KYOGLE COUNCIL

REVIEW OF CLIMATE CHANGE ASSESSMENT AND ADAPTATION INITIATIVES

July 2019

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Report Prepared for

The Kyogle Council.

Editorial Team

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ASSUMPTIONS AND LIMITATIONS

There is a level of uncertainty regarding climate change projections, including those for New South Wales. JLT Consulting acknowledges that climate change data may change over time and has committed to the scenarios and projections available at the time of the assessment.

This review considered the original assessment work of 2010 and utilised scientific data that is currently available through such sources as:

- the New South Wales Government by the CSIRO,
- the Australian Bureau of Meteorology,
- the NSW Office of Environment and Heritage (OEH) and
- the Intergovernmental Panel for Climate Change (IPCC)

This data did not include scenarios for all weather events such as hail or storm surge, or commentary on other potential climate change factors such as the heat island effect. The scenarios considered are;

Scenario 1 – TEMPERATURE

- By 2030 Maximum Temperatures, Mean temperatures and Minimum temperatures are projected to rise by 0.7° C across the North coast region.
- By 2070 the Maximum Temperatures, Mean temperatures and Minimum temperatures are projected to rise by 2.1° C with greater increases in the west of the region (Kyogle area).
- All models show there are no declines in Max., Min or Mean temperatures in NSW
- Cold nights (below 2° C): - By 2030 in the area along the mountains there may be 10-20 fewer cold nights and over 30 fewer cold nights by 2070

Scenario 2 – HOT DAYS

- Currently the North Coast Region experiences an average of 10 days above 35º C each year.
- By 2030 Hot Days are projected to increase by an average of 3 days above 35º C per year; the greatest increases are seen in the northwest of the region during summer with an additional 5-10 days per year.
- By 2070 Hot Days are projected to increase by an average of 9 days per year; greatest increases in the northwest of the region during summer with an additional 20 days per year.

Scenario 3 – RAINFALL

- By 2030 there is little change in the annual Rainfall; the greatest increases are seen in the SW of the region during autumn and the greatest decreases are along the northern coastal strip during winter.
- By 2070 annual Rainfall will increase across the region; increases are projected during summer, autumn and spring. Winter rains are projected to decrease across the region.

Scenario 4 – FIRE WEATHER

- Changes in number of days a year FFDI >50
- FFDI is used in NSW to quantify Fire Weather. The FFDI combines observations of temp, humidity and wind speed. Fire Weather is classified as Severe when the FFDI is above 50.
- By 2030 severe Fire Weather is projected to have a slight increase in spring and summer across the north coast region.
- By 2070 severe Fire Weather is projected to increase during summer and spring; these increased are seen during the peak prescribed burning season (spring) and peak fire risk season (summer).

The focus of this Climate Change Risk Assessment is to build on the work already done in 2010 and review those assessments in light of new and more region specific data that will more accurately inform Council policy decisions.

The aim continues to focus on planned and gradual adaptation on the awareness that conditions have or are likely to change over the short and long

term and that action is or will be required to return to, maintain, or achieve a desired state.

The scope of this project is to identify adaptation planning initiatives where the impact levels rated HIGH and/ or EXTREME. Medium and Low level risk impacts are outside the scope of this project in respect of developing adaptation initiatives, however Council has identified proposed future adaptation initiatives for some Medium and Low risk impacts and will continuously monitor, review and manage climate change risks at all levels and scenarios.

Council acknowledges that the information provided for this study is within the scope of those who participated in the workshops only and that this report may be used as a reference for reviewing not only Council's climate change and environmental management strategies but any high strategy that may have been identified within the Adaptation Action Plan. Some impacts and risk levels may have been omitted or misrepresented.

Council also acknowledges that whilst this study focussed on the potential adverse impacts of climate change, opportunities may also arise from the changing climate. In keeping with Kyogle Council's Enterprise Risk Management Plan and subject to future scientific data, Council proposes to identify and incorporate such opportunities in subsequent assessments and adaptation plans.

EXECUTIVE SUMMARY

The Statewide Mutual Liability Scheme (Statewide Mutual) developed and funded the inaugural “Climate Change Risk Assessment and Adaptation Planning” Program that over a period of five years (from 2009 to 2014) assisted a total of 106 member councils to undertake their first step towards understanding the potential impact of Climate Change on local government assets and operations and the effect on their communities.

The short to medium term effects of climate change may directly impact on the functionality of Council. Studies indicate that there is a real risk that the impact on Council assets and operations could increase in a number of areas such as:

- Inability to preserve “community” owned and valued assets affected by more intense natural disasters.
- The number of claims in the area of asset damage (physical damage to Council owned buildings infrastructure and assets);
- Higher insurance premiums as a result of increased claims;
- Professional indemnity issues relating to the management of the development and building approvals, issuing of certificates, verbal advice;
- Corporate governance issues including failure to implement legislation, financial responsibility, strategic planning and corporate responsibility; and
- Public liability issues caused by extreme weather events.

Kyogle Council participated in the programme during 2013 and developed the original Climate Change Risk Assessment and Adaptation Planning. This year Council sought to conduct a review of the original assessment in light of updated data and initiatives undertaken subsequent to the original study.

The NSW and ACT Governments and the Climate Change Research Centre at the University of NSW together with other NSW Government authorities (NARCliM) have partnered to develop Regional Climate Modelling for key catchment areas with climate change projections at a regional scale through interactive mapping. Local Government can now consider impacts of climate variation that are specifically related to its region, thus providing a more accurate assessment of the impacts and develop more accurate adaptation initiatives where warranted.

The delivery of this project comprised three workshops; one with elected members and two with representation from the various sections of Council consistent with the desired consultative approach required to deliver the best outcome. The areas of Council represented in the workshops included:

- Assets and Design
- GIS and Natural Resources
- Strategic Initiatives
- Infrastructure Works
- Urban Services
- Corporate Services
- Town Planning
- Elected members including the Mayor

Their expertise was crucial to ensuring the process was holistic in its approach. In addition this process also took into consideration the initiatives undertaken by the Kyogle Council since the original assessment.

In summary, this year and taking into consideration the latest climate data and projections, Council identified a total of 33 risks with risk rating levels as follows:

- Five (5) rated LOW
- Twenty one (21) rated MEDIUM
- Seven (7) rated HIGH and
- None (0) rated EXTREME

Whilst the focus of the study is usually placed on risks with HIGH & EXTREME rating, given the large number of MEDIUM rated risks, Council considered it prudent to also determine possible adaptation initiatives for some of the Medium rated risks.

This report outlines the findings of the review and the outcomes are now presented for consideration and appropriate action.

CLIMATE CHANGE RISK ASSESSMENT DATE ANALYSIS

The following provides a graphical representation and analysis of the Climate Change Risk Assessment including impacts, and ratings.

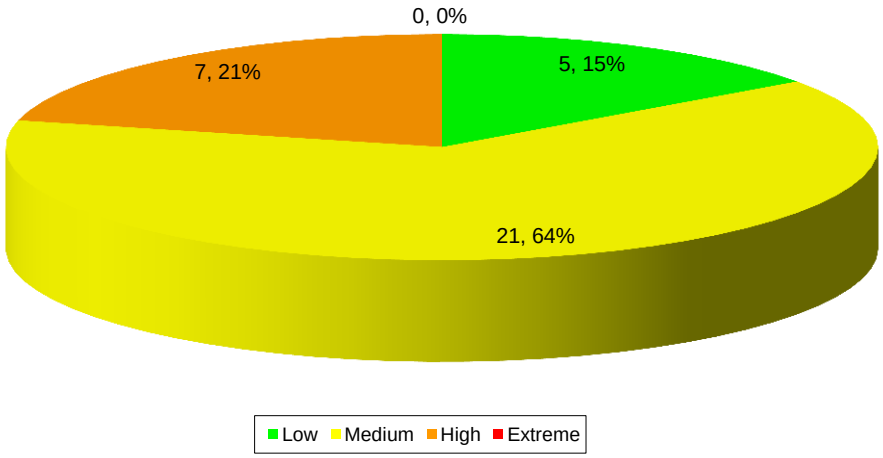
Current controls and proposed adaptation initiatives were also identified for the High and Extreme risks as well as Most Medium and a few Low rated risks.

The information in this report also includes the respective graphs from the 2013 results for comparison purposes, having regard to amendments required to undertake the 2019 assessment.

ANALYSIS OF ALL IMPACTS

2019 Risk Ranking of All Impacts

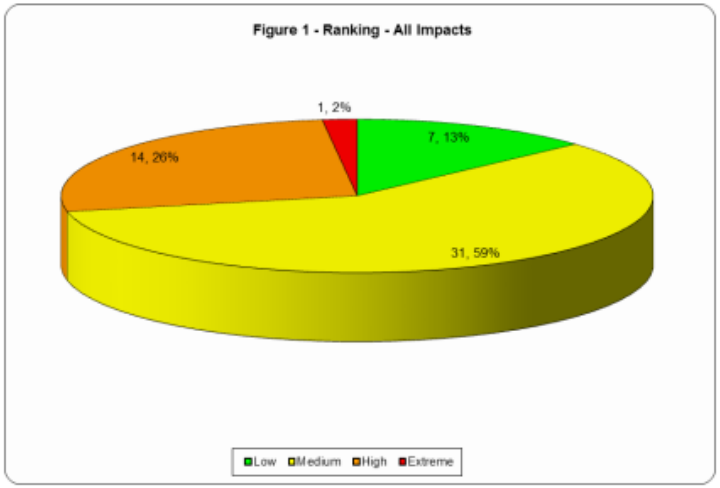
Figure 1 - Ranking - All Impacts



- A total of 33 risks were identified across the six risk scenarios presented.
- A total of 7 risks rated in the HIGH category with no risks rated EXTREME.
- A total of 21 risks were rated MEDIUM and five scored a rating of LOW.

