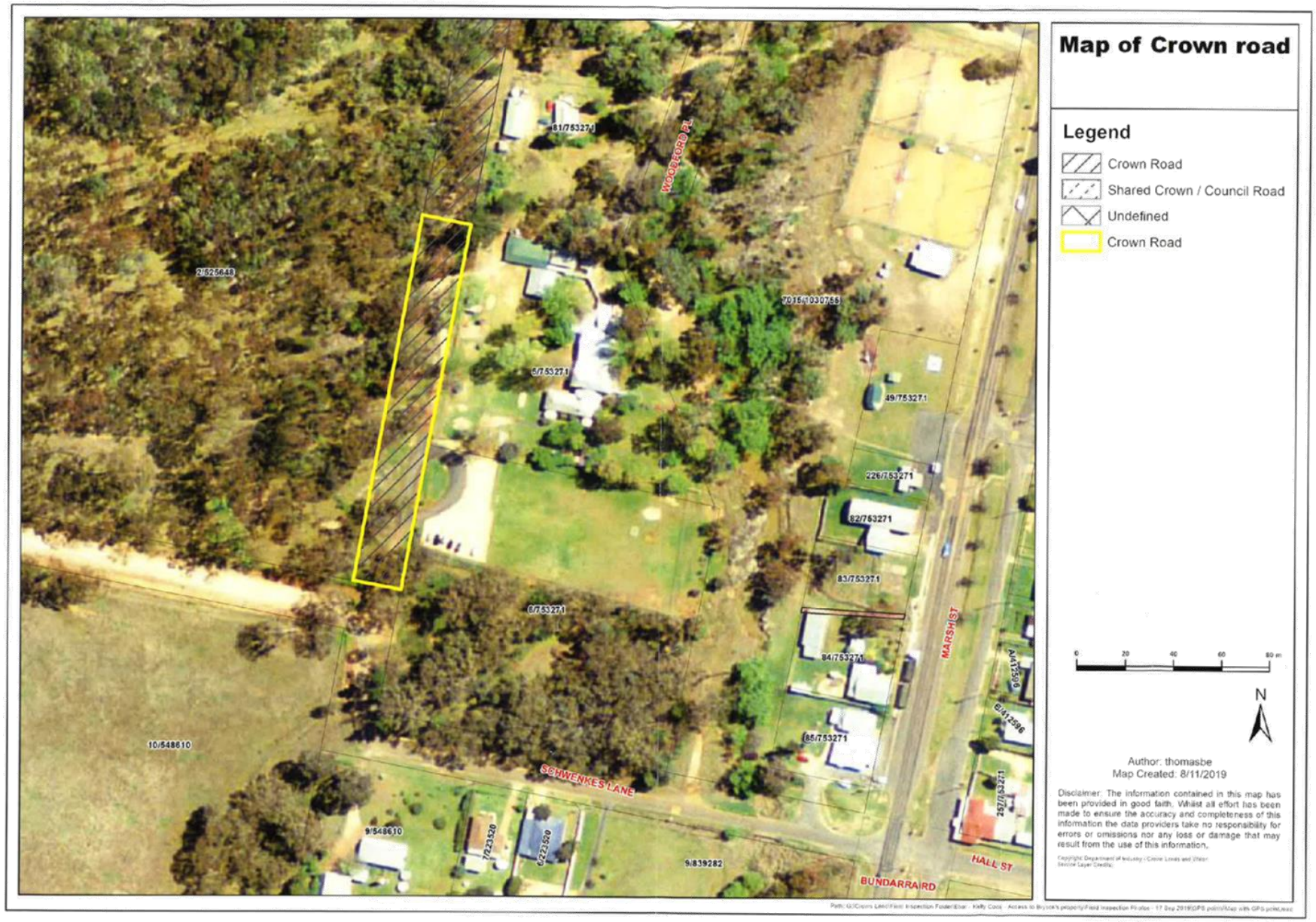
In December 2018 a meeting was held between Department of Education representatives and Council representatives to discuss an ongoing safety issue with conflict between pedestrians and vehicles at the Gilgai Public School bus zone. In attendance was the Acting School Principal, Head Teachers, Education Department delegate, Council's Manager Civil Engineering and representatives from the bus operator.

For a number of years there have been issues with the operation of the bus zone adjacent to Gilgai Public School in the area of crown road that extends from Schwenkes Lane. The conflict arises from parents also using this area to drop of children from their cars. This is a very undesirable situation that has lead to multiple near misses with children nearly being struck by buses or other cars. The matter had been raised to the school by a number of parents and particularly the school bus operator. At the meeting, the school bus operator presented photographs of a number of near misses, recorded from on bus CCTV.

