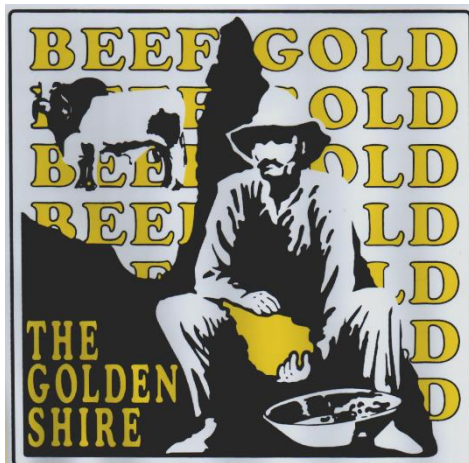


*A report to inform the proposed  
Etheridge Shire Planning Scheme*

**NATURAL HAZARD RISK ASSESSMENT**



Etheridge Shire Council  
August 2019

A handwritten signature in black ink, appearing to be 'DM', enclosed within a large, thin, hand-drawn oval.

David Munro  
Chief Executive Officer

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## 1.0 Introduction

This fit for purpose risk assessment applies to natural hazards in the Etheridge Shire local government area. Etheridge Shire is a remote rural local government area in north-western Queensland. There are no storm tide inundation areas or erosion prone areas. This risk assessment includes consideration of the following natural hazards:

- Flood hazard areas
- Bushfire prone areas
- Landslide hazard areas

Based upon each of the hazards detailed above, this fit for purpose risk assessment outlines:

- how the hazards areas have been identified
- the level of risk associated with the hazard areas
- what measures have been included in the proposed planning scheme to address the level of risk.

In undertaking this risk assessment regard has been had to the State Planning Policy (SPP) – state interest guidelines:

[Natural hazards, risk and resilience – Flood July 2017](#)

[Natural hazards, risk and resilience – Landslide July 2017](#)

[Natural hazards, risk and resilience – April 2016](#)

## 2.0 Context

This risk assessment applies to the local government area of Etheridge Shire, located in the Gulf Savannah Region of Far North Queensland. Etheridge Shire encompasses an area of approximately 40,000km<sup>2</sup>. The 2016 census identifies the resident population of Etheridge Shire as 799 persons.

The Etheridge Shire local government area is serviced by the main township of Georgetown and the smaller townships of Mount Surprise, Forsayth and Einasleigh.

Etheridge Shire Council (the council) has a [Local Disaster Management Plan](#) which outlines responses to natural hazards such as flooding and rural fires. It has a range of strategies to deal with these events such as:

- identification and provision of flood free evacuation centres
- managing fuel loads to prevent fire breakouts.

The council also has an Emergency Action Plan for the Copperfield River Gorge Dam, prepared by the Department of Natural Resources, Mines and Energy. The plan has been prepared to guide affected parties in the event of an incident or flood flows being released from the Copperfield River Gorge Dam that compromises the safety of persons and/or property immediately downstream of the dam.

## 3.0 Hazard identification

### 3.1 Flood

Flood hazard areas have been identified in the planning scheme using two methods:

- For rural areas and the townships of Mount Surprise, Forsayth and Einasleigh, flood hazard areas have been identified using the SPP Interactive Mapping System Flood hazard area – Level 1 – Queensland Floodplain Assessment Overlay (QFAO). Detailed flood mapping is not available for these areas.
- For Georgetown, detailed Level 2 flood hazard mapping prepared for the then Department of Natural Resources and Mines under the Queensland Flood Mapping Program has been used.

The township of Georgetown is located on the western bank of the Etheridge River. The Delaney River joins with the Etheridge River just to the south-west of Georgetown. Sandy Creek, a minor tributary, also runs through Georgetown and joins with the Etheridge River just north of the town.

The Department of Natural Resources and Mines report titled *“Flood Hazard Mapping. Georgetown Level 2 Final Report, October 2015”* mapped the following flood events at Georgetown:

- January 1974 flood event (6.82m at BoM Gauge 030018)
- 2% AEP design event (6.64m at BoM Gauge 030018)
- 1% AEP design event (6.91m at BoM Gauge 030018)
- 0.2% AEP design event (7.91m at BoM Gauge 030018).

For Georgetown, the 1% AEP (Annual Exceedance Probability) design event has been used as the basis to identify the flood hazard area.