2013 Outcome

The original assessment identified a total of 53 risks



2019 Total Impact Rankings

Table 1 - 2019 Impact Rankings by Scenario					
	Temperature	Hot Days	Rain	Fire Weather	**Total**
Low	0	0	4	1	**5**
Medium	9	2	8	2	**21**
High	3	2	1	1	**7**
Extreme	0	0	0	0	**0**
	12	**4**	**13**	**4**	**33**

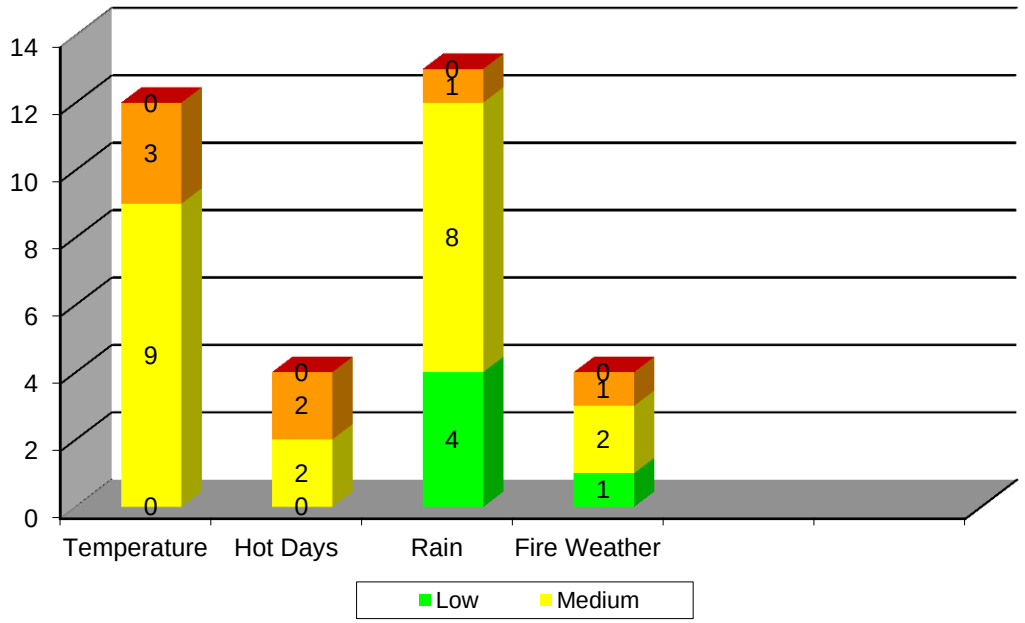
- The 7 HIGH rated risks are the focus of the proposed strategies to be given further consideration in Council's medium and long term planning.

2013 Outcome

Table 1 - Impact Rankings by Scenario										Table 1 Ranking All ImpactsTotal	
	Temperature	Hot Days	Rain	Wind	Fire Weather	Sea Level	Rain Intensity				
Low	0	0	0	4	2	0	1			**Low**	**7**
Medium	19	0	1	2	1	0	8			**Medium**	**31**
High	2	0	1	0	4	0	7			**High**	**14**
Extreme	0	0	0	0	0	0	1			**Extreme**	**1**
	21	**0**	**2**	**6**	**7**	**0**	**17**	**0**	**0**	**53**	**53**

2019 Impact Ranking by Scenario

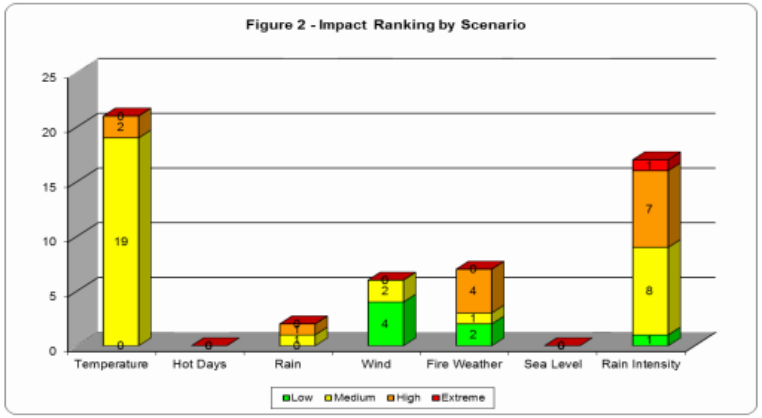
Figure 2 - Impact Ranking by Scenario



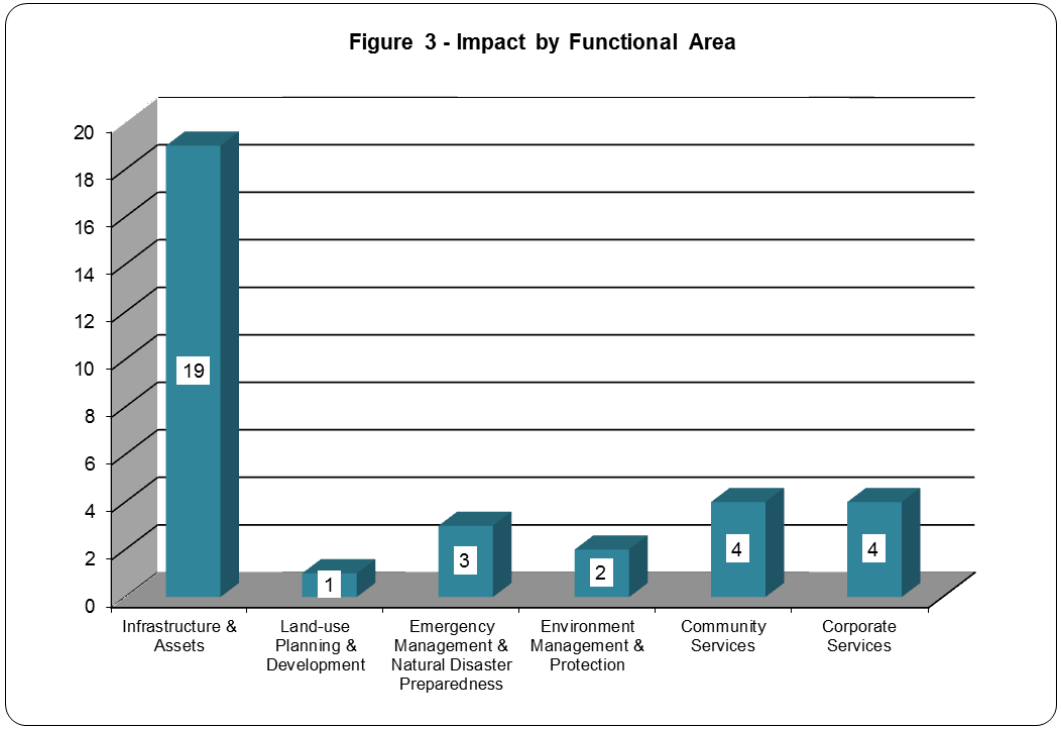
The results indicate that there are an equal number of risks associated with increased temperatures as there are with the risks of rainfall. The projections for temperature reflect an increase not only in the high temperatures but also in the low temperatures. Whilst Rainfall was not deemed to change significantly, it was considered to have significant impact.

There was also a correlation among temperatures, Hot days and Fire Weather; all of which identified High rated risks.