At the meeting it was resolved that the existing practice of parents using the bus zone was not safe, and must stop. The school indicated that this would lead to another issue, lack of suitable alternative space for parents to drop off their children. A number of alternatives were discussed and it was suggested that construction of a number of parking spaces on the other side of the crown road would be the best solution. It was decided that Council staff would undertake preliminary investigations and report back to the Department regarding the viability of the project.

In further discussions with the Department during 2019, it was evident that the original proposed solution was not optimal; as such the school has taken measures to provide suitable alternative segregated space for parents to drop off their children on existing school grounds.

This solution will continue to be monitored by the school, Council staff and bus operators, to ensure that optimum safety outcomes have been achieved. No further action is required from Council at this time.


Map of Crown road
Legend
Crown Road
Shared Crown / Council Road
Undefined
Crown Road
81/753271
WOODFORD PL
2/525648
7015/1030755
5/753271
49/753271
226/753271
82/753271
83/753271
6/753271
84/753271
MARSH ST
10/548610
SCHWENKES LANE
85/753271
9/548610
9/839282
BUNDARRA RD
HALL ST
N
Author: thomasbe
Map Created: 8/11/2019
Disclaimer: The information contained in this map has been provided in good faith. Whilst all effort has been made to ensure the accuracy and completeness of this information the data providers take no responsibility for errors or omissions nor any loss or damage that may result from the use of this information.

INVERELL
SHIRE COUNCIL

MANAGEMENT POLICY:	CROWN ROADS – TRANSFER TO COUNCIL
Ref:	S5.19.2

Contact Officer	Development Planner
Approval Date	23 April 2014 (Resolution 42/14)
Approval Authority	Council
Reviewed	
Amended	
Date of Next Review	September 2020

1.1 Policy statement

The transfer of a Crown Road to Council will be subject to a report being presented to Council.

1.2 Application

Crown public roads provide lawful access to many privately owned and leasehold lands where little or no subdivision has occurred since the early nineteenth century. These roads are part of the State's public road network. They are often referred to as 'paper roads' as many have not been formed or constructed.

Requests for Council to accept control of crown roads, whether they are 'paper roads', fully or partially constructed, are generally associated with:

1) Development applications, typically the construction of a crown road to service a dwelling or lots within a subdivision; or

2) Constructed crown roads which service one or more properties, where Council is requested to:

    a) Accept maintenance responsibility; or

    b) Accept control of the road to prevent its closure (e.g. where one property owner purchases the access of another property owner/s).

There may be certain circumstance where Council has a vested interest in a crown road and will initiate the transfer.

1.3 Definitions

Crown Road – A road which is owned and managed by the State Government or an agency of the State Government.

Inverell Urban Area – Land within the suburb of Inverell, zoned residential (but not large lot residential, rural or similar), business or industrial under the relevant local environmental plan.

1.4 Implementation

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SHIRE COUNCIL

Each transfer of a crown road to Council control will be assessed on its individual merits. Generally, one or more of the following criteria are to be satisfied prior to Council considering supporting the transfer of a crown road to its responsibility:

1) Council has historically maintained (excluding private works agreements) the crown road as a public road, which is partly or wholly located within a crown road reserve;

2) There is significant infrastructure located within a crown road reserve and provision of an easement is not feasible;

3) The road reserve has been identified by Council as having strategic importance;

4) For new development, within the Inverell Urban Area – Refer to Council's *Management Policy – Access to Residences*.

5) For new development, other than the Inverell Urban Area:

   a) The crown road (entire length or relevant part if applicable) is constructed to Council's public road standard at the developer's expense prior to the commencement of the development;

   b) All costs associated with the transfer are borne by the developer; and

   c) The scale of the proposed development will promote significant (as determined by Council) economic and/or population growth for region.

   Generally, Council will not support the transfer of crowns roads where they are proposed to serve a single dwelling or lot. Alternative methods of access would need to be established (right of carriageway, landholder to purchase the crown road, etc.).

6) It is within the public interest, having consideration for:

   a) The standard of construction of the road, including any required upgrade;

   b) The number and use of the properties utilising the road;

   c) Council's responsibility towards future maintenance;

   d) Alternative access arrangements that may exist;

   e) Access to places of environmental, cultural or recreational significance.

For roads that remain 'crown'; if possible, Council will encourage that they remain open where they provide practical and/or legal access to properties.

1.5 Procedures

Maintenance of Crown Roads – Private Works - Any maintenance of crown roads undertaken as private works will be undertaken in accordance with Council's *Management Policy – Private Works under Section 67*.

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Works undertaken via a private works agreement confers no responsibility on Council to accept ownership or control of a crown road.

In the event that a crown road is transferred to Council under the *Roads Act 1993*, without prior consideration of this policy, Council may not maintain the road unless the criteria above is met.