### 3.2 Bushfire

Bushfire prone area is land that is potentially affected by significant bushfires and includes vegetation likely to support a significant bushfire. Adjacent land that could also be subject to impacts from a significant bushfire is also mapped. Bushfire prone areas have been identified in the local government area using the Queensland Government bushfire prone area mapping shown on the SPP Interactive Mapping System. The bushfire prone mapping includes the following hazard areas:

- very high potential bushfire intensity
- high potential bushfire intensity
- medium potential bushfire intensity
- potential impact buffer.

### 3.3 Landslide

There is no mapping specifically relating to development on sloping land or identifying a landslide hazard area in the proposed planning scheme. The Etheridge Shire Local Disaster Management Plan (22 June 2017) does not include landslide as a potential hazard for the local government area.

## **4.0 Risk assessment**

### **4.1 Flood**

The local government area of Etheridge Shire has an average annual rainfall of 734mm. The Shire has a history of being impacted by flood events. The impacts from the flood events have varied and depend upon the severity of the event. These events have historically caused localised disruptions (especially to road networks within the shire) and property damage.

Due to the relatively flat topography of each of the townships, flash flooding caused by storm events is not a common occurrence.

#### **Georgetown**

For the township of Georgetown the 1% AEP design event for flooding has been used as the basis for identifying the flood hazard area. This design event is a commonly used design event for flood hazards and is considered acceptable to the level of risk that flooding represents in Georgetown. It is also consistent with recommendations in the SPP guidance material pertaining to flood hazard areas that have longer warning periods available. Minimal properties within the township are mapped within the flood hazard area. Of those that are, most are already developed.

Council has committed to make available the 0.2% AEP design event mapping (1 in 500 year event) to help further guide and advise future developments and ensure flooding risks are appropriately considered.

The corner of South Street and St George Street is protected from inundation by an earthen levee. The 1974 flood extent (similar to the 1% AEP event) is defined by this short levee at this location.

#### **Mount Surprise and Forsayth**

For the townships of Mount Surprise and Forsayth the QFAO Mapping has been utilised. The flood risk is minimal and the QFAO mapping shows a small potential risk on the outskirts of both townships that does not traverse into any industrial, sensitive use or residential areas.

