FLOOD RISK MANAGEMENT REPORT

St Mary's Catholic Primary School, Toukley

Prepared for Glendenning Szoboszlay Architects

JN
Responsive Engineering

N0230364

Revision History

REVISION	DATE	BY	CHECKED	COMMENTS
A	08/08/2023	LM	WW	ISSUED FOR DA
B	26/09/2023	LM	WW	ISSUED FOR DA
C	03/06/2024	LM	WW	REVISION
D	06/06/2024	LM	WW	REVISION

The recipient of the latest issue as noted above will be responsible for superseding/destroying all previous documents.

Contents

1. Overview

1.1. Site Description

The subject site is located along Main Road, refer Figure 1. The site comprises Lot 1 DP530125, with an area of 5.4ha. The site is relatively flat, primarily draining towards the Toukley wetland.

Figure 1: Site location (Nearmaps, image dated 20/05/2023)

1.2. Proposed Development

The proposed development includes the demolition of Blocks F, H & D. This will be followed by the construction of a new Block D & H while refurbishing Block E & G. This can be seen in Figure 2.

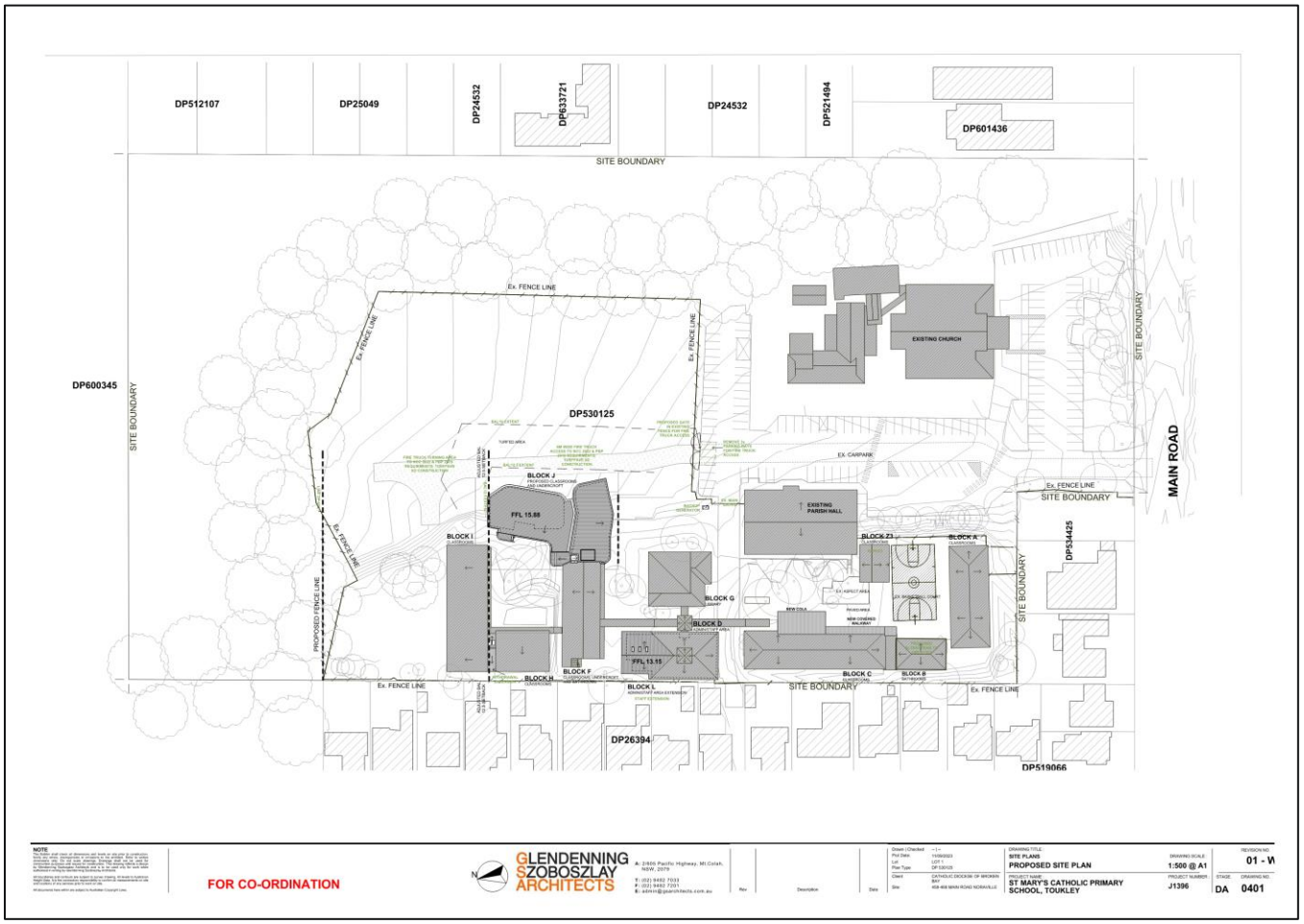


Figure 2: Proposed development, new additions in green (GS Architects)

2. Flood Assessment

2.1. Council Flood Information

Central Coast Council have provided Flood Information Certificate for the subject site and is provided in Appendix A. The site is located within the Northern Lakes Flood Study (2015) area and is mapped as Flood Precinct 1: Probable Maximum Flood, Precinct 2: Flood Planning Areas with some minor areas of Precinct 3: Flood Storage, see Figure 3.

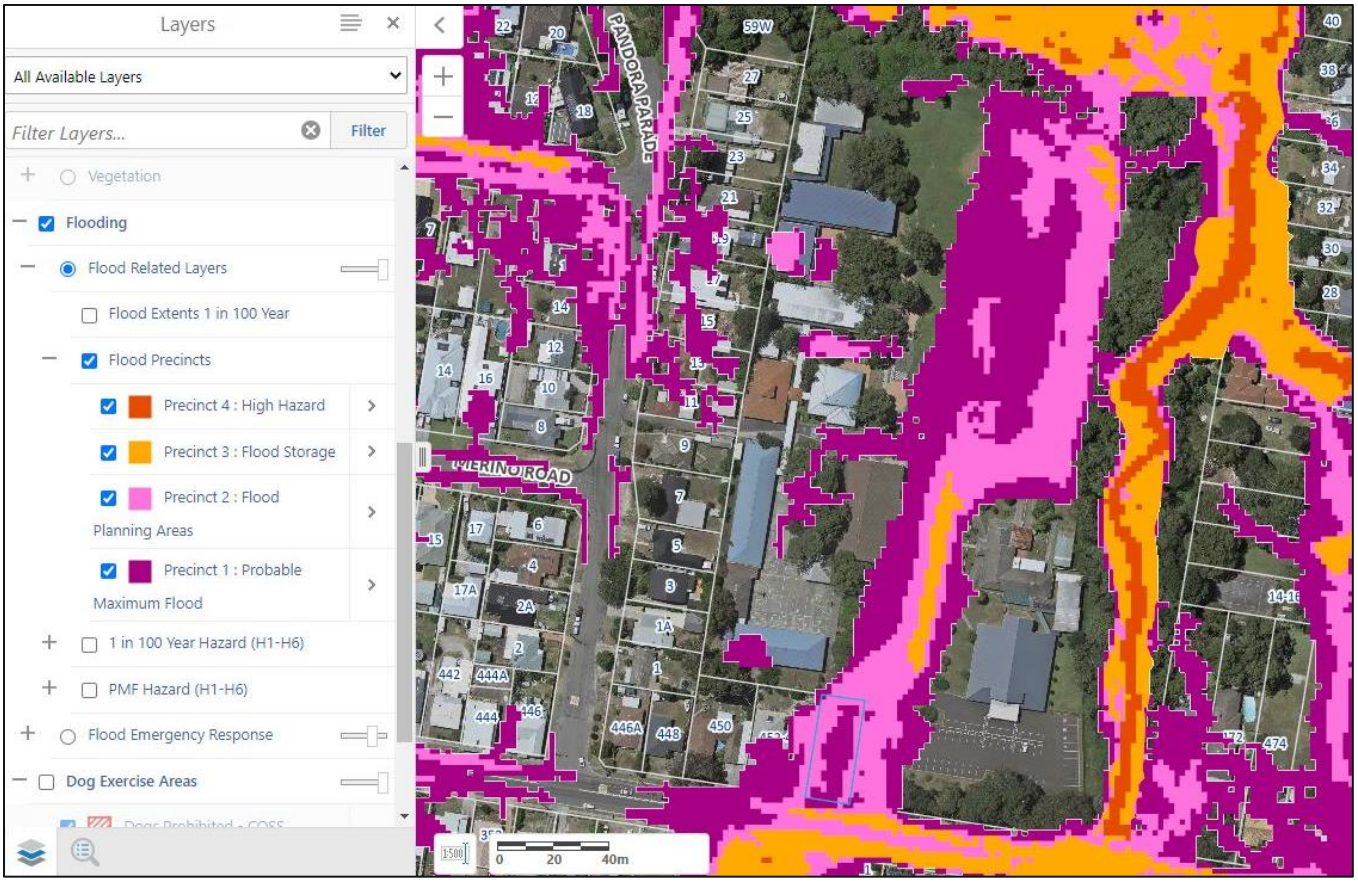


Figure 3: Central Coast Council online mapping of Flood Precincts

As per Central Coast DCP Chapter 3.1 Floodplain Management and Central Coast LEP Clause 7.23 Transitional Provision for Floodplain Risk Management, the development type is deemed as Critical or Sensitive Facilities with the proposed works principally adjacent to Flood Precinct 1: Probably Maximum Flood. Council's provided Flood Information Certificate states a Flood Planning Level of 1% AEP + 500mm freeboard however on review and in further correspondence with Council (see Appendix B), JN advise adoption of a Flood Planning Level equal to or above the PMF in the vicinity of development as typical for Critical and Sensitive Facilities, refer Figure 4.

Proposed Land use	Precinct 1 FPL to PMF	Precinct 2 Below FPL	Precinct 3 Flood Storage and Flow Paths (up to 10% AEP)	Precinct 4 High Hazard (up to 50% AEP)
1 Single Dwelling Houses		1, 9	2, 5, 7	
2 Agriculture & Recreation		2	2, 5, 7	
3 Sheds / Garages / ancillary Residential		1	2, 5, 7	
4 Commercial and Industrial Uses		2, 6		
5 Medium to High Density Residential				
6 Critical or Sensitive Facilities	3			
7 Land Subdivision	4			
8 Tourist Development				
9 Caravan parks - short-term sites		6	5, 6	
10 Permissible Earthworks		8		

	Flood related development controls do not apply
	Flood related development controls apply (refer to numbered prescriptive criteria below)
	If the proposal is to be pursued further, a performance based assessment is to be provided demonstrating that the proposed development is compatible with the flooding characteristics of the site (refer to Section 3.2 and Appendix C).

Figure 4: CCC DCP Chapter 3.1 Development FPL and Controls

The smaller additions to existing structures are generally located in the west of the site and significantly higher than the flood affected areas through the sports field and carpark. These will be constructed at existing building levels and are beyond the Flood Precinct 1: Probable Maximum Flood extents, refer Figure 5.

