Flood Emergency Response Plan

Northern River Flood Recovery- Richmond River High Campus Redevelopment

Prepared for Department of Education / 16 July 2025

231563

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1	12/12/2024	AV		Draft
2	28/01/2024	AV		
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Glossary and Abbreviations

Annual Exceedance Probability	AEP	The chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage
Australian Height Datum	AHD	A common national surface level datum often used as a referenced level for ground, flood and flood levels, approximately corresponding to mean sea level.
Average Recurrence Interval	ARI	The long-term average number of years between the occurrence of a flood equal to or larger in size than the selected event. ARI is the historical way of describing a flood event. AEP is generally the preferred terminology.
Bureau of Meteorology	BoM	An executive agency of the Australian Government responsible for providing weather services to Australia and surrounding areas.
Critical Duration		The critical duration is the storm duration for a given event magnitude that provides for the peak flood conditions at the location of interest.
Development Control Plan	DCP	A Development Control Plan is a document prepared by the Council which provides detailed guidelines which assist a person proposing to undertake a development. A DCP must be consistent with the provisions and objectives of a Local Environmental Plan (LEP).
Finished Floor Level	FFL	The level, or height, at which the floor of a building or structure (including alterations and additions) is proposed to be built.
Flood hazard		A source of potential harm or a situation with a potential to cause loss of life, injury and economic loss due to flooding. Flood hazard is defined as a function of the relationship between flood depth and velocity.
Flood Planning Level	FPL	The combination of the flood level from the defined flood event and freeboard selected for flood risk management purposes.
Freeboard		A factor of safety typically used in relation to the setting of floor levels or levee crest levels. Freeboard provides a factor of safety to compensate for uncertainties in the estimation of flood levels across the floodplain, such as wave action, localised hydraulic behaviour etc.
Local Environmental Plan	LEP	LEPs provide a framework that guides planning decisions for local government areas through zoning and development controls. Zoning determines how land can be used (for example, for housing, industry, or recreation).
Probable Maximum Flood	PMF	The largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation. Generally, it is not physically or economically possible to provide complete protection against this event. The PMF defines the extent of flood prone land, that is, the floodplain.
Representative Concentration Pathways	RCP	RCPs make predictions of how concentrations of greenhouse gases in the atmosphere will change in future as a result of human activities. The four RCPs range from very high (RCP8.5) through to very low (RCP2.6) future concentrations

1.0 Introduction

This Flood Emergency Response Plan (FERP) has been prepared to support a Review of Environmental Factors (REF) for the rebuild of Richmond River High Campus (the activity) (RRHC). The REF has been prepared to support an approval for the RRHC development under Section 68 of the NSW Reconstruction Authority Act 2022 (RA Act).

The purpose of this report is to summarise the flood risks within the site and also surrounding i.e. roads, identify preparation measures that should be undertaken to mitigate such risks, and provide an action plan with steps to be completed prior to and during a flood event for evacuation.

1.1 Site Description

The site is located at Dunoon Road, North Lismore, also known as 163 and 170 Alexandra Parade, North Lismore. The site comprises of three separates lots located to the north of Alexandra Parade, with Dunoon Road running parallel to the eastern boundary of the site.

The site is legally described as:

- Lot 1 DP 539012
- Lot 2 DP 539012
- Lot 1 DP 376007

The site area is approximately 33.53 hectares. The proposed activity will be undertaken mainly within the southeastern portion of the site. The site is outlined in Figure 1.

Figure 1 Arial image of site (Source: Nearmap)

1.2 Proposed Activity Description

The proposed activity comprises the relocation and rebuilds of the Richmond River High Campus from its existing temporary location alongside The Rivers Secondary College Lismore High Campus at East Lismore to the site at 163 and 170 Alexandra Parade, North Lismore.

The school will be delivered in one stage. A detailed description of the proposal is as follows:

1. Demolition of existing features including existing buildings, cattle drinking well, cattle sheds, and wire fencing, and removal of trees to accommodate school development.

2. Construction of new 3 storey buildings on the southeastern portion of the site for the proposed public secondary school including:

    a. General and Specialist Learning Spaces, and Workshops.

    b. Administration, and Staff facilities.

    c. Library, Hall, and Movement Studio.

    d. Construction, Hospitality, and Agricultural Learning Facilities.

    e. Amenity, Plant, Circulation, and Storage areas.

    f. Outdoor Learning Spaces and play spaces.

3. Landscaping including tree planting.

4. Public domain works comprising:

    - Access road off Dunoon Road, comprising a separate shared bicycle/pedestrian pathway, and internal access roundabout.

    - Kiss and ride drop-off and pick up zones.

    - Bus transport arrangements with a separate bus zone.

5. Outdoor spaces including assembly zones, agricultural spaces, sports fields, games courts, dancing circles, yarning and dancing circles, seating and shade structures.

6. On-site carparking, including accessible spaces and provision for EV charging spaces.

Figures 2 below shows the scope of works:

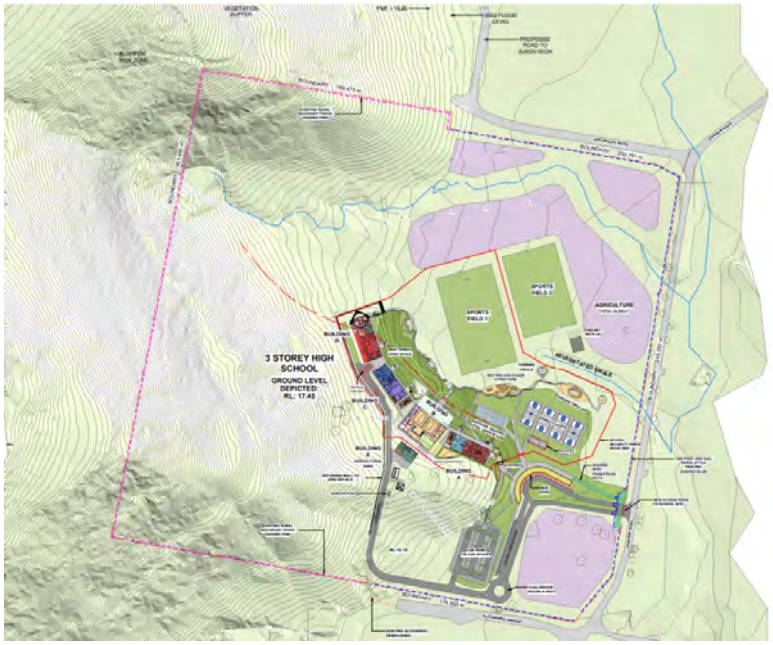

Figure 2- Overall Site Context Plan (Source: EJE Architecture)

1.3 Catchment and Hydrological Information

Lismore is among Australia's most flood-prone urban areas, with a long history of severe flooding due to its location at the confluence of Leycester Creek and Wilsons River. The upstream catchment is complex, and flooding in the area is influenced by factors such as catchment conditions, rainfall intensity, and the spatial distribution of rainfall. The Wilsons River and Leycester Creek, fed by numerous tributaries, merge near Lismore, and major floods can result from elevated water levels in either waterway. When both rivers flood simultaneously, the impact can be particularly severe

The Lismore floodplain contains several key hydraulic structures, including the South Lismore Levee, CBD Levee, Gasworks Creek and Hollingworth Creek floodgates, the Bruxner Highway, and the railway embankment. Some of these features are illustrated in Figure 3. However, North Lismore, a low-lying area, lacks the protection provided by these controls, which are primarily located in South and Central Lismore.

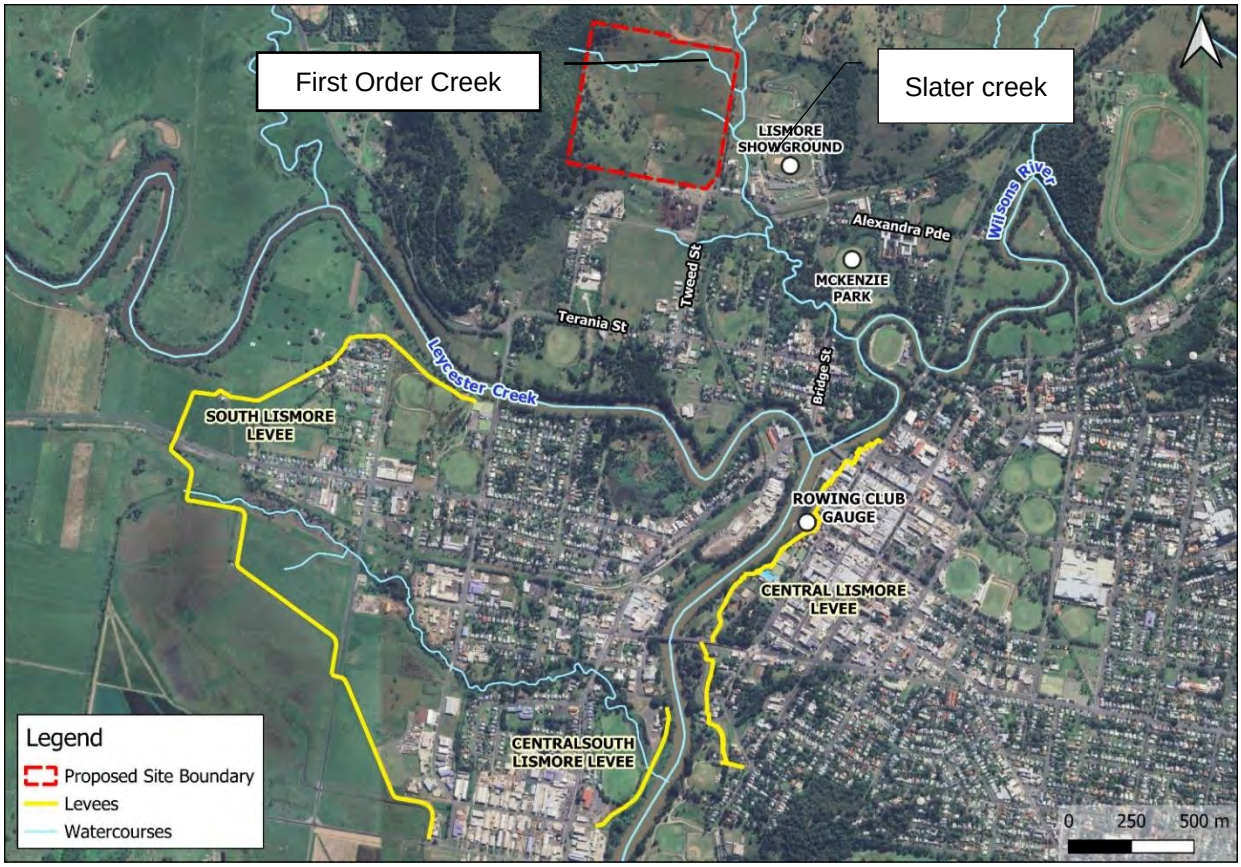

Figure 3- Hydraulic controls in the vicinity of the site

The subject site is vulnerable to both localized and regional flooding from river systems.

Regarding regional flooding, significant flood events can occur due to rising water levels in either the Wilsons River or Leycester Creek. In North Lismore, the primary flood influence is the Wilsons River, with flood levels monitored at the Wilsons River Rowing Club Gauge (Station Number 058176), which has been in operation since 1917. The Bureau of Meteorology classifies flood levels at this gauge as minor at 4.2 m, moderate at 7.2 m, and major at 9.7 m.

Floodwaters in the Wilsons River can rise rapidly, causing early impacts in North Lismore when the gauge reaches 4.3 metres AHD (NSW SES, 2018). Water levels at this point begin to back up near the relocation site.

In North Lismore, the phenomenon of flood slope can cause water levels upstream of the Rowing Club Gauge to exceed those recorded at the gauge. This requires residents and property owners in upstream areas to anticipate potentially higher water levels during flood preparations.

After the 2017 floods, anecdotal reports suggested that many residents in North Lismore underestimated the impact of the flood slope, leading to insufficiently raised household items. It’s important to recognize that flood slope behaviour varies, and no two flood events are exactly alike.

Based on the information provided in the Rous County Council’s Lismore Floodplain Risk Management Study report (2024), the rainfall durations and temporal pattern provided in Table 1 is identified as the critical rainfall and patterns.

Table 1- Critical rainfall and patterns

Event	Critical Duration	Temporal Pattern
10% AEP	48 hours	T3
5% AEP	48 hours	T4
1% AEP	24 hours	T8
1% AEP+CC	24 hours	T8
0.2% AEP	36 hours	T10
PMF	36 hours	T10

A newly developed model for the local catchment indicates that the 15-minute storm is the most critical event for localized PMF flooding (PMF Overland flow).

1.4 Analysis of the 2022 Flood Events in Lismore

Flooding is a recurring challenge for the New South Wales far north coast, with the City of Lismore ranked as Australia's most flood-prone postcode. In 2017, the flood reached a height of 11.59 metres in Lismore. The 2022 flood was initially forecast to be lower; however, it ultimately exceeded expectations and became a record-breaking event reaching a height of 14.4-14.6 m AHD.

On February 27, 2022, evacuation orders were issued for North and South Lismore at 9:30 pm, providing residents with only 30 minutes to evacuate. By dawn, all access roads to and from the two areas were inundated.

The Bureau of Meteorology (BOM) describes the weather along Australia's east coast as among the most complex in the world, capable of rapid and unpredictable changes. The 2022 flood resulted from the interaction of large- and small-scale weather systems over an already saturated landscape. This compounding effect, where successive storms intensified the impact of earlier ones, significantly escalated the severity of the event.

Beginning February 22, a low-pressure system over northern NSW and southern Queensland caused torrential rainfall and triggered the development of two east coast lows—weather systems known for their forecasting challenges.

On February 27, BOM initially forecast a 10% chance of rainfall exceeding 113 mm at Dunoon, located upstream of Lismore. However, within 24 hours, Dunoon received an unprecedented 775 mm of rain.