#### **Einasleigh**

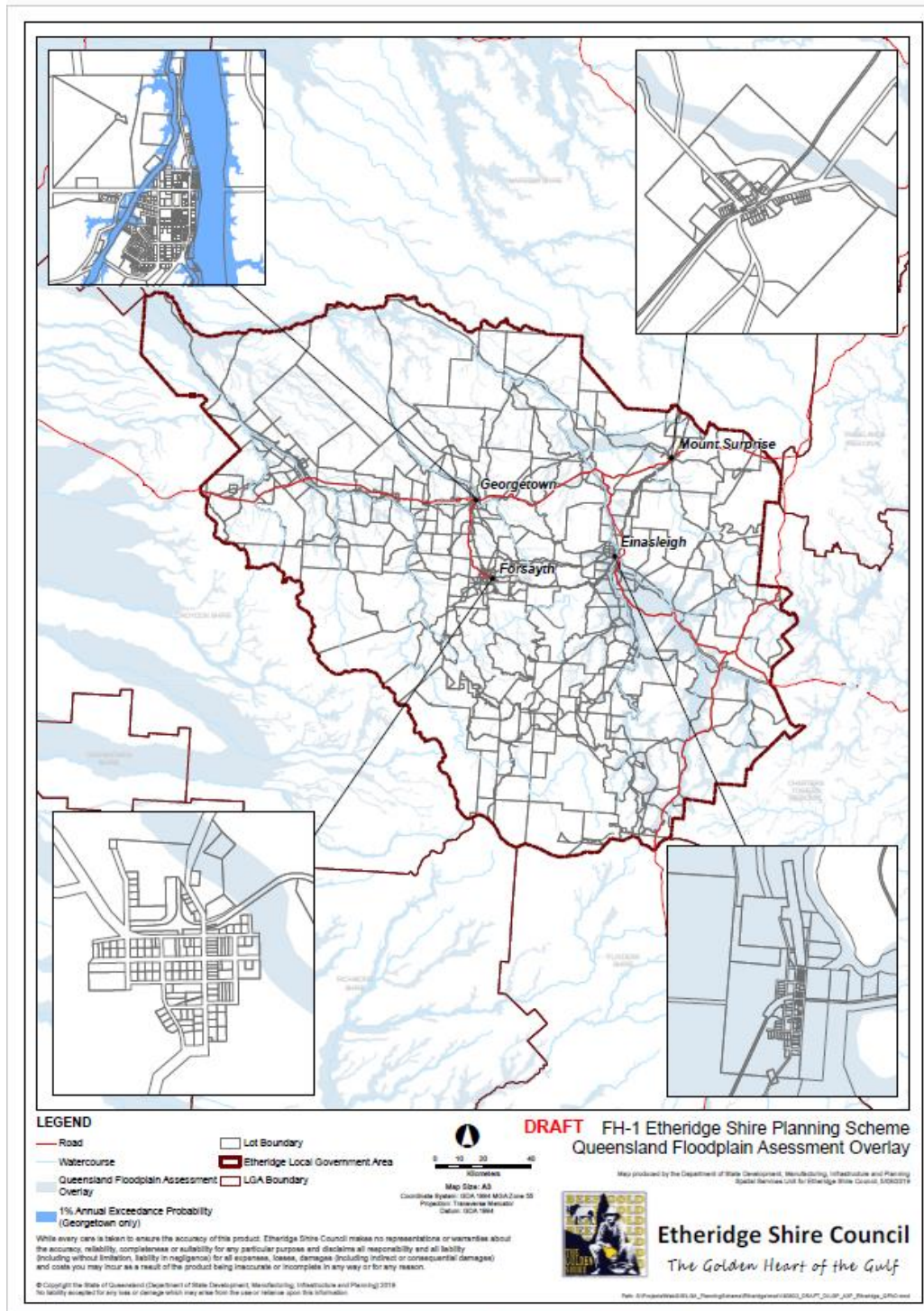
The township of Einasleigh is completely covered by the QFAO mapping as a potential flood hazard area. No further refinement of the QFAO mapping has occurred; however, local verification confirms that flood levels are not usually known to traverse Daintree Street or have significant impact on buildings within the township (Daintree Street is located closest to the river and borders the township). It has been acknowledged that even though the perceived risk is low, until mapping refinements are undertaken mitigation measures need to be included within the planning scheme.

The Emergency Action Plan for the Copperfield River Gorge Dam includes various flood mapping scenarios for Einasleigh. The data that was used in preparation of these flood maps and flood event scenarios for Einasleigh may be able to be utilised to refine the proposed planning scheme flood mapping. This is still under investigation, and if possible mapping refinements will be included into the proposed planning scheme before it is adopted. Mapping refinements will reduce, not increase, the number of properties in Einasleigh covered by the flood hazard area. If mapping refinements are possible, a revised Natural Hazard Risk Assessment will also need to be adopted by council.

## Rural areas

The remainder of the shire has flood hazard areas mapped using the QFAO mapping. These areas mostly consist of large rural properties (mainly for cattle grazing) with already established dwellings. The flooding risk to new development in these areas is considered minimal. Council is working on a continuous improvement program to upgrade the roads within the shire to be serviceable during rain and flood events.

**Figure 1. Extract of flood mapping for Etheridge Shire**



## 4.2 Bushfire

Etheridge Shire has experienced bushfire events, and bushfire prone areas in the shire are shown on SPP mapping – Safety and Resilience to Hazards, Bushfire Prone Area. New development must take bushfire risks into account and avoid areas known to be bushfire-prone. Where unavoidable, new development must be built and located to be resilient to bushfires.

Council has a proactive approach to the risk management of bushfire and firebreaks are maintained around the townships. In order to circumvent bushfire risks, firebreaks and active fire management are encouraged in the rural areas of the shire and within national parks and conservation reserves.