Figure 5: Central Coast Council online mapping of Flood Precincts with overlay of proposed development

The main new Block J located along the western edge of the sports field is outside the Flood Precinct 1: Probable Maximum Flood extents. In correspondence with Council however, JN have obtained adjacent PMF levels and advise these are adopted as the Flood Planning Level (FPL) in line with Figure 4. Specifically, the **PMF level of RL 11.23 was determined just upstream and should be adopted as the Flood Planning Level (FPL)**, refer Figure 6.

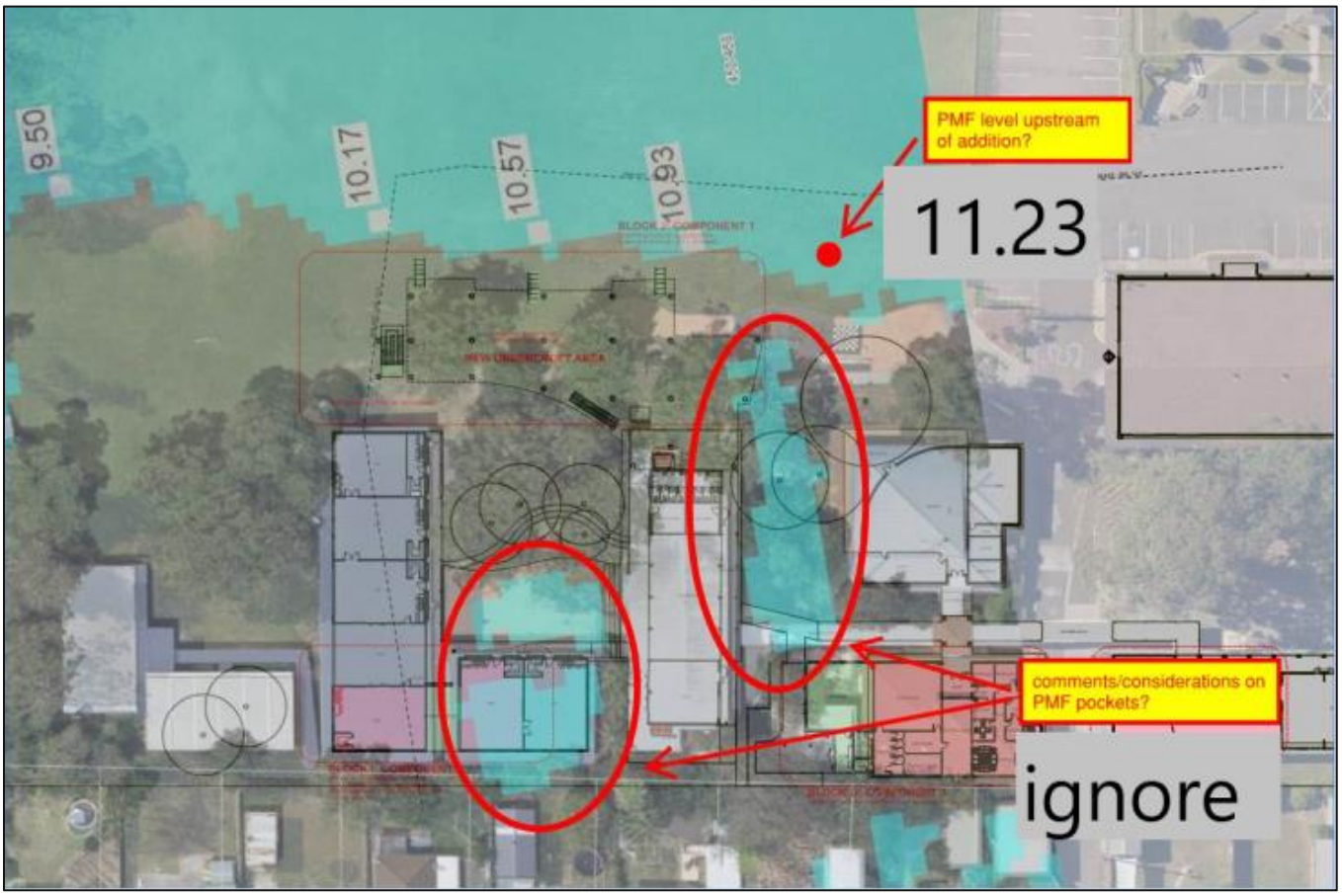


Figure 6: Excerpt of image in correspondence with Central Coast Council with PMF levels shown in vicinity of main addition, noting Council's advice to *"ignore"* small intra-site pockets of PMF (circled) as these *"should have been filtered out in the model"*

2.2. Flood Hazard Categories

Referring to Appendix A including Council's mapping, the proposed development is located outside the PMF extents and outside all 1% AEP Hazard categories.

2.3. Assessment Against Development Controls

Central Coast Council Development Control Plan 2022 (DCP) Chapter 3.1 outlines development controls specific to individual sites based on the flood risk associated with specific development types in accordance with Figure 4. Further assessment has been carried out against Wyong LEP 2013 Chapter 7.23, refer Table 1.

Table 1: Assessment against DCP 2022 Chapter 3.1 & Central Coast LEP 2022 5.21(2)

Criteria	Comment
Central Coast Council DCP 2022 Chapter 3.1	
a. Minimum flood levels = PMF level plus mine subsidence allowance, if applicable	The smaller additions to existing structures are generally located in the west of the site and significantly higher than the flood affected areas through the sports field and carpark, these will be built at existing building levels and are beyond the Flood Precinct 1: Probable Maximum Flood extents. The main new Block J had an undercroft external area at grade however all proposed classrooms are to tie-in with the first floor level of the adjacent existing building at RL 15.92. The site is not within a Mine Subsidence Districts as per the NSW Planning Portal online maps.
b. Low flood hazard access and egress for pedestrians during a PMF flood to an appropriate area of refuge located above the PMF	The majority of the western side of the site is significantly higher than the primarily flood affected sports field and carpark. The smaller additions are within this area and the main new Block J is outside of PMF extents with a floor levels significantly above the adjacent PMF level.
c. Low flood hazard emergency vehicle road access (Ambulance, SES, RFS) during a PMF flood event	The Flood Information Certificate provided by Central Coast Council does not provide PMF flood hazard mapping however indicates PMF flood depths generally up to around 300mm and in parts approaching 600mm. These depths would be expected to be impassable by typical road vehicles. The Site Flood Coordinator should enact Shelter-In-Place as per Flood Evacuation Plan in Appendix E and contact SES to notify of occupants on-site. If emergency occurs or appears impending (e.g. flood water rising higher than expected) then emergency services should be contacted by phoning 000 to seek direction. Emergency services will coordinate with SES who have access to flood specialised equipment and vehicles to be appropriately deployed (e.g. high clearance vehicles, boats, helicopters).
d. Consideration of the impacts of climate change	The main new Block J has a floor level approximately 4.5m above the adjacent PMF levels, this would be expected to beyond the range of impact of Climate Change.
Central Coast LEP 2022 5.21 (2)	
(a) is compatible with the flood function and behaviour on the land,	The proposed additions and alterations to the school are considered Critical or Sensitive Facilities hence working towards the PMF flood level for any building levels. This development is compatible with the flood hazard of the land.

(b) will not adversely affect flood behaviour in a way that results in detrimental increases in the potential flood affectation of other development or properties	The proposed works are located outside the flood extents and are not in any identified overland flow paths, therefore will not adversely affect other properties.
(c) will not adversely affect the safe occupation and efficient evacuation of people or exceed the capacity of existing evacuation routes for the surrounding area in the event of a flood	The development provides a safe refuge above the PMF level.
(d) incorporates appropriate measures to manage risk to life in the event of a flood	The development provides a safe refuge above the PMF level.
(e) will not adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.	The development has no significant impact on the nearby environment.

3. Flood Risk Reduction

3.1. Flood Compatible Materials

A list of flood compatible materials can be found in Appendix D, taken from Central Coast Council DCP 2022. The proposed development must utilise flood compatible materials for any building components below the Flood Planning Level (i.e. Probable Maximum Flood). Any future works contractors are to also ensure that flood compatible materials are utilised in any future design and construction works on the site.

3.2. Flood Mitigation Works

The Flood Information Certificate provided by Central Coast Council (see Appendix A) indicates that the proposed additions are located out of the Probable Maximum Flood extents as shown in Figure 3, however as per JN advice the main new Block J is to have floor level at or above the adjacent PMF levels of RL 11.23.

Lift egress points in the undercroft are also to be set to a level above the adjacent PMF level in order to facilitate protection of lift machinery.

4. Flood Warnings

4.1. Warning of Impeding Flood

The Bureau of Meteorology provides flood advice, flood forecasting and warnings relevant to the local area which are conveyed to emergency service agencies.

The Bureau of Meteorology will advise on severe weather or thunderstorm warnings for the local area to the SES Local Controller. In addition to this, information will also be made available through media outlets to disseminate evaluation warnings.

4.1.1. Severe Weather Warnings

The Bureau of Meteorology issues Severe Weather Warnings whenever severe weather is occurring in an area or is expected to develop or move into an area. The warnings describe the area under threat and the expected hazards. Warnings are issued with varying lead-times, depending on the weather situation, and range from just an hour or two up to about 24 hours.

Severe Weather Warnings are issued for:

- Sustained winds of gale force (63 km/h) or more
- Wind gusts of 90 km/h or more
- Very heavy rain that may lead to flash flooding
- Abnormally high tides (or storm tides) expected to exceed highest astronomical tide
- Unusually large surf waves expected to cause dangerous conditions on the coast
- Widespread blizzards in Alpine areas

4.1.2. Flood Watch

A Flood Watch is issued by the Bureau of Meteorology if flood producing rain is expected to happen in the near future and flooding is expected to be above Minor level.

4.1.3. Preliminary Flood Warnings

These warnings usually predict which class of flooding (minor, moderate or major) will occur rather than providing quantitative forecasts. They are the first in a series of warnings and will typically be followed by more detailed flood warnings. These products are disseminated directly to media outlets by the BoM and are published on the BoM website.

4.1.4. Flood Warnings

These normally predict flood heights (in metres and centimetres at a gauge) which will be reached at a location at a specified time in the future. After the issuing of a Preliminary Flood Warning, Flood Warnings are renewed at frequent intervals until the relevant stream drops to below the minor flood level. The local SES is responsible in covering operations for all levels of flooding within the council area and caters for both SES control of operations and where appropriate, the handover to the Local Emergency Controller (LECON).

Local Emergency Operations Controller (LECON)

- Mentor flood response operations
- Coordinate support to the SES local Controller if requested to do so
- As required by the SES Local Controller, evacuate persons at threat of inundation
- Control emergency operations
- Issue the 'all clear' when Emergency operations have been completed

NSW Police Service

- Assist with the distribution of evacuation warnings
- Assist with the conduct of evacuations
- Conduct road control operations in conjunction with Transport for NSW (TfNSW)

- Ensure all evacuees are registered
- Secure evacuated area

NSW Fire Brigades

- Assist with the distribution of evacuation warnings
- Assist with the conduct of evacuations
- Conduct clean-up operations, including the hosing down of flood affected premises

5. Flood Emergency Response Plan

5.1. Preparedness

In preparation for any flood event the following items should be addressed:

- Education and training to staff on flood awareness and plan implementation is intrinsic to its successful operation. All staff are to be familiarised with this document.
- A permanent building advisor will be designated as the Site Flood Coordinator and is entrusted with the responsibility of monitoring flood activities and dissemination of evacuation warning as and when required.
- The Site Flood Coordinator should attend the flood events and seminar held by the community in the local area to meet the local SES members and learn about flood safety. The event dates area found on the following website, https://www.ses.nsw.gov.au/disaster-tabs-header/flood/. This person allocated the responsibility is to return and provide a presentation to the rest of the staff members after each session
- The FloodSafe Guide for the local area is required to be distributed to every staff member electronically. The FloodSafe Guide is a customised brochure addressing flooding in the local context.
- All new staff are to be introduced to this plan as part of their induction and made aware of the protocols to be employed during a flood event.
- Conduct regular flood evacuation drills to make sure evacuation time is cut to 20 mins maximum.
- All medical supplies should be located above the PMF flood level where possible.