2013 Outcome

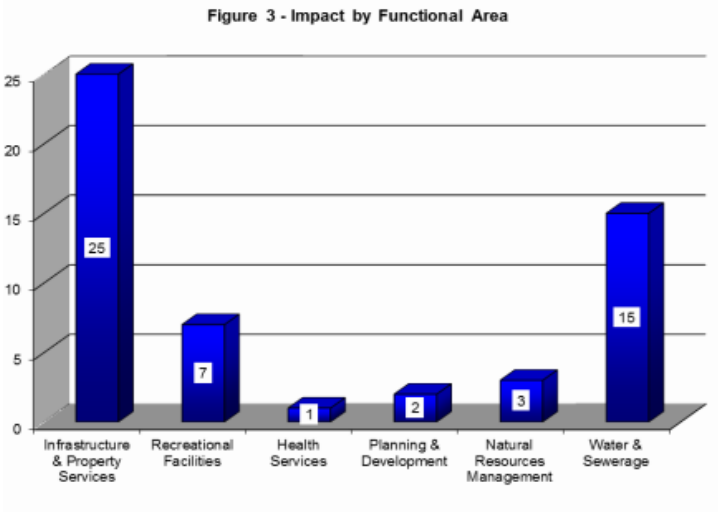


2019 Impact Ranking by Functional Area

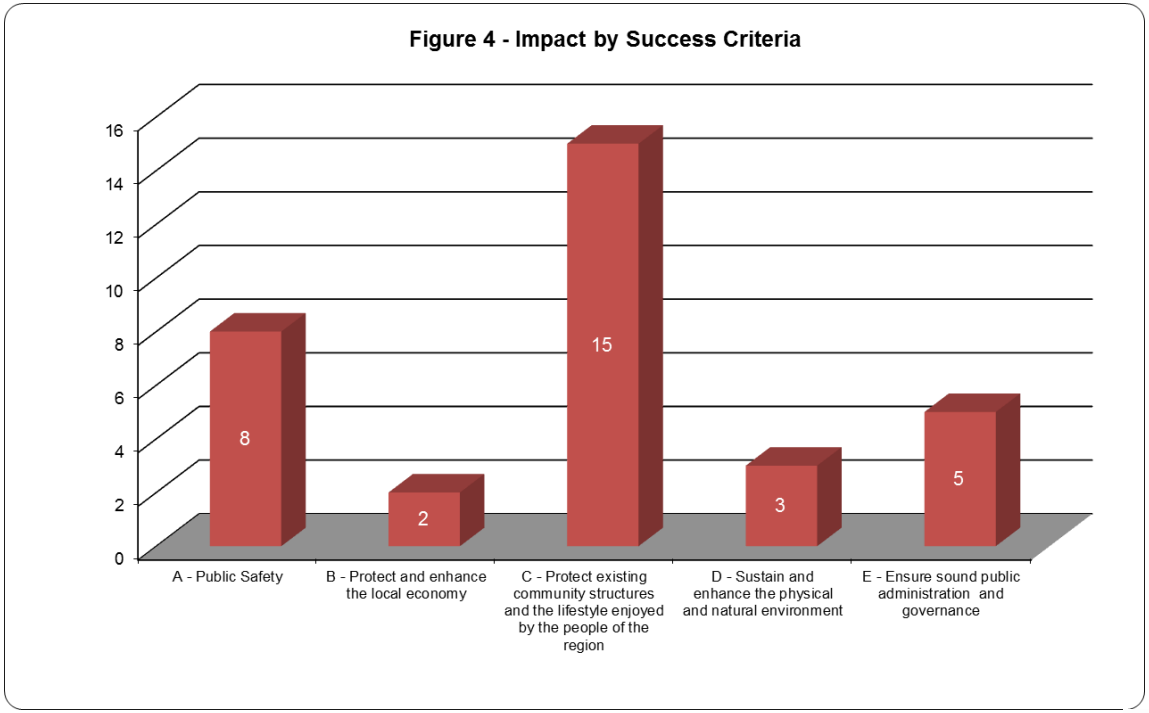


19 of the total 33 risks identified were considered to impact on the Infrastructure and Assets area of Council operations.

2013 Outcome



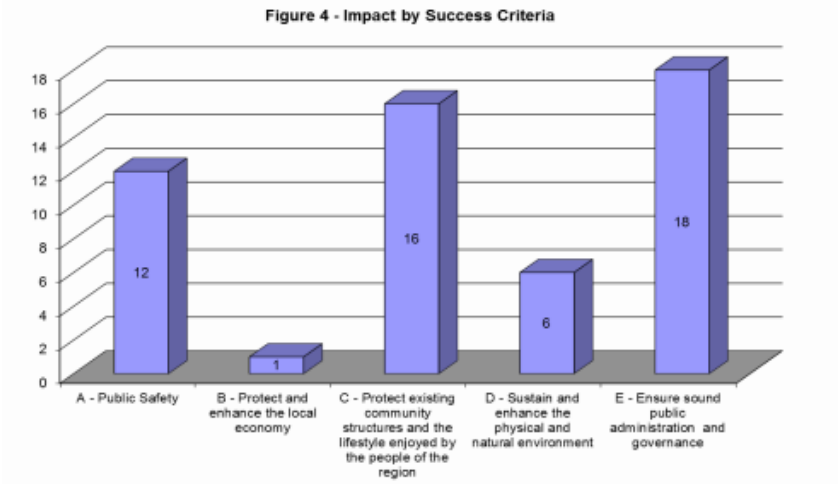
Impact by Success Criteria



2013 Outcome

Local Government have five success criteria that may be impacted by Climate Change. Out of the 33 risks, 15 risks (representing 45.5%) were considered to impact Council's ability to "Protect existing community structures and the lifestyle enjoyed by the people of the region".

A far second there were eight risks (representing 24%) assessed as impacting on "Public Safety".



BACKGROUND

PROJECT OBJECTIVES

The objectives of this project are to:

- Acknowledge Council's corporate responsibility by understanding the potential risks presented by climate change on the LGA;
- Undertake a risk assessment that aligns with AS ISO 31000;
- Understand the impact of climate change on the organisation and the community it aims to serve;
- Develop strategies that focus on adaptation to potential climate change impact
- Identify strategic initiatives that can be used to inform Council's medium and long term management planning.

IMPACT ON LOCAL GOVERNMENT

Local governments are responsible for delivering a broad range of services to the community, and for managing and maintaining a substantial number of assets and infrastructure that not only deliver essential services to the community but are of local, regional, state and national significance.

Local governments by their very nature are on the frontline in respect to dealing with and being affected by the impacts of climate change and as such, can play a critical role in ensuring that local conditions and needs are adequately considered in the overall adaptation response.

They are strongly positioned to inform State and Commonwealth Governments about the on-the-ground needs of local and regional communities, to communicate directly with communities, and to respond appropriately and in a timely manner to local changes. They also have the ability to collaborate with other local government authorities and to involve the local community directly in efforts to facilitate effective change.

2013 KYOGLE COUNCIL CLIMATE CHANGE ASSESSMENT

The Kyogle Council participated in the first Climate Change Risk Assessment and Adaptation Planning programme funded by Statewide Mutual in 2013. This assessment identified a total 53 risks with the following risk assessment ratings:

- 7 were rated Low
- 31 were rated Medium
- 14 were rated High and
- 1 was rated Extreme

The greatest number of risks, whilst mainly Medium, related to impact from Temperature.

The greatest impact of these risks (25) representing 47% were attributed to Infrastructure and Property Services.

Council's ability to "Ensure Sound Public Administration and Governance" was the most affected with the highest number of risks (18) representing 34%, followed closely by impact on the ability to "Protect existing community structures and the lifestyle enjoyed by the people of the region", with 16 risks representing 30%.

Adaptation initiatives were developed for the 16 risks rated High and the one Extreme.

ASSESSMENT TOOLS

This review aims to revisit and compare the 2013 assessment data and update in light of more current and more localised projections now available.

Risk ID

Each risk identified is given a Risk Identification code. This code is made up of the following identifiers:

- Success Criterion
- Climate Scenario:
- Functional Area
- Number of the risk

The ID is then displayed as CS/SC/FA/N

Success Criteria

'Success Criteria' are overall typical local government long term objectives, as originally defined in Climate Change Impacts & Risk Management A Guide for Business, Australian Greenhouse Office 2006. For consistency purposes the same were used in this year's assessment.

These criteria give consideration to the impact of Climate change on Council in terms of its ability to:

A Maintain public safety

B Protect and enhance the local economy

C Protect existing community structures and the lifestyle enjoyed by the people of the region

D Sustain and enhance the physical and natural environment

E Ensure sound public administration

Functional Areas of Council

As done in the original assessment, all functions of Council are grouped into generic areas consistent with all local government across the State. These areas were slightly modified as follows:

I Infrastructure and Assets

E Environmental Management & Protection

CS Community Services

L Land-use Planning and Development

D Emergency Management & Natural Disaster Preparedness

C Corporate Services

The agreed distribution of Council's business operations in line with the above categories is found at Appendix 7

Example: a risk identified in the Temperature Scenario, impacting Council's ability to maintain public safety and affecting the Functional Area of Infrastructure is coded as "TAI1".

The report also captures how the Success Criteria are impacted by the various Climate Scenarios and the specific Functional Areas potentially affected in each. This grouping is found in Appendix 6

Risk Evaluation

The risks were evaluated using the same evaluation matrix as that of 2013 for effective comparison of the assessments and consistency with the NSW OEH.

The Risk Matrix tools can be found at appendix 3.

IMPLEMENTATION OF 2013 INITIATIVES

Following the completion of the 2013 Climate Change Risk Assessment and Adaption Planning Report, Kyogle Council took an active role in ensuring the identified initiatives were actioned, with the following outcomes:

- Completion of Secure Yield Analysis for the Kyogle, Bonalbo and Urbenville Muli Muli Woodenbong water supplies
- Completion of the improvements to the Kyogle Water Supply augmentation involving a new off stream storage with solar powered destratification system, upgraded water treatment plant and modifications to the in stream weir
- Drinking Water Quality Management Plan improvement plan implemented, with capital improvements incorporated into the Kyogle Water Supply Augmentation
- Flood modification works completed for Kyogle
- Floodplain Risk Management Plan process commenced for the village of Tabulam, and funding applications submitted for Bonalbo and Woodenbong
- Council took part in the Regional Bulk Water Supply Strategy Study
- Commenced the planning process for a new water supply to service the village of Tabulam
- Combined Local Emergency Committee formed between Kyogle., Lismore and Richmond Valley Councils and updated Emergency Management Plan prepared including Consequence Management Plans for critical infrastructure and associated risks
- Additional resilience built in to replacement bridges and causeways
- Additional funding provided to improve rural roads and drainage and for continuous improvement in road maintenance practices
- Additional funding secured for urban stormwater upgrades and high priority projects completed and ongoing
- Ongoing private stormwater inspection program implemented to help reduce inflow and infiltration into the sewerage system
- Accelerated sewer relining program implemented and ongoing
- Actively lobbied for changes to the Natural Disaster Restoration and Recovery arrangements which have been implemented in 2018 allowing use of Council day labour and plant as part of the eligible expenditure, modern engineering standards, and provisions for betterment to improve resilience of replacement infrastructure

RECOMMENDATIONS

Kyogle Council clearly understands the importance of being aware of the potential impact of Climate Change on its assets, operations and community and is commended for actively driving the implementation of initiatives identified in the original Assessment.

In this reviewed assessment and identification of new adaptation initiatives, Council continues to build on its work through ongoing climate change adaptation planning.

The following recommendations are offered for Council consideration and implementation:

1. Review the new adaptation initiatives within recommended review dates; or earlier as necessary.
2. Review all risk assessments including low and medium risks as required
3. Consider new climate change risks when reviewing risk assessments, or as and when they arise.
4. Stay informed and consider any changes in relevant climate change data, operating environment, legislation, economy, demographics, and other relevant factors when reviewing adaptation plans and risk assessments.
5. Categorise adaptation initiatives and integrate these into Council's long term planning programs e.g. 4, 10 and 20 years to inform future planning.
6. Include climate change risk management and adaptation plans into strategic (e.g. Council's 20 year Community Strategic Plan) and other relevant management planning processes.
7. Map vulnerable areas in line with Climate projections and where relevant, review LEP and DCP controls as necessary.
8. Investigate the opportunities to partner with other government and non-government bodies and to attract external funding to assist with implementation

2019 CLIMATE CHANGE ASSESSMENTS AND ADAPTATION PLAN SUMMARY

Kyogle Council identified seven (7) climate change impact risks rated HIGH and no impacts rated Extreme. These seven risks are the main focus of this report and the proposed adaptation initiatives for the relevant Climate Scenario as summarised below.