On the morning of February 27, minor flooding was already observed in Lismore, with authorities predicting the possibility of major flooding. However, updates from BOM throughout the day and night indicated a rapidly deteriorating situation. Within 24 hours, conditions escalated from minor flooding to a catastrophic, record-breaking flood event. The sequence of events during the February 2022 flood is outlined in Table 2. This shows that the Bureau of Meteorology's (BOM) forecast for when the Lismore levee would be overtopped changed and was revised several times. An evacuation order for North Lismore was issued at 9:30 PM on February 27, 2022, with residents required to leave before 10 PM. While the Lismore CBD was ordered to evacuate by 5 AM, the Lismore levee was overtopped at 3 AM.

Table 2- Sequence of Events During the February 2022 Flood

Time	Sequence of the events
27th February 2022 at 8:50 AM	**Heavy rainfall occurring** Minor flooding occurring. Rises to major flooding possible from overnight Sunday into Monday.
27th February 2022 at 2:15 PM	**Flood levels forecast**

Time	Sequence of the events
	The Wilsons River may reach moderate flood level on Sunday evening. It may reach the major flood level early Monday.
27th February 2022 at 4:20 PM.	**Evacuation warning for Lismore** Residents and business in low-lying areas of Lismore may need to evacuate due to rising floodwater.
27th February 2022 at 5:08 PM	**Forecast revised** Renewed rises are occurring. The river level may reach 11.0 metres during Monday, the highest level since the March 2017 flood.
27th February 2022 at 9:30 PM	**Evacuation order for North & South Lismore** South and North Lismore must evacuate now. Leave by 10pm. The Lismore CBD must evacuate by 5am.
27th February 2022 at 11:00 PM	**Levee to overtop** The levee protecting Lismore's CBD is expected to overtop around 5am Monday. The river is now expected to reach the level of the historic March 1974 flood (12.15 metres). Further rises are possible.
28th February 2022 at 12:45 AM	**Lismore evacuate NOW** **N**orth & South Lismore, Lismore CBD, Girards Hill and low-lying areas of East Lismore must evacuate now. Lift possessions and important items above the predicted flood height, take pets and essential items with you, and leave as early as possible.
28th February 2022 at 1:09 AM	**Levee to overtop sooner** Moderate flooding is occurring. The levee is now likely to overtop around 3am. The river is still expected to reach around 12.15 metres late Monday morning, with further rises possible.
28th February 2022 at 1:45 AM	**Flood siren** The SES calls for Lismore's flood siren to be sounded. The firefighters responsible for sounding the alarm have already been flooded out of their building.
28th February 2022 at 2:55 AM	**New river peak predicted** Major flooding is occurring at Lismore, and the levee is about to overtop at 10.6 metres. The river may reach around 13.50 metres on Monday evening.
28th February 2022 at 5:56 AM	**Lismore's first 14m flood forecast** The Wilsons River may reach around 14.00 metres on Monday afternoon, above the previous record flood in February 1954 (12.27 metres).

Time	Sequence of the events
28th February 2022 at 8:48 AM	**Record flooding is now occurring** Flooding is now occurring above the levels of the 1974 and 1954 floods. These record years have long been the benchmarks by which other floods are measured.
28th February 2022 at 11:41 AM	**Peak predicted** The river is expected to peak at 14.4 metres on Monday afternoon.
28th February 2022 at 2:52 PM	**The situation steadies** The river level is now around 14.37 metres and steady.
28th February 2022 at 8:17 PM	**At last, the river level drops** The Wilsons River peaked in Lismore at 14.40 metres around 3pm. It is now fall

Source: ABC News, "Have lessons been learned from 2022 Lismore flood disaster?" https://www.abc.net.au/news/2023-02-27/have-lessons-been-learned-from-2022-lismore-flood-disaster/101863278

2.0 Modelled Flood Behaviour

TTW obtained Rous County Council's TUFLOW model, developed by Engeny, alongside the Lismore Floodplain Risk Management Study (Engeny, 2024) for the purpose of this study. The existing model was updated with new survey data for the site. The flood behaviour and flood impact associated with the activity is described in detail in the Flood Impact and Risk Assessment Report prepared by TTW and submitted with this FERP.

The PMF event was simulated for the critical duration 36-hour storm, as well as the February 2022 flood event (that was based on recorded rainfall data). Results for peak flood levels obtained by this model were consistent with those determined by Engeny (2024).

A hazard assessment was conducted using the flood hazard vulnerability curves set out in 'Handbook 7 – Managing the Floodplain: A Guide to Best Practice in Flood Risk Management in Australia' of the Australian Disaster Resilience Handbook Collection (2017).

These curves assess the vulnerability of people, vehicles and buildings to flooding based on the velocity and depth of flood flows. The flood hazard categories are outlined in Figure 4, ranging from a level of H1 (generally safe for people, vehicles and buildings) to H6 (unsafe for vehicles and people, with all buildings considered vulnerable to failure).

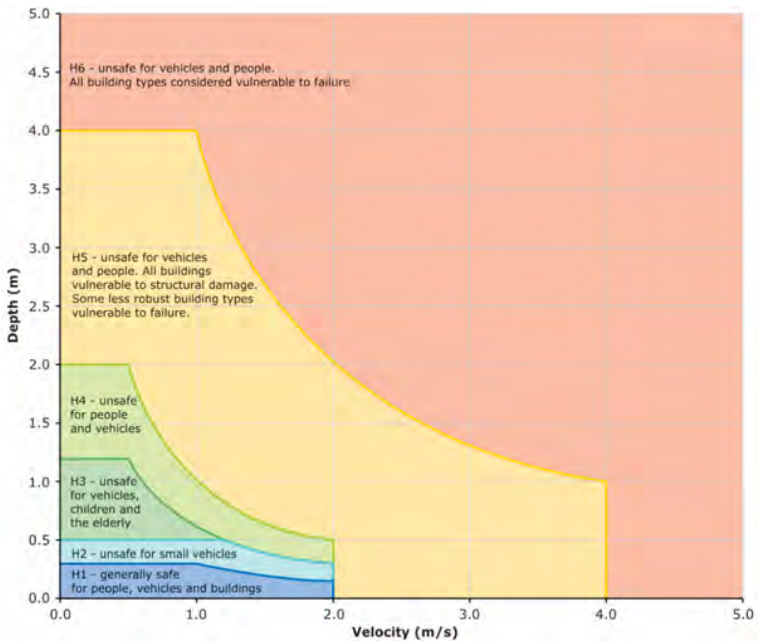

Figure 4- Flood hazard vulnerability curve (Source: Flood Risk Management Guide FB03 - Flood Hazard, NSW Department of Planning and Environment, 2022)

The flood depths, levels and hazard in the 1% AEP and PMF events are discussed below. Assessment of flood impacts in the 10%, 5%, and 0.2% AEP events are included in TTW's Flood Impact and Risk Assessment report, alongside the February 2022 event.

2.1 1% Annual Exceedance Probability Event

Under the 1% AEP event, flood modelling indicates that water levels across the site range from 39.73 m AHD in the northwest to 12.84 m AHD in the east. The proposed buildings are not affected in this scenario, with the diversion channel and stormwater infrastructure effectively managing floodwaters. The greatest depths—up to 4.59 m—are observed in the eastern section of the site, primarily due to inflows from Wilsons River and Leycester Creek.

Flood velocities in the eastern area remain generally below 0.5 m/s. In contrast, flows within the first-order creek reach between 2.0 and 3.0 m/s, peaking at 3.47 m/s near the site's western boundary. Hazard classifications are consistent with the existing scenario, with most flows in the first-order creek and eastern areas—including Dunoon Road—rated as H4 or H5. The flood Depth, velocity and hazard is shown in Figure 5, Figure 6 and Figure 7.

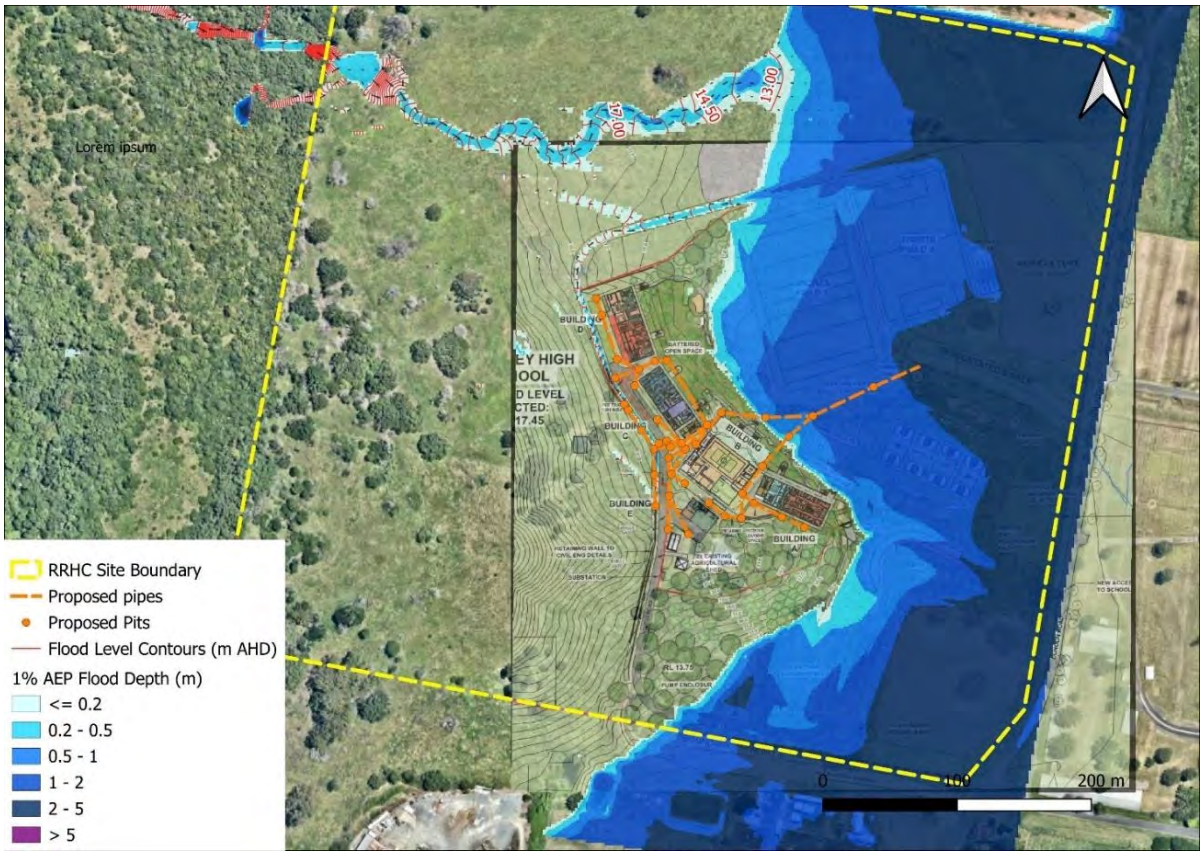

Figure 5-1% AEP depths and levels at the proposed RRHC site under post-development site conditions

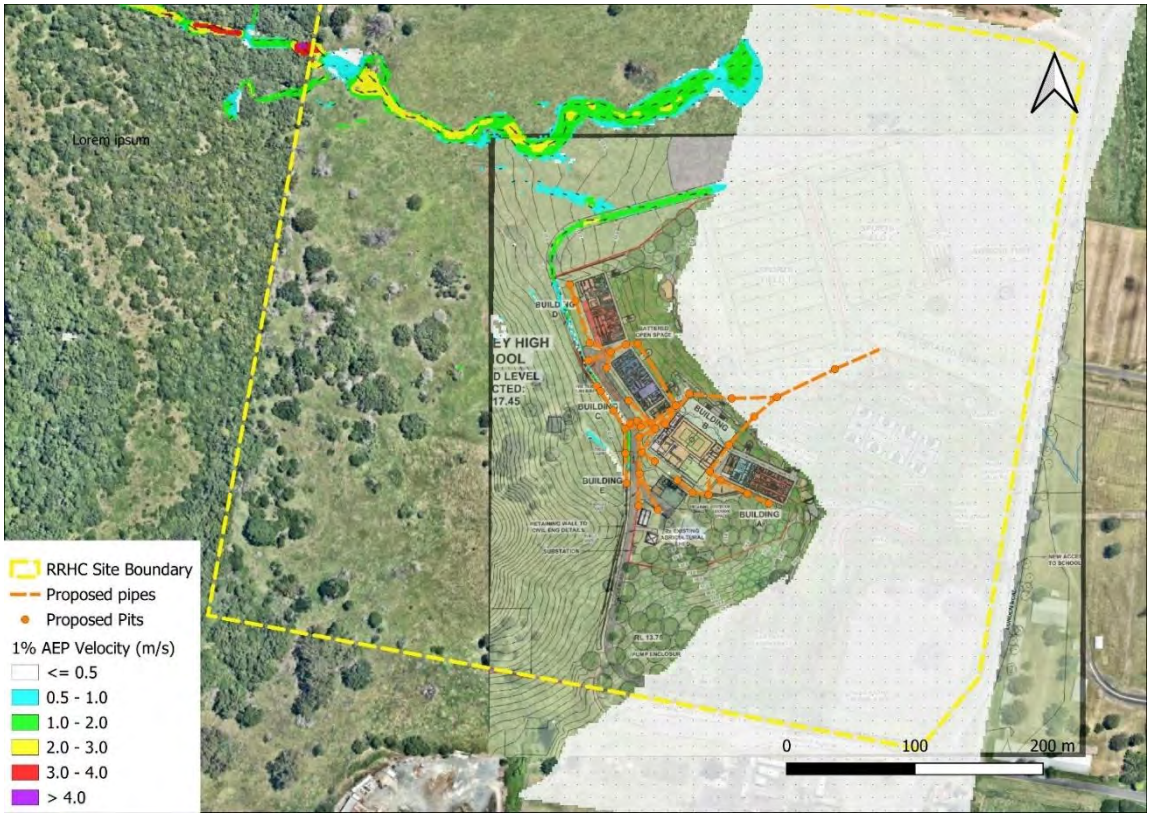

Figure 6-1% AEP velocities at the proposed RRHC site under post-development site conditions