Further useful information on school specific flood emergency planning can be found at the following SES site:

https://www.ses.nsw.gov.au/for-schools/leadership/school-emergency-planning-for-flood/

5.2. Alert

The occupants shall be vigilant at all times of severe thunderstorms, weather warning and continual rain, and are encouraged to check with warning from BoM, local radio, television, or the SES Local Controller. If advance warning of potential flooding is given, the Site Flood Coordinator and school staff should consider closing the school well in advance, if safe to do so, to mitigate risk to students, staff, families and others.

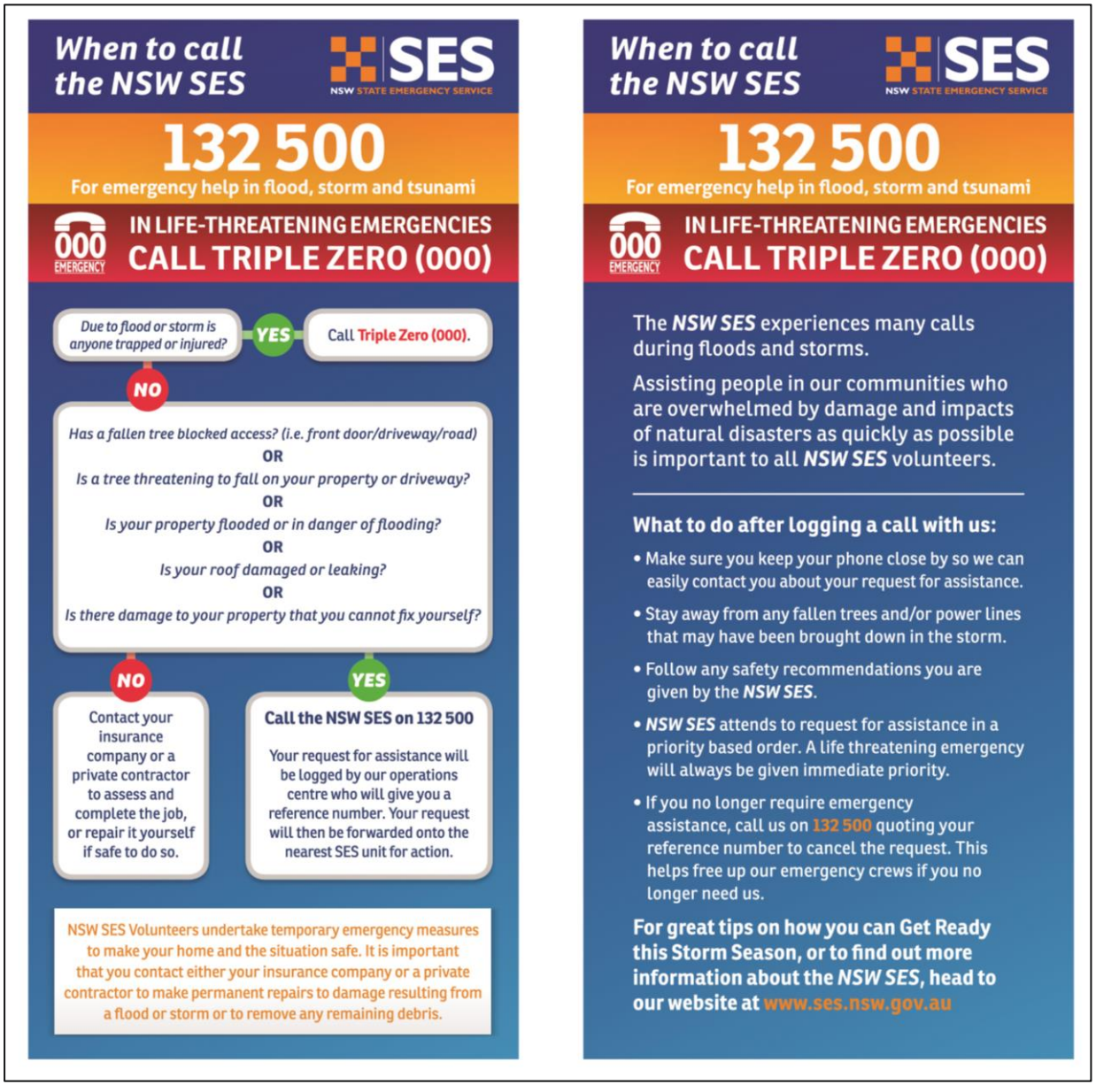


Figure 7: NSW SES 'When to call' diagram

In the event that an alert is raised by any of the channels outlined previously in this report, the Site Flood Coordinator is to communicate the alert to all other staff members and initiate the Flood Emergency Response Plan.

5.3. Emergency Contacts

The list below should be updated regularly.

Parties to Contact	**Phone Number**
Site Flood Coordinator	..../...../..... (Nominate and date by site administration)
SES	132 500 (Emergency Help)
Bureau of Meteorology NSW Flood Warning Centre	1300 659 218 9296 1555 http://www.bom.gov.au/nsw/warnings/
Local Fire Brigade	000 (Emergency)
Police	000 (Emergency)
Central Coast Council	(02) 4306 7900
Sydney Water (Water and Sewer)	132 090
Endeavour Energy	131 033
TfNSW Traffic Enquiry	1300 555 727

5.4. Evacuation

Evacuation is the temporary movement (relocation) of people from a dangerous or potentially dangerous place to a safe location, and their eventual return. It is an initiative-taking emergency management strategy that uses distance to separate people from danger created by a hazard.

In this case evacuation will be conducted as per the evacuation plan in Appendix E.

Staff and students are to immediately go to the Assembly Point as determined by the school's Site Flood Coordinator, generally in the green extents shown in Appendix E. Both the ground level and level 1 finished floor level is located at or above the PMF level. Use the western undercroft stairs to gain access to level 1 for additional safety. Due to the surrounding suburb being heavily affected during a PMF storm, any staff and students will need to Shelter-In-Place and await further instructions from SES and/or Emergency Services in the event of a flood evacuation order being issued.

5.5. Actions, Responsibilities and Procedures

Evacuation actions, responsibilities and procedures are outlined below:

Action	When	Who
Monitor local radio and TV for flood warning	During heavy rain and prior to predicted heavy rain	Site Flood Coordinator
Monitor BOM and SES website	During heavy rain and prior to predicted heavy rain	Site Flood Coordinator
Review Site Evacuation Plan	Monthly	Site Flood Coordinator
Evacuation Drills	Bi-Annually	Site Flood Coordinator
Evacuation of residents	Following a flash flood warning from BoM, in liaison with SES	Site Flood Coordinator

5.5.1. Steps to Follow During the PMF Event

- In an emergency always phone emergency services on 000.
- If flood water rising higher than expected and/or rapidly approaching upper levels phone emergency services on 000.
- Obtain information from BoM, SES, radio stations and local observations to ensure occurrence of event.
- Warn other occupants on site, immediately start to vacate low level areas (e.g. sports field, carpark) and move towards western high level areas asper Appendix E.
- Lock rooms after each room is emptied.
- Designate an individual (if available) to activate back-up power supply if required
- Turn off unnecessary electrical, gas and water on site.
- Coordinate all participants to the Flooding Site Coordinator's designated assembly location (see Appendix E).
- Site Flood Coordinator to contact SES to advise on site occupancy or vacancy. If occupied advise on intended Shelter-In-Place plan for site and consult with SES on any further actions.

5.5.2. Recovery

Recovering from a disaster will be easier if you are prepared. To help people recover, the NSW SES, NSWRFS and Fire & Rescue NSW have Recovery Kits available on their websites and in hard copy.

Disaster Recovery Centres may be established following disasters. These can provide a range of welfare services including financial assistance, personal support, organising temporary accommodation and providing information and referrals.

5.5.3. SES Assistance with Recovery Functions

Concurrently with response operations, the SES is responsible for ensuring that the evacuation and immediate welfare of affected persons is coordinated.

The SES will:

a. Provide information to flood-affected people on safety matters and the restoration of belongings which have been in contact with flood waters
b. Provide impact information to recovery agencies
c. Assist with clean-up operations after floods (if sufficient volunteers are available)
d. Assist with the return of evacuees to their homes (if sufficient volunteers are available)

SES Controllers should brief the following on details of the flood operations:

a. Any Recovery Coordinating Committee
b. The Welfare Services Functional Area; and
c. Relevant Emergency Management Committees

SES Controllers should participate in recovery committees as required.

Disaster Welfare Services – 1800 018 444

5.6. After the Flood Event

After the flood event, the Site Flood Coordinator is required to check with the relevant authority that it is safe to re-enter into the flooded area. Staff or students should not re-enter the flooded area unless advised by emergency services authorities to do so. Flooded areas pose health risks to individuals and the following procedures should be followed entering the facility:

- Have electrics and gas fixtures been checked by qualified personnel prior to use
- Beware of snakes and spiders
- Beware of health risks from wading through muddy water
- Do not use food or drinks which have been in contact with floodwater
- Boil all water until supplies are declared safe to drink
- Report damaged utility lines to appropriate authorities
- Plan which items and areas should be cleaned first
- Use disinfectant for cleaning
- Wear shoes and gloves in any area which has been flooded.

6. Conclusion

In conclusion, the outcomes of this Flood Risk Management Report are:

- All new additions are generally in the higher western portion of the site that is outside the Probably Maximum Flood (PMF) extents and above PMF level. The proposed Block J being in proximity to the PMF extents is advised to have a Flood Planning Level (FPL) at or above the adjacent PMF level of RL 11.23.
- Use of flood compatible materials for all components below the Flood Planning Level (FPL).
- This plan, specifically the Flood Emergency Response Plan located within, is to be put into effect to:
    - Ensure the safety of staff, students and visitors
    - Ensure that no individuals are left stranded without supplies during flooding
    - Ensure potential damage to the property and facility are minimised

It is the responsibility of all residents and the Site Flood Coordinator to ensure this plan is readily available and followed during flood events.

This plan is to be read in conjunction with the Flood Evacuation Plan found in Appendix E.

Please contact the undersigned for any further questions and clarification.

For and on behalf of JN,

Luke Meredith

Senior Civil Engineer

Appendix A

Central Coast Council Flood Information Certificate

Flood Information Certificate

Property Address:	458-468 Main Rd, NORAVILLE
Lot /DP:	1/DP530125
Date Prepared:	20 June 2023
Source of information:	Northern Lakes Flood Study, 2015

This Flood Certificate provides advice furnished in good faith by the council relating to the likelihood of the land identified above being flooded and to the nature or extent of any such flooding ("flood risk") .