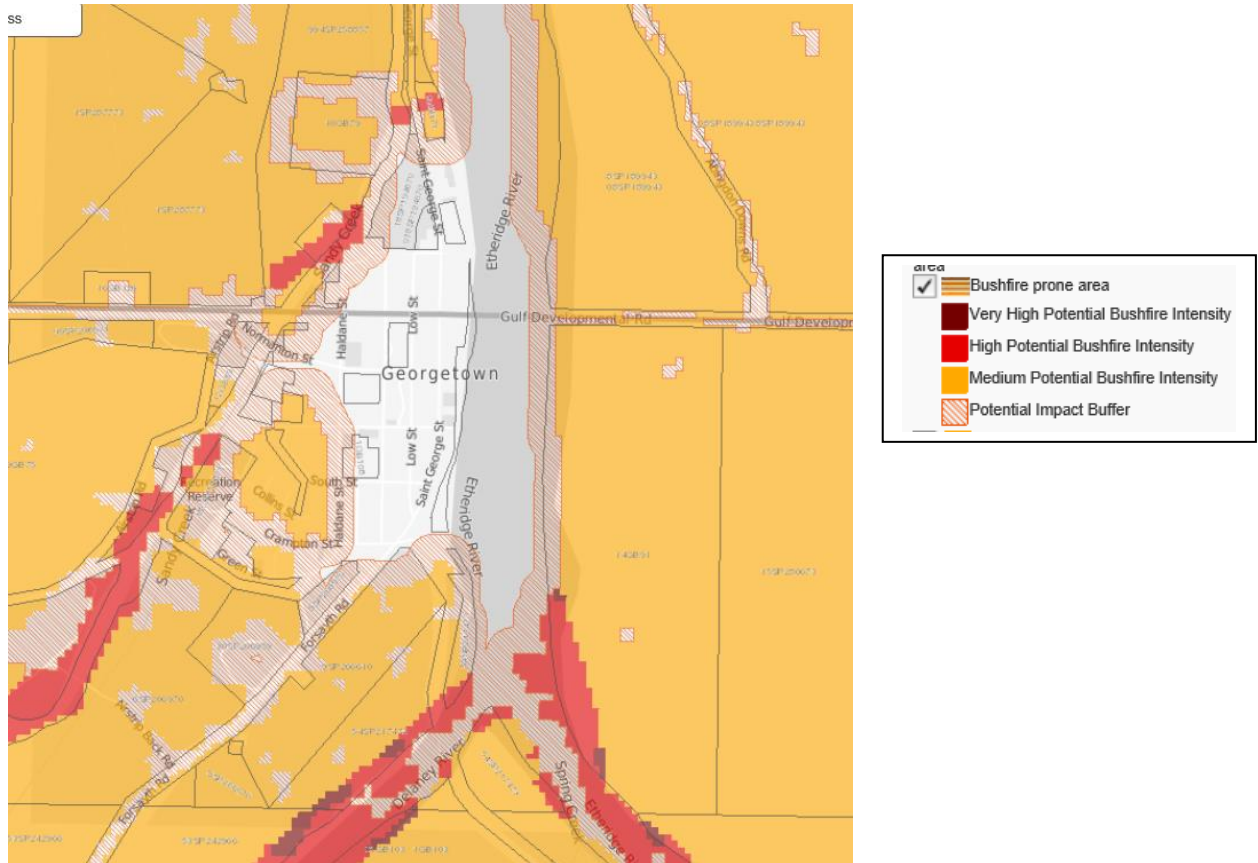
### Georgetown

The majority of the township of Georgetown is not located in a bushfire prone area. Bushfire prone areas surround the township, with a small area of residential, some recreational areas, and the whole rural residential precinct mapped in a medium or potential impact bushfire hazard areas. A small number of industrial lots are also mapped in a medium or potential impact bushfire hazard area. The high potential bushfire Intensity areas follow the creek line, where there is no development. There are no very high potential bushfire intensity areas mapped within the township.

Council is proactive in the management of bushfire risk around Georgetown and maintains firebreaks on the edges of the township and manages vegetation within the township. The Etheridge River bed buffers the eastern side of the township, and therefore provides separation from the mapped hazard areas to the main commercial, residential and historical buildings in the township.