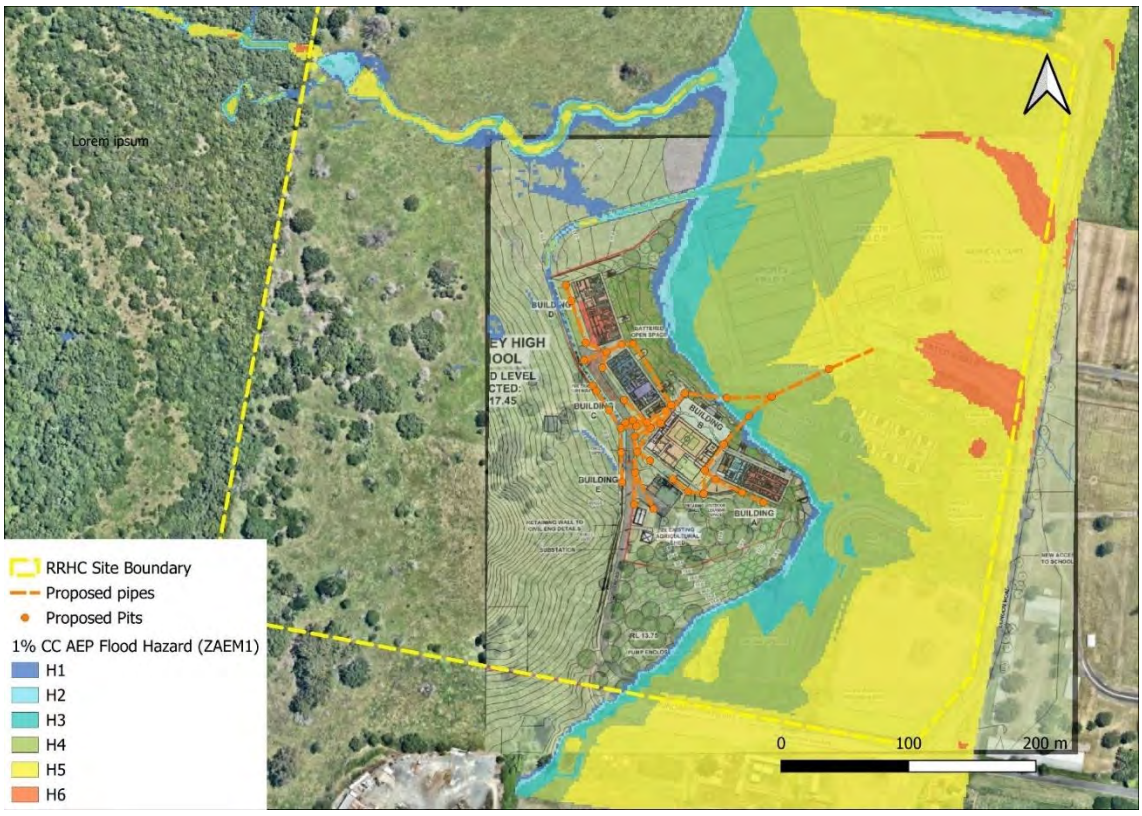

Figure 7-1% AEP Hazard categorisation at the proposed RRHC site under post-development site conditions

2.2 Probable Maximum Flood Event

During the Probable Maximum Flood (PMF) event, flood extent across the site increases significantly, with the open space east of the proposed buildings inundated. Despite this, none of the proposed buildings are affected by flooding from either the local catchment or the broader regional system. The diversion channel, retaining wall, and proposed drainage infrastructure operate effectively to divert floodwaters away from the development, ensuring the safety of all buildings during this extreme event.

All proposed buildings are designed with finished floor levels (FFLs) at 17.45 m AHD, providing a minimum freeboard of 500 mm above the PMF flood level of 16.95 m AHD

The flood depth, levels, velocities, and hazard maps for the PMF event are presented in Figure 8 to Figure 10.

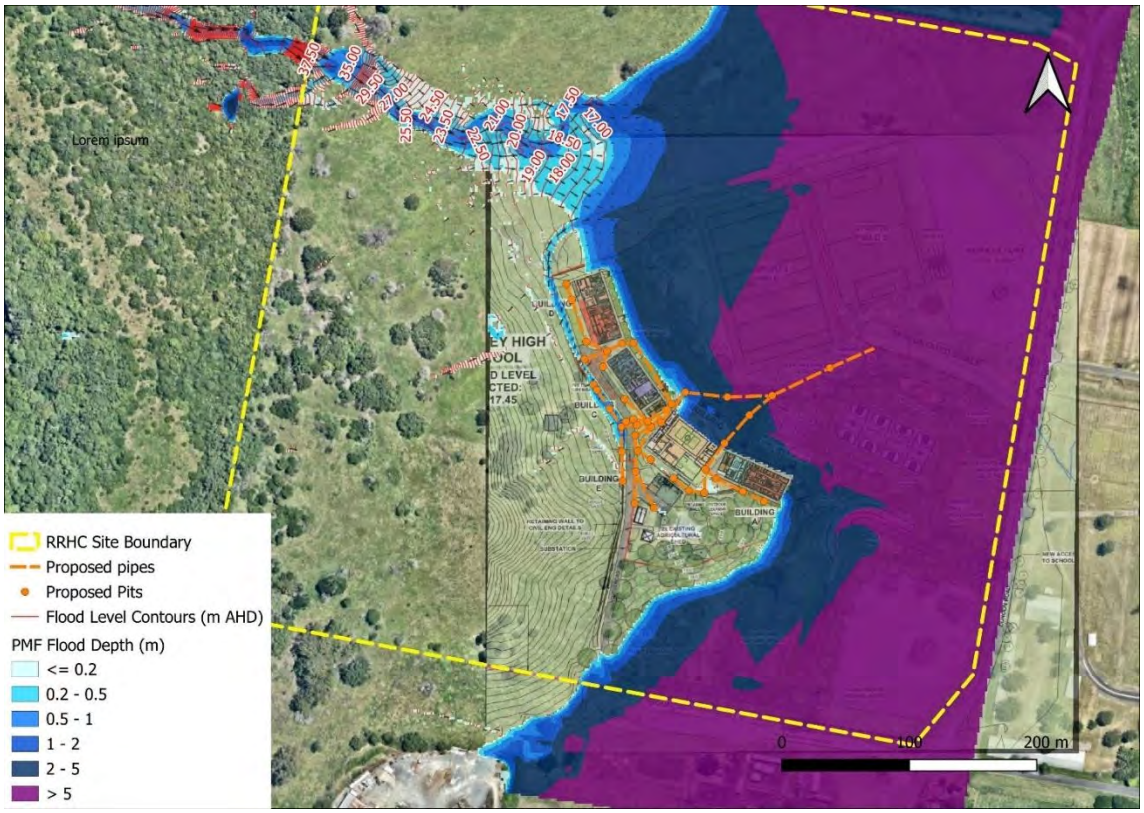

Figure 8- PMF depths and levels at the proposed RRHC site under post-development site conditions

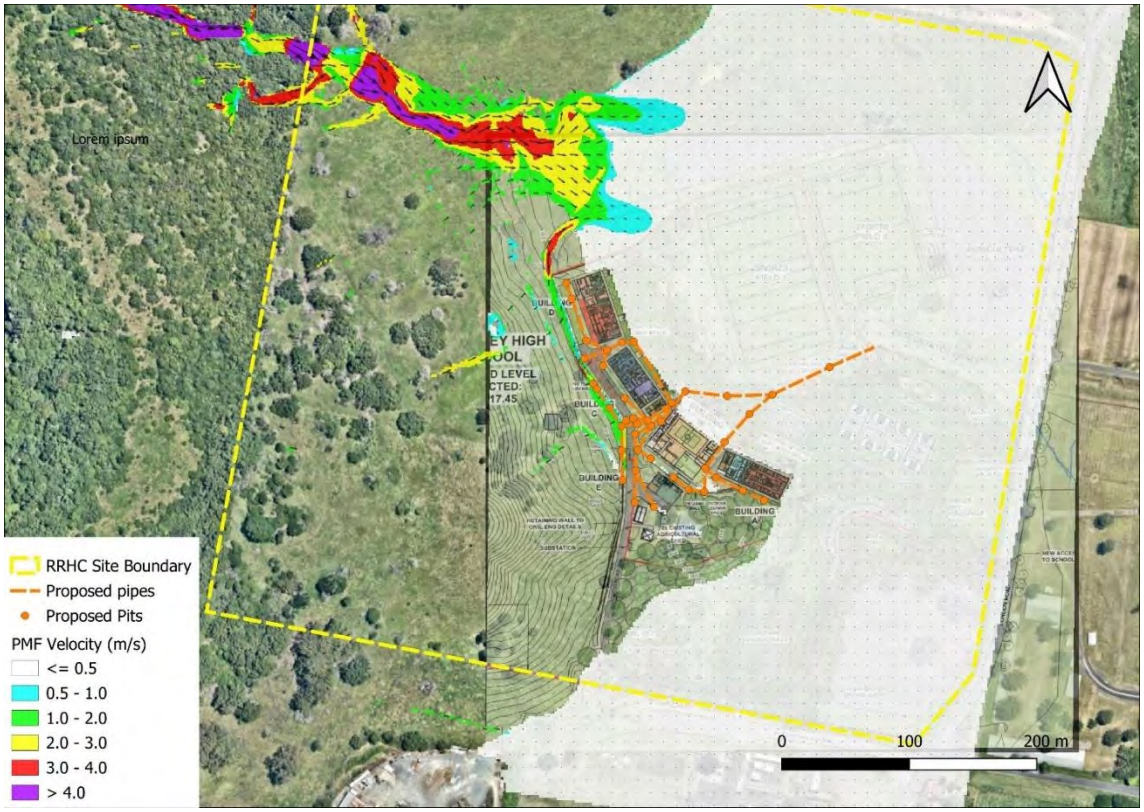

Figure 9- PMF velocities at the proposed RRHC site under post-development site conditions

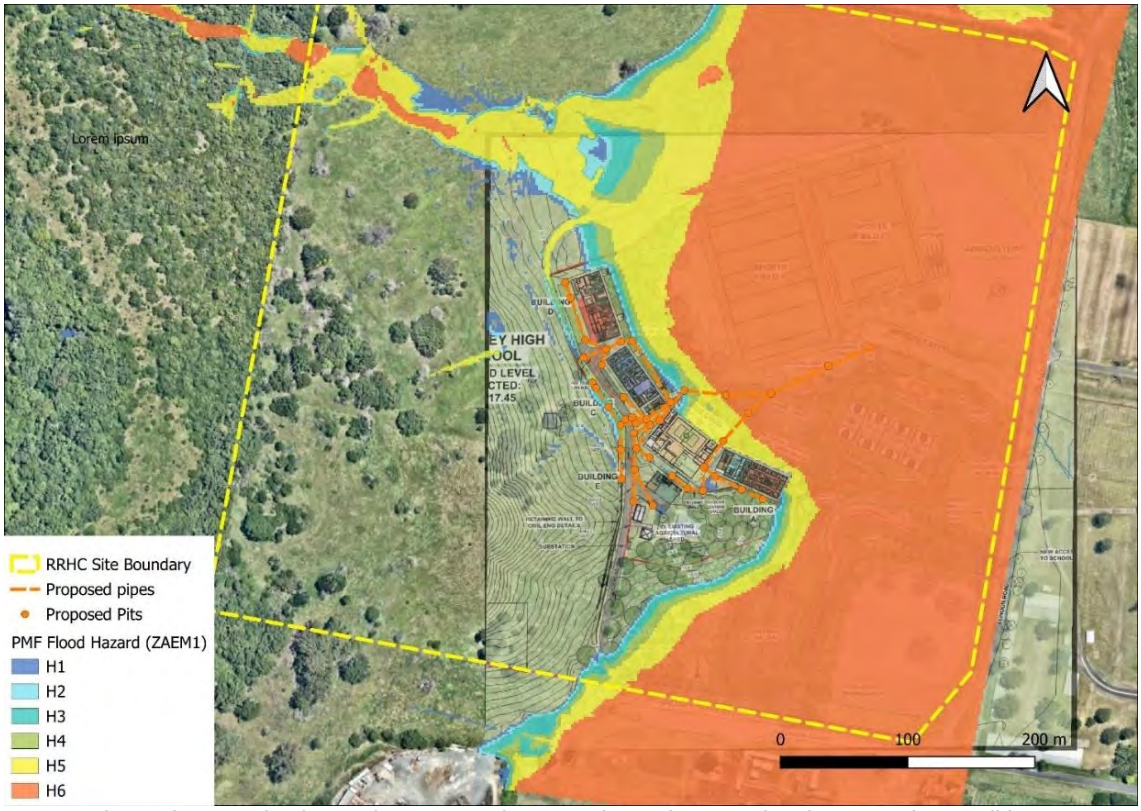

Figure 10- PMF hazard categorisation at the proposed RRHC site under post-development site conditions

2.3 NSW SES Local Flood Emergency Sub-Plan

For this study, the Lismore City Local Flood Emergency Sub-Plan was utilized. This document was endorsed by the Northern Rivers Local Emergency Management Committee on 22 August 2023. The plan covers the Lismore City Local Government Area (LGA), including its main towns, villages, rivers, and creeks, as depicted in Figure 11.

Flooding in North Lismore typically begins when the Wilsons River backs up at Slater Creek, inundating low-lying areas from the Showground past McKenzie Park to the river. These initial impacts may occur at water levels as low as 4.3 metres AHD on the Rowing Club gauge. As river levels continue to rise, inundation intensifies until the Wilsons River and Leycester Creek overtop their banks, threatening nearby properties and cutting off most roads at approximately 9.3 metres AHD on the same gauge.