Adaptation initiatives have also been identified for some of the impacts rated MEDIUM and these have been included in this report.

Scenario 1 – TEMPERATURE

- By 2030 Maximum Temperatures, Mean temperatures and Minimum temperatures are projected to rise by 0.7° C across the North coast region.
- By 2070 the Maximum Temperatures, Mean temperatures and Minimum temperatures are projected to rise by 2.1° C with greater increases in the west of the region (Kyogle area).
- All models show there are no declines in Max., Min or Mean temperatures in NSW
- Cold nights (below 2° C): - By 2030 in the area along the mountains there may be 10-20 fewer cold nights and over 30 fewer cold nights by 2070

There are three risks rated HIGH and three risks rated MEDIUM out of a total 12 risks for which future adaptation initiatives have been identified:

Risk ID	Impact Description	Impact Rating	Current Controls	Proposed Future Adaptation initiatives
TCI1	Due to the projected increase in average annual ambient temperature, there is a risk that areas surrounding Council assets and public open spaces will become much hotter and there may be a need to increase the number of shade structures through trees/other structures	High	Open spaces and community facilities generally have reasonable shaded areas, with limited numbers of artificial shade structures and some shade trees, however there are areas with a shade deficiency	Prepare Open Spaces Design Guide to determine balance between use of artificial shade structures and shade trees. Look to increase shade around playgrounds sporting facilities, open spaces and town centres whilst avoiding use of trees in locations that can cause damage to assets and other structures.
TCI2	As a result of the projected increase in average temperature there is a risk that there could be an increased demand for and load on air conditioning systems within Council buildings i.e. loss of a/Cond efficiency and/or a/Cond failure	Medium	Some community buildings are air conditioned or climate controlled but not all	Review existing community buildings with a view to planning for future cooling system needs and energy demand

Risk ID	Impact Description	Impact Rating	Current Controls	Proposed Future Adaptation initiatives
TCI3	Due to the projected increase in average ambient temperature visitation/usage rates at Council sporting fields may increase resulting in a need to provide council infrastructure such as lighting at sporting ovals for longer and more frequent occasions	Medium	Limited number of sights with suitable night lighting	Consider provision of lighting at sporting facilities and recreational areas during development of open space plans
TCI5	There is a risk that an increase in average temperature may see Council faced with an increased demand for potable water and increased water quality monitoring and reporting requirements	High	Existing controls include, Demand Management and Use of Water Restrictions, Community Education Programmes and BASIX requirements for new residential developments; all three water supplies have secure yields that meet the current NSW Governments requirements including provisions for climate change	Continued involvement in Regional Water Supply strategy and studies. Periodic review of existing Drought and Demand Management Plans and protocols. Review and update of the Integrated Water Cycle Management Strategy to cover the full Local Government Area. Ongoing review and implementation of the Drinking Water Quality Management Plan and associated improvement plan.
TAI6	There is a risk that the projected Increased temperatures may cause increased algal blooms with adverse flow on effects on water quality treatment and monitoring	High	Regular monitoring to identify toxic algal species within raw water supply sources. Treatment processes in place (powdered activated carbon facilities). Protocols in place to notify affected people and deal with contamination of water supplies. Existing off stream storages at Bonalbo and Kyogle have destratification system in place. Drinking Water Quality Management plan in place.	Ongoing review and implementation of the Drinking Water Quality Management Plan and associated improvement plan. Installation of algae control systems in sewage treatment facilities.
TBC11	There is a risk that an increase in average temperatures could impact on the region's agriculture and subsequently on the economy	Medium	NA	Support formation of university of restorative agriculture and other regional initiatives. Undertake a Local Strategic Planning Statement Process and identify environmental planning and economic development initiatives to protect the agricultural economy.

Scenario 2 – HOT DAYS

- Currently the North Coast Region experiences an average of 10 days above 35º C each year.
- By 2030 Hot Days are projected to increase by an average of 3 days above 35º C per year; the greatest increases are seen in the northwest of the region during summer with an additional 5-10 days per year.
- By 2070 Hot Days are projected to increase by an average of 9 days per year; greatest increases in the northwest of the region during summer with an additional 20 days per year.

There are two risks rated HIGH and one risk rated MEDIUM out of a total 4 risks for which future adaptation initiatives have been identified:

Risk ID	Impact Description	Impact Rating	Current Controls	Proposed Future Adaptation initiatives
HDAC1	There is a risk that an increase in hot days would impact on public safety (in particular the vulnerable) placing increased demand on public facilities usage and need for longer opening during the hot days to provide relief	High	Pools are open for longer on hot days when required; some council community facilities fitted with air conditioning; public facilities such as library can provide relief, but limited community halls with air conditioning for refuge in the villages.	increase education on risks to vulnerable communities as per NSW Health guidelines; consider hot days during open spaces planning process and planning around shade; consider creation of refuges in existing public and community spaces; review council and community buildings for potential refuges and look at improvements such as cooling systems, shade and potable water supplies
HDCC2	There is a risk that an increase in hot days would cause some community events or activities to be postponed or ceased as public facilities become unusable due to being rendered unacceptable for use in hot days	Medium	NA	public facilities to be suitably fitted with cooling systems for continued use by the community; consideration during open space planning around provision of additional shade and lighting
HDECS3	There is a risk that an increase in hot days could impact on the outdoor workforce work schedule due to heat conditions	High	policies for outdoor work on hot days; current practices allow for working outside the hottest period of the day; frequent breaks; portable shade structures; air conditioned offices and vehicles	continue to monitor practices review work protocols as necessary

Scenario 3 – RAINFALL

- By 2030 there is little change in the annual Rainfall; the greatest increases are seen in the SW of the region during autumn and the greatest decreases are along the northern coastal strip during winter.
- By 2070 annual Rainfall will increase across the region; increases are projected during summer, autumn and spring. Winter rains are projected to decrease across the region.

There are one risk rated HIGH, five risks rated MEDIUM and two risks rated LOW out of a total 13 risks for which future adaptation initiatives have been identified:

Risk ID	Impact Description	Impact Rating	Current Controls	Proposed Future Adaptation initiatives
RCI1	There is a risk that as a result of projected rainfall patterns it could impact on river flows and subsequently result in a reduction of secure yield water supply sources within the LGA	High	Council has undertaken strategies to identify the augmentation and capital works required to ensure secure yield of water supply sources. Drought Management Plan can also be implemented within the LGA as and when required and demand management protocols are also in place. BASIX controls for new residential developments reducing the demands placed upon the reticulated water supply network. Completion of Capital Works identified as a current control. Regional Water Supply strategy which looks towards the 50 year planning horizon and assesses the secure yield of water supply resources across the region. Implementation and review of existing Demand Management protocols.	Continued involvement in Regional Water Supply strategy and studies. Periodic review of existing Drought and Demand Management Plans and protocols. Review and update of the Integrated Water Cycle Management Strategy to cover the full Local Government Area. Ongoing review and implementation of the Drinking Water Quality Management Plan and associated improvement plan.

Risk ID	Impact Description	Impact Rating	Current Controls	Proposed Future Adaptation initiatives
RCI2	There is a risk that intense rain periods increasing in frequency as detailed in the scenario would cause more frequent and more severe damage to roads infrastructure. (Road Surface)	Medium	Detailed and timely assessment of damage to ensure access to any funding available through Natural Disaster Funding programmes. Emergency Management protocols and disaster planning to address/mitigate risks of this nature. Council maintains funds held in reserve to fund any immediate/urgent works that arise due to such intense rainfall events. Improvements to roads drainage infrastructure. Improved construction and maintenance practices. Additional resilience built into water crossing infrastructure (causeways & bridges). Maintenance and inspection regime as per Councils Road Network Management Plan and additional video inspections to ensure data is available on pre-disaster condition of assets.. Council also has a strategy in place to communicate information about roads affected by intense rainfall events using the MyRoadInfo web based system. Also make use of appropriate signage.	Lobbying other tiers of Government (State & Federal) to ensure the continued provision of disaster funding. Ongoing awareness and education regarding the safe use of roadways during such intense rainfall events.
RCI3	There is a risk that as a result of an increase of intense rainfall events existing urban drainage infrastructure capacity will be surpassed with greater frequency and intensity	Low	Revenue is raised through a storm water management charge to fund capital expenditure programmes. Council also undertakes a regime of cleaning, clearing and maintenance of urban storm water drainage infrastructure. Council also has an Urban Storm water Management Strategy.	Review of Urban Storm water Management Strategy in light of increased frequency of intense rainfall events. Seek additional funding for the ongoing upgrade of Urban Storm water system