Flood level and flood planning advice is provided in the tables below and as maps in the Appendix. This advice regarding flood risk has been derived from the flood study listed above. Should you have any enquiries concerning this certificate, please do not hesitate to contact Andrew Dewar on 1300 463 954 during the hours of 8.00am to 4.15pm Monday to Friday

Flood Level Information Table

Flood Event	Minimum Level (m AHD)	Maximum Level (m AHD)
PMF	3.09	14.71
1% AEP	2.74	13.69
5% AEP	2.87	12.96

Planning Information Table

Flood Control Lot	☒
Minimum Habitable Floor Level	14.19m AHD
Complying Development: Flood Exclusionary Categories	
(a) Flood Storage Area	☒
(b) Floodway Area	☒
(c) Flow Path	☐
(d) High Hazard Area (H3, H4, H5, H6 Hazard Categorisation)	☒
(e) High Risk Area	☐

Central Coast Council
P 1300 463 954 I **E** ask@centralcoast.nsw.gov.au

Flood Information Certificate

Minimum Habitable Floor Level in the Planning Information Table above is also known as the Flood Planning Level. It is derived from the maximum 1% AEP Flood Level plus 0.5m freeboard and an allowance for sea level rise if applicable. For large lots the maximum 1% AEP flood level may vary across the lot; as such the Minimum Habitable Floor Level would vary at different locations on the lot, which may result in a lower Minimum Habitable Floor Level than the one quoted in the Planning Information Table. Note that Minimum Habitable Floor Levels are based on a flood size that has a 1% chance each year of either being reached or exceeded. Larger floods still have a small chance of occurring. For this reason, Council recommends that property owners consider the merits of choosing a floor level above the minimum floor level if practical to do so.

Flood Mapping related to this address is included in the Appendix. On the Environmental Layers you can choose to view 1% AEP (1 in 100y) flood extents, as well as Flood Precincts, which are referred to in the Development Control Plan.
https://maps.centralcoast.nsw.gov.au/public/

Development Controls set appropriate floor levels, construction materials, pedestrian and vehicular access, car parking and impacts on surrounding property for a proposed development; either complying development (fast tracked - see below) or a DA. Council's development controls vary depending on the location:

- Former Gosford: LEP 2014 Clauses 5.21 & 7.3, DCP 2013 Chapter 6.7
- Former Wyong: LEP 2013 Clauses 5.21 & 7.3, DCP 2013 Chapter 3.3

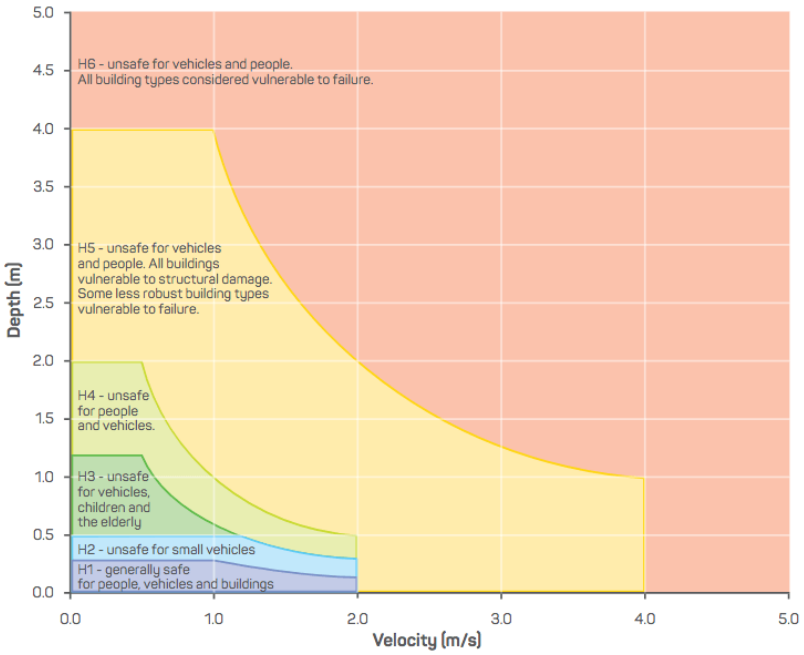
https://www.centralcoast.nsw.gov.au/plan-and-build/planning-controls-and-guidelines

Complying Development is a fast-track approval process for straightforward residential, commercial and industrial development (e.g. Granny Flats). From 1 July 2021, all Complying Development Certificate (CDC) applications must be lodged through the online NSW Planning Portal. If the application meets specific criteria it can be determined by a registered certifier. Under Clause 3A.38 of the Codes SEPP 2008 Development must not be carried out on any part of a *flood control lot* that is considered to be in one of the following exclusionary categories: (a) flood storage area, (b) floodway area, (c) flow path, (d) high hazard area, (e) high risk area. Complying Development may be allowable at this address if none of the five flood exclusionary categories in the Planning Information Table above are marked "Yes".
https://www.planning.nsw.gov.au/Assess-and-Regulate/Development-Assessment/Planning-Approval-Pathways/Complying-development

Flood Hazard: Flooding has the potential to cause loss: loss of life, injury or economic loss. The degree of hazard varies with the severity of flooding and is affected by flood behaviour (extent, depth, velocity, isolation, rate of rise of floodwaters, duration), topography and emergency management.

Council classifies flood hazard using thresholds related to the stability of people as they walk or drive through flood waters, or shelter in a building during a flood. This method classifies hazard on a spectrum of H1 to H6 as described by the hazard vulnerability curves below. For further information refer to: Flood Hazard: Guideline 7.3, Australian Institute for Disaster Resilience 2017 https://knowledge.aidr.org.au/media/3518/adr-guideline-7-3.pdf

Flood Information Certificate



Source – Australian Institute for Disaster Resilience 2017. Hydraulic Hazard: refer also to Australian Rainfall and Runoff Section 7.2.7 General Flood Hazard Curves (Figure 6.7.9) http://book.arr.org.au.s3-website-ap-southeast-2.amazonaws.com/

Disclaimers

a. This certificate is based on Council's relevant flood study, which covers a large area and utilises *airborne laser scanning* ground level data. Flood depths as shown on the maps at specific locations may not accurately account for localised changes in ground topography; the accuracy of flood depth information at a specific location may be improved by taking the flood level and subtracting the accurate ground level at a particular location, which could be established by a Registered Surveyor.

b. Without limiting s.733 of the *Local Government Act* 1993, Council expressly disclaims all and any liability and responsibility in respect of loss, damage or injury to person or property arising from anything done or omitted to be done by any person in reliance, whether wholly or in part, upon any part of this information. Any person having regard to the information contained in this document is encouraged to seek, at their discretion, all other sources of information on the subject matter as they consider appropriate, which may include local knowledge and/or professional advice.

c. Council does not, and cannot, warrant that it will, in its capacity as a consent authority under the *Environmental Planning and Assessment Act 1979*, grant consent to a DA that seeks to erect or use dwellings or other structures on the above property that conform with the levels set out in the above information. Council assesses DAs based on merit, which must consider various development controls as set out in the LEP and DCP. For any development proposal on a *Flood Control Lot* Council recommends the applicant to engage the services of a professional engineer who specialises in Flood Risk Management.

Flood Information Certificate

Glossary

AEP	*Annual Exceedance Probability*: The probability of a flood event of a given size occurring in any one year, usually expressed as a percentage. For example, the 1% AEP flood has a 1% probability of occurring in any given year. This flood is sometimes referred to as 1 in 100, 100yr ARI or Q100
AHD	*Australian Height Datum* is the reference level for defining ground levels in Australia. The level of 0.0m AHD is approximately mean sea level.
Airborne Laser Scanning	A ground level measurement system in which a laser is emitted from an instrument in an aircraft and directed to the ground in a scanning pattern
DA	Development Application
DCP	Development Control Plan
Flood Control Lot	A land parcel that is subject to flood related development controls
Flood Hazard	Flooding which has the potential to cause loss: loss of life, injury or economic loss. The degree of hazard varies with the severity of flooding and is affected by flood behaviour (extent, depth, velocity, isolation, rate of rise of floodwaters, duration), topography and emergency management.
Flood Storage Area	Areas that are important for the temporary storage of floodwaters during the passage of flood.
Floodway Area	Those areas where a significant volume of water flows during floods.
Flow Path	Those areas where a flow path is identified in the relevant flood study, generally associated with velocities greater than 1 metre per second in the 1% AEP flood.
Freeboard	A factor of safety used in relation to the setting of floor levels. The typical freeboard set by the NSW Government is 0.5m, unless Council can demonstrate a different freeboard can apply as defined in an adopted Floodplain Risk Management Plan.
Ground Levels	Highest and lowest ground levels on the property, predominately based on ground level information databases created by *Airborne Laser Scanning*. A Registered Surveyor can confirm exact ground levels.
High Hazard Area	Those areas where flooding has the potential to be unsafe or cause damage. Council considers those areas that are Hazard Category H3 or above in a 1% AEP flood to be high hazard. Refer to Section on Flood Hazard below.
High Risk Area	Those areas of high flood risk as identified in a flood study or Floodplain Risk Management Plan.
LEP	Local Environment Plan
PMF	The *Probable Maximum Flood* is an extreme flood deemed to be the largest flood that could conceivably occur at a specific location. It is generally not physically or economically possible to provide complete protection against this flood event but should be considered for emergency response. The PMF defines the extent of flood prone land (i.e. the floodplain).

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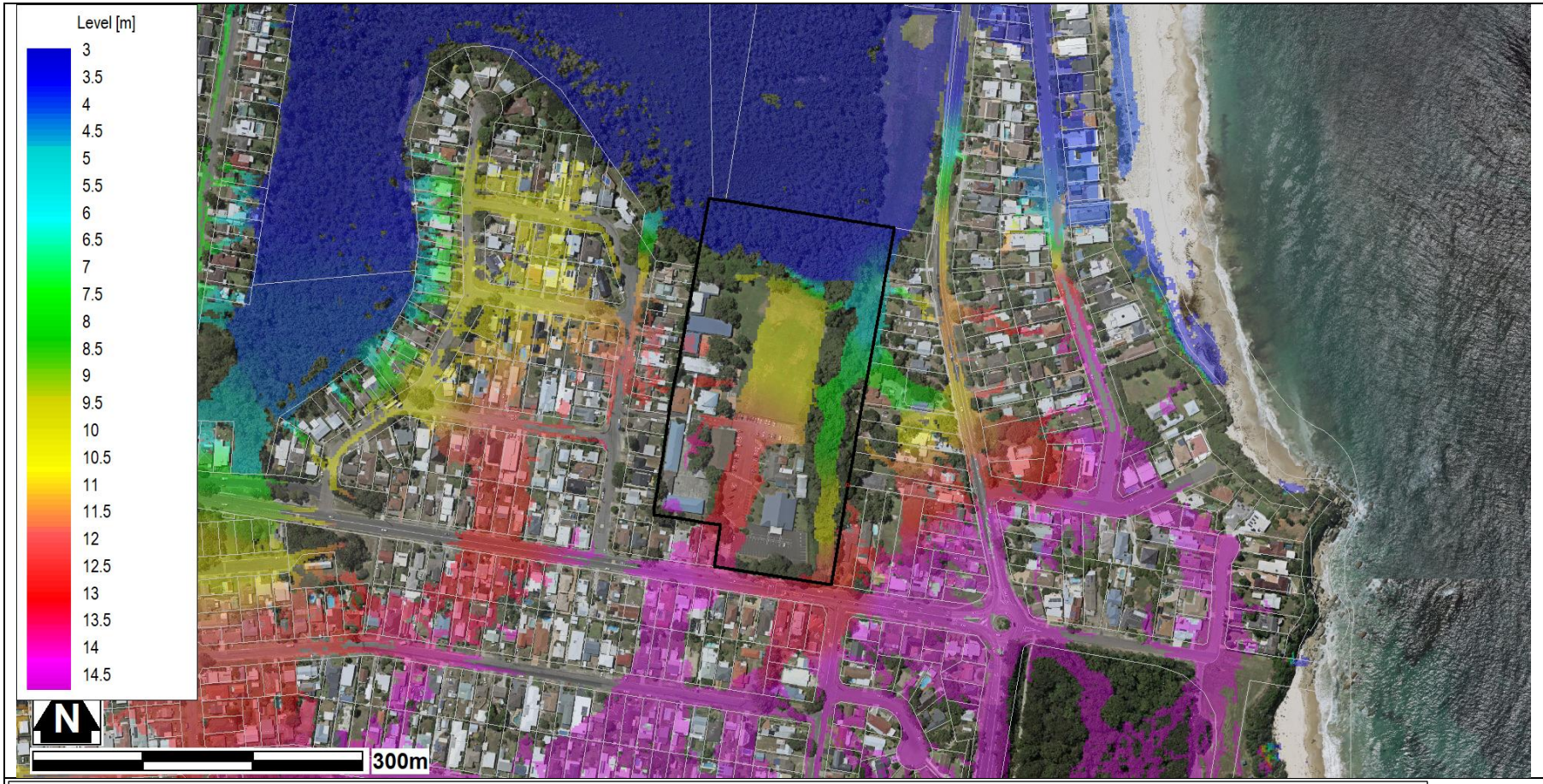
Flood Information Certificate