1.6 Related Documents

Compliance with this policy provides no guarantee that approval would be granted under any other plan or policy, including development consent issued under the *Environmental Planning and Assessment Act 1979*. There may be requirements of other government agencies which may influence the outcome of any road transfer request.

In addition to costs associated with construction and transfer of a crown road, contributions under the relevant Section 94 Plan applying to the land may apply.

1.7 Modification History

Adopted by Council 23 April 2014 (Resolution 42/14).

5.5 PETITION REGARDING VEGETATION IN FRAZERS CREEK - ASHFORD VILLAGE

File Number: **S6.8.5/11 / 20/3805**

Author: **Matthew Mepham, Works Engineer**

SUMMARY:

Council has previously received a petition from a number of Ashford residents concerning the potential flooding risk from Frazers Creek due to current vegetation and sedimentation levels. It was resolved at the October 2018 meeting of Council that staff were to undertake further investigation and liaison with relevant Government Agencies to determine an appropriate course of action and a further report be presented to the Civil and Environmental Services Committee outlining the findings of the investigation.

RECOMMENDATION:

That the Committee recommend to Council that:

i) The information be received and noted;

ii) No further action be taken; and

iii) The lead author of the petition be formally advised of Council's course of action and provided with the appropriate contact details for the Natural Resource Access Regulator (NRAR).

COMMENTARY:

Council has previously received a petition from a number of Ashford residents concerning the potential flooding risk from Frazers Creek due to current vegetation and sedimentation levels. A copy of the petition has been included in attachment 1 for the information of the Committee.

The Manager Civil Engineering previously inspected the site with Mr Bruce Currell (author of the petition) in October 2018 and submitted a report to the Civil and Environmental Services Committee meeting. The recommendation from the Committee and subsequent resolution from the October 2018 meeting of Council (RES132/18-D3) is reproduced below:

That:

i) The information in the report be received and noted;

ii) Staff undertake further investigation and liason with relevant Government Agencies to determine an appropriate course of action;

iii) A further report be presented to the Committee outlining the findings of the investigation; and

iv) The lead author of the petition be formally advised of Council's course of action.

Ongoing investigations and liason with the relevant Government Agencies has been conducted by the Manager Civil Engineering. The Works Engineer inspected the creek with Mr Bruce Currell and Andrew Walsh, Senior Land Services Officer – Healthy Rivers of Local Land Services (LLS) on Thursday, 1 August 2019. The main site directly behind Mr Currell's house was inspected during the visit which found significant amounts of vegetation, flood debris and sediment lining the creek bed. The photographs in attachment 2 depict the current state of Frazers Creek behind Mr Currell's residence and adjacent to Alabama Street.

Discussions with Andrew Walsh, from LLS were conducted whilst onsite where he explained that there is a significant amount of vegetation, flood debris and a build up of sediment within the creek bed, but these do not pose a huge risk in a flood event. The smaller trees will most likely wash away in the next flood along with the debris and sediment. The sediment build up in the waterholes and the trees growing in the creek bed are a natural occurring process and is similar to other creeks and rivers in the area. A recommendation was sought from Andrew which is quoted below.

Although many of the issues are natural processes of that riparian environment, some management actions could be undertaken.

I would advise the following:

- *selective removal of any in-channel choke points to re-engage the natural channel.*
- *floodplain trash reduction by mechanical removal.*

Discussions with other Government Agencies including Fisheries (Mr David Ward, Fisheries Manager) and the Natural Resource Access Regulator (Mr Chris Binks, Water Regulation Officer) were conducted and both agencies gave similar advice that the vegetation does not pose a huge risk during a flood event.

David Ward from Fisheries advised that the larger sized flood debris would provide good fish habitat and any of the larger timber would need to remain in the creek. If any debris or sediment was to be removed, a dredging permit would need to be applied for and approved prior to any works.

If a dredging permit was approved and the removal of sedimentation occurred, this could potentially become an ongoing maintenance issue as the next flood event would deposit the sediment from upstream into the site that was excavated. As discussed previously, the movement of sediment is the natural occurring process of a river or creek.

Chris Binks from the Natural Resource Access Regulator (NRAR) advised if Council were to remove the vegetation, the impact could potentially be worse as there is an increased risk of erosion of the creek bed and banks from the higher velocity flow that would occur. A Controlled Activity Approval is required to conduct any works in the creek bed or banks. Council is exempt from this approval but landholders are required to gain approval if they wish to complete works themselves.

Mr Binks also advised that he is available to have a discussion over the phone with the landholders about their concerns.

From discussions conducted with the different Government Agencies and upon receiving their advice, it is recommended that no further action is to be taken. The vegetation does not pose a huge risk during flooding events and there are benefits regarding erosion control if they are left in place. The lead author of the petition should also be notified and provided with the contact details for the NRAR if he would like to discuss the matter further.

