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FLOOD RISK MANAGEMENT REPORT

PROJECT: **PROPOSED GRANNY FLAT**

LOCATION: **5 THE CRESCENT, NORTH NARRABEEN**



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1. Introduction

A site visit was conducted to the proposed site No 5 The Crescent, North Narrabeen. (Refer Figure 1 – Site Location). Architectural plans prepared by Vaughan Milligan Project No 191015 dated 11 December 2019 are for the proposed addition development at the above location. The proposal is for addition of a granny flat and carport. In total the development consists of an existing fibro single building and proposed granny flat and carport at the rear of the site (refer to Figure – 2 Proposed Site). The proposed ground floor of the granny flat is setting on brick piers and the carport has slab on ground. The proposed building area is approximately 61.0 m², including the carport. The total existing building at 5 The Crescent, North Narrabeen, has an area of approximately 113 m².

The mentioned site is classified as “Flood control lot” by Pittwater 21 Development Control Plan (21 DCP). Hyten Engineering were commissioned by Mr. Warwick Gainfort to assess the flood characteristic of the site and provide a Flood Risk Management Report demonstrating compliance with Appendix 15 of Pittwater Development Control plan (21DCP) and the Department of Planning’s “Floodplain Development Manual”.

2. Site Analysis

The site is referred to as 5 The Crescent, North Narrabeen. Majority of the site is affected by major flooding known as “High Risk” and minor front set back area as “Low Risk” as classified by 21DCP Development standards for flood control lots of Pittwater Council (Refer to Figure 3 – 100 year ARI Flood Level Information). The flood affectation for 1 in 100 Year ARI or (1% AEP) is to a maximum level of RL3.03. This flood level is to be considered for establishing the proposed finished floor level for all habitable area to be above the 100 year ARI plus 500mm freeboard as shown on Figure 2 – Proposed Flood Planning Levels. The site is categorized as a 100 Year ARI High Hazard as can be seen in Figure 3 – 100 year ARI Flood level Information table.



3. Assessment & Recommendations

The objective of this report is to identify whether the proposed development will have a significant effect on the existing parameters, details of any flood mitigation works and provide a safe floor level and keep all the entry access to the building above the flood level. Additionally Appendix 15 of 21DCP for flood control lots of Pittwater council requires recommendations on all precautions to minimise risk to personal safety of occupants and the risk of property damages for the total development, to address the flood impacts on the site of the 100 year ARI and Probable Maximum Flood (PMF) storm. These precautions shall include, but not be limited to the following:

- (i) Type of materials to be used to ensure the structural integrity of the development for immersion and impact of velocity and debris for 100 year ARI storm event and PMF.
- (ii) Waterproofing methods, including electrical equipment, wiring, fuel lines or any other service pipes or connections
- (iii) A flood evacuation strategy
- (iv) On-site response plan to minimise flood damage and provide adequate storage areas for hazardous materials and valuable goods above the flood level.

All checks are to be in accordance with the Department of Planning's "Floodplain Development Manual" and Appendix 15 of 21DCP.

The site is considered as flood affected (see figure 3 – 100 year ARI Flood Level Information).

The site is considered at this stage not to be affected by the overland flow, however based on information provided by council "2013 Narrabeen Lagoon Flood Study" by (BMT WBM) the whole entire site is shown as flood affected. The high hazard areas are defined from mid to the rear of the site and the front setback as low hazard. The floodwaters predominantly will enter via the rear boundary from upstream catchment. The floodwaters will then pond in the available areas in the site and once the downstream of the Crescent floodwaters subside, the ponding waters dissipate under the boundary fences. The inundation ranges from 0.96m at the north western corner, 0.85m north eastern corner of the rear boundary 1.04m middle of the site to



0.77m at the front boundary in 1 in 100 year flood event as per flood information.
Probable Maximum Flood (PMF) Level for the site is stated to be RL4.87m (AHD).