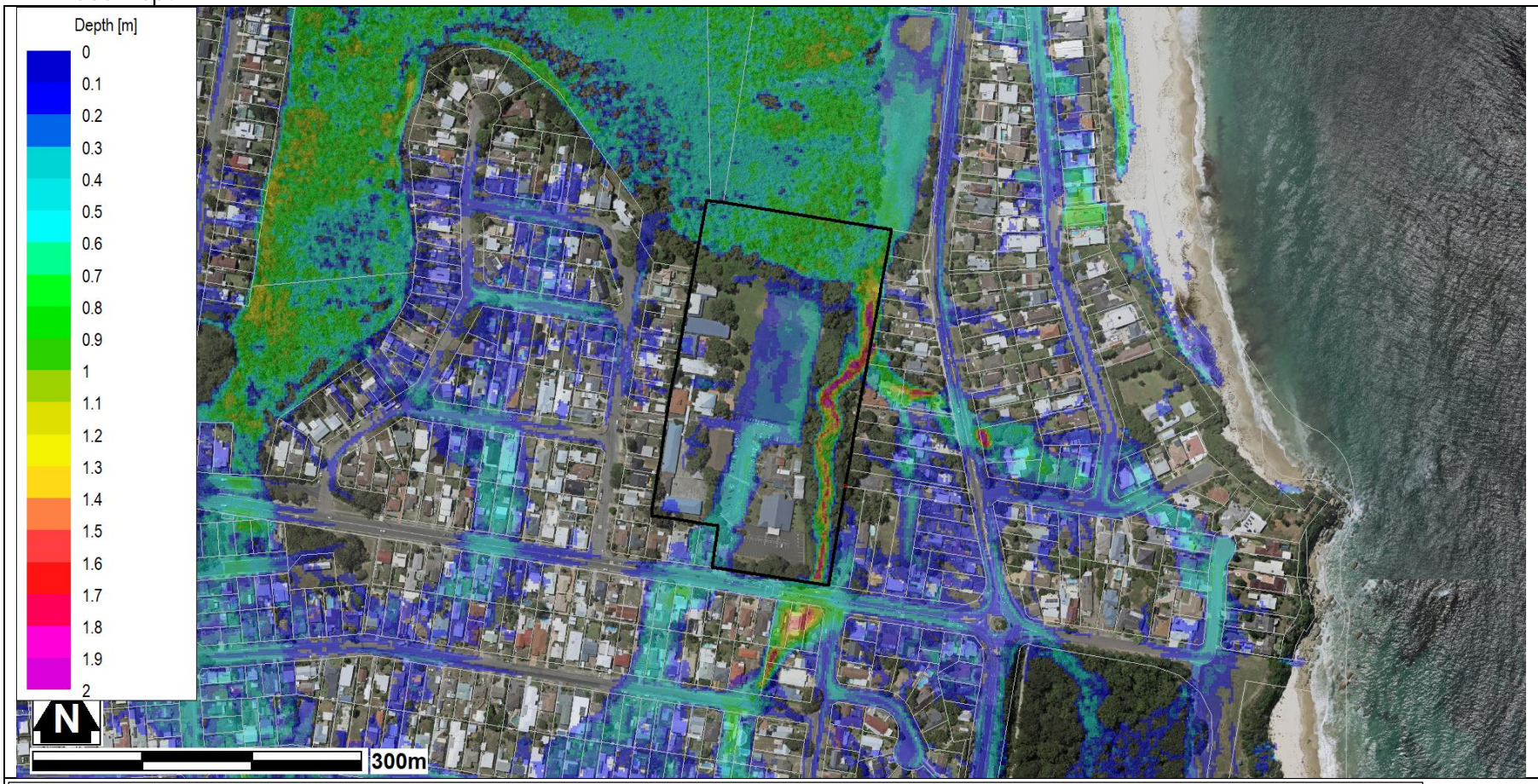
PMF Flood Extents



Phone: 1300 463 954 I **Email:** ask@centralcoast.nsw.gov.au I ABN 73 149 644 003
Wyong Office: 2 Hely St / PO Box 20 Wyong NSW 2259 **Gosford Office:** 49 Mann St / PO Box 21 Gosford NSW 2250