RISK ASSESSMENT:

Nil

POLICY IMPLICATIONS:

Nil

CHIEF FINANCIAL OFFICERS COMMENT:

Nil

LEGAL IMPLICATIONS:

Nil

ATTACHMENTS:

1. **Petition**
2. **Photos of Current State of Frazers Creek**

FRAZERS CREEK - ASHFORD

ASHFORD IS IN DANGER OF FLOODING OWING TO A BUILDUP OF OAK TREES IN THE BED OF THE CREEK, CAUSING LOSS OF WATER HOLES.

DUE TO PREVIOUS FLOODS, THE WATER HAS CAUSED A BUILD UP OF GRAVEL WHERE WATER HOLES ONCE WERE.

THE OAK TREES NEED TO BE REMOVED TO STOP FUTURE FLOODING.

NAME	ADDRESS PH. 67254160
[illegible]	90 INVERELL ST ASHFORD
Nicky Hills	94 Inverell St Ashford
Jen Rumsey	94 Inverell st Ashford.
[illegible]	[illegible]
[illegible]	[illegible]
MARIC Young	40 DUDLEY ST ASHFORD
FAY YOUNG	40 Dudley St. Ashford 67254206
Helen Elliot	237 Loves Lane Elsmore
Jenny O'Hara	32 Dudley St Ashford
GARY LAWLOR	30 DUDLEY ST ASHFORD
Brenton Lavender	30 Dudley st Ashford

INVERELL SHIRE COUNCIL
10 SEP 2018

NAME	ADDRESS
CLARRIE CHARLES	19 SINCLAIR ST ASHFORD
Jack Minos.	28 Dudley St, Ashford.
Kristen Brady.	2 Kneipp St, Ashford.
Julie mackay.	15 pocket Rd Bukkulla. [signature]
Doug Chanter	25 DUDLEY ST ASHFORD
MARY SIMMONS	" " " "
LAURA HIGGINS	27 Dudley St Ashford
Hays Stevens	26 Dudley St Ashford
JEFFREY CHARLES	17 DUDLEY ST ASHFORD
DOROTHY C. LAWRY	owner of 19 Dudley St Ashford
Grahame Voss	3 Dudley St
Malcolm Dipple	2 Martyn st. Ashford
Christina Malone	14 Martyn St
[illegible] MC PHEE	[illegible] INVERELL ST ASHFORD
Jenny Beveridge	26 Inverell St. Ashford
NANCY HARDING	84 INVERELL ST ASHFORD
NIGEL SCERESINI	79 INVERELL ST ASHFORD.
Kerry Julius	75 Inverell St Ashford
TREVOR SMITH	13 [illegible] ST ASHFORD
Patsy [illegible]	[illegible] Inverell St Ashford.

NAME	ADDRESS
Don Fenton	77 Inverell st Ashford.
ARTHUR WILLIAMS	3 SEMMES ST ASHFORD
ALLAN ARKHURST	"ARNSFELDE" ASHFOR
M.J. Burnett	5 Semmes St Ashford
John Logan	112 ST INVERELL
Helen M. Hitler	11 ALABAMA ST, ASHFORD.
MARTYN ST	CARAVAN - PARK
Bill Erwin	233 Bonshaw Rd Ashford.
T & T. GRAHAM	15 FROME St, Ashford. 2361
Deborah Lavender	22 Frome st Ashford
Brian Talbot	16 David St Ashford.
Leanne Kelly	16 David St, Ashford.
BARB HARWOOD	22 DUDLEY ST Ashford
W[illegible] D[illegible]	21 DUDLEY ASHFORD
DANIEL KRAUSS	42 BUKKULLA ST ASHFORD
Georgina Krauss	As Above
Mick Halloran	20 Duff St Ashford.
ANN MINCA	103 INVERELL ST ASHFORD

Photo 1 – upstream view from location adjacent to Alabama Street

Photo 2 – down stream view from location adjacent to Alabama Street.

6 INFORMATION REPORTS

6.1 CRITICAL COMMUNICATIONS ENHANCEMENT PROGRAM UPDATE

File Number: **S10.12.2/13 / 20/2917**

Author: **Elise Short, Planning Officer**

SUMMARY:

This report has been prepared to update the Committee on the NSW Telco Authority Critical Communications Enhancement Program relating to the Inverell Shire Council Local Government Area. It is requested that the Committee note the information.

COMMENTARY:

On 8 January 2020 Council received an update from Visionstream on behalf of the NSW Telco Authority relating to the status of the Critical Communications Enhancement Program (CCEP) in the Inverell Shire.

What is the Critical Communications Enhancement Program (CCEP)?