### Figure 2. Extract of bushfire mapping for Georgetown



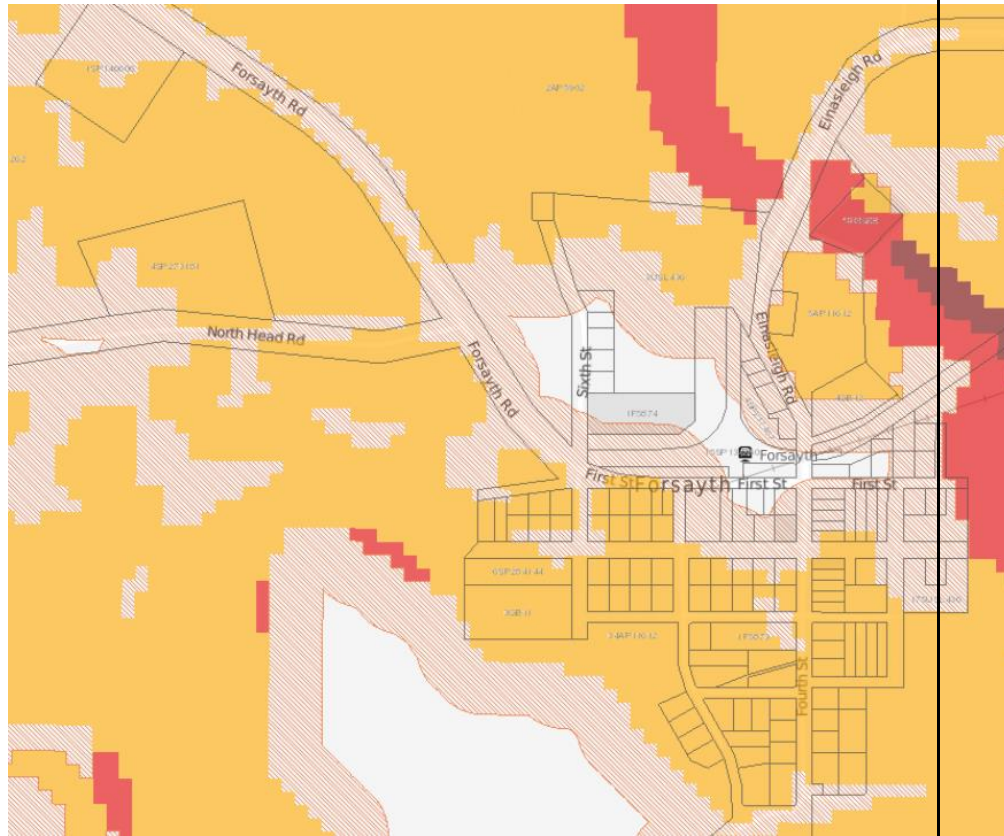


**Forsayth**

Forsayth is predominately covered by the medium potential bushfire intensity mapping. There is limited vegetation on some of the lots covered by the mapping. The centre of the township is not mapped in the bushfire hazard area. The immediate area surrounding the centre is mapped as a potential impact buffer. The high to very high hazard area is located outside of the township following the creek bed. Council is proactive in the management of bushfire risk around Forsayth and maintains firebreaks on the edges of the township and manages vegetation within the township.

**Figure 3. Extract of bushfire mapping for Forsayth**

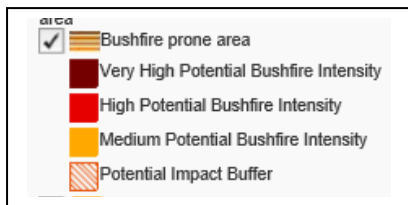
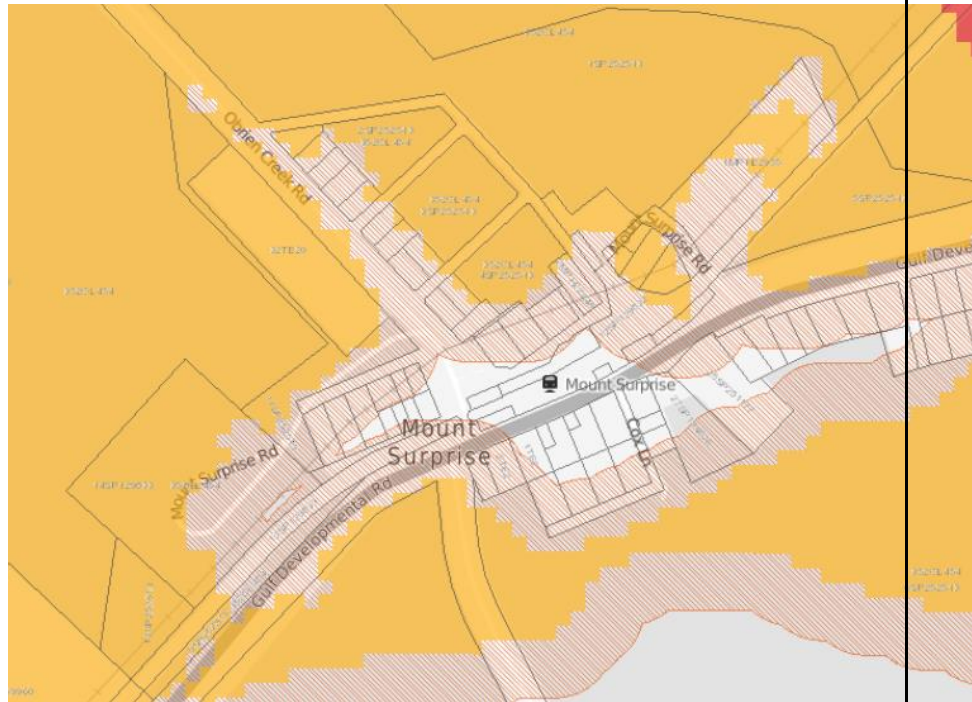