Risk ID	Impact Description	Impact Rating	Current Controls	Proposed Future Adaptation initiatives
RCI4	There is a risk that there could be an overload of the sewerage pumping stations due to storm water intrusion causing surcharge	Low	Sewerage Overflow Management Plan. Constructed overflow discharge points in critical areas. Council has undertaken a comprehensive risk assessment of sewerage overflow. There is an established reporting and action strategy to respond to such occurrences. Council is also in the process of undertaking a program of sewer main relining and CCTV inspections of mains. Telemetry systems installed across all pumping stations with SCADA alarms systems in place	Council to continue the process of ongoing inspection of private properties to mitigate against illegal connections of storm water to the sewerage system. Acceleration of relining and renewal of sewerage reticulation network. Existing controls would remain in place and would be reviewed and amended in accordance with prevailing climatic conditions
RAL6	There is a risk that flood plans and development control guidelines may become outdated given the predicted higher instances of intense rainfall events within the Local Government Area	Medium	Flood Plain Risk Management Plan with Development Controls for the towns of Kyogle & Wiangaree. Limited knowledge of flood history in Woodenbong & Mallanganee whereby conservative floor levels are estimated for new development, undertaking flood studies for Tabulam, and one planned for Bonalbo,	Undertake flood studies and implementation of flood management plans for those areas where historical data is the primary source of information with a view to establishing development controls and review flood models as required
RED8	There is a risk that as a result of an increase in intense rainfall events and localised flooding, the damage to Council infrastructure may not meet the threshold for Natural Disaster Declaration or that State & Federal Government may withdraw disaster funding and Council would bear the costs for repairs/replacement of assets/ infrastructure themselves	Medium	Council has provisions for minimum reserve levels in its financial management policy to deal with isolated shock events	Council to lobby State & Federal Government, in conjunction with all NSW Local Government industry sector members to ensure the continued provision of Natural Disaster Declaration funding
RCI9	There is a risk of increased turbidity and poor source water quality following intense rainfall events	Medium	Monitoring of source water and treatment processes. Protocols in place to manage any public health risks. Drinking Water Quality Management plans have been completed.	Ongoing review and implementation of the Drinking Water Quality Management Plan and associated improvement plan.

Risk ID	Impact Description	Impact Rating	Current Controls	Proposed Future Adaptation initiatives
RCI12	There is a risk that lack of rainfall could lead to an increased demand on town water supply in un-serviced villages	Medium	Investigating options for water supply for the village of Tabulam.	Continued involvement in Regional Water Supply strategy and studies. Periodic review of existing Drought and Demand Management Plans and protocols. Review and update of the Integrated Water Cycle Management Strategy to cover the full Local Government Area. Ongoing review and implementation of the Drinking Water Quality Management Plan and associated improvement plan.

Scenario 4 – FIRE WEATHER

- Changes in number of days a year FFDI >50
- FFDI is used in NSW to quantify Fire Weather. The FFDI combines observations of temp, humidity and wind speed. Fire Weather is classified as Severe when the FFDI is above 50.
- By 2030 severe Fire Weather is projected to have a slight increase in spring and summer across the north coast region.
- By 2070 severe Fire Weather is projected to increase during summer and spring; these increased are seen during the peak prescribed burning season (spring) and peak fire risk season (summer).

There are one risk rated HIGH and two risks rated MEDIUM out of a total 4 risks for which future adaptation initiatives have been identified:

Risk ID	Impact Description	Impact Rating	Current Controls	Proposed Future Adaptation initiatives
FWAD2	There is a risk that public safety could be in jeopardy in areas which are under Councils care and/or control during on the days where the FFDI is >50	Medium	Council contributes towards and supports the operations of the RFS/NSW Fire & Rescue who would be the primary response agency in the event of a fire in areas used by the public under Councils care and control. Council would also inform the public via the MyRoadInfo web system to inform the community of roads affected by fire. The SES & RFS are also active in education programmes within the community to keep them informed. Council actively contributes to and participates in regional Emergency Management Response strategies	Continuation of existing controls subject to ongoing monitoring and review
FWAI3	There is a risk of an increased likelihood of uncontrolled wild fire damaging critical infrastructure (electricity sub stations, telecommunications exchanges, water and sewerage infrastructure) across the LGA impacting on the services to the community	Medium	Identification of vulnerable/critical infrastructure in Emergency Risk Management context which has been included in Emergency Risk Management Plans. Emergency Management Process in general would address this identified risk	Development of specific Emergency Management Sub Plans for specific failure/damage to identified critical infrastructure at risk

Risk ID	Impact Description	Impact Rating	Current Controls	Proposed Future Adaptation initiatives
FWAE4	There is a risk that an increase in Fire weather days could lead to increased fuel levels and risk of wild fire impacting on public safety including isolation of communities, damage to infrastructure and the economy	High	RFS; land holders and national parks and state forest undertake limited hazard reduction burns however there are community concerns about the level of effectiveness; some neighbourhood safer places identified	lobbying for increased hazard reduction burns and other fuel load reduction programs; community education; containment measures; fire trail maintenance; community managed evacuation centres and neighbourhood safer places

APPENDICES

APPENDIX 1 – RISK LIKELIHOOD DESCRIPTORS

Table 4: Kyogle Council Likelihood Table

Likelihood Rating	Recurrent Risks	Single Events
Almost Certain	Could occur several times per year	More likely than not - Probability greater than 50%
Likely	May arise about once a year	As likely as not - 50/50 chance
Possible	May arise once in ten years	Less likely than not but still appreciable - Probability less than 50% but still quite high
Unlikely	May arise once in ten to 25 years	Unlikely but not negligible - Probability low but noticeably greater than zero
Rare	Unlikely during the next 25 years	Negligible - Probability very small, close to zero.

APPENDIX 2 – RISK CONSEQUENCE DESCRIPTORS

Success Criteria	Consequence Rating				
	Insignificant	Minor	Moderate	Major	Catastrophic
A Maintain public safety	Appearance of a threat but no actual harm	Serious near misses or minor injuries	Small numbers of injuries	Isolated instances of serious injuries or loss of lives	Large numbers of serious injuries or loss of lives
B Protect and enhance the local economy	Minor shortfall relative to current forecasts	Individually significant but isolated areas of reduction in economic performance relative to current forecasts	Significant general reduction in economic performance relative to current forecasts	Regional stagnation such that businesses are unable to thrive and employment does not keep pace with population growth	Regional decline leading to widespread business failure, loss of employment and hardship
C Protect existing community structures and the lifestyle enjoyed by the people of the region	There would be minor areas in which the region was unable to maintain its current services	Isolated but noticeable examples of decline in services	General appreciable decline in services	Severe and widespread decline in services and quality of life within the community	The region would be seen as very unattractive, moribund and unable to support its community
D Sustain and enhance the physical and natural environment	No environmental damage	Minor instances of environmental damage that could be reversed	Isolated but significant instances of environmental damage that might be reversed with intensive efforts	Severe loss of environmental amenity and a danger of continuing environmental damage	Major widespread loss of environmental amenity and progressive irrecoverable environmental damage
E Ensure sound public administration and governance	There would be minor instances of public administration being under more than usual stress but it could be managed	Isolated instances of public administration being under severe pressure	Public administration would be under severe pressure on several fronts	Public administration would struggle to remain effective and would be seen to be in danger of failing completely	Public administration would fall into decay and cease to be effective

APPENDIX 3 – RISK MATRIX

Risk evaluation matrix used in the 2019 Risk assessment and analysis.

		CONSEQUENCE				
		Insignificant	Minor	Moderate	Major	Catastrophic
LIKELIHOOD	Almost Certain					
	Likely					
	Possible					
	Unlikely					
	Rare					

EXTREME	**Extreme** risks demand/require urgent attention at the most senior level and action plans and management responses are required; cannot be simply accepted as a part of routine operations.
HIGH	**High** risks are the most severe that can be accepted as a part of routine operations but must be managed by a senior manager who reports on progress to the Executive.
MEDIUM	**Medium** risks can be expected to form part of routine operations where specific monitoring and response procedures exist. Management will be assigned to a particular manager and reported on at senior management level.
LOW	**Low** risks will be part of routine operations and expected to be managed by existing controls.

APPENDIX 4 – CLIMATE CHANGE ADAPTION INITIATIVES PLAN

This table includes all identified risks for which Future adaptation initiatives have been identified and now require future action.

The last column is provided for Council to consider and determine the appropriate actions to be taken to implement the adaptation initiatives.

Risk ID	Description	Risk Rating	Future Adaptation Plans	Functional Area	Timeframe
TCI1	Due to the projected increase in average annual ambient temperature, there is a risk that areas surrounding Council assets and public open spaces will become much hotter and there may be a need to increase the number of shade structures through trees/other structures	High	Prepare Open Spaces Design Guide to determine balance between use of artificial shade structures and shade trees. Look to increase shade around playgrounds sporting facilities, open spaces and town centres whilst avoiding use of trees in locations that can cause damage to assets and other structures.	Planning, & Urban Services	Open Spaces Design Guide and site specific master plans by December 2019 Kyogle town centre master plan review by Dec 2020
TCI5	There is a risk that an increase in average temperature may see Council faced with an increased demand for potable water and increased water quality monitoring and reporting requirements	High	Continued involvement in Regional Water Supply strategy and studies. Periodic review of existing Drought and Demand Management Plans and protocols. Review and update of the Integrated Water Cycle Management Strategy to cover the full Local Government Area. Ongoing review and implementation of the Drinking Water Quality Management Plan and associated improvement plan.	Urban Services	IWCMS Review by Dec 2019 DWQMS ongoing Review Drought Management Plan by Dec 2020 Regional Water Strategy by June 2020 (NSW DoI Water)
TAI6	There is a risk that the projected Increased temperatures may cause increased algal blooms with adverse flow on effects on water quality treatment and monitoring	High	Ongoing review and implementation of the Drinking Water Quality Management Plan and associated improvement plan. Installation of algae control systems in sewage treatment facilities.	Urban Services	DWQMS ongoing IWCMS Review by Dec 2019