3.1 Floor Levels

According to Pittwater Council's policies for flood affected sites, the minimum habitable floor level of the proposed development is to be "equal or greater than the 100 years flood plus freeboard". Freeboard is 500mm above 1 in 100 year ARI flood level for proposed building. This requires the FFL at minimum to be RL3.53. Further recommendations and precautions have been provided in this report to minimise risk to personal safety of the occupants of the building and to minimise the risk of property damage in buildings. Hence a minimum Flood Planning Level (finished floor level) for the following areas of the development to satisfy the above requirements.

All materials proposed in the construction of the development are to be flood compatible and are to comply with the Pittwater Council requirements, regulations and Appendix 15 of 21 Development Control Plan. All power points on the proposed ground floor is to be at least 500mm above the 1:100 flood levels. Waterproofing methods, including electrical equipment, wiring, fuel lines or any other service pipes or connections, must be effectively implemented.

3.3. Structural Soundness

The types of materials to be used are to ensure the structural integrity of the development for immersion and impact of velocity and debris for the PMF event. We hereby recommend to the structural engineer to provide a certification stating that the proposed structure to be constructed of a reinforced concrete slab can withstand all forces of flowing water including flood waters, hydrostatic pressure, hydrodynamic pressure, impact of debris and buoyancy forces.



3.4. Flood Affectation

3.4.1. Velocity

The proposal is to maintain the existing single storey dwelling (approx. 113 m²) and Construct an additional granny flat with carport at the rear of the site (approx. 61.0 m²). There is a small decrease in temporary floodplain storage capacity due to the proposed development and if the finished floor levels are above the 1 in 100 Year ARI, a marginal increase in peak flow downstream will be expected. However, the proposal does not adversely impact the downstream flood regime. The velocities within the site are likely to remain as per pre- development condition that is equal or less than 0.25m/s as per flood information.

3.4.2. Volume

The volume of the existing flood storage on the site (land storage less existing building) is approximately 551 m³. Associated development will be built with the same boundaries as the existing development and the granny flat structure will be constructed on brick piers. Hence the volume of the new flood storage (i.e approx. 551 m³) will therefore be the same as the existing and any minor losses due to proposed piers is negligible.

3.5. Evacuation

The development shall be provided with a *Flood Alert System* comprising an audible alarm to alert occupants and visitors of building in flood events. The alert system should be located at the south eastern corner of the existing building wall. The audible alarm shall be activated when the water level reaches RL 2.35m AHD (100mm above NGL at the front). The audible alarm is to be activated by float switches. The audible alarm shall operate until the water level subsides to RL 2.25m



AHD, or a minimum of 10 minutes duration (whichever occurs first). All occupants and visitors shall obey the *Flood Safety (Evacuation) Procedure*.

Flood Safety (Evacuation) Procedure:

- a) Upon hearing the audible alarm or viewing the flashing light all occupants and visitors of the building to proceed to a safe refuge higher ground area.

- b) No person is to attempt to leave the building by vehicle or on foot during operation of the audible alarm or flashing light.

- c) All occupants and visitors shall remain in the proposed development until the Cessation of the flashing light or until directed by the relevant Authorities.

- d) A flood emergency warden to be established by the occupants to instruct the occupants and visitors in events of flood occurrence.

3.6. Management and design

The proposed development should be carried out as per plan and as outlined in this report. All storage of hazardous materials and valuable goods in the ground area are to be stored in cupboards and shelves located above the 100Year ARI plus 500mm freeboard level.

4. Conclusion

We hereby certify that the proposed development as presented in the architectural plans by Vaughan Milligan Consultants with Project No.191015 will address the requirements of Pittwater Council's 'Appendix 15 21 Development Control Plan' provided that the procedures and recommendation presented in the Section 3 of this report are implemented. Should you require any further explanations, please do not hesitate to contact us.