### Mount Surprise

The central area of Mount Surprise (located along the main thoroughfare) is not mapped as a bushfire hazard area. Some allotments along the main thoroughfare of the township of Mount Surprise have been mapped in the potential impact buffer area, as well as some of the residential and general township zone allotments. A small number of lots in the township zone (no precinct area) are mapped as medium potential bushfire intensity, some of which are currently undeveloped. Council is proactive in the management of bushfire risk around Mount Surprise and maintains firebreaks on the edges of the township and manages vegetation within the township.

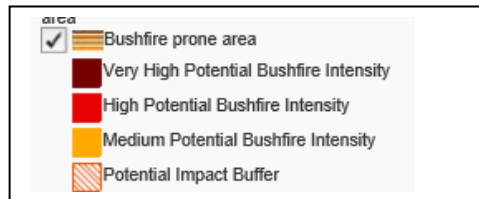
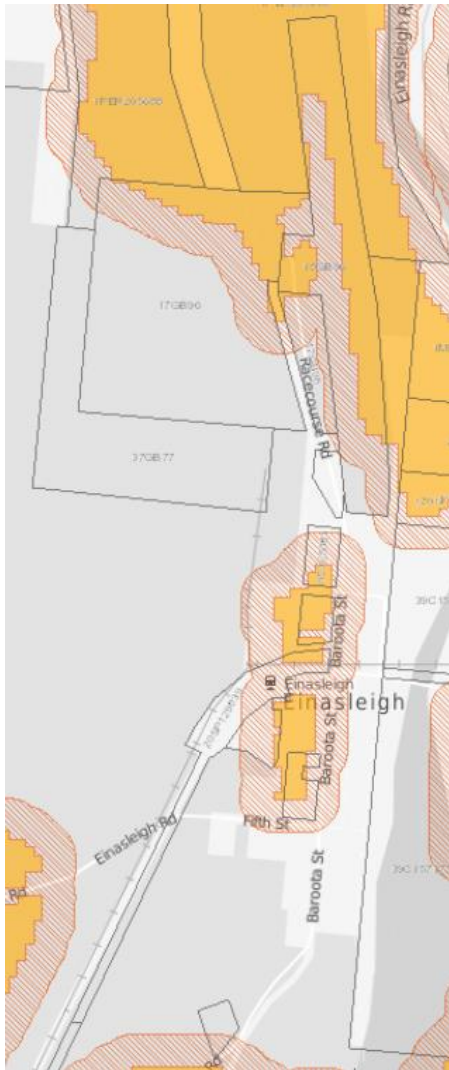
**Figure 4. Extract of bushfire mapping for Mount Surprise**



### Einasleigh

The majority of the residential lots located in Einasleigh are either not mapped in a bushfire hazard area or mapped in the potential impact buffer area. A small portion of the general township zone (no precinct area) is mapped in the medium potential bushfire intensity area or potential impact buffer area. Limited development is expected in Einasleigh. Council is proactive in the management of bushfire risk around Einasleigh and maintains firebreaks on the edges of the township and manages vegetation within the township.