Risk ID	Description	Risk Rating	Future Adaptation Plans	Functional Area	Timeframe
HDAC1	There is a risk that an increase in hot days would impact on public safety (in particular the vulnerable) placing increased demand on public facilities usage and need for longer opening during the hot days to provide relief	High	increase education on risks to vulnerable communities as per NSW Health guidelines; consider hot days during open spaces planning process and planning around shade; consider creation of refuges in existing public and community spaces; review council and community buildings for potential refuges and look at improvements such as cooling systems, shade and potable water supplies.	Planning, Emergency Management, & Urban Services	Open Spaces Design Guide and site specific master plans by December 2019 Kyogle town centre master plan review by Dec 2020 Review Community Buildings needs by Dec 2020
HDECS3	There is a risk that an increase in hot days could impact on the outdoor workforce work schedule due to heat conditions	High	continue to monitor practices review work protocols as necessary	Corporate Services	Ongoing
RCI1	There is a risk that as a result of projected rainfall patterns it could impact on river flows and subsequently result in a reduction of secure yield water supply sources within the LGA	High	Continued involvement in Regional Water Supply strategy and studies. Periodic review of existing Drought and Demand Management Plans and protocols. Review and update of the Integrated Water Cycle Management Strategy to cover the full Local Government Area. Ongoing review and implementation of the Drinking Water Quality Management Plan and associated improvement plan.	Urban Services	IWCMS Review by Dec 2019 DWQMS ongoing Review Drought Management Plan by Dec 2020 Regional Water Strategy by June 2020 (NSW DoI Water)
FWAE4	There is a risk that an increase in Fire weather days could lead to increased fuel levels and risk of wild fire impacting on public safety including isolation of communities, damage to infrastructure and the economy	High	lobbying for increased hazard reduction burns and other fuel load reduction programs; community education; containment measures; fire trail maintenance; community managed evacuation centres and neighbourhood safer places	Elected Councillors, Strategic Initiatives, & Emergency Management	Advocacy briefs by Dec 2019 Community Managed Evacuation Centres by Dec 2019

Risk ID	Description	Risk Rating	Future Adaptation Plans	Functional Area	Timeframe
TCI2	As a result of the projected increase in average temperature there is a risk that there could be an increased demand for and load on air conditioning systems within Council buildings i.e. loss of a/Cond efficiency and/or a/Cond failure	Medium	Review existing community buildings with a view to planning for future air conditioning needs and energy demand	Planning, & Urban Services	Review Community Buildings needs by Dec 2020
TCI3	Due to the projected increase in average ambient temperature visitation/usage rates at Council sporting fields may increase resulting in a need to provide council infrastructure such as lighting at sporting ovals for longer and more frequent occasions	Medium	Consider provision of lighting at sporting facilities and recreational areas during development of open space plans and	Planning, & Urban Services	Open Spaces Design Guide and site specific master plans by December 2019
TBC11	There is a risk that an increase in average temperatures could impact on the region's agriculture and subsequently on the economy	Medium	Support formation of university of restorative agriculture and other regional initiatives. Undertake a Local Strategic Planning Statement Process and identify environmental planning and economic development initiatives to protect the agricultural economy.	Strategic Initiatives	LSPS by June 2020
HDCC2	There is a risk that an increase in hot days would cause some community events or activities to be postponed or ceased as public facilities become unusable due to being rendered unacceptable for use in hot days	Medium	public facilities to be suitably fitted with air conditioning for continued use by the community; consideration during open space planning around provision of additional shade and lighting	Planning, & Urban Services	Open Spaces Design Guide and site specific master plans by December 2019 Review Community Buildings needs by Dec 2020
RCI2	There is a risk that intense rain periods increasing in frequency as detailed in the scenario would cause more frequent and more severe damage to roads infrastructure. (Road Surface)	Medium	Lobbying other tiers of Government (State & Federal) to ensure the continued provision of disaster funding. Ongoing awareness and education regarding the safe use of roadways during such intense rainfall events.	Elected Councillors, & Infrastructure Works	Ongoing

Risk ID	Description	Risk Rating	Future Adaptation Plans	Functional Area	Timeframe
RAL6	There is a risk that flood plans and development control guidelines may become outdated given the predicted higher instances of intense rainfall events within the Local Government Area	Medium	Undertake flood studies and implementation of flood management plans for those areas where historical data is the primary source of information with a view to establishing development controls and review flood models as required	Planning, & Urban Services	Tabulam FPRMP by Dec 2019 Bonalbo and Woodenbong by Dec 2021 subject to external funding
RED8	There is a risk that as a result of an increase in intense rainfall events and localised flooding, the damage to Council infrastructure may not meet the threshold for Natural Disaster Declaration or that State & Federal Government may withdraw disaster funding and Council would bear the costs for repairs/replacement of assets/ infrastructure themselves	Medium	Council to lobby State & Federal Government, in conjunction with all NSW Local Government industry sector members to ensure the continued provision of Natural Disaster Declaration funding	Elected Councillors, & Infrastructure Works	Ongoing
RCI9	There is a risk of increased turbidity and poor source water quality following intense rainfall events	Medium	Ongoing review and implementation of the Drinking Water Quality Management Plan and associated improvement plan.	Urban Services	DWQMS ongoing
RCI12	There is a risk that lack of rainfall could lead to an increased demand on town water supply in un-serviced villages and rural areas	Medium	Continued involvement in Regional Water Supply strategy and studies. Periodic review of existing Drought and Demand Management Plans and protocols. Review and update of the Integrated Water Cycle Management Strategy to cover the full Local Government Area. Ongoing review and implementation of the Drinking Water Quality Management Plan and associated improvement plan. Consider development controls to improve water storage for un serviced areas	Urban Services	IWCMS Review by Dec 2019 DWQMS ongoing Review Drought Management Plan by Dec 2020 Regional Water Strategy by June 2020 (NSW DoI Water)

Risk ID	Description	Risk Rating	Future Adaptation Plans	Functional Area	Timeframe
FWAD2	There is a risk that public safety could be in jeopardy in areas which are under Councils care and/or control during on the days where the FFDI is >50	Medium	Continuation of existing controls subject to ongoing monitoring and review	Emergency Management	Ongoing
FWAI3	There is a risk of an increased likelihood of uncontrolled wild fire damaging critical infrastructure (electricity sub stations, telecommunications exchanges, water and sewerage infrastructure)across the LGA impacting on the services to the community	Medium	Development of specific Emergency Management Sub Plans for specific failure/damage to identified critical infrastructure at risk	Emergency Management	Ongoing, subject to Local Emergency Management Committee priorities
RCI3	There is a risk that as a result of an increase of intense rainfall events existing urban drainage infrastructure capacity will be surpassed with greater frequency and intensity	Low	Review of Urban Storm water Management Strategy in light of increased frequency of intense rainfall events. Seek additional funding for the ongoing upgrade of Urban Storm water system	Planning, & Urban Services	Review USWMS within 2 years of IWCMS completion
RCI4	There is a risk that there could be an overload of the sewerage pumping stations due to storm water intrusion causing surcharge	Low	Council to continue the process of ongoing inspection of private properties to mitigate against illegal connections of storm water to the sewerage system. Acceleration of relining and renewal of sewerage reticulation network. Existing controls would remain in place and would be reviewed and amended in accordance with prevailing climatic conditions	Urban Services	Ongoing programs.

APPENDIX 5 – TOTAL CLIMATE CHANGE RISK ASSESSMENT RESULTS

TEMPERATURE

RISK ID	RISK IMPACT DESCRIPTION	IMPACTED CRITERION	FUNCTIONAL AREA	LIKELIHOOD	CONSEQUENCE	RISK RATING
TCI1	Due to the projected increase in average annual ambient temperature, there is a risk that areas surrounding Council assets and public open spaces will become much hotter and there may be a need to increase the number of shade structures through trees/other structures	Protect Community Structures and Lifestyle	Infrastructure & Assets	Almost Certain	Minor	High
TCI2	As a result of the projected increase in average temperature there is a risk that there could be an increased demand for and load on air conditioning systems within Council buildings i.e. loss of a/Cond efficiency and/or a/Cond failure	Protect Community Structures and Lifestyle	Infrastructure & Assets	Likely	Insignificant	Medium
TCI3	Due to the projected increase in average ambient temperature visitation/usage rates at Council sporting fields may increase resulting in a need to provide council infrastructure such as lighting at sporting ovals for longer and more frequent occasions	Protect Community Structures and Lifestyle	Infrastructure & Assets	Likely	Minor	Medium
TCI4	A potential flow on consequence resulting from the projected increase in average temperature is that Council could be faced with increased demand on pool facilities (e.g. increased chemical dosing, extended season and opening hours)	Protect Community Structures and Lifestyle	Infrastructure & Assets	Almost Certain	Insignificant	Medium
TCI5	There is a risk that an increase in average temperature may see Council faced with an increased demand for potable water and increased water quality monitoring and reporting requirements	Protect Community Structures and Lifestyle	Infrastructure & Assets	Almost Certain	Minor	High

RISK ID	RISK IMPACT DESCRIPTION	IMPACTED CRITERION	FUNCTIONAL AREA	LIKELIHOOD	CONSEQUENCE	RISK RATING
TAI6	There is a risk that the projected Increased temperatures may cause increased algal blooms with adverse flow on effects on water quality treatment and monitoring	Maintain Public Safety	Infrastructure & Assets	Likely	Major	High
TDE7	An increase in temperature may cause a change in local ecology (e.g. change of profile of pests and weeds and threat to endangered species of plants and animals)	Physical and Natural Environment	Environment Management & Protection	Likely	Minor	Medium
TCI8	There is a risk that higher evaporation rates caused by the increase in average temperature will impact on river flows and subsequently reduce secure yield water supplies	Protect Community Structures and Lifestyle	Infrastructure & Assets	Likely	Minor	Medium
TECS9	There is a risk that as a result of the projected increase in average temperature there could be increased incidence of heat stress/fatigue amongst Councils outdoor staff	Sound Public Administration and Governance	Corporate Services	Likely	Minor	Medium
TDI10	There is a risk that the increase in average temperatures will increase the demand on energy supply and cost and lead to increased occurrences of blackouts or brownouts	Physical and Natural Environment	Infrastructure & Assets	Possible	Minor	Medium
TBC11	There is a risk that an increase in average temperatures could impact on the region's agriculture and subsequently on the economy	Protect and Enhance Local Economy	Community Services	Likely	Minor	Medium
TCI12	There is a risk that an increase in average temperatures could cause faster degradation of infrastructure (consider new materials)	Protect Community Structures and Lifestyle	Infrastructure & Assets	Possible	Minor	Medium