Floodwaters from the Wilsons River subsequently spread across the floodplain east of North Lismore, advancing westward through low-lying areas between Bridge Street and Bray Street. Concurrently, Leycester Creek floodwaters flow northward between Tweed Street and Bouyan Street, quickly cutting off Bouyan and Terania Streets. Rising waters eventually close all evacuation routes to Central Lismore, resulting in widespread inundation. The dominant flow from the Wilsons River can cause rapid water level rises in North Lismore.

Figure 11- Map of Lismore City council Area

2.3.1 SES Sub-Plan Evacuation Procedures

If evacuation becomes necessary, residents of North Lismore should proceed to the evacuation centre at Southern Cross University. This can be accessed via North Lismore, crossing Bridge Street to the CBD, and then traveling north through Keen Street and Leycester Street. Residents farther from the river may have access to Dunoon Road through the Showground.

This evacuation route is shown in Figure 12.

Figure 12- Evacuation Route for RRHC site based on SES local Sub-plan

Responsibility for issuing general evacuation orders during flooding lies with the Lismore City SES Local Controller, as outlined in Section 22(1) of the State Emergency Service Act 1989. The decision to issue an evacuation order is made in consultation with the Local Emergency Operations Controller and the Richmond-Tweed SES Region Controller.

Evacuation orders are generally issued when a flood warning predicts water levels exceeding 10 metres at the Rowing Club gauge or when high flows in Leycester Creek are anticipated to overtop the South Lismore levee. However, **Chapter 2 of Volume 3** of the Lismore Sub Plan, which specifically addresses the North Lismore sector, indicates that evacuation procedures for this area commence when the Rowing Club gauge reaches 9.0 metres AHD.

2.3.2 Flood Isolation and Low Flood Islands

Based on the information provided in this document, the majority of Urban North Lismore becomes isolated when water levels reach between 9.15 m and 9.4 m AHD, corresponding to the closures of Terania Street and Bridge Street, however, access routes could be impacted earlier due to levee overtopping in South and Central Lismore. Detailed information regarding this sub-plan, specifically for Lismore North, is included in Appendix A.

2.4 Service Level Specification for Flood Forecasting and Warning Services

The Service Level Specification for Flood Forecasting and Warning Services for New South Wales and the Australian Capital Territory – Version 3.15 was also utilized in preparing this report. This document serves to outline, define, and detail the flood forecasting and warning services provided by the Bureau of Meteorology (the Bureau) within these regions. It establishes the scope, operational standards, and responsibilities associated with delivering timely and accurate flood forecasts and warnings. These services are provided within the framework of the Total Flood Warning System, as defined in the Australian Emergency Manuals Series, Manual 21: Flood Warning (Australian Government, 2009). Table 3 shows the information which is provided in this report for the Lismore.

Table 3- Service Level Specification for Lismore

Bureau number	AWRC number	Forecast location	Gauge type	Gauge datum	Flood classification (m)			Target warning lead time	
					Minor	Moderate	Major	Time (hrs)	Trigger height (m)
58176	203904	Lismore City Council	Automatic	AHD	4.2	7.2	9.7	12 hours	>10.0 m

The target warning lead time refers to the minimum advance notice period before a specified flood height or classification level is reached. For North Lismore, this threshold is 9m AHD, while for South and Central Lismore, the threshold is 10m AHD.

Based on February 2022 data, the flood event evolved rapidly, prompting multiple forecast revisions by the Bureau of Meteorology (BOM). It remains unclear when the flood level reached the 9m AHD evacuation trigger for North Lismore and whether a timely evacuation order was issued by the BOM.

However, for South and Central Lismore, an evacuation order was issued at 9:30 PM on February 27, 2022, with the Lismore levee overtopping at 3 AM on February 28, 2022. This provided residents with only 5.5 hours to evacuate, significantly less than the 12-hour lead time specified in the SES Sub-Plan.

2.5 Time to Inundation

The 36-hour PMF event has been used to assess the time to inundation. Flood modelling results indicate that the flood level is approximately 5.0 m AHD at the initial time step and rises to 9.0 m AHD by the 2.25-hour mark. This is shown in Figure 13.

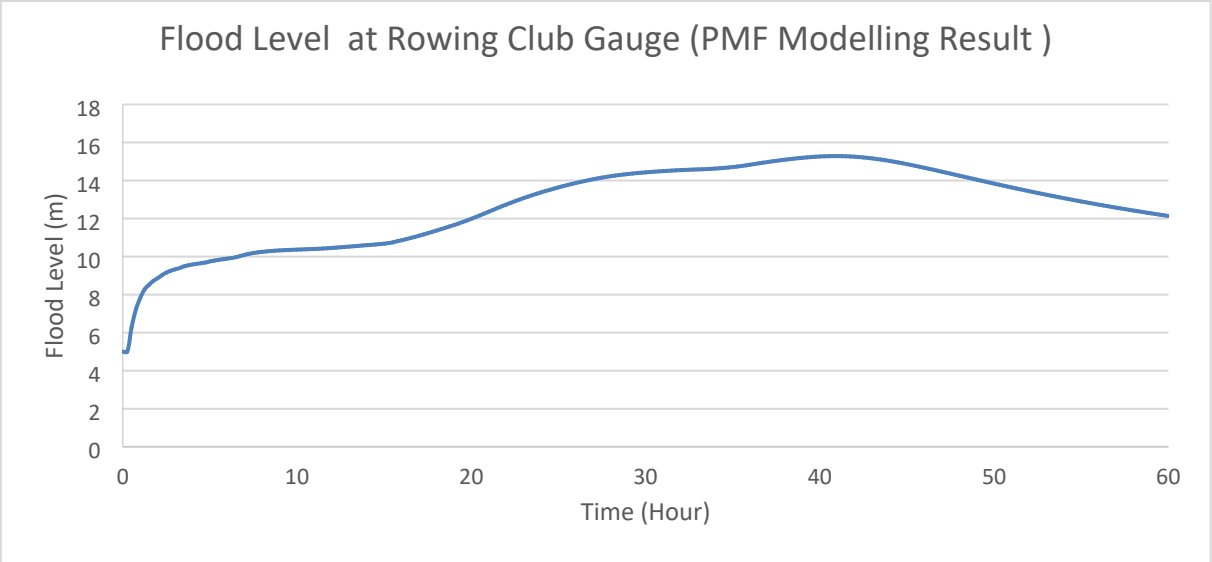

Figure 13- flood level at Rowing Club Gauge for PMF event in Hydraulic model.

The modelling results also indicate that Bridge Street—identified in the Emergency Sub-Plan—intersects with Slater Creek and is highly likely to be overtopped and inundated early during heavy rainfall events. Consequently, it is recommended that evacuation be routed via Tweed Street and Terania Street instead of Bridge Street to ensure safer access during flood conditions. This is shown in the Figure 14.

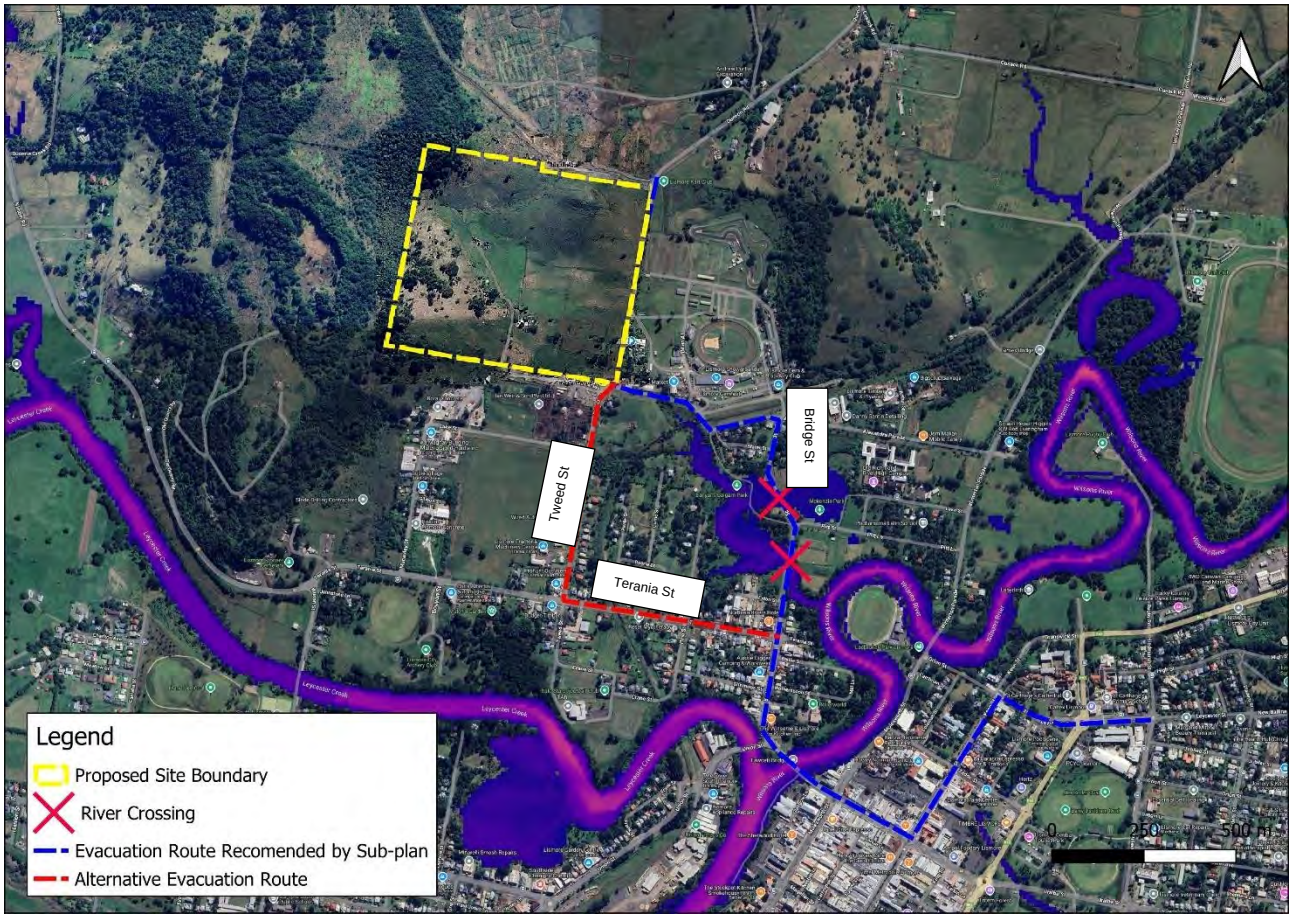

Figure 14- Proposed New Evacuation Route- Flood Depth at the T=0 of the model.

The PMF modelling results indicate that Tweed Street and Terania Street begin to be impacted at the 3-hour storm modelling time step. Additionally, the results show that the flood level at the Rowing Club gauge reaches 9.30 m AHD at the same time step, aligning with the Lismore Sub-Plan's observation that most roads out of North Lismore are generally closed at flood levels between 9.2 and 9.4m AHD at the Lismore gauge. Consequently, it is assumed these roads are unsuitable for use after 3 hours. This is shown in Figure 15.

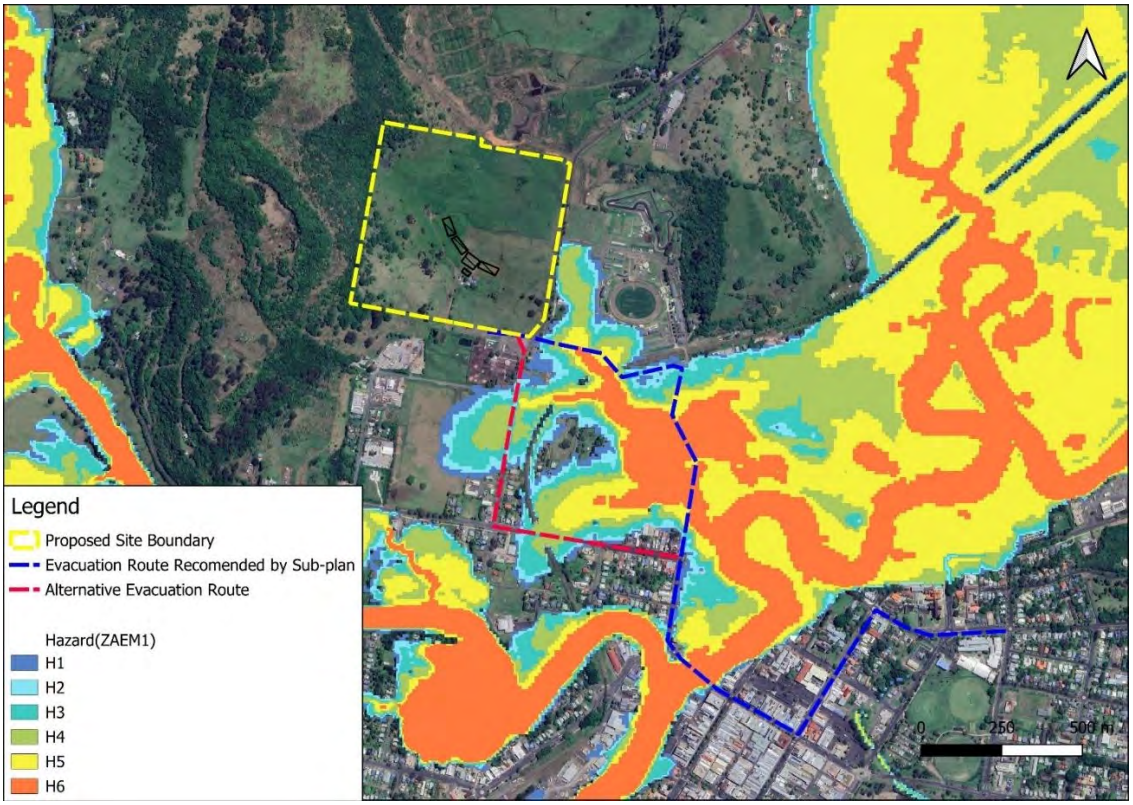

Figure 15- Flood Hazard Analysis Result at 3-Hour Time Steps for the PMF Event

Flood modelling indicates that site access roads become fully inundated by the 8-hour time step of the model, with peak inundation occurring at the 42-hour mark .These are illustrated in Figure 16 and Figure 17. Table 4 shows some of the flood characteristics for the 1%, 10% AEP, and PMF events.