**Figure 5. Extract of bushfire mapping for Einasleigh**



**Rural areas**

Parts of rural areas of Etheridge Shire are impacted by the full range of bushfire hazard areas (eg. very high potential bushfire intensity, high potential bushfire intensity, medium potential bushfire intensity and potential impact buffer). The higher bushfire intensity areas are generally located in the remote, heavily vegetated areas which contain slopes or occur along waterways. Rural fires which may affect property and grazing areas are most common in the dry season. Etheridge Shire has a rural fire brigade service.

**4.3 Landslide**

The township areas do not include areas of land considered steep. Rural areas may contain areas of steep land. Rural areas primarily comprise of large rural grazing properties. There is considered minimal likelihood that future development will be located on steep land given the opportunities to construct buildings in other areas.

## 5.0 Analysis of natural hazards (planning provisions)

### 5.1 Flood

No changes in zoning are proposed based upon the risk assessment; however, planning provisions are proposed based upon an avoid and mitigate approach. Ideally, future development should be located outside of flood affected areas. Where this is not possible, development needs to be designed so as to not expose people or property to unacceptable risks.

**Table 2. Flood risk and planning response assessment**

| Planning response  | Planning strategy   | Planning scheme provisions  |
|--|---|---|
| Limit certain land uses that are not appropriate for a flood hazard area | Up zoning does not occur in a flood hazard area and new development must consider flood risks | <p>New rural residential and industrial precinct areas included in the scheme (apart from Einasleigh) are located so that development can occur outside of the flood hazard area.</p> <p>Einasleigh includes some expanded township zone (no precinct) areas. These areas are currently utilised for recreational activities (such as the rodeo grounds) or the airstrip. New development in these areas will be code assessable and require a flood study (apart from a park or certain developments provided by council or public sector entities).</p> <p>Strategic framework, use table and code provisions in the scheme ensure development considers flood risks.</p> |
| Levels of assessment appropriate for the hazard                          | Uses which increase people residing in flood prone areas require assessment                   | <p>Development involving sensitive uses or increasing people residing in flood affected areas (e.g. dwelling house, dual occupancy, short-term accommodation, rural workers accommodation, tourist park, residential care or retirement facility) is elevated to code assessment.</p> <p>An exception is provided for residential development located in the flood hazard area in Georgetown, where it can remain as accepted development subject to requirements by achieving a 600mm freeboard above the defined flood level for all habitable rooms.</p> <p>An exception is also provided for dwelling</p>   |

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|  |   | houses in the rural zone. The assumption is made that limited residential development will occur in the rural zone. As all rural properties contain flood free areas, dwelling houses are to remain as accepted development in the rural zone.  |
| New development to avoid flood prone areas or mitigates the risk | Include planning code provisions to address the risk    | <p>General development code includes provisions to ensure new development avoids flood prone areas or alternatively a flood study is undertaken.</p> <p>An exception is provided for development located in the flood hazard area for Georgetown if it can achieve a 600mm freeboard above the defined flood level for all habitable rooms.</p>   |
| Support built form change over time                              | Make future development resilient to the hazard         | <p>General development code includes provisions to ensure new buildings in flood hazard areas are located and designed to be resilient to flood events.</p> <p>Council has taken a precautionary approach and adopted a 600mm freeboard requirement for all habitable rooms as opposed to the standard 300mm used in most planning schemes.</p> <p>Council is also managing the flood risk for Einasleigh by ensuring new developments undertake a flood study.</p>   |
| Flooding is not made worse                                       | Filling and excavation in floodplain areas is minimised | <p>Filling and excavation is regulated in a flood hazard area. PO34 of the General development code and PO4 of the Operational work code specifies that development avoids any increase in water flow velocity or flood level and does not increase the potential for flood damage either on-site or on other properties.</p> <p>The Operational work use table (table 4.7.1) also has specific filling and excavation requirements for work occurring in a flood hazard area, which if not met require the</p> |

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|   |  | development be made code assessable.  |
| Community resilience to flooding is improved  | Include planning code requirements to enable development to address the risk | Essential services are elevated to code assessment when located in a flood affected area.<br><br>The storage of hazardous material is regulated in flood hazard areas.<br><br>General development code includes provisions to ensure safe evacuation routes, appropriate locating of community infrastructure, and maintaining the protective function of vegetation and landforms. |
| Future lots ensure any future development is not adversely impacted by flood hazard | Design of new lots to address the risk                                       | Reconfiguring of a lot code ensures any new lots created: <ul style="list-style-type: none"> <li>• are located outside of the hazard area or maintain the necessary flood immunity</li> <li>• safe evacuation routes established.</li> </ul>  |

## 5.2 Bushfire

A strategy of avoid and mitigate has been adopted in the proposed planning scheme. That is, new developments should avoid areas known to be bushfire-prone but, where unavoidable, must be built, designed and located to be resilient to bushfire hazards. Details of bushfire risk and planning provisions proposed are detailed below in Table 2.