The CCEP aims to improve operational communications for law enforcement, emergency services organisations and essential service providers.

The CCEP will consolidate the large number of separate radio networks built, owned and maintained by numerous NSW Government agencies. This will enable critical information to be shared between agencies and across state borders during major incidents and events.

The CCEP will significantly increase the level of shared radio coverage available to NSW Government agencies. The program will also expand network capacity, availability and resilience designed to meet mission critical or public safety standards of operation.

Why is the CCEP needed?

NSW Government agencies and essential services have typically designed, built, operated and maintained separate radio networks. As a result, law enforcement and emergency services organisations including the NSW Police Force, Fire and Rescue NSW, NSW Ambulance, NSW Rural Fire Service and NSW State Emergency Service operate their own, dedicated radio networks.

The existence of both the Government Radio Network and numerous agency radio networks has resulted in substantial duplication of radio infrastructure, coverage and costs.

What are the benefits of the CCEP?

Some of the benefits of the CCEP for NSW Government agencies, emergency services and the broader community include:

- **Greater accessibility to public safety standard radio communications** for frontline responders and day-to-day operations through the increased coverage – from less than 35 per cent of the state at present to over 80 per cent when complete;
- **More flexible incident responses and coordination** as agencies can more easily share information between each other and across borders including during times of major incidents;
- **A single common platform for emergency communications**, which will support agencies in continuing to deliver public safety, law enforcement and essential services to the NSW community; and
- **More efficient management of resources** by reducing the duplication of infrastructure and taking advantage of the economies of scale that can be realised through a common platform.

What is happening in the Inverell Shire?

Within the Inverell Shire Local Government Area it is proposed to either upgrade and/or install radio communication infrastructure at four (4) separate locations. The four (4) sites are located at Sawtooth Hill Trig, Inverell (Swanbrook Road), Mt Topper and Yetman as shown in **Figure 1**. These sites are located on either Crown Land or privately owned land.

A fifth site has also been identified at Atholwood (**Figure 1**). The nature of the upgrade works at this site is still under review. Visionstream have advised that additional information will be provided to Council in regards to the Atholwood site once further investigations have been completed. The Atholwood site is located on land owned by Council, and as such a report has been prepared for the February 2020 Economic and Community Sustainability Committee which addresses the lease consolidation at the site.

The four (4) proposals indicated above have been assessed by Visionstream as being capable of meeting the Development without Consent provisions of Clause 114(1) of *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP). These provisions state that *"Development for the purposes of telecommunications facilities (including radio facilities) may be carried out by a public authority without consent on any land."* As such, the NSW Telco Authority will be the determining authority under this Policy and are required to undertake a review of Environmental Factors for these proposals.

NSW Telco Authority, or any company acting on their behalf, will also consult with Inverell Shire Council and potentially affected properties as deemed necessary under the provisions of Clauses 13-15 and 141(2) of the Infrastructure SEPP.

It is requested that the Committee note this information.