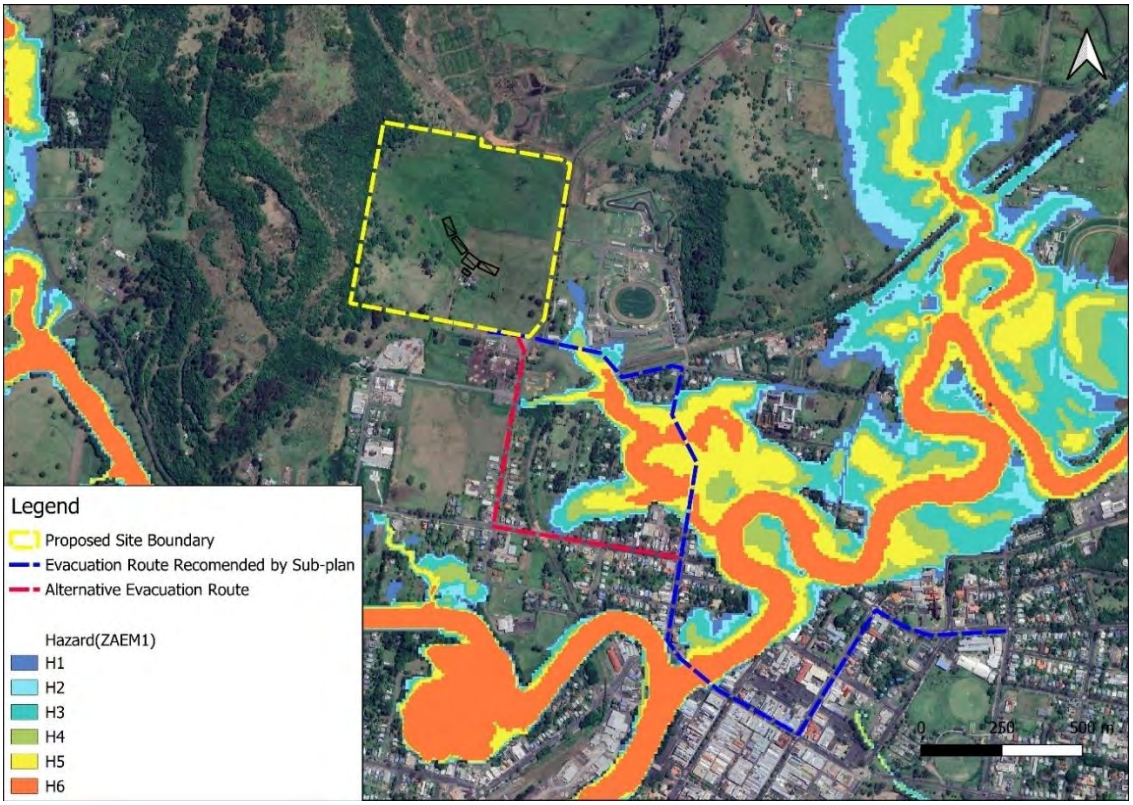

Figure 16- Flood Hazard Analysis Result at 8-Hour Time Steps for the PMF Event

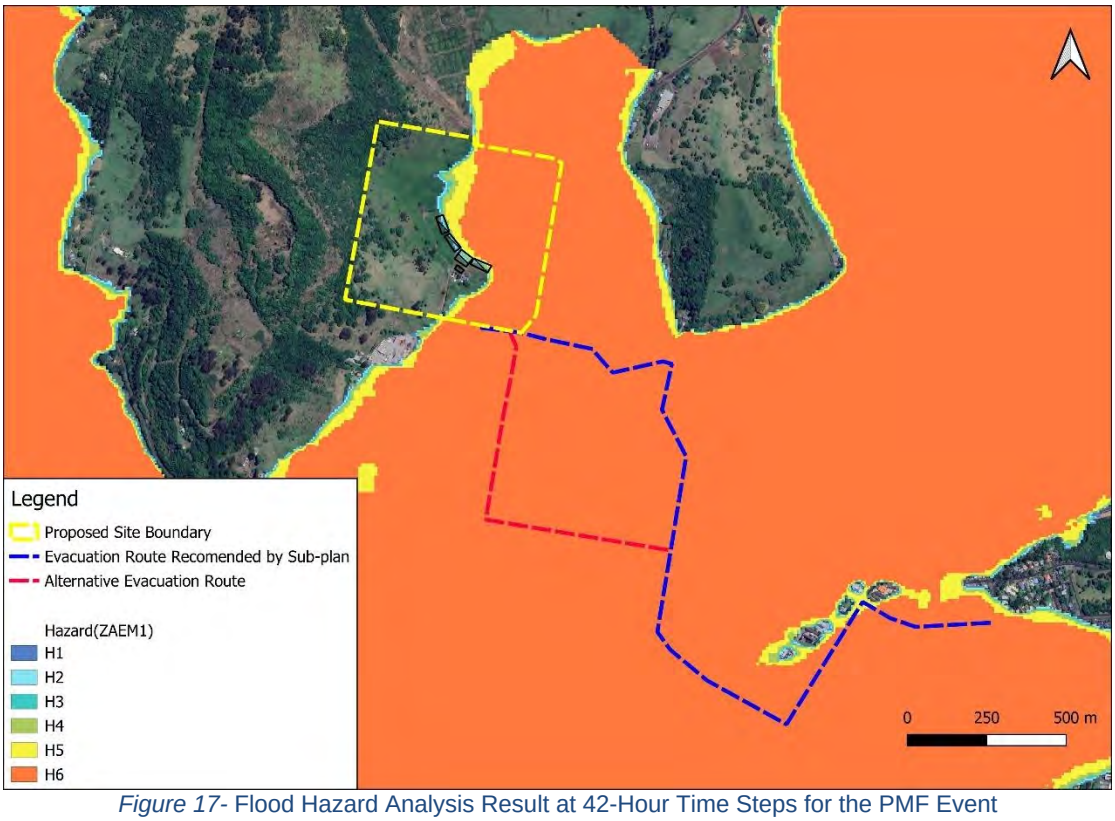

Figure 17- Flood Hazard Analysis Result at 42-Hour Time Steps for the PMF Event

Table 4- Major Flood Characteristics

Event	Evacuation route is inundated (Hour)	Completely is Inundated (Hour)	Time to peak (Hour)	Time for recession (Hour)
10% AEP	26	34	44 hour	70<
1 % AEP	10	17	32	70<
Feb 2022	90	118	140	190

The February 2022 flood event is characterized by a hydrograph with two distinct peaks, reflecting the occurrence of two consecutive storm events. The first, less severe storm commenced at Time Step 0 and lasted approximately 80 hours. This was immediately followed by a second, significantly more severe storm, which persisted for over 150 hours. The hydrograph at the Rowing Club gauge, extracted from the council's TUFLOW model, is presented in Figure 18.

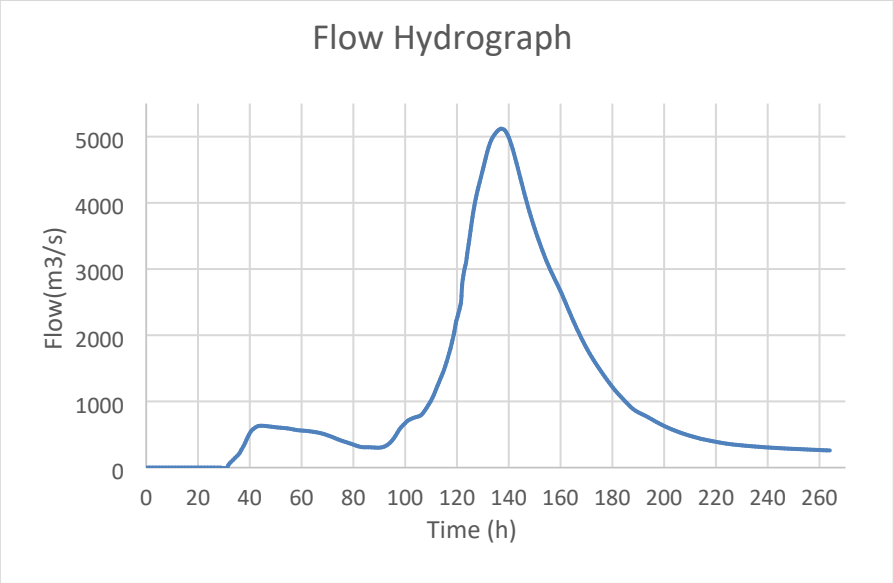

Figure 18- Flow Hydrograph Extracted from the Council's TUFLOW Model at the Rowing Club Gauge

2.6 Consultation With SES

A meeting was held on Thursday, 20 February 2025, between the NSW Department of Education and NS SES (North-Eastern Zone) to discuss evacuation planning for the site. The following key points were agreed:

- Rising road access dictates evacuation before sites are flood-affected.
- Evacuation will be triggered by one or both of the following:
    - A Watch and Act warning issued for Lismore CBD or Lismore South, typically when the Lismore gauge (Rowing Club – BOM 58176, AWRC 203904) reaches 5.4 m with a forecast to exceed the moderate flood level.
    - The Lismore gauge reaching 5.4 m, accompanied by a forecast indicating exceedance of the moderate flood level.
- Road access begins to be affected at approximately 7.2 m, at which point both the proposed school and LSPS fall within the existing SES evacuation polygons

- This scenario allows a 2–4hour evacuation window; however, significant pressure on bus service availability is expected during this time.
- The evacuation triggers also account for the wide geographic catchments of the schools.

A copy of the email correspondence is attached as Appendix B

3.0 Flood Emergency Response Strategy

3.1 Flood Response Strategy

As aforementioned, the site is at risk of both localized and regional flooding. Localized flooding is brief, while regional flooding can last for several hours. To manage these risks, two response strategies have been adopted: a 'Shelter-in-Place' strategy for localized flooding and a pre-emptive closure and evacuation strategy for regional flooding.

For regional flooding, shelter-in-place is only a last resort, used when the school cannot evacuate on its own and needs help from emergency services. This ensures a safer and more coordinated response to flooding.

The NSW SES will lead evacuation efforts for regional flooding, with support from the NSW Police, Fire and Rescue NSW, and NSW Rural Fire Service (RFS) volunteers. The measures in Sections 3 and 4 apply only to regional flooding. Local flooding and the Shelter-in-Place (SIP) strategy are explained in detail in Section 4.6.

3.2 Flood Warning Time

The February 2022 flood event in the Lismore area, the largest ever recorded, posed significant challenges to emergency response planning. While such extreme events are rare, they highlight the importance of preparedness for a range of flood scenarios. The BoM typically recommends a 12-hour warning lead time for evacuations, but the 2022 flood saw multiple forecast changes, ultimately providing only about 5 hours' notice. This emphasizes the need for flexible and adaptive emergency plans that can respond effectively under varying conditions.

This FERP is based on the latest Lismore sub-plan and assumes that the BoM will provide the necessary 12-hour warning lead time. However, it's crucial to continually review and update emergency plans to account for potential changes in weather patterns and emergency response capabilities.

Consultations with Lismore South Public School (LSPS) Principal Larissa Polak, whose school is located near the RRHC site in Lismore, confirmed that no students or staff were present onsite during the 2017 and 2022 flood events. However, two flash flood incidents in 2020 highlighted the necessity of a 2–4-hour lead time to facilitate safe evacuation. In one instance, all students were collected within 1.5 hours. Conversely, during the second instance, traffic congestion caused delays, with most students being picked up within the first hour while some remained onsite for up to 4 hours. Based on these observations, it can be reasonably inferred that similar conditions could affect the RRHC site.

Assuming a 4-hour lead time for the evacuation of RRHC students and staff, an estimated 7-8 hours would be available for evacuation under optimal conditions. This underscores the critical importance of timely and accurate weather forecasting in ensuring effective evacuation planning.

The BoM Flood Watch notifications serve as a vital trigger for enhanced monitoring by the school. These notifications, issued ahead of significant storm events, allow the school to initiate early preparations, thereby improving the efficiency of evacuation responses. However, the success of any evacuation plan ultimately depends on the timely and accurate dissemination of public information and warning packages. This includes clear, concise messaging through diverse channels such as local media, emergency alerts, and social media platforms.

When combined, these measures – early monitoring through Flood Watch notifications, efficient school evacuation procedures, and effective public communication – significantly enhance the ability to meet recommended evacuation lead times. Collectively, they contribute to ensuring the safety of the Lismore community during flood events.

3.3 Closure and Evacuation

3.3.1 Outside of School Hours – Site Closure

Liaison with the SES and Department of Education (DoE) should be initiated when minor flooding is occurring with a forecast to escalate to moderate levels, or when a BoM Flood Warning indicates likely exceedance of the moderate flood level at the Lismore gauge (58176).

If the BoM issues a Flood Warning for an approaching moderate or major flood event at the Lismore gauge, or if no warning is issued but the gauge reaches 5.4 m with forecasts indicating exceedance of the moderate flood level, or as directed by NSW SES, the school should be closed for the expected duration of the flood event.

Flood Watches issued by the BoM should be communicated clearly to staff, students, and parents via SMS and email, advising them of the potential for school closure depending on the evolving flood situation. During an active Flood Watch, the Chief Warden (the individual responsible for coordinating the school's flood response – see Section 5.1) may decide to close the school early, prior to a Flood Warning, if flood risks are deemed high based on the agreed triggers.

Notifications of school closures should be sent immediately via SMS and email. Once floodwaters have receded and alerts have been downgraded or rescinded, the decision to re-open the school will rest with the Chief Warden, in consultation with NSW SES where necessary.