Flood Information Certificate

PMF Flood Depth

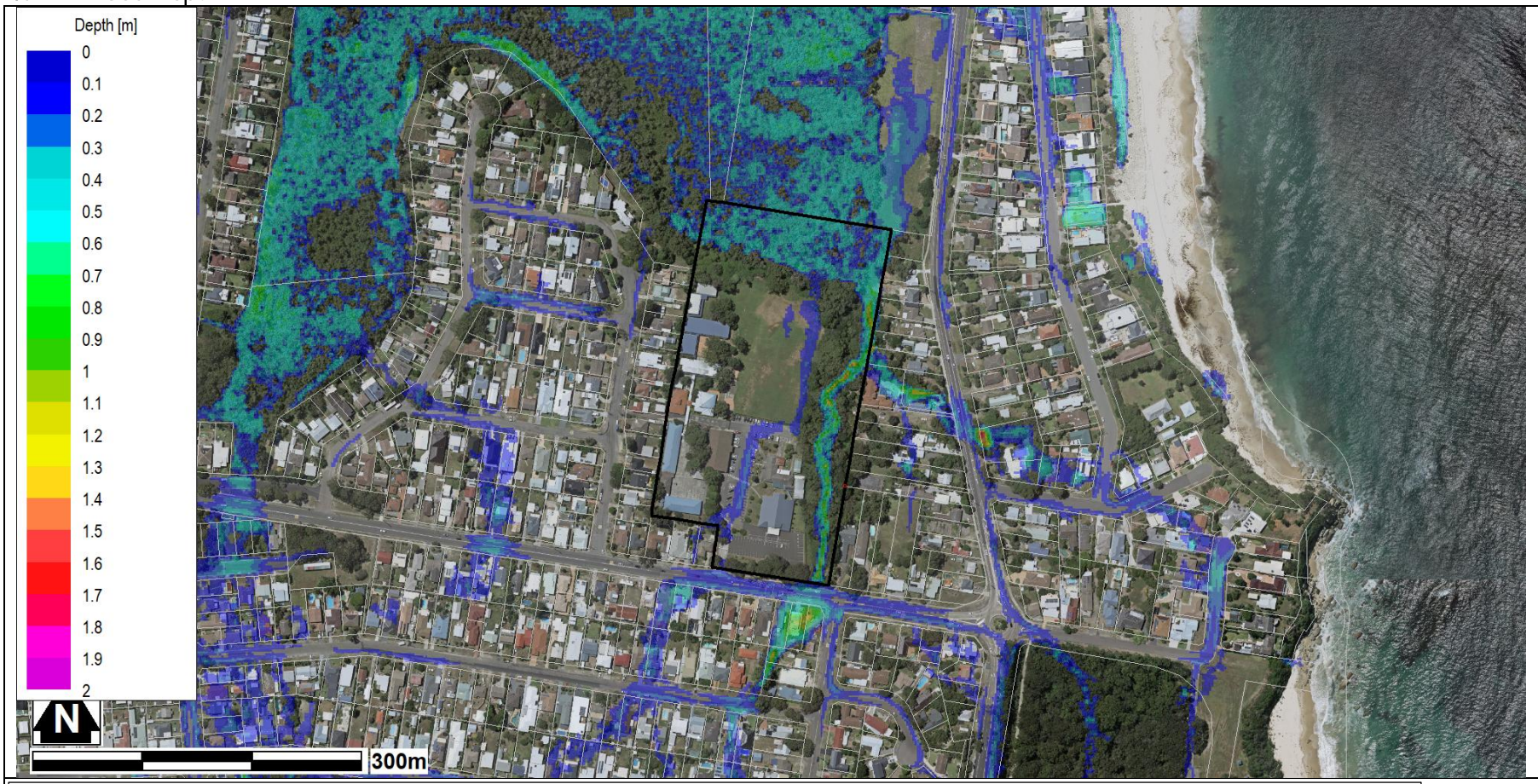


Flood Information Certificate

1% AEP Flood Extents

Flood Information Certificate

1% AEP Flood Depth



Flood Information Certificate

5% AEP Flood Extents

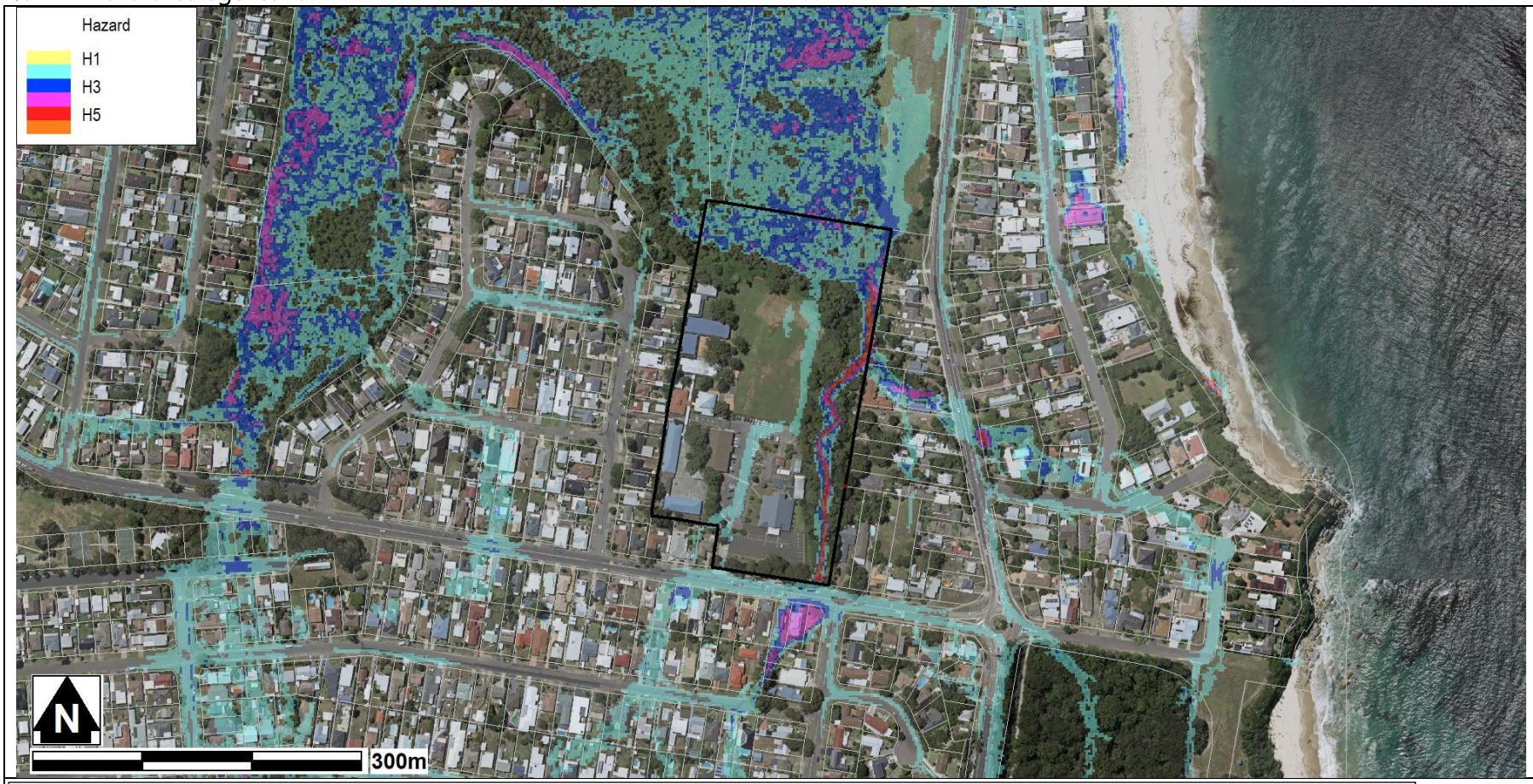
Central Coast Council
P 1300 463 954 I **E** ask@centralcoast.nsw.gov.au

Flood Information Certificate

5% AEP Flood Depths

Flood Information Certificate

1% AEP Hazard Categorisation



Central Coast Council
P 1300 463 954 I **E** ask@centralcoast.nsw.gov.au

Flood Information Certificate

Hydraulic Categorisation

Appendix B

Central Coast Council Correspondence on PMF Levels

Luke Meredith

From: Luke Meredith
Sent: Monday, 17 July 2023 10:21
To: Andrew Dewar
Subject: RE: 458 Main Road, Noraville - Flood Levels

Thanks Andrew, greatly appreciated.

Luke

Luke Meredith | Senior Civil Design Engineer

P: (02) 8973 2000 **M:** 0493 419 232
E: lukem@jn.com.au **W:** jn.com.au

JN
Responsive Engineering

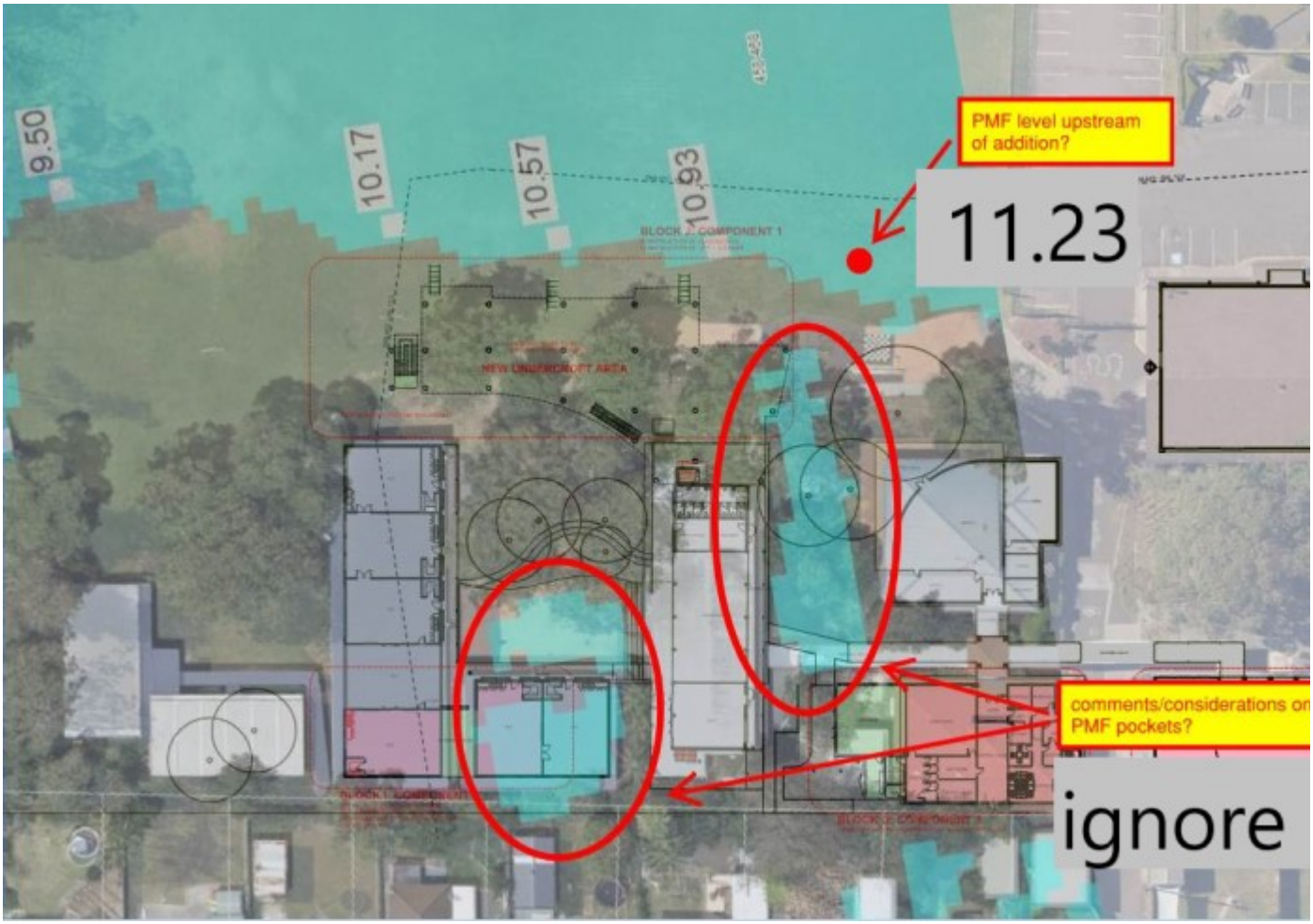
CIVIL
STRUCTURAL
REMEDIAL WORK
BUILDING SERVICES

From: Andrew Dewar <Andrew.Dewar@centralcoast.nsw.gov.au>
Sent: Monday, July 17, 2023 10:20 AM
To: Luke Meredith <lukem@jn.com.au>
Subject: RE: 458 Main Road, Noraville - Flood Levels

Sorry Luke,

Ignore those isolated pockets. They should have been filtered out in the model.

Thanks



Andrew Dewar
Development Flooding Engineer
Floodplain Management
Central Coast Council
P.O. Box 20 Wyong, NSW 2259
m: 0408 837 902
e: Andrew.Dewar@centralcoast.nsw.gov.au

Central Coast Council

Please consider the environment before printing this email

"We acknowledge the Traditional Custodians of the land on which we live, work and play. We pay our respects to Elders, past, present and emerging and recognise their continued connection to these lands and waterways. We acknowledge our shared responsibility to care for and protect our place and people."

From: Luke Meredith <lukem@jn.com.au>
Sent: Monday, 17 July 2023 9:54 AM
To: Andrew Dewar <Andrew.Dewar@centralcoast.nsw.gov.au>
Subject: RE: 458 Main Road, Noraville - Flood Levels

Hi Andrew,

Sorry to chase, is it possible to get a response on previous email?

Thanks,

Luke

Luke Meredith | Senior Civil Design Engineer

P: (02) 8973 2000 **M:** 0493 419 232
E: lukem@jn.com.au **W:** jn.com.au

JN Responsive Engineering

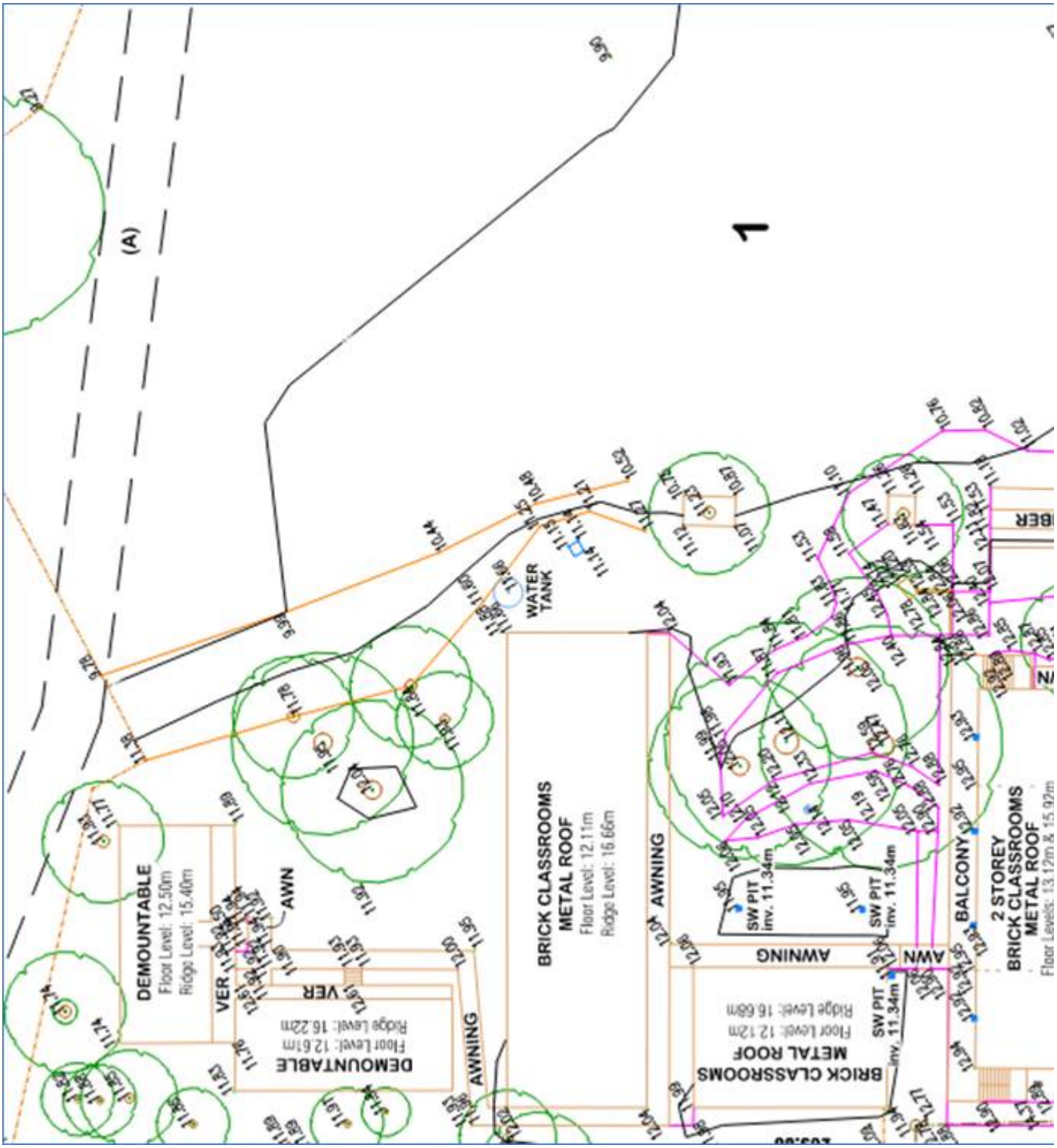
CIVIL
STRUCTURAL
REMEDIAL WORK
BUILDING SERVICES

From: Luke Meredith
Sent: Tuesday, July 11, 2023 11:54 AM
To: Andrew Dewar <Andrew.Dewar@centralcoast.nsw.gov.au>
Subject: RE: 458 Main Road, Noraville - Flood Levels

Hey Andrew,

Just reviewing this, was hoping for a little more information? I've overlaid your levels and marked up against the new addition, would be interested to see a PMF levels just upstream and also if you had any comments/consideration on the 2 pockets of PMF flood away from the main flooding? I know this wide area flood modelling can be quite coarse with LIDAR etc. The survey for this area shows the surface levels generally increase towards the boundary (survey excerpt included below markups).