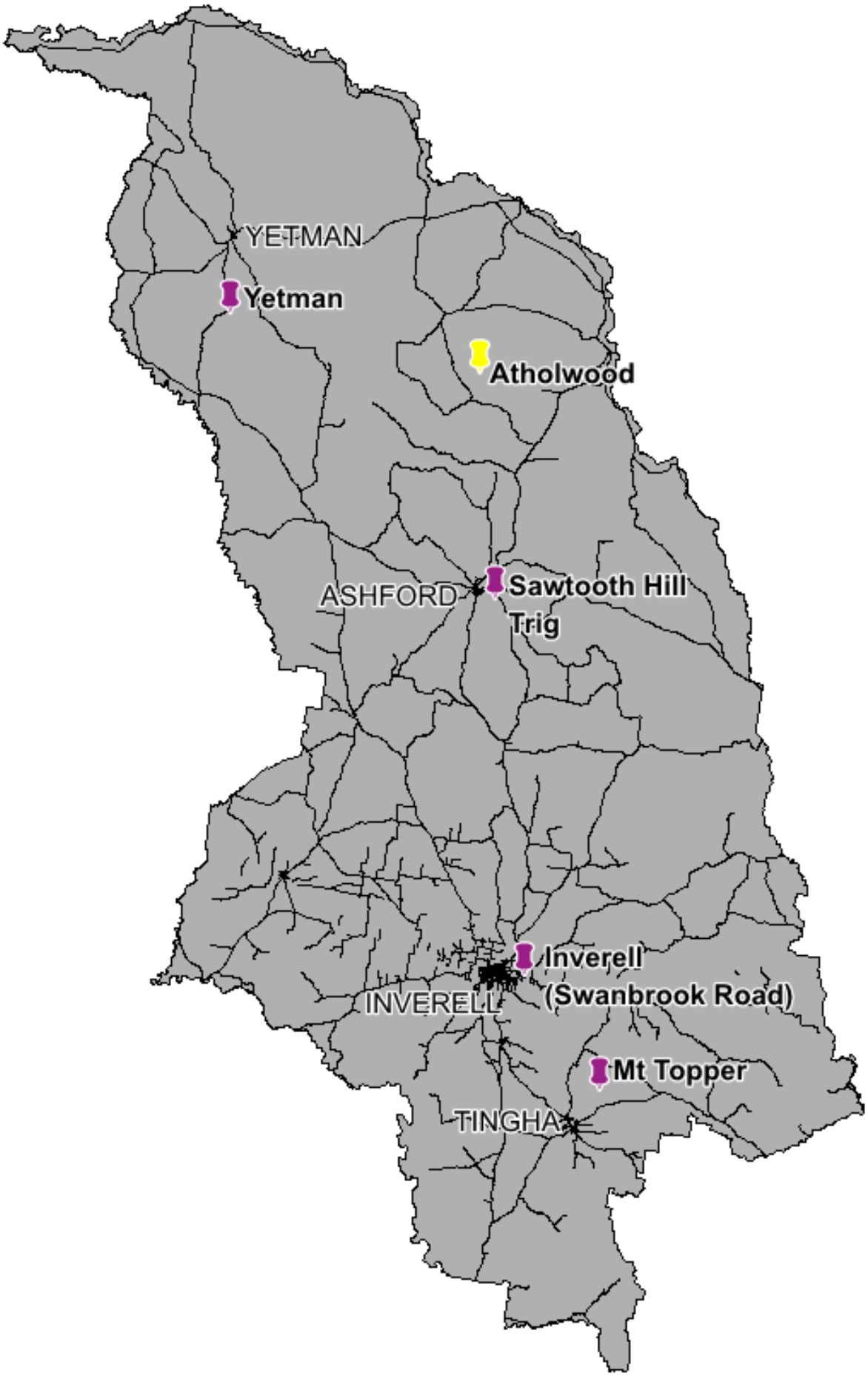

Figure 1 – Location of radio communication infrastructure proposals

RISK ASSESSMENT:

Nil

POLICY IMPLICATIONS:

The upgrades to Critical Communications infrastructure within the Inverell Shire LGA is consistent with Council's Destination 5 – Services & Infrastructure where *Communities are supported by sustainable services and infrastructure.*

CHIEF FINANCIAL OFFICERS COMMENT:

Nil

LEGAL IMPLICATIONS:

Nil

ATTACHMENTS:

Nil

6.2 WORKS UPDATE

File Number: **S28.21.1/12 / 20/3214**

Author: **Justin Pay, Manager Civil Engineering**

SUMMARY:

This report is intended to keep Council updated on the capital works and maintenance programs.

COMMENTARY:

Rifle Range Road Subdivision

This project is the final stage of an industrial subdivision being undertaken by Council on Rifle Range Road, Inverell. This stage involves the construction of sewer, water, drainage and road infrastructure for up to 23 various sized industrial lots located between Rifle Range Road and the Pioneer Village. The $1.475M project is being funded from the Industrial Development Internal revote and the Industrial Promotion and Assistance vote. The design for the project was completed by Local Government Engineering Services and is in accordance with relevant Austroads Design Guidelines. Earthworks for road construction, underground drainage and sewer have been completed and placement of pavement material has commenced in preparation for kerb and gutter works.

Construction of the pavement of this project was undertaken in stages, consistent with Council's standard construction technique and engineering specifications. Pavement depths of up to 600mm were required for the project given the proposed traffic composition and the underlying soil types. In order to achieve these pavement depths whilst also ensuring proper drainage, areas of existing soil were required to be removed, or "boxed out". This is a standard pavement construction technique. Some construction areas had considerable volumes of cut for pavement construction, sewer and drainage installation. This is due to the site constraints, including depth of drainage lines, depth of sewer and provision of proper road drainage in varying natural site gradients. After completion of the concrete kerb and gutter the final pavement layer will be constructed. The levels of the kerb and gutter and final pavement layer provide adequate grades on both the access and egress from Rifle Range Road for a range of heavy vehicles, including buses. The project is progressing in accordance with the original approved design.

The project has experienced minor delays as crews are also working on the Sporting Complex Upgrade project. Works have recommenced in January 2020 with the sub base layer completed and ready for kerb and gutter. Works are expected to continue over the next six (6) weeks with a planned completion date mid March 2020.