3.3.2 During School Hours – Evacuation of School

Consistent with the approach used outside of school hours, liaison with the SES and Department of Education (DoE) should be initiated when minor flooding is occurring with a forecast to escalate to moderate levels, or when a BoM Flood Warning indicates likely exceedance of the moderate flood level at the Lismore gauge (58176).

If the BoM issues a Flood Warning for an approaching moderate or major flood event, or if no warning is issued but the Lismore gauge reaches 5.4 m with forecasts indicating exceedance of the moderate flood level, or as directed by NSW SES, the following actions must be undertaken:

- Staff are to gather students at the designated assembly point (refer to Section 7.1) for nominated assembly point)
- Parents and carers are to be notified via email and SMS to collect students as soon as possible.
- Transport is to be arranged for any remaining students who are not picked up promptly.

Evacuation can proceed for remaining Students and staff via the route identified in Section 7.2 to the designated evacuation centre. This may be necessary in cases where the safe, early return of all students and staff isn't possible, such as if evacuation is delayed, inundation is projected to occur earlier than expected, or if some students are unable to be collected from school on time. Staff and students taking this route are to travel south to Elliot Rd via Wilson St, past the Ballina St Bridge and then east into Southern Cross University (SCU), RRHC, designated Evacuation centre.

If it is not possible to safely return all students and staff before floodwaters rise—such as in the case of delayed parent pick-up, earlier-than-expected inundation, or other unforeseen circumstances—evacuation must proceed via the route outlined in Section 7.2.

Staff and students are to follow the designated evacuation route:

- Travel south along Wilson Street
- Turn onto Elliott Road

- Cross the Ballina Street Bridge
- Continue east to the evacuation centre located at Southern Cross University (SCU), Richmond River High Campus (RRHC).

This route has been identified as the safest option for flood evacuation during moderate to major flood events.

3.3.3 Triggers

River heights in Lismore are monitored at the Rowing Club gauge (Station Bureau number: 058176). In Lismore, a Minor flood is classified by a level of 4.2m AHD at the Rowing Club gauge, whilst Moderate and Major floods are classified by a level of 7.2 and 9.7m AHD, respectively (BoM).

The water level at the Rowing Club Gauge (Station Number: 058176) can be monitored via BoM website at BoM Rowing Club Gauge. However, due to the significant influence of Wilsons River and the resulting variability in trigger heights, it is recommended that both BoM Flood Warnings and NSW State Emergency Service (SES) alerts (refer to Section 5.0) be closely monitored. These alerts should serve as the primary indicators for the timely closure of the school, ensuring that parents have the opportunity to collect their children before hazardous road conditions develop.

The school is required to evacuate when instructed by the NSW SES. The SES, in coordination with the BoM, will continuously assess conditions and when evacuation becomes necessary, will liaise with the Chief Warden to facilitate a safe and orderly evacuation.

The specific trigger for evacuation due to localised flooding is illustrated in section 4.6

The evacuation triggers for North Lismore, as outlined in the Lismore Sub Plan, are explained in detail in **Appendix A.**

4.0 Flood Warnings and Notifications

4.1 Bureau of Meteorology

Severe weather and thunderstorm warnings are issued by the Bureau of Meteorology (BoM). These warnings are continually updated with descriptions of the likely conditions, including predicted extreme rainfall depths.

Flood warnings are issued by the BoM when flooding is occurring or is expected to occur in an area. Warnings may include specific predictions of flood depths dependent on real-time rainfall and river level data. These warnings are distributed to Councils, Police and the relevant local SES, as well as being available on the BoM website.

- A ***Flood Watch*** is issued by the BoM up to four days prior to a flood event. A Flood Watch is generally updated daily and may be issued before, during, or after rainfall has occurred.
- ***Flood Warnings*** are issued by the BoM when flooding is occurring or expected to occur in a particular area. Warnings may include specific predictions of river heights at specific gauges that are dependent on real-time rainfall and river level data. These warnings are distributed to Council, Police and the relevant local SES, as well as being available on the BoM website, through telephone weather warnings and radio broadcasts.

4.2 Australian Warning System

NSW SES has recently implemented the Australian Warning System (AWS) which replaces their previous evacuation orders and warnings system. The AWS is a new national approach to information and 'Calls to Actions' for hazards including flooding. The AWS uses a nationally consistent set of icons, with three warning levels: Advice, Watch and Act, and Emergency Warning. The warning levels are described in Figure 19.

Figure 19 - Australian Warning System - Three Warning Levels

The NSW SES utilises a range of sources to build detailed flood intelligence within local communities – including information from flood studies and historical flood data. As part of the transition to the Australian Warning System, the NSW SES has increased flexibility to tailor warnings at the community level, based on the expected consequences of severe weather events.

Accessing NSW SES warnings

The Chief Warden is responsible for monitoring information from the AWS. Impacted communities will continue to receive flood warnings through the NSW SES website, NSW SES social media channels and by listening to local ABC radio stations.

SES warnings are also available through the web platform Hazard Watch (at hazardwatch.gov.au) and the free mobile app “Hazards Near Me NSW”. These platforms act as additional channels for communities and individuals to access important warning information.

Each warning has three components:

- **Location and hazard**: The location and the type of hazard impacting the community.
- **Action statement**: For each warning level there are a range of action statements to guide protective action by the community. These statements evolve as the warning levels increase in severity. Statements range from ‘stay informed’ at the Advice level, to ‘prepare to evacuate’ at the Watch and Act level, to ‘evacuate now’ in the Emergency Warning level. As the situation changes and the threat is reduced, the level of warning will decrease accordingly.
- **The warning level**: The severity of the natural hazard event based on the consequence to the community.

4.3 Lismore City Council

Lismore City Council offer a free Flood Alert SMS service. An SMS is sent to all subscribers once Lismore City Council have been informed that Lismore will reach the minor flood level of 4.2m AHD. Additional alerts are sent every 6-8 hours or when river heights are rising and continue until the flood reaches its peak.

It is recommended that the Chief Warden and all flood emergency support staff subscribe to this free service, available via the LCC website (https://forms.lismore.nsw.gov.au/forms/17082).

It is also recommended to inform all staff, parents, and students about this service and encourage them to subscribe.

4.4 Early Warning Network and Hazard Near me

Early Warning Network (EWN) is a subscription service that consolidates publicly available information, such as rainfall and water level telemetry, into a centralized monitoring and alerting platform. SMS alerts or push notifications can be sent to the school admin team (including the Chief Warden) when Minor, Moderate, or Major flood levels are predicted at the Lismore gauge.

As noted, evacuation triggers are based on BoM warnings, and a subscription to EWN is not a requirement. Similar functionality can be achieved by setting watch zones in the free BoM app and Hazards Near Me app. However, EWN may provide additional convenience by streamlining information to assist with planning and preparation.

The Hazards Near Me app is a free application that provides real-time information about local emergencies, including floods, bushfires, and tsunamis, along with advice on how to stay safe. The app allows users to set watch zones and sends push notifications when new incidents occur or when information updates.

4.5 Co-ordination of Regional Flood Evacuation Orders and Warnings

The overall coordination of the regional road evacuation routes will be conducted from the Evacuation Coordination Desk at the NSW SES.

The Incident Controller (“Evacuation Coordination Desk”) will distribute these warnings to other NSW SES control centres; metropolitan media outlets for immediate broadcast; and the Joint Media Information Centre. The Incident Controller will also advise Police and the NSW Transport Management Centre to begin traffic management procedures on regional evacuation routes. The Incident Controller will distribute an evacuation warning through the following systems (when available): internet, fax, email, text message, and automatic telephone dialling with pre-recorded messages.

4.6 Localised Flash flooding and Shelter-in-Place

Due to its location on steep terrain, the school is susceptible to flash flooding from the local catchment. Flood modelling indicates that the 15-minute PMF event represents the most critical storm scenario for the area. The modelling further shows that the flood peak occurs approximately six minutes after the onset of the storm, with floodwaters receding within 15 minutes of peaking.

To mitigate this risk, a retaining wall, diversion channel, and stormwater infrastructure have been designed to divert floodwaters—up to and including the PMF event—away from the school buildings. Flood modelling confirms that, under all assessed flood scenarios, including the PMF, floodwaters are successfully diverted downstream and do not pose a risk to school infrastructure. For further details, refer to the Flood Impact and Risk Assessment (FIRA) provided with this report.

Although the modelling shows that the site itself is not directly impacted by flooding, a Shelter-in-Place (SIP) strategy is recommended due to the potential for rapid-onset flash flooding in the surrounding area.

SIP guidance issued by the NSW Department of Planning, Housing and Infrastructure (DPHI, 2025) recommends this approach for developments exposed to flash flooding, particularly where the available warning time is less than six hours.

The fast-developing nature of localised flooding at the site—and the limited warning time it provides—reduces the NSW SES's ability to issue timely flood notifications and action statements. As such, flood warnings may not always be available in advance or may arrive too late for safe evacuation.

To ensure timely action, alternative triggers should be monitored, including severe weather warnings and updates via local radio stations and social media. While the Chief Warden is responsible for monitoring alerts from the AWS, the NSW SES recommends that all site users (including staff and wardens) also monitor the Hazard Watch website and the Hazards Near Me app.

Accordingly, SIP has been adopted as the emergency response strategy for localised intense rainfall events. Further details are provided in Section 7.0

5.0 Flood Response

5.1 Staff Responsibilities

In the event of a severe flood, various staff members (detailed in Table 5) will be responsible for specific tasks as outlined in Table 6 .Before the school is in operation, these roles must be delegated to specific staff members.

Table 5- Flood response roles and the staff responsible for these

Role	Responsibility	Name	Contact Number
Chief Warden	Principal	TBC	TBC
Deputy Chief Warden	Supports the Chief Warden	TBC	TBC
Communications Officer	Supports the Chief Warden	TBC	TBC
Floor Warden	Supports the Chief Warden	TBC	TBC
First Aid Officer	Flood Emergency Kit	TBC	TBC

Table 6- Flood response roles and the staff responsible for these

Role	Location	Responsibilities
Department of Education	N/A	- Prepare Emergency Management Plan that addresses the recommendations of this report - Liaise with NSW SES to facilitate the early release of students whose travel arrangements may be disrupted by flooding. The school should identify these students during the enrolment - Liaise with NSW SES for temporary closure of school potential impacted by flooding - Assist with evacuation coordination
Chief Warden	Within school	- Inform Staff of flood risk - Coordinate flood evacuation drills - Decide when evacuation is required based on triggers - Liaise with NSW SES - If school requires buses to evacuate contact Northern Rivers Bus line or Busways.
First Aid Officer	Within school	- Coordinate assistance for less able students and staff during evacuation - Prepare a Flood Emergency Kit that includes a portable radio, torch, spare batteries, first aid materials, emergency contact numbers, candles, waterproof matches, waterproof bags and required medications.
Floor Wardens	Within school	- Coordinate evacuation of their designated floor and assist in evacuation
Staff	Within school	- Assist Floor Wardens in evacuation of students - Report missing students to Floor Wardens

5.2 Key Contact Details

In the event of a severe flood, key telephone numbers have been listed in Table 7 below.

Table 7- Key Contact Numbers

IMPORTANT TELEPHONE NUMBERS

Administration Office	tbc
Principal	tbc
Stores Office	tbc
Chief Warden	tbc
Floor Warden	tbc
Deputy Principal	tbc
Deputy Principal	tbc
Counsellor	tbc
First Aid Officer	tbc

OUTSIDE SCHOOL CONTACTS

NSW SES	132 500
NSW SES South Lismore Warden (John Habib)	02 6621 6940
Dept Education – State Office	9836 9000
Dept Education – District Office	4724 8799
Dept Education – Incident Report & Support	1800 811 523
Director, Educational Leadership	0427 807 108
Northern Rivers Buslines	02 6626 1499
Busways	1300 692 929
Transport Infoline	131 500
Lismore Base Hospital	02 6624 0200
Lismore Police Station	02 6626 0599
2NR ABC Regional Radio 94.5 FM	02 6627 2011

6.0 Preparation for Flood Response

6.1 Education

Community awareness of flooding is a significant issue within the floodplain due to the severity of flooding within Lismore and the anticipated flood depths of these events. The following flood response measures should be taken in preparing the community for a flood event.

As part of the preparation for a flood event, staff with responsibilities within this Plan should review and be familiar with their roles. Inductions should be held to educate staff on their role during a flood event.

To increase awareness within the school, it is recommended that students be educated on the potential flood risk and actions that will be undertaken during a flood event. As part of this education, evacuation drills should be conducted regularly to ensure students are aware of the procedures for evacuation. Lessons should also be held that address flood risks and highlight dangerous behaviours during a flood event. These lessons could be based on materials available on the NSW SES website which have been tailored for students of various ages.

A copy of a detailed FERP which includes emergency response procedures will be made available at communal areas within the school as well as the main hall and main office.

6.2 Signage

It is important that the site has adequate signage for evacuation and flood warning, similar to those in Figure 20. Evacuation direction signs will be in place around the school corridors indicating the route to be taken to assembly points onsite or evacuation routes in the event of a flood. Evacuation signage will also be in place in any car parking areas and bus pick up areas to indicate the direction that vehicles should exit the site.

There is no requirement for a gauge at the site to be installed and used as a trigger for evacuation, as early evacuation prior to inundation is necessary at the RRHC site.

Figure 20 - Signage

6.3 Evacuation Drills

Schools are required to conduct two evacuation drills per year, and in flood-prone areas, it is likely that at least one of these drills will focus specifically on flood evacuation procedures. It is the responsibility of the Chief Warden to ensure that evacuation drills are organised and that any issues with these drills be attended to, and if necessary, rerun. The Chief Warden must highlight changes that should be made to the response procedure, and this plan should be reviewed and updated. The Chief Warden will also ensure that all site drills are recorded in an appropriate records book and any non-conformities reported and responded to.