**Table 2. Bushfire risk and planning response assessment**

| Planning response  | Planning strategy   | Planning scheme provisions   |
|--|---|--|
| Limit certain land uses that are not appropriate for a bushfire prone area | Ensure bushfire risk is considered when preparing the zone use tables | All emergency services, vulnerable uses and sensitive land uses are required to be located outside of the bushfire prone area (including caretakers accommodation in the rural zone, and bed and breakfast and childcare home-based businesses in both the rural and township zones). Dwelling houses will still undergo assessment for bushfire risk (see below). |
| Levels of assessment appropriate for the hazard                            | Uses which increase people residing in bushfire prone areas           | Section 1.6 of the planning scheme designates that development in bushfire prone areas will be subject to building assessment  |



|   |  |  |
|---|--|--|
|   | require assessment   | <p>requirements with regards to bushfire. This allows dwelling houses to remain accepted development if located in a bushfire prone area, as the risk is still being assessed and mitigated through the Building Code.</p> <p>Uses in the rural zone (that do not directly increase people residing in bushfire areas) such as parks, roadside stalls, cropping and animal husbandry are accepted development and not subject to bushfire assessment. The same approach is used in the township zone for uses such as cemeteries and parks.</p> <p>Development proposed in bushfire prone areas involving sensitive or accommodation type uses (e.g. dual occupancy, short-term accommodation, rural workers accommodation, tourist park, home-based childcare, residential care or retirement facility) is elevated to code assessment. The development must adhere to the bushfire provisions in the general development code.</p> |
| New development to avoid bushfire prone areas or mitigates the risk | Include planning code provisions to address the risk                         | <p>General development code includes provisions to ensure new development avoids bushfire prone areas or mitigates the risk by providing:</p> <ul style="list-style-type: none"> <li>• defensible buffer space and separation</li> <li>• safe evacuation route</li> <li>• suitable water supply</li> <li>• location away from steep slopes and landforms.</li> </ul>   |
| Bushfire risk not made worse  | Include planning code provisions to address the risk                         | <p>General development code includes provisions to ensure storage of hazardous materials does not occur in the bushfire prone area; and that landscaping, revegetation or rehabilitation maintains an acceptable fuel load and a discontinuous fuel structure.</p>   |
| Community resilience to bushfire is improved                        | Include planning code requirements to enable development to address the risk | <p>General development code includes provisions to ensure emergency services, essential community infrastructure and services, and vulnerable or sensitive uses are not located in the bushfire prone area.</p>  |

|  |  |   |
|--|--|---|
|  |  | The assumption is made that infrastructure services provided by public sector entities will be subjected to a risk assessment by that entity to ensure location suitability.  |
| Future lots ensure any future development is not adversely impacted by bushfire risk | Design of new lots to address the risk | Reconfiguring of a lot code ensures any new lots created: <ul style="list-style-type: none"> <li>• allow for a building envelope that maintains a suitable separation distance from hazardous vegetation;</li> <li>• maintain an effective buffer suitable for fire fighting vehicles;</li> <li>• have safe evacuation routes established.</li> </ul> |

### 5.3 Landslide

A planning provision (PO31) has been included in the general development code to address potential landslide risks.

Reasons for not specifically identifying and mapping landslide hazard areas in the planning scheme are:

- the township areas do not include areas of land considered steep;
- the resources required to do so based on the expansive nature of the local government area; and
- lack of development pressure in the rural areas.

Standard engineering requirements for building construction will ensure any future development is constructed to a suitable standard.

## 6.0 Conclusion

This risk assessment has examined natural hazards such as flood, bushfire and landslide for the local government area of Etheridge Shire. The assessment has reviewed the extent of the natural hazard areas and considered the relative risk of such events on people and property. Planning provisions have been developed to respond to the risk by adopting an avoid or mitigate approach. This will enable future development to be more resilient to natural hazard events.