Sub base pavement material placed and compacted – Rifle Range Road Industrial Subdivision

Guyra Road Pavement Rehabilitation and Widening – Slurry Gully

This project involves the widening and rehabilitation of a section of Guyra Road 66.66km to 68.58km west of Guyra at the locality known as Slurry Gully (2km west of Tingha). The project has been constructed in two (2) stages with stage one (1) (CH 67.40km to 68.58km) an 1180 metre section completed and stage two (2) (CH 66.66km to 67.40km) a 740 metre section currently under construction. Council has committed $1.41M to this project with $1.087M being funded from the Repair Program and $323K from the Block Grant.

Stage one (1) has been completed with a primer seal placed on 6 December, 2019. The site was closed down for the Christmas break with crews returning to commence stage two (2) early January 2020. Culvert upgrades are underway with a box culvert extension completed by a local concreting contractor. Earthworks commenced late January 2020 with pavement construction due to commence early February 2020. A primer seal for stage two (2) is planned for mid March 2020 with a final seal for both stage one (1) and stage two (2) programmed for November 2020, in conjunction with the 2020/2021 Resealing Program.

Completed Primer Seal Stage One MR135 Slurry Gully

Earthworks under construction Stage Two MR135 Slurry Gully

Inverell Sporting Complex Athletics Precinct Upgrade

Council has been successful in obtaining $350K from the Stronger Country Communities Fund to contribute towards the construction of a new athletics precinct at the Inverell Sporting Complex on Eucalypt Drive. Works involve the construction of a new athletics precinct and associated infrastructure with upgrades to Eucalypt Drive including drainage works and the construction of kerb and gutter. The total budget allocation for this project is $789K with the remaining $439K required for this project being revenue funded by Council.

Works commenced on this project in late September 2019 and were expected to be completed within 12 weeks. Some delays were experienced as crews were working on the Lake Inverell All Abilities Project and Rifle Range Road Project.

The earthworks and irrigation for the new athletics fields is now complete and ready for grass mix. Pavement construction, stormwater drainage and kerb and gutter works have also been completed along with the concrete works on the footpath and grandstand area adjacent to the netball courts. Preparations for the associated landscaping works (tree planting) are currently taking place ready for tree planting and laying turf in Autumn 2020.

The remaining works include the construction of the discus, shotput and longjump facilities on the new athletics fields and fencing around the new field. These works are due to be completed by Easter.

Newly constructed roundabout and parking areas – Inverell Sports Complex Upgrade

Byron Street – Town Centre Renewal Plan Project – Campbell Street to Vivian Street

This project is stage 2 of the Town Centre Renewal Plan (TCRP). This stage is located along Byron Street from Campbell Street to Vivian Street. The stage consists of the removal of 11 plane trees, planting of 6 new Pin Oak trees in the newly constructed centre median plus six (6) Chanticleer Pear edge plantings. The existing raised crossings will also be removed and replaced with an at grade level crossing. The project is estimated to cost $1.54M and is expected to take 16 weeks to complete. This follows on from Stage one (1) in Otho Street, which was completed early 2018.

Works have commenced and are progressing well on the Byron Street TCRP project. A total of 11 Plane trees were removed on Wednesday 8 and Thursday 9 January following this, works commenced on replacing the pedestrian crossing between Campbell Street and Otho Street. The new crossing is to have the same shape as the previous, however the raised ramp has been removed and damage to the surrounding kerb and gutter is being repaired.

Works crews have completed the removal of the crossing and have poured concrete for the new crossing and associated gardens. A temporary bitumen seal is in place until the median is completed. The asphalt seal is due to be completed mid April.

Works crews started trenching the centre of the road on Monday, 13 January, in preparation for Pin Oak tree planting. This work started between Campbell Street and Otho Street of which the southern traffic lane was closed to traffic until the southern side of the new crossing was completed. On Wednesday 29 January, the northern traffic lane between Campbell Street and Otho Street was closed and the southern traffic lane was reopened to allow works to continue on the northern side of the crossing.

Saturday, 1 February saw the fencing erected to close the northern traffic lane from Otho Street to Vivian Street ready to commence the next block. The southern traffic lane between Otho Street and Vivian St is still open to traffic.

Despite recent periods of wet weather the project is on schedule to be completed within the planned 16 week time frame.

Citygreen Stratavault Cells installed in the median trench – TCRP Byron Street

New Concrete Level Crossing near Coles – TCRP Byron Street

Yetman Road – Vegetation Clearing in Clear zone

This project involves the removal of vegetation within the 6m clear zone either side of the road shoulder approximately 60km North of Inverell starting just north of Sawpit Gully heading towards Yetman for two (2) kilometres finishing at “Arakoola Springs” driveway.

An ecological assessment was undertaken in October 2019 by Reconeco. Some Habitat trees were located on site but are outside the 6m clearzone and therefore will not be removed.

Leo’s Tree and Tower were engaged to complete the works of which commenced on Monday 3 February and will take approximately one (1) week to complete.