6.4 Flood Emergency Kit

A Flood Emergency Kit should be prepared prior to a flood event taking place and regularly checked to ensure that supplies within the kit are sufficient and in working condition. This check could occur after the evacuation drill takes place to provide a regular schedule. The Kit should include:

- Radio with spare batteries;
- Torch with spare batteries;
- First aid kit and other medicines;
- Candles and waterproof matches;
- Waterproof bags;
- A copy of the Site Emergency Management Plan; and
- Emergency contact numbers.

This Emergency Kit should be stored in a waterproof container, and it is the responsibility of the First Aid Officer to make sure that this kit is maintained and available during an emergency.

7.0 Flood Response Actions

Flood Emergency Response Plan	
Flood Warning and Notification Procedures	**Evacuation Protocols**
1) A Bom flood warning indicates that moderate flooding is likely or that minor flooding is occurring with a forecast to reach the moderate flood level (at Lismore Gauge 58176) or BoM issues a **FLOOD WATCH** or NSW SES issue a yellow "**ADVICE**" warning 	The following actions must be undertaken: 1) Ensure the emergency kit is ready to use. 2) Minimise all outdoor activities, particularly near the diversion channel, retaining wall, and the adjacent road. 3) Listen to the local radio station for updates on forecasted flood heights and timings, particularly if/when the South Lismore Levee will be overtopped. Monitor updates on NSW SES platform Hazard Watch. 4) Call NSW SES or local police for an update and advice. 5) Contact bus companies to confirm availability of transport resources. 6) Notify all staff and students of the flood watch and confirm availability of staff to assist with emergency actions if required. 7) Ensure staff are familiar with the flood emergency strategy.

2) Flash flooding is reported in the media or BoM issues a **FLOOD WARNING Including (Severe Weather and thunderstorm conditions and potential heavy rainfall)** or NSW SES issue an amber "**WATCH AND ACT**" or red "**ACT NOW**" warning (Lismore gauge (58176) reaches 5.4 m with a forecast or likelihood of exceeding the moderate flood level) 	If flood event is anticipated to impact the site, the **Chief Warden** must undertake the following actions: **During School Hours**: • If the Bom issues a Severe Weather or Thunderstorm Warning indicating potential heavy rainfall, cancel all outdoor activities. Instruct staff and students to remain indoors—preferably in their classrooms—as part of the SIP procedure to safeguard against flash flooding. • Contact **TBC**, SES North Lismore Warden (on **TBC**) or NSW SES on 132500 to confirm response strategy. • Contact **NICKIE BARTLETT,** Director, Educational Leadership (**0427 807 108**) and the Incident Report and Support Hotline (**1800 811 523**). • **Send SMS and Email to parents or Sentral Parent Advise App** confirming evacuation of school and requesting that students are picked up from school. all remaining students will be safely transported to the evacuation centre at SCU. • An alert and warning message should be broadcast over the PA system, notifying all students and staff to **gather in the Assembly Point** in the Building B (Section 7.1). Students should be grouped according to class. • Conduct headcount to ensure all students and staff are accounted for. • Teachers are to bring a hard copy of the student list and record student release. • Call **Northern Rivers Buslines** (02 6626 1499) / **Busways** (1300 692 929) / **Transport Infoline** (131 500) and coordinate transport resources for evacuation of any remaining students/staff to SCU. • If there is no bus available to pick up the remaining children and staff at the school, contact SES or dial 000 to assist with the evacuation. • If time permits, the Chief Warden and General Assistant are to coordinate asset protection, including power shutdown and **relocation of assets**. • Evacuate students and staff. **NOTE: Avoid driving or walking through floodwaters. These are the main causes of death during flooding.** **Outside of School Hours:** Close the school. If the flood is expected to continue into school hours, notify students and staff of the temporary closure of the school. The **Chief Warden** is to confirm floodwater has subsided below the ground level and that there is no ponding within the site. • Flooded areas are to remain off limits until ponding has cleared. Site is to be inspected by the **Chief Warden** if required. Following completion of these checks, the school may reopen.
3) The alert has been rescinded or downgraded and any flood event that occurred has passed	The **Chief Warden** is to confirm floodwater has subsided below the ground level and that there is no ponding within the site. Flooded areas are to remain off limits until ponding has cleared. Site is to be inspected by the **Chief Warden** if required. Following completion of these checks, the school may reopen.

7.1 Assembly Point

As shown in Figure 21, the ground floor of Building B—and, if additional space is required, the ground floor of Building C—has been designated as the assembly point. In the event of an evacuation order, staff are to gather all students and personnel at the assembly point and conduct a headcount. Once accounted for, everyone will proceed to the designated drop-off area, where students will be collected by their parents or guardians.

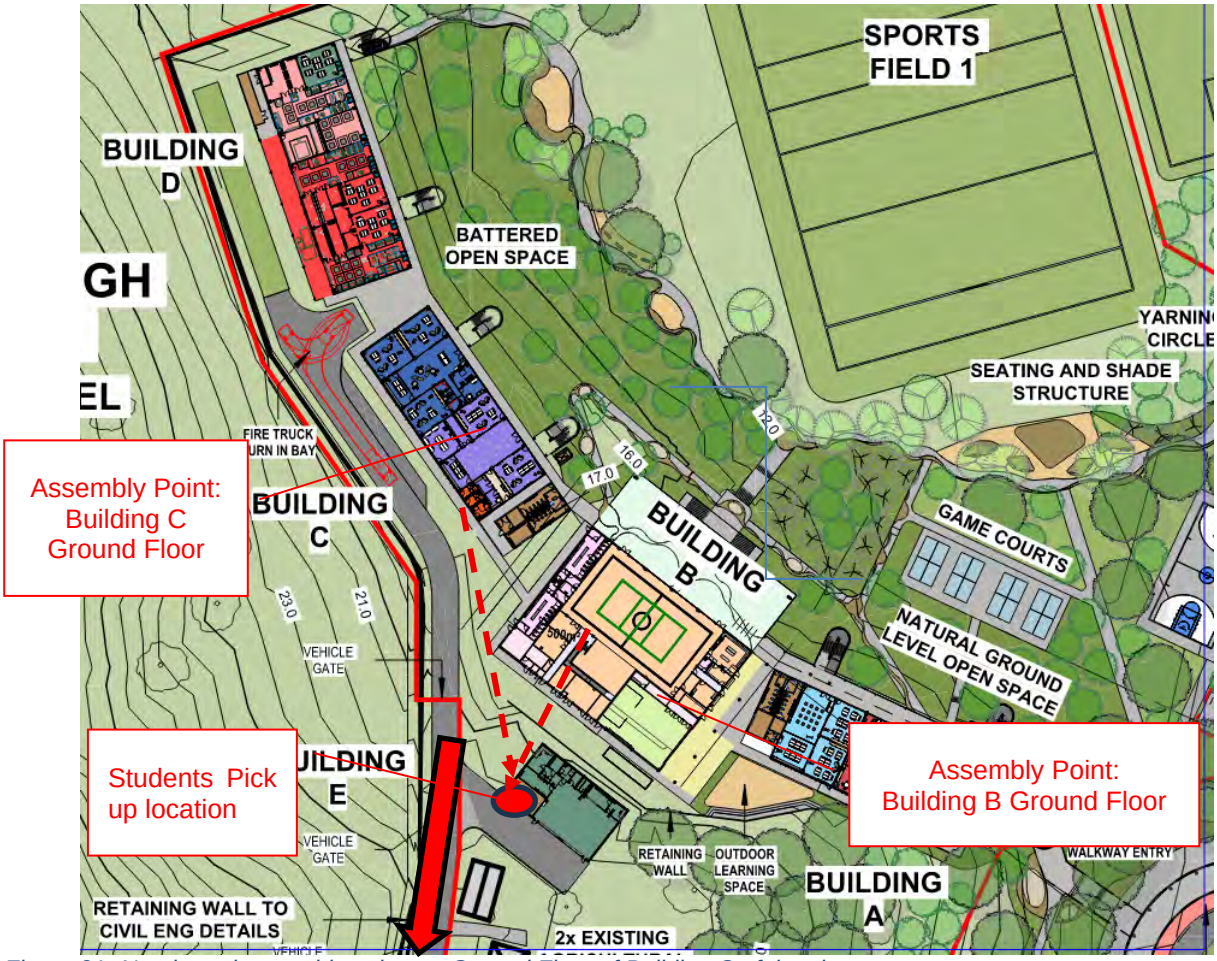

Figure 21- Nominated assembly point, on Ground Floor of Building C of the site

7.2 Evacuation Route

While early school closure before flooding is preferred to allow parents to pick up their children, a designated evacuation route is provided in Figure 22 for situations where students and staff are unable to return home safely or reach a secure area outside the floodplain.

The evacuation route—generally consistent with the Lismore City Local Flood Emergency Sub-Plan—proceeds via Alexandra Parade to Tweed Street, then continues east along Terania Street. It crosses the Wilsons River using Bridge Street and Fawcett Bridge, before proceeding along Diadem Street and Ballina Road to the evacuation centre at Southern Cross University.

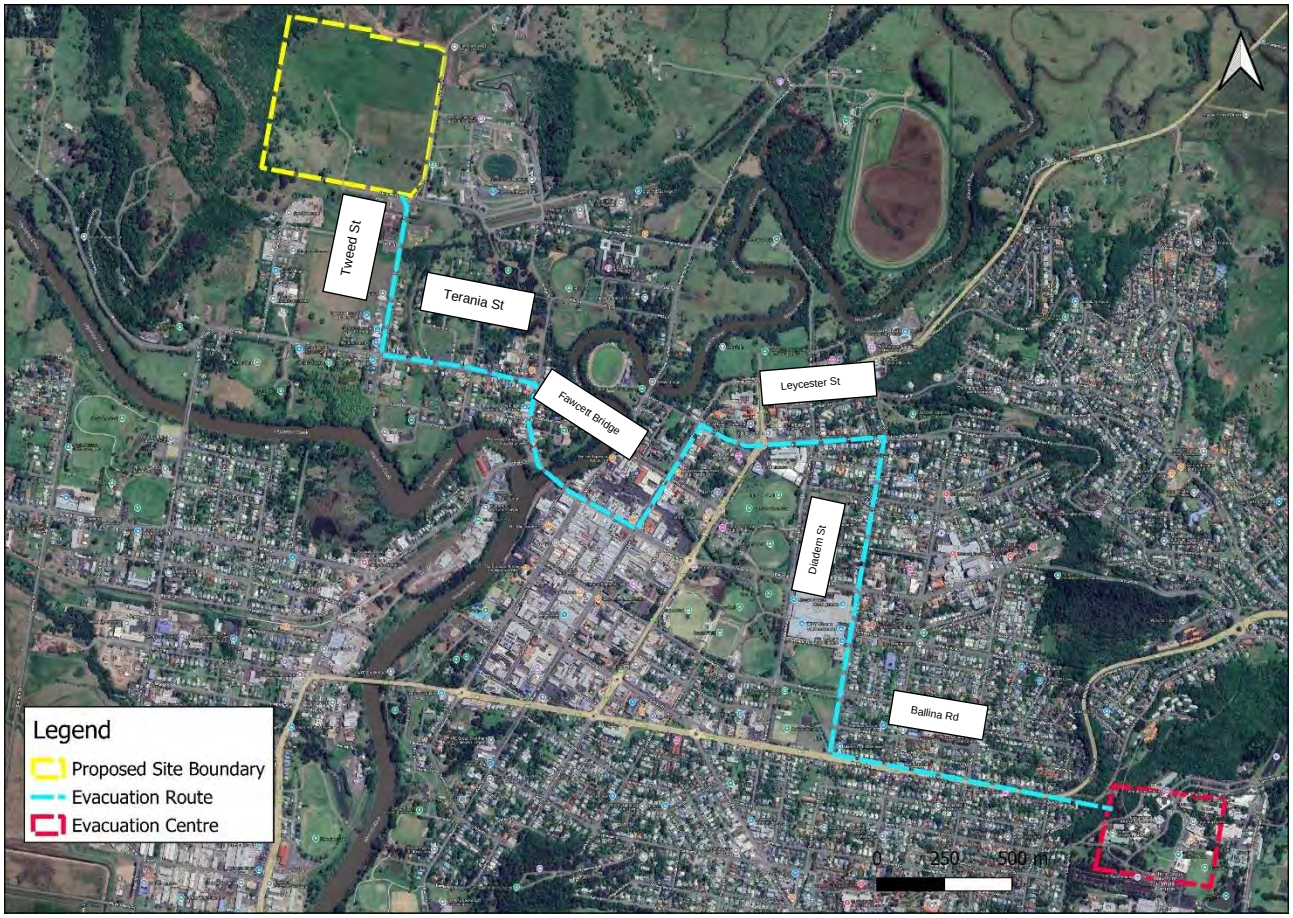

Figure 22: Selected Evacuation Route.

8.0 Limitations and Revision of the Flood Emergency Response Plan

The NSW Department of Education is responsible for ensuring that this FERP remains current and is updated as necessary to align with relevant standards, directorates, legislation, and the Regional State Emergency Management Plan. This responsibility is vital to safeguarding the health, safety, and welfare of all staff, students, and others.

Lismore is ranked as Australia's most flood-prone postcode, and the February 2022 flooding demonstrated the significant challenges in flood forecasting for the region. The BOM has acknowledged that accurately predicting flood levels and timing in this area is difficult. The weather along Australia's east coast is among the most complex in the world and can change rapidly, which increases the uncertainty in flood predictions. This FERP has been prepared on the assumption that BOM will provide an evacuation warning lead time of 12 hours, as specified in the Lismore Sub-Plan.

This plan is based on the most current information available at the time of writing, including flood modelling results, which inherently carry uncertainties. These models may evolve over time due to factors such as climate change, potentially altering flood behaviour and site impacts.