9.50
10.17
10.57
10.93
BLOCK J COMPONENT 1
NEW UNDERCROFT AREA
BLOCK I COMPONENT



Luke

Luke Meredith | Senior Civil Design Engineer

P: (02) 8973 2000 **M:** 0493 419 232
E: lukem@jn.com.au **W:** jn.com.au

From: Luke Meredith
Sent: Tuesday, July 11, 2023 10:57 AM
To: 'Andrew Dewar' <Andrew.Dewar@centralcoast.nsw.gov.au>
Subject: RE: 458 Main Road, Noraville - Flood Levels

Thanks Andrew.

Appreciate the information.

Luke

Luke Meredith | Senior Civil Design Engineer

P: (02) 8973 2000 **M:** 0493 419 232
E: lukem@jn.com.au **W:** jn.com.au

From: Andrew Dewar <Andrew.Dewar@centralcoast.nsw.gov.au>
Sent: Monday, July 10, 2023 3:45 PM
To: Luke Meredith <lukem@jn.com.au>
Subject: RE: 458 Main Road, Noraville - Flood Levels

Hi Luke,

Thanks for providing these locations.

Both of these locations which you have shown below are outside the PMF extent. As long as the buildings stay out of the PMF extent area (shown on our Flood Certificate and CCC online mapping) they can be slab on ground without a minimum floor level.

If the buildings were to encroach into the PMF extent I would expect that the Minimum Floor Level would need to be raised to match the PMF level at the corresponding location. I have attached a map which shows the nearest PMF levels to building locations

Thanks

Andrew Dewar
Development Flooding Engineer
Floodplain Management
Central Coast Council
P.O. Box 20 Wyong, NSW 2259
m: 0408 837 902
e: Andrew.Dewar@centralcoast.nsw.gov.au

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From: Luke Meredith <lukem@jn.com.au>
Sent: Friday, 7 July 2023 3:12 PM
To: Andrew Dewar <Andrew.Dewar@centralcoast.nsw.gov.au>
Subject: 458 Main Road, Noraville - Flood Levels

Hi Andrew,

Thanks for your time on the phone.

As discussed, the concept at the minute is some small extensions, a COLA over existing and 1 main new building/extension (green areas).

Below shows a general site plan with the 2 red dots being the location of where we're interested in the flood levels as these are the most probable locations of the main building/extension.

Also in the Flood Information Certificate the Minimum Habitable Floor Level is listed at 500mm above 1% AEP, as this site is a school would this be applicable or should it be the PMF?

Thanks,

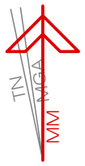
Luke

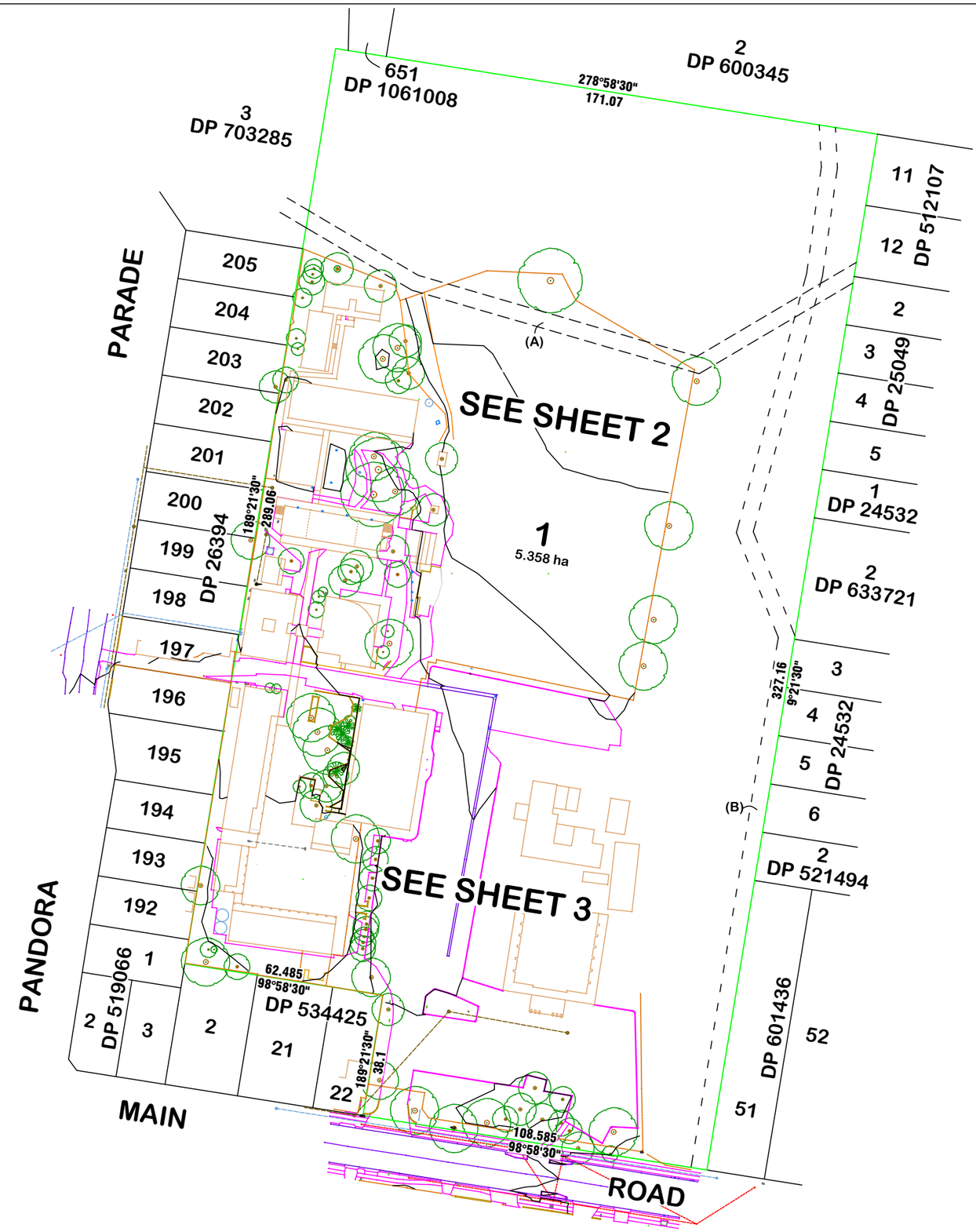
Luke Meredith | Senior Civil Design Engineer

P: (02) 8973 2000 **M:** 0493 419 232
E: lukem@jn.com.au **W:** jn.com.au

Appendix C

Site Survey





(A) - EASEMENT FOR RISING MAIN (S31897)
(B) - EASEMENT TO DRAIN SEWERAGE 5 WIDE (T730452)

www.dialbeforeyoudig.com.au
DIAL 1100 BEFORE YOU DIG

Origin of Levels : PM 104400 fd.
Location : Pandora Pde, Toukley.
R.L. : 13.530m A.H.D.

revision	description:	date:

client: CATHOLIC SCHOOLS BROKEN BAY

approved: Registered Surveyor

assessed: A.W.C.
drawn: R.G.
surveyed: A.W.C.

Clarke Dowdle & Associates
Development Consultants
surveyors - planners - ecologists - bushfire consultants
#1 OSCAR STREET
UMINA BEACH NSW 2257
ph (02)43443553 fax (02)43446636
email admin@cdasurveys.com.au
Po Box 3122 Umina NSW 2257

project: #458 MAIN ROAD, TOUKLEY.
details: Lot 1 in DP 530125
drawing: PLAN SHOWING SPOT-LEVELS, CONTOURS & DETAIL.

red. ratio:	1:1500	datum:	A.H.D.
reference #Go:	22779	ref ext:	
contour interval:	1m	DA #:	
job date:	20/05/2023	number in set:	1 of 3
LGA:	CENTRAL COAST		
Parish:	WALLARAH		
County:	NORTHUMBERLAND		

-all dimensions are in metres unless otherwise shown.
-check and confirm all areas & dimensions on site prior to the commencement of any works.
-do not scale from face of plan.
-preliminary boundary fixation has been undertaken only.
-if any construction is planned on or close to the boundaries further survey work will be required.
-a complete investigation of services has not been undertaken for this survey.
-services shown hereon have been located by visible features only.
-tree trunk & height dimensions are approximate only.
-tree spreads are approximate only but have been drawn to scale.
-ridge& gutter levels displayed on buildings are approximate only.
-underground utility mains locations are provided by Council diagrams & are approx positions only.

(A) - EASEMENT FOR RISING MAIN (S31897)
(B) - EASEMENT TO DRAIN SEWERAGE 5 WIDE (T730452)

TN MM MGA

LEGEND

SIGN
Kb Adpt
ELEC
GAS
WM
PP
LP
TAP
I/O
FL.Pt
SW PIT
TEL
SMH
HYD
SV

PARADE

PANDORA

DEMOUNTABLE
Floor Level: 12.50m
Ridge Level: 15.40m

DEMOUNTABLE
Floor Level: 12.61m
Ridge Level: 16.22m

AWN

VER

AWNING

BRICK CLASSROOMS
METAL ROOF
Floor Level: 12.11m
Ridge Level: 16.66m

WATER TANK

BRICK CLASSROOMS
METAL ROOF
Floor Level: 12.12m
Ridge Level: 16.68m

SW PIT
inv. 11.34m

SW PIT
inv. 11.34m

BALCONY

2 STOREY
BRICK CLASSROOMS
METAL ROOF
Floor Levels: 13.12m & 15.92m
Ridge Level: 19.65m

TIMBER

W/T

BRICK BUILDING
METAL ROOF
' STAFF TOILETS '
Floor Level: 12.11m
Ridge Level: 16.66m

ROOF

BRICK
BUILDING
TILE ROOF
' ADMIN '
Floor Level:
13.15m
Ridge Level:
21.17m

BRICK BUILDING
METAL ROOF
' LIBRARY '
Floor Level: 12.92m
Ridge Level: 18.98m

11
CLAD DWELLING
TILE ROOF
Floor Level: 13.39m
Ridge Level: 17.38m

CLAD BUILDING
Floor Level: 13.11m

B.M.Nail in Kerb.
r.l. 11.23m A.H.D.