Maintenance Grading

The following maintenance grading works were undertaken during November-December 2019.

Road Number	Road Name	Length Graded (km)
SR 128	Delungra Road	17.81
SR 214	Old Bundarra Road	7.08
SR 215	Schwenkes Lane	2.17
SR 286	Monterey Lane	0.87
SR 419	Bassendean Road	7.47
SR 420	Weidermans Road	2.36
	TOTAL	**37.76**

The following maintenance grading works were undertaken during January 2020.

Road Number	Road Name	Length Graded (km)
SR 54	Emmaville Road	8.00

SR 58	Rocky Creek Road	5.00
SR 139	Glenburnie Road	2.13
SR 252	McLachlans Lane	4.50
SR 253	Old Armidale Road	12.44
SR 263	Rifle Range Road	4.75
SR 427	Cracknells Road	3.18
SR 426	Dry Creek Road	4.25
SR 425	Georges Creek Road	9.00
	TOTAL	**53.25**

Reactive Spot Grading

The following reactive spot grading works were undertaken during November-December 2019.

Road Number	Road Name	Length Graded (km)
SR 254	Stannifer Road	2.00
	TOTAL	**2.00**

The following reactive spot grading works were undertaken during January 2020.

Road Number	Road Name	Length Graded (km)
SR 110	Rob Roy Road	3.76
SR 223	Byron Station Lane	2.00
	TOTAL	**5.76**

Gravel Patching

The following gravel patching works were undertaken during November-December 2019.

Road Number	Road Name	Area Patched (sqm)
SR 419	Bassendean Road	7000
	TOTAL	**7000**

The following gravel patching works were undertaken during January 2020.

Road Number	Road Name	Area Patched (sqm)
SR 110	Rob Roy Road	2000
SR 223	Byron Station Lane	2200
SR 267	Spring Mountain Road	2500
	TOTAL	**6700**

Gravel Re-sheeting

No gravel re-sheeting works were undertaken during November-December 2019 or January 2020.

Recent climatic conditions had placed significant stress on the gravel re-sheeting program with the lack of available water. The program had been suspended due to lack of sufficient water sources. Recent rainfall events have provided the opportunity for the program to recommence in some areas. Resheeting works will commence on Reserve Creek Road during early February. Upon completion of work in the Delungra area, staff will mobilise to complete work in the Maybole area, as soon as possible.

Other Maintenance Activities

Council's State, Regional and Local Roads, Urban and Village Street maintenance activities, such as bitumen patching, drainage and shoulder repairs as well as vegetation control, are continuing as required. Town maintenance will continue as programmed.

ATTACHMENTS:

Nil

6.3 ASHFORD TOWN WATER SUPPLY SEVERN RIVER RAW WATER QUALITY

File Number: **S32.12.9 / 20/4180**

Author: **Michael Bryant, Manager Environmental Engineering**

SUMMARY:

This report updates Council on problems being experienced with treating poor quality raw water sourced from the Severn River at Ashford for the town water supply.

COMMENTARY:

The extended severe drought has resulted in a parched landscape with very little ground cover within the Severn River catchment. Towards the end of January 2020 localised storms below Pindari Dam have resulted in a low flow of highly turbid water containing elevated levels of organic matter, iron and manganese. The water has low levels of dissolved oxygen leading to eutrophication of the river.

On 31 January treatment of water at the Ashford Water Treatment Plant (WTP) was suspended to undertake adjustment to chemical dosing arrangements at the plant to treat the highly turbid raw water. NSW Department of Industry & Energy Water (DPIE Water) plus a specialist process engineer have provided assistance to Council in implementing temporary arrangements to treat the water to a level complying with the Australian Drinking Water Guidelines. The WTP recommenced operations on 3 February and is being closely monitored with adjustments made as necessary to maintain production.

The current elevated level of poor water quality has never been experienced at the Ashford town water supply intake. Many other town water supplies in the New England are experiencing similar problems. Drought breaking rain is required to cleanse the catchment for the rivers to return to normal.

The initial response is anticipated to cost in the order of $20,000 including professional advice and temporary chemical dosing equipment.

The current arrangements at Ashford WTP are temporary and an assessment will be made to determine if any permanent changes need to be introduced going forward. Should any significant capital works be required the matter will be reported to Council for consideration. Early discussion with NSW DPIE Water and NSW Health is that funding may be available to assist Council with capital works associated with the drought response measures.

A further update on this matter will be provided at the meeting.

RISK ASSESSMENT:

The town water supply is being managed to minimise public health risks.

POLICY IMPLICATIONS:

Nil

CHIEF FINANCIAL OFFICERS COMMENT:

Nil

LEGAL IMPLICATIONS:

Nil

ATTACHMENTS:

Nil