Evacuating a large number of people during a rare, high-impact flood event presents considerable challenges. Factors such as human behaviour under stress, potential traffic congestion, limited access to transport, and possible communication breakdowns could complicate the evacuation process and delay a timely response. These challenges emphasize the importance of clear planning, regular training, and coordination with local authorities to improve the resilience and effectiveness of the FERP.

This FERP specifically addresses evacuation strategies for students and staff within the school site during extreme flooding events and serves as a guide. It does not include individual safe travel arrangements to the site or account for disruptions to travel caused by flooding or road closures.

Ultimately, it is the responsibility of the NSW Department of Education and Communities to ensure that this FERP remains up to date and complies with all relevant standards, legislation, and emergency management plans, ensuring the safety and welfare of all staff, students, and others.

9.0 Mitigation Measures

Mitigation measures identified as necessary are outlined in Table 8.

Table 8- Mitigation Measures

Mitigation Number/Name	Aspect/Section	Mitigation Measure	Reason for Mitigation Measure
Reviewing the FERP in detail design	Flooding	This FERP is based on the 100% Schematic Design information for the proposed site, and must be reviewed following the detailed design stage, prior to the site becoming operational.	To update the FERP based on the latest design and information
Education and signage	Flooding/Education	Education and signage – to ensure all staff and students are aware of the flood risks present onsite and the flood protocols and procedures via signage. Depth markers will be implemented along the piers within the undercroft of the proposed building to demonstate the estimated 1% AEP and PMF depths, ensuring that site users are aware of the potential risks of flooding at the site.	To ensure all staff and students are aware of flood risks present onsite
Flood drills	Flooding	Flood drills – to ensure staff and students are familiar with the sound of the alert and their flood reponse actions.	To minimise risk during the flood evacuation
Regular check of Flood emergency kit	Flooding	Flood emergency kit should be prepared and regularly checked to ensure that supplies are in working condition	To ensure to be prepared during evacuation

10.0 Recommendations

1) Update the Important Telephone Numbers in Section 5.0 of this report prior to school being operational.

2) Flood-educate staff and residents through Education, Signage and Evacuation Drills as detailed in the Section 6.0 of this FERP.

3) DoE to review and update this FERP as necessary once a year and immediately following any updates to SES' local sub-plan.

4) All staff to be familiar with Flood Response Actions as detailed in the Section 7.0 of this FERP.

Prepared by
TTW (NSW) PTY LTD

Ali Vahidi

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SENIOR ENGINEER
CPEng NER (5293949)

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Appendix A

Lismore Subplan (Lismore North Sector)

3.1. LISMORE NORTH RESPONSE ARRANGEMENTS

Refer to Volume 2: Hazard and Risk in Lismore City for more information about this Sector.

Sector Description	The suburbs within the sector include North Lismore, Tullera, Woodlawn, Bexhill, Richmond Hill, Numulgi (part), Boat Harbour, McLeans Ridges, Pearces Creek, Booyong (part), Eltham, Clunes (part), Corndale, Rosebank and Repentance Creek.		
Hazard	Riverine flooding Wilsons River and Leycester Creek as well as local catchment flooding from upper catchment creeks.		
Flood Affect Classification	Urban North Lismore has Rising Road Access		
At risk properties	There are approximately 176 properties within the PMF flood extent at risk of isolation and/or over floor inundation in Urban north Lismore. Over floor inundation data not available for the remainder of the sector.	**Total number of properties within Sector/Community**	2146
Sector Control	The Incident Controller will nominate a Sector Commander to control evacuations in this Sector. The NSW SES will conduct evacuations in this sector with assistance from NSW Police, Fire and Rescue NSW, and NSW Rural Fire Service (RFS) volunteers.		

Key Warning Gauge Name	**Name**	**AWRC No.**	**Min (m)**	**Mod (m)**	**Maj (m)**
	Wilsons River at Lismore	203904	4.2	7.2	9.7

General Strategy	• Evacuation of at-risk population. • Self-evacuation to friends/family outside of the impact area. • Establishment of an Assembly Area at Southern Cross University, where evacuees are able to gather while flood situation is monitored. • If required, evacuees will either remain at Southern Cross University or be transported to an appropriate alternate evacuation centre.
Key Risks / Consequences	• Potential loss of life from rapid and potentially high velocity flooding inundation. • Inundation of a large number of dwellings. • Potential isolation of thousands of people estimated to be for a number of days.
Information and Warnings	▪ Flood Watch (BoM) ▪ Flood Warnings (BoM) ▪ AWS Advice ▪ AWS Watch and Act ▪ AWS Emergency Warning

	• Sequenced door knocking of evacuation sectors • Media announcements (including social media) • Emergency Alerts (SMS, landlines) • Standard Emergency Warning Signal
	• Door knocking suitable for smaller areas or a sequential approach to evacuation in conjunction with messaging via the Australian Warning System • In larger scale evacuations warnings may be accompanied by lights and sirens and evacuation messaging over P.A system on SES vehicles along affected streets.
Property Protection	*Specific property protection measures:* • Monitoring rising flood waters. • Relocation of livestock. • Relocation of farm machinery and valuable goods • Relocation of furniture and valuable goods. • Relocation or lifting shop/business fittings and stock. • Control of surface water through sandbagging measures. • Monitoring integrity of dwellings surrounded by flood waters.
	Assistance with property protection: • Refer to Chapter 4: Caravan Park Arrangements
	Protection of essential infrastructure: There is no identified essential infrastructure requiring protection in this sector. Refer to other sectors for infrastructure within the Lismore LGA.
Evacuation and/or Isolation Triggers	• Closure of evacuation routes prior to isolation • Inundation of property • Failure of essential services
Evacuation Triggers	Evacuation or warning triggers based on Bureau of Meteorology flood height predictions at the **Wilsons River at Lismore Gauge (203904):** **1.) Prediction to reach and/or exceed 7m:** Parts of urban North Lismore can become isolated from this level, with inundation to occur with further river rises. The first area to become isolated is in the vicinity of Pine St and Pitt St, with Winterton Parade, Wotherspoon St to follow. **2.) Prediction to reach and/or exceed 9m:** Last roads out become impacted for urban North Lismore, and all parts of this area quickly become inundated. Outside of the sequenced evacuation subsectors, isolation and/or inundation may occur, with the following key triggers based on Bureau of Meteorology flood height predictions at the **Wilsons River at Lismore Gauge (203904):** **3.) Prediction to reach and/or exceed 6.2 at the Lismore gauge:** Woodlawn College may become isolated when Woodlawn Rd near the Turf Club entrance is cut. **4.) Prediction to reach or exceed 7-7.2m at Lismore gauge:** Road closures occur

	This may isolate areas around Bexhill and the Outer North Lismore subsector **if access to Richmond Hill Rd is also lost at Boat Harbour Bridge.** 5.) **Prediction to reach or exceed 9.2m at the Lismore gauge:** Terania St closes in North Lismore, roads in North Lismore are all predicted to close from approximately this height. 6.) **Prediction to reach or exceed 10.2m at the Lismore gauge:** Lismore is no longer accessible from any direction.
Sequencing of evacuation	1.) **For prediction 1:** Watch and Act prepare to evacuate or prepare to isolate for targeted properties in the Lower North Lismore subsector (GEMS ID 68980) or Emergency Warning depending on predicted heights and monitoring of local conditions. Unit to doorknock affected properties. 2.) **For prediction 2**: Emergency warning for North Lismore A (GEMS ID 62275) and remainder of Lower North Lismore subsector (GEMS ID 68980). Outside of the sequenced evacuation subsectors, evacuation or isolation messaging may need to be considered based on predicted heights and local conditions, as well as isolation triggers outlined in predictions 3-6. These may include; 3.) **For prediction 3:** Woodlawn subsector (GEMS ID 62276). 4.) **For prediction 4:** Outer North Lismore subsector (GEMS ID 62277).
Evacuation Routes	**North Lismore Route 1:** Bridge St to Keen St, then Orion St to Leycester or High St towards East Lismore or Goonellabah. **North Lismore Route 2:** Bridge St to Keen St, then Conway St to Wyrallah Rd to Dalley St and Military Rd to Southern Cross University.
Evacuation Route Closure	The majority of roads out of North Lismore are generally closed by 9.2-9.4m at the Lismore gauge. Tweed St leading to Robert White Bridge and the southern portion of Bridge St may remain open until approx. 10.2-10.4m. Road closures may also occur within the CBD area affecting evacuation and are outlined in the Lismore Central Sector. Closures within the sector which may affect local evacuation include; • Bridge St near McKenzie Park from 4.75m. • Simes Bridge from 5.1m. • Bridge St at Slater Creek from approx. 5.7m. • Closures of local streets in Lower North Lismore subsector occur from approx. 7m and include Pine St and Pitt Lane. • Terania St approx. 9.2-9.4m near railway viaduct
Method of Evacuation	• Primarily self-evacuation by private transport to higher ground within East Lismore, Lismore Heights or Goonellabah. • Primarily self-evacuation by private transport to nominated evacuation centres/assembly area at Southern Cross University or other nominated evacuation centre.
Evacuation Centre/Assembly Point	**The Primary evacuation centre is:** Southern Cross University, Military Rd, Lismore.

	Other evacuation centres may be opened at Goonellabah or other nominated locations as the need arises and may include; • Goonellabah Sports and Aquatic Centre: 50 Oliver Ave Goonellabah • Goonellabah Community Centre: 27 Oliver Ave Goonellabah • Goonellabah Primary School: Cnr Bruxner Highway and Jubilee Ave • Kadina High School: Kadina St, Goonellabah If needed, the Showground may act as an emergency refuge in the pavilion area until suitable evacuation can be arranged from this point.
Large scale evacuations	When large-scale evacuations are likely, the NSW SES Incident Commander will liaise with the LEOCON and request support of the EOC as required.
Rescue	• The flood rescue management process adopted will be determined by the Incident Controller, based on the scale of the flood rescue operations. • The Incident Controller may declare a flood rescue area of operations and establish a flood cell to assist with the management of flood rescues. • All Flood Rescue Operations will be undertaken as per the State Rescue Policy.
	Road access to this sector may close early in an event.
Resupply	Resupply may be required for communities within this sector.
	Areas around Bexhill and Clunes (approx. 608 properties) may require resupply in some flood events. This is likely to take place via boat or helicopter, with a possible distribution point at Bexhill Public School.
	Table 20 in Volume 2 provides information about isolated communities in the Lismore City Council area and potential periods of isolation.
Aircraft Management	*Helicopter Landing Points:* Suitable landing points are located at: • Bexhill Public School
	Airports: There are no airports located within this sector.
Other	Special considerations relating to evacuation: • Closure of schools - coordinated through the Department of Education and Training. • The evacuation of domestic animals, horses and livestock to the appropriate facility to be managed by Department of Primary Industries and Local Land Services. • Closure of licensed premises. All hotels and licensed clubs will be closed if required. • Security. Police patrols to be established to maintain law and order after evacuation has occurred. • The NSW SES will use flood boats, aircraft, community contacts and other agencies to monitor the safety of individuals, where feasible. • These arrangements will stay in place until the "Return with Caution" is provided by the NSW SES to residents to return to their premises.

Appendix B

Re: EMAIL - 250203 - Lismore South PS - Updated REF Documentation

Nick Jennings <Nicholas.Jennings15@det.nsw.edu.au>
To: Mel Kizuc; Martyn Charlett; Greg Hall; Parisa Sheikhi; Gareth James
Cc: Tim Field; Ali Vahidi; Melissa Manning

[External Email]: Do not click links or open attachments unless you recognize the sender and know the content is safe.

Morning colleagues,

My colleagues and I met with the NSW SES, North-Eastern Zone yesterday to discuss both Lismore South Public School and Northern Rivers Secondary College, Richmond River High Campus.

- Rising road access dictates evacuation before sites are flood-affected.
- Richmond River High School - maintain the evacuation route to the south as detailed in Section 8.2 mitigates the risk of flash flooding which can occur rapidly in the eastern/north-eastern quadrant of the showground located adjacent to the nominated site for RRHS.
- Evacuation for both schools will be triggered by one, or both of the following triggers:
  - A Watch and Act Warning, issued for Lismore CBD, or Lismore South - this warning is likely to be issued when the Lismore gauge (Rowing Club - BOM 58176, AWRC 203904) reaches 5.4m with forecasts indicating an exceedance of the moderate flood level.
  - Lismore gauge reaches 5.4m with forecast to exceed moderate flood level.
- It was noted that at approximately 7.2m roads start to become impacted and both schools either sit within existing evacuation polygons, or in the case of RRHC, will have to travel through these areas via rising road access to access their evacuation site at Southern Cross University.
- This will then prompt on evacuations within the 2-4 hour window highlighted in the FERP in Section 3.2 - noting that the demand on bus providers during these periods will be high/extreme.
- This trigger also gives consideration to the expansive school catchments of schools, most specifically the high school. Richmond River draws from a wide geographic area, including Rosebank and Minyon in the west, Larnook to the North-West and west to Manifold.

We intend to use a similar trigger for both schools during 'Outside of School Hours' temporary cease of operations, noting that the BOM is likely to issue a flood warning for the Wilsons River if the antecedent conditions described above are met.

- Liaison trigger - minor with a forecast to meet moderate; BOM Flood Warning indicates exceedance of moderate flood level likely
- Evacuation/temp cease trigger
  - Watch and Act Warning Issued - 5.4m at Lismore (58176) forecast/likely to exceed moderate
  - No warning, but 5.4m at Lismore (58176) forecast/likely to exceed moderate
  - As directed by NSW SES

As per previous 6 flood recovery rebuilds, we will prepare a 'flood risk response plan' which is an appendix/addendum to the schools existing emergency management plan. The intent is to synthesise the FERP and the triggers/actions described above into an action-oriented document with and action statements. It is my intent to have this prepared within the coming fortnight, should you choose to use it in in the REF pathway as a demonstration of the department's understanding of emergency management/evacuation management.

Please let me know if further clarification or detail is required.

Kind Regards,

Nick Jennings
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