HOT DAYS

RISK ID	RISK IMPACT DESCRIPTION	IMPACTED CRITERION	FUNCTIONAL AREA	LIKELIHOOD	CONSEQUENCE	RISK RATING
HDAC1	There is a risk that an increase in hot days would impact on public safety (in particular the vulnerable) placing increased demand on public facilities usage and need for longer opening during the hot days to provide relief	Maintain Public Safety	Community Services	Likely	Moderate	High
HDCC2	There is a risk that an increase in hot days would cause some community events or activities to be postponed or ceased as public facilities become unusable due to being rendered unacceptable for use in hot days	Protect Community Structures and Lifestyle	Community Services	Possible	Minor	Medium
HDECS3	There is a risk that an increase in hot days could impact on the outdoor workforce work schedule due to heat conditions	Sound Public Administration and Governance	Corporate Services	Likely	Moderate	High
HDAI4	There is a risk that an increase in hot days could cause more incidences of black outs or brown outs during the demand on energy leading to the interruption of business operations (water supply and sewerage services) for extended periods	Maintain Public Safety	Infrastructure & Assets	Likely	Minor	Medium

RAINFALL

RISK ID	RISK IMPACT DESCRIPTION	IMPACTED CRITERION	FUNCTIONAL AREA	LIKELIHOOD	CONSEQUENCE	RISK RATING
RCI1	There is a risk that as a result of projected rainfall patterns it could impact on river flows and subsequently result in a reduction of secure yield water supply sources within the LGA	Protect Community Structures and Lifestyle	Infrastructure & Assets	Possible	Moderate	High
RCI2	There is a risk that intense rain periods increasing in frequency as detailed in the scenario would cause more frequent and more severe damage to roads infrastructure. (Road Surface)	Protect Community Structures and Lifestyle	Infrastructure & Assets	Unlikely	Moderate	Medium
RCI3	There is a risk that as a result of an increase of intense rainfall events existing urban drainage infrastructure capacity will be surpassed with greater frequency and intensity	Protect Community Structures and Lifestyle	Infrastructure & Assets	Unlikely	Minor	Low
RCI4	There is a risk that there could be an overload of the sewerage pumping stations due to storm water intrusion causing surcharge	Protect Community Structures and Lifestyle	Infrastructure & Assets	Unlikely	Minor	Low
RAI5	There is a risk that as a result of an increase in intense rainfall events that localised river flooding could occur more frequently leading to unsafe public areas	Maintain Public Safety	Infrastructure & Assets	Possible	Insignificant	Low
RAL6	There is a risk that flood plans and development control guidelines may become outdated given the predicted higher instances of intense rainfall events within the Local Government Area	Maintain Public Safety	Land-use Planning & Development	Possible	Minor	Medium
RECS7	There is a risk that there could be increased levels of litigation claims from property owners as a result of inappropriate drainage infrastructure	Sound Public Administration and Governance	Corporate Services	Possible	Minor	Medium

RISK ID	RISK IMPACT DESCRIPTION	IMPACTED CRITERION	FUNCTIONAL AREA	LIKELIHOOD	CONSEQUENCE	RISK RATING
RED8	There is a risk that as a result of an increase in intense rainfall events and localised flooding, the damage to Council infrastructure may not meet the threshold for Natural Disaster Declaration or that State & Federal Government may withdraw disaster funding and Council would bear the costs for repairs/replacement of assets/ infrastructure themselves	Sound Public Administration and Governance	Emergency Management & Natural Disaster Preparedness	Possible	Minor	Medium
RCI9	There is a risk of increased turbidity and poor source water quality following intense rainfall events	Protect Community Structures and Lifestyle	Infrastructure & Assets	Likely	Minor	Medium
RCC10	There is a risk that intense rain events could continue to flood roads and bridges and isolate communities known to become cut off	Protect Community Structures and Lifestyle	Community Services	Possible	Minor	Medium
RDI11	There is a risk that lack of rainfall could impact on road infrastructure function and maintenance (water is required to grade roads)	Physical and Natural Environment	Infrastructure & Assets	Unlikely	Insignificant	Low
RCI12	There is a risk that lack of rainfall could lead to an increased demand on town water supply in un-serviced villages and rural areas	Protect Community Structures and Lifestyle	Infrastructure & Assets	Likely	Minor	Medium
RBCS13	There is a risk that a reduction in rainfall could impact on the region's agriculture and impact subsequently on economy	Protect and Enhance Local Economy	Corporate Services	Likely	Minor	Medium

FIRE WEATHER

RISK ID	RISK IMPACT DESCRIPTION	IMPACTED CRITERION	FUNCTIONAL AREA	LIKELIHOOD	CONSEQUENCE	RISK RATING
FWED1	There is a risk that as a result of an increase in fire events Council's contribution to RFS expenses may increase (Strategic Planning Consideration)	Sound Public Administration and Governance	Emergency Management & Natural Disaster Preparedness	Possible	Insignificant	Low
FWAD2	There is a risk that public safety could be in jeopardy in areas which are under Councils care and/or control during on the days where the FFDI is >50	Maintain Public Safety	Emergency Management & Natural Disaster Preparedness	Rare	Major	Medium
FWAI3	There is a risk of an increased likelihood of uncontrolled wild fire damaging critical infrastructure (electricity sub stations, telecommunications exchanges, water and sewerage infrastructure) across the LGA impacting on the services to the community	Maintain Public Safety	Infrastructure & Assets	Unlikely	Moderate	Medium
FWAE4	There is a risk that an increase in Fire weather days could lead to increased fuel levels and risk of wild fire impacting on public safety including isolation of communities, damage to infrastructure and the economy	Maintain Public Safety	Environment Management & Protection	Possible	Moderate	High

APPENDIX 6 – RISK ASSESSMENT IMPACT MATRIX

Scenario for Temperature (T)

Temperature Risk Impact Matrix							
T		Infrastructure and Assets	Environment Management & Protection	Community Services	Land-use Planning and Development	Emergency Management & Natural Disaster Preparedness	Corporate Services
		(I)	**(E)**	**(CS)**	**(L)**	**(D)**	**(C)**
A	Maintain public safety	X					
B	Protect and enhance the local economy			X			
C	Protect existing community structures and the lifestyle enjoyed by the people of the region	X					
D	Sustain and enhance the physical and natural environment	X	X				
E	Ensure sound public administration and governance						X

The following is the list of risks associated with Temperature increase Impact on Council Operations

RISK ID	RISK IMPACT DESCRIPTION	SUCCESS CRITERION IMPACTED	FUNCTIONAL AREA IMPACTED	LIKELIHOOD	CONSEQUENCE	RISK RATING
TCI1	Due to the projected increase in average annual ambient temperature, there is a risk that areas surrounding Council assets and public open spaces will become much hotter and there may be a need to increase the number of shade structures thru trees/other structures	Protect Community Structures and Lifestyle	Infrastructure & Assets	Almost Certain	Minor	High
TCI2	As a result of the projected increase in average temperature there is a risk that there could be an increased demand for and load on air conditioning systems within Council buildings i.e. loss of a/Cond efficiency and/or a/Cond failure	Protect Community Structures and Lifestyle	Infrastructure & Assets	Likely	Insignificant	Medium
TCI3	Due to the projected increase in average ambient temperature visitation/usage rates at Council sporting fields may increase resulting in a need to provide council infrastructure such as lighting at sporting ovals for longer and more frequent occasions	Protect Community Structures and Lifestyle	Infrastructure & Assets	Likely	Minor	Medium
TCI4	A potential flow on consequence resulting from the projected increase in average temperature is that Council could be faced with increased demand on pool facilities (e.g. increased chemical dosing, extended season and opening hours)	Protect Community Structures and Lifestyle	Infrastructure & Assets	Almost Certain	Insignificant	Medium
TCI5	There is a risk that an increase in average temperature may see Council faced with an increased demand for potable water and increased water quality monitoring and reporting requirements	Protect Community Structures and Lifestyle	Infrastructure & Assets	Almost Certain	Minor	High

RISK ID	RISK IMPACT DESCRIPTION	SUCCESS CRITERION IMPACTED	FUNCTIONAL AREA IMPACTED	LIKELIHOOD	CONSEQUENCE	RISK RATING
TAI6	There is a risk that the projected Increased temperatures may cause increased algal blooms with adverse flow on effects on water quality treatment and monitoring	Maintain Public Safety	Infrastructure & Assets	Likely	Major	High
TDE7	An increase in temperature may cause a change in local ecology (e.g. change of profile of pests and weeds and threat to endangered species of plants and animals)	Physical and Natural Environment	Environment Management & Protection	Likely	Minor	Medium
TCI8	There is a risk that higher evaporation rates caused by the increase in average temperature will impact on river flows and subsequently reduce secure yield water supplies	Protect Community Structures and Lifestyle	Infrastructure & Assets	Likely	Minor	Medium
TECS9	There is a risk that as a result of the projected increase in average temperature there could be increased incidence of heat stress/fatigue amongst Councils outdoor staff	Sound Public Administration and Governance	Corporate Services	Likely	Minor	Medium
TDI10	There is a risk that the increase in average temperatures will increase the demand on energy supply and cost and lead to increased occurrences of blackouts or brownouts	Physical and Natural Environment	Infrastructure & Assets	Possible	Minor	Medium
TBC11	There is a risk that an increase in average temperatures could impact on the region's agriculture and subsequently on the economy	Protect and Enhance Local Economy	Community Services	Likely	Minor	Medium
TCI12	There is a risk that an increase in average temperatures could cause faster degradation of infrastructure (consider new materials)	Protect Community Structures and Lifestyle	Infrastructure & Assets	Possible	Minor	Medium