SW PIT
inv. 10.92m

189°21'30"
289.06

(A)

(B)

1

SEE SHEET 3

www.dialbeforeyoudig.com.au
DIAL 1100 BEFORE YOU DIG

Origin of Levels : PM 104400 fd.
Location : Pandora Pde, Toukley.
R.L. : 13.530m A.H.D.

revision	description:	date:

client: CATHOLIC SCHOOLS BROKEN BAY

approved: Registered Surveyor

assessed: A.W.C.
drawn: R.G.
surveyed: A.W.C.

Clarke Dowdle & Associates
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#1 OSCAR STREET
UMINA BEACH NSW 2257
ph (02)4343553 fax (02)43446636
email admin@cdasurveys.com.au
Po Box 3122 Umina NSW 2257

project: #458 MAIN ROAD, TOUKLEY.
details: Lot 1 in DP 530125
drawing: PLAN SHOWING SPOT-LEVELS, CONTOURS & DETAIL.

red. ratio:	1:600	datum:	A.H.D.
reference #Go:	22779	ref ext:	
contour interval:	1m	DA #:	
job date:	20/05/2023	number in set:	2 of 3
LGA:	CENTRAL COAST		
Parish:	WALLARAH		
County:	NORTHUMBERLAND		

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SEE SHEET 2

PARADE

PANDORA

MAIN ROAD

BRICK CLASSROOMS METAL ROOF
Floor Level: 13.92m
Ridge Level: 18.80m

BRICK BUILDING METAL ROOF ' HALL '
Floor Level: 12.70m
Ridge Level: 21.56m

AWNING

PLAYGROUND

W/T

DEMOUNTABLE
Floor Level: 14.79m
Ridge Level: 17.68m

VER

ROOF OVER

BRICK BUILDING TILE ROOF ' CANTEEN '
Floor Level: 14.66m
Ridge Level: 19.35m

VERANDAH

CONCRETE COURTYARD

CONC

ROOF OVER

VERANDAH

BRICK CLASSROOMS METAL ROOF
Floor Level: 14.65m
Ridge Level: 20.11m

W/T

W/T

189°21'30"
289.06

62.485
98°58'30"

454
BRICK BUILDING TILE ROOF
Floor Level: 14.00m
Ridge Level: 18.56m

189°21'30"
38.1

108.585
98°58'30"

SW PIT
inv. 11.96m

SW PIT
inv. 10.77m

BRICK BUILDING TILE ROOF
Floor Level: 12.99m
Ridge Level: 17.88m

AWN

METAL SHED
Floor Level: 12.73m
Ridge Level: 16.62m

CLAD BUILDING METAL ROOF

BRICK BUILDING METAL ROOF ' CHURCH '
Floor Level: 13.67m
Ridge Level: 19.81m

1

(B)

327.16
9°21'30"

ROAD

SW PIT
inv. 10.53m

SW PIT
inv. 10.17m

SW PIT
inv. 10.29m

LEGEND

- SIGN
- Kb Adpt
- ELEC
- GAS
- WM
- PP
- LP
- TAP
- I/O
- FL.Pt
- SW PIT
- TEL
- SMH
- HYD
- SV

TN MGA MM

www.dialbeforeyoudig.com.au
DIAL 1100 BEFORE YOU DIG

(B) - EASEMENT TO DRAIN SEWERAGE 5 WIDE (T730452)

Origin of Levels : PM 104400 fd.
Location : Pandora Pde, Toukley.
R.L. : 13.530m A.H.D.

revision	description:	date:

client: CATHOLIC SCHOOLS BROKEN BAY

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Po Box 3122 Umina NSW 2257

project: #458 MAIN ROAD, TOUKLEY.
details: Lot 1 in DP 530125
drawing: PLAN SHOWING SPOT-LEVELS, CONTOURS & DETAIL.

red. ratio:	1:600	datum:	A.H.D.
reference #Go:	22779	ref ext:	
contour interval:	1m	DA #:	
job date:	20/05/2023	number in set:	3 of 3
LGA:	CENTRAL COAST		
Parish:	WALLARAH		
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Appendix D

Flood Compatible Materials

Component	Flood Compatible Material
Flooring and Sub-floor	• Concrete slab-on-ground monolith construction • Suspended reinforced concrete slab
Wall Structure	• Solid brickwork, blockwork, reinforced, concrete or mass concrete
Wall and Ceiling Linings	• Fibro-cement board • Brick, face or glazed • Clay tile glazed in waterproof mortar • Concrete • Concrete block • Steel with waterproof mortar • Stone, natural solid or veneer, waterproof grout • Glass blocks • Glass • Plastic sheeting or wall with waterproof adhesive
Roof Structure	• Reinforced concrete construction • Galvanised metal construction
Doors	• Solid panel with water proof adhesives • Flush door with marine ply filled with closed cell foam • Painted metal construction • Aluminium or galvanised steel frame
Insulation	• Closed cell solid insulation • Plastic/polystyrene boards
Windows	• Aluminium frame with stainless steel rollers or similar corrosion and water resistant material
Nails, Bolts, Hinges and Fittings	• Brass. Nylon or stainless steel

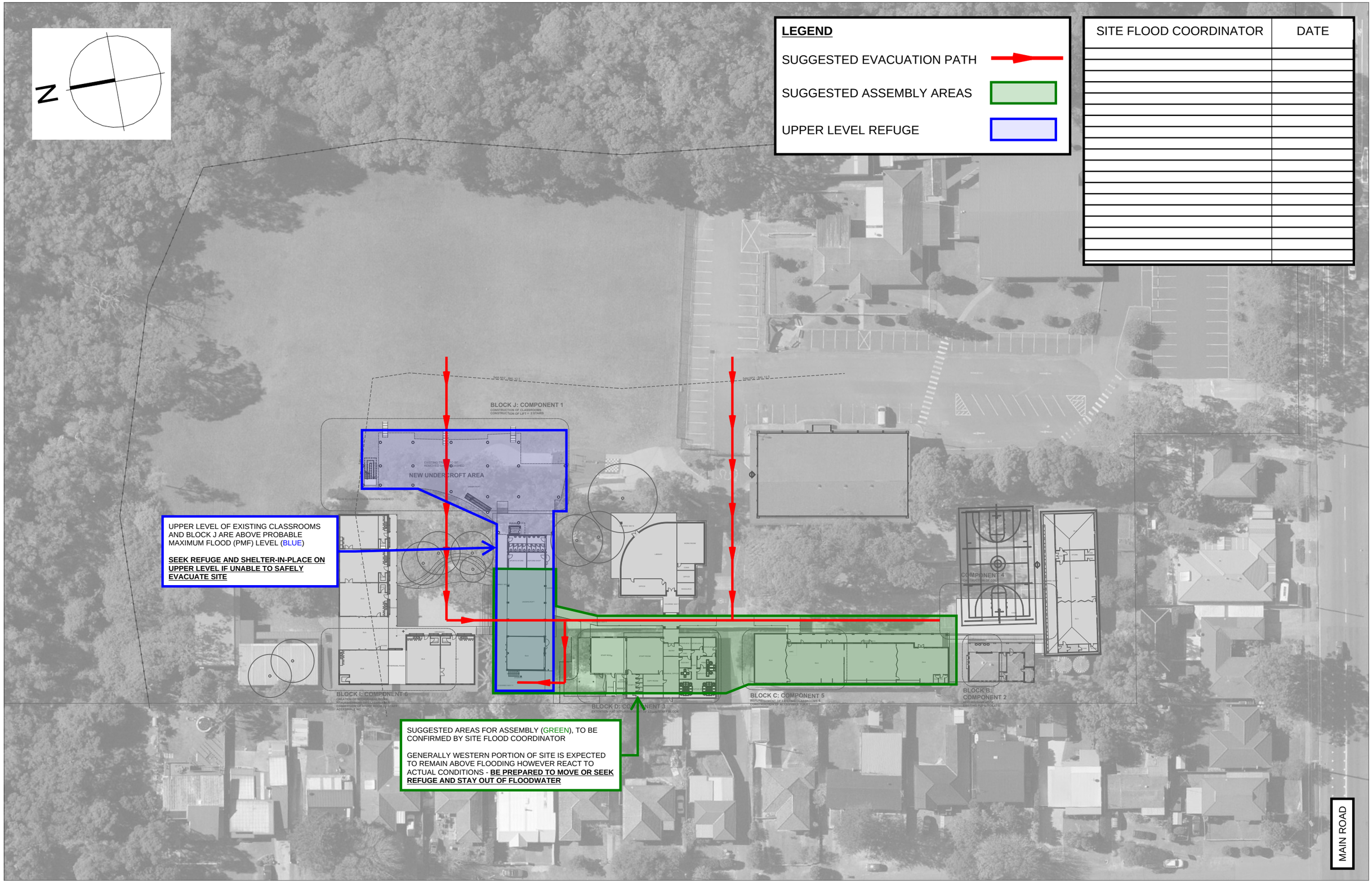
	• Removable pin hinges • Hot dipped galvanised steel wire nails or similiar
Main Power Supply	• Subject to the approval of the relevant authority the incoming main commercial power service equipment, including all metering equipment, shall be located above the designated flood level. Means shall be available to easily disconnect the dwelling from the main power supply.
Wiring	• All wiring, power outlets, switches, etc., should be located above the designated flood level. All electrical wiring installed below this level should be suitable for continuous underwater immersion and should contain no fibrous components. • Earth leakage circuit-breakers (core balance relays) or Residual Current Devices (RCD) must be installed. • Only submersible type splices should be used below maximum flood level. • All conduits located below the relevant designated flood level should be so installed that they will be self-draining if subjected to flooding.
Electrical Equipment	• All equipment installed below or partially below the designated flood level should be capable of disconnection by a single plug and socket assembly.
Heating and Air Conditioning Systems	• Heating and air conditioning systems should be installed in areas and spaces of the house above the designated flood level.
Fuel storage for heating purposes	• Heating systems using gas or oil as a fuel should have a manually operated valve located in the fuel supply line to enable fuel cut-off. • The heating equipment and related fuel storage tanks should be mounted on and securely anchored to a foundation pad of sufficient mass to overcome buoyancy and prevent movement that could damage the fuel supply line. The tanks should be vented to an elevation of 600 millimetres above the designated flood level.

Ducting for heating/cooling purposes	• All ductwork located below the relevant flood level should be provided with openings for drainage and cleaning. Self-draining may be achieved by constructing the ductwork on a suitable grade. Where ductwork must pass through a water-tight wall or floor below the relevant flood level, a closure assembly operated from above relevant flood level should protect the ductwork

Note: Materials not listed may be accepted by Council subject to certification of the suitability of the material of the manufacturer to withstand immersion for up to 96 hours

Appendix E

Flood Evacuation Plan



FLOOD EVACUATION PLAN

PREPARED BY JONES NICHOLSON CONSULTING ENGINEERS (03/06/2024)