Scenario for Hot Days (HD)

Hot Days Risk Impact Matrix (HD)							
HD		Infrastructure and Assets	Environment Management & Protection	Community Services	Land-use Planning and Development	Emergency Management & Natural Disaster Preparedness	Corporate Services
		(I)	**(E)**	**(CS)**	**(L)**	**(D)**	**(C)**
A	Maintain public safety	X		X			
B	Protect and enhance the local economy						
C	Protect existing community structures and the lifestyle enjoyed by the people of the region			X			
D	Sustain and enhance the physical and natural environment						
E	Ensure sound public administration and governance						X

The following is the list of risks associated with Hot Days Impact: on Council Operations:

RISK ID	RISK IMPACT DESCRIPTION	SUCCESS CRITERION IMPACTED	FUNCTIONAL AREA IMPACTED	LIKELIHOOD	CONSEQUENCE	RISK RATING
HDAC1	There is a risk that an increase in hot days would impact on public safety (in particular the vulnerable) placing increased demand on public facilities usage and need for longer opening during the hot days to provide relief	Maintain Public Safety	Community Services	Likely	Moderate	High
HDCC2	There is a risk that an increase in hot days would cause some community events or activities to be postponed or ceased as public facilites become unusable due to being rendered unacceptable for use in hot days	Protect Community Structures and Lifestyle	Community Services	Possible	Minor	Medium
HDECS3	There is a risk that an increase in hot days could impact on the outdoor workforce work schedule due to heat conditions	Sound Public Administration and Governance	Corporate Services	Likely	Moderate	High
HDAI4	There is a risk that an increase in hot days could cause more incidences of black outs or brown outs during the demand on energy leading to the interruption of business operations (water supply and sewerage services) for extended periods	Maintain Public Safety	Infrastructure & Assets	Likely	Minor	Medium

Scenario for Rainfall (R)

Rainfall Risk Impact Matrix (R)							
R		Infrastructure and Assets	Environment Management & Protection	Community Services	Land-use Planning and Development	Emergency Management & Natural Disaster Preparedness	Corporate Services
		(I)	**(E)**	**(CS)**	**(L)**	**(D)**	**(C)**
A	Maintain public safety	X			X		
B	Protect and enhance the local economy						X
C	Protect existing community structures and the lifestyle enjoyed by the people of the region	X		X			
D	Sustain and enhance the physical and natural environment	X					
E	Ensure sound public administration and governance					X	X

The following is the list of risks associated with Rainfall Impact: on Council Operations:

RISK ID	RISK IMPACT DESCRIPTION	SUCCESS CRITERION IMPACTED	FUNCTIONAL AREA IMPACTED	LIKELIHOOD	CONSEQUENCE	RISK RATING
RCI1	There is a risk that as a result of projected rainfall patterns it could impact on river flows and subsequently result in a reduction of secure yield water supply sources within the LGA	Protect Community Structures and Lifestyle	Infrastructure & Assets	Possible	Moderate	High
RCI2	There is a risk that intense rain periods increasing in frequency as detailed in the scenario would cause more frequent and more severe damage to roads infrastructure. (Road Surface)	Protect Community Structures and Lifestyle	Infrastructure & Assets	Unlikely	Moderate	Medium
RCI3	There is a risk that as a result of an increase of intense rainfall events existing urban drainage infrastructure capacity will be surpassed with greater frequency and intensity	Protect Community Structures and Lifestyle	Infrastructure & Assets	Unlikely	Minor	Low
RCI4	There is a risk that there could be an overload of the sewerage pumping stations due to storm water intrusion causing surcharge	Protect Community Structures and Lifestyle	Infrastructure & Assets	Unlikely	Minor	Low
RAI5	There is a risk that as a result of an increase in intense rainfall events that localised river flooding could occur more frequently leading to unsafe public areas	Maintain Public Safety	Infrastructure & Assets	Possible	Insignificant	Low
RAL6	There is a risk that flood plans and development control guidelines may become outdated given the predicted higher instances of intense rainfall events within the Local Government Area	Maintain Public Safety	Land-use Planning & Development	Possible	Minor	Medium

RISK ID	RISK IMPACT DESCRIPTION	SUCCESS CRITERION IMPACTED	FUNCTIONAL AREA IMPACTED	LIKELIHOOD	CONSEQUENCE	RISK RATING
RECS7	There is a risk that there could be increased levels of litigation claims from property owners as a result of inappropriate drainage infrastructure	Sound Public Administration and Governance	Corporate Services	Possible	Minor	Medium
RED8	There is a risk that as a result of an increase in intense rainfall events and localised flooding, the damage to Council infrastructure may not meet the threshold for Natural Disaster Declaration or that State & Federal Government may withdraw disaster funding and Council would bear the costs for repairs/replacement of assets/ infrastructure themselves	Sound Public Administration and Governance	Emergency Management & Natural Disaster Preparedness	Possible	Minor	Medium
RCI9	There is a risk of increased turbidity and poor source water quality following intense rainfall events	Protect Community Structures and Lifestyle	Infrastructure & Assets	Likely	Minor	Medium
RCC10	There is a risk that intense rain events could continue to flood roads and bridges and isolate communities known to become cut off	Protect Community Structures and Lifestyle	Community Services	Possible	Minor	Medium
RDI11	There is a risk that lack of rainfall could impact on road infrastructure function and maintenance (water is required to grade roads)	Physical and Natural Environment	Infrastructure & Assets	Unlikely	Insignificant	Low
RCI12	There is a risk that lack of rainfall could lead to an increased demand on town water supply; in particular villages outside Kyogle	Protect Community Structures and Lifestyle	Infrastructure & Assets	Likely	Minor	Medium
RBCS13	There is a risk that a reduction in rainfall could impact on the region's agriculture and impact subsequently on economy	Protect and Enhance Local Economy	Corporate Services	Likely	Minor	Medium

Scenario for Fire Weather (FW)

Fire Weather Impact Matrix (FW)							
FW		Infrastructure and Assets	Environment Management & Protection	Community Services	Land-use Planning and Development	Emergency Management & Natural Disaster Preparedness	Corporate Services
		(I)	**(E)**	**(CS)**	**(L)**	**(D)**	**(C)**
A	Maintain public safety	**X**	**X**			**X**	
B	Protect and enhance the local economy						
C	Protect existing community structures and the lifestyle enjoyed by the people of the region						
D	Sustain and enhance the physical and natural environment						
E	Ensure sound public administration and governance					**X**	

The following are the list of risks associated with Fire Weather Impact: on Council Operations:

RISK ID	RISK IMPACT DESCRIPTION	SUCCESS CRITERION IMPACTED	FUNCTIONAL AREA IMPACTED	LIKELIHOOD	CONSEQUENCE	RISK RATING
FWED1	There is a risk that as a result of an increase in fire events Council's contribution to RFS expenses may increase (Strategic Planning Consideration)	Sound Public Administration and Governance	Emergency Management & Natural Disaster Preparedness	Possible	Insignificant	Low
FWAD2	There is a risk that public safety could be in jeopardy in areas which are under Councils care and/or control during on the days where the FFDI is >50	Maintain Public Safety	Emergency Management & Natural Disaster Preparedness	Rare	Major	Medium
FWAI3	There is a risk of an increased likelihood of uncontrolled wild fire damaging critical infrastructure (electricity sub stations, telecommunications exchanges, water and sewerage infrastructure) across the LGA impacting on the services to the community	Maintain Public Safety	Infrastructure & Assets	Unlikely	Moderate	Medium
FWAE4	There is a risk that an increase in Fire weather days could lead to increased fuel levels and risk of wild fire impacting on public safety including isolation of communities, damage to infrastructure and the economy	Maintain Public Safety	Environment Management & Protection	Possible	Moderate	High

APPENDIX 7 – KYOGLE COUNCIL FUNCTIONAL AREA DISTRIBUTION

	Infrastructure and Assets	Environment Management & Protection	Community Services	Land-use Planning and Development	Emergency Management & Natural Disaster Preparedness	Corporate Services
	(I)	(E)	(CS)	(L)	(D)	(C)
Directorate	Assets & Infrastructure	Planning & Environmental Services	Planning & Environmental Services	Planning & Environmental Services	Assets & Infrastructure	General Manager
Department	Roads & Bridges; RMS Contract works; Quarries; Project Design and Mgt; GIS & Tech Services; Water Supply; Sewerage Services, Asset Mgt Stormwater and Flood Management; Parks Gardens and Cemeteries; Facilities Maintenance; Plant Fleet & Depots; Aquatic Centre Mgt	Regulatory; Building control compliance;	Cmty Relations; Cmty & Cultural; Economic Development; Tourism	Land Management; Planning; Environmental; Waste Mgt; Inspections;	Emergency services;	Policy development; Finances; Rates and charges; Human Resources; Media Relations; Governance Crown Reserves;

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Janet Wilson - Councillor

John Burley - Councillor

Danielle Mulholland - Mayor

Earle Grundy – Councillor

Kylie Thomas - Councillor

Hayden Doolan – Councillor

Lindsay Passfield - Councillor

Graham Kennett – General Manager

Tony Lickiss – Director Assets & Infrastructure

Marcus Schintler – Manager Corporate Services

Matt Sorrenson – Assets & Design Coordinator

Maree Brennan – GIS & Project Officer

Suzie Coulston - Strategic Initiatives Coordinator

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