5. Appendix

Figure 1 – Site location

Figure 2 – Proposed Site Plan

Figure 3 – 100 Year ARI Flood Level Information

Figure 4 – Flood Alert System Location



FIGURE 1 – SITE LOCATION

Source: Google Map

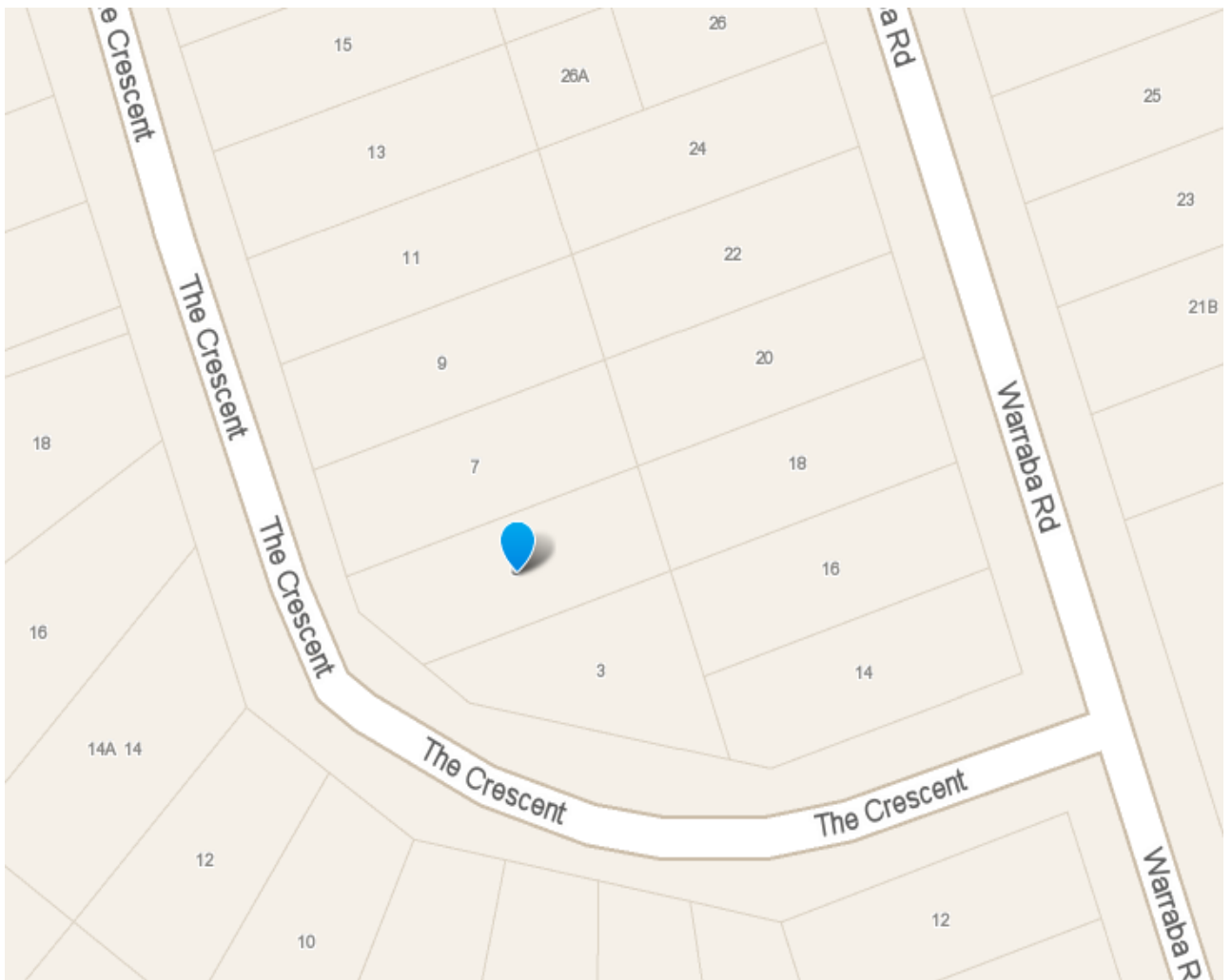


FIGURE 2 – PROPOSED SITE PLAN

Source: Plans by Vaughan Milligan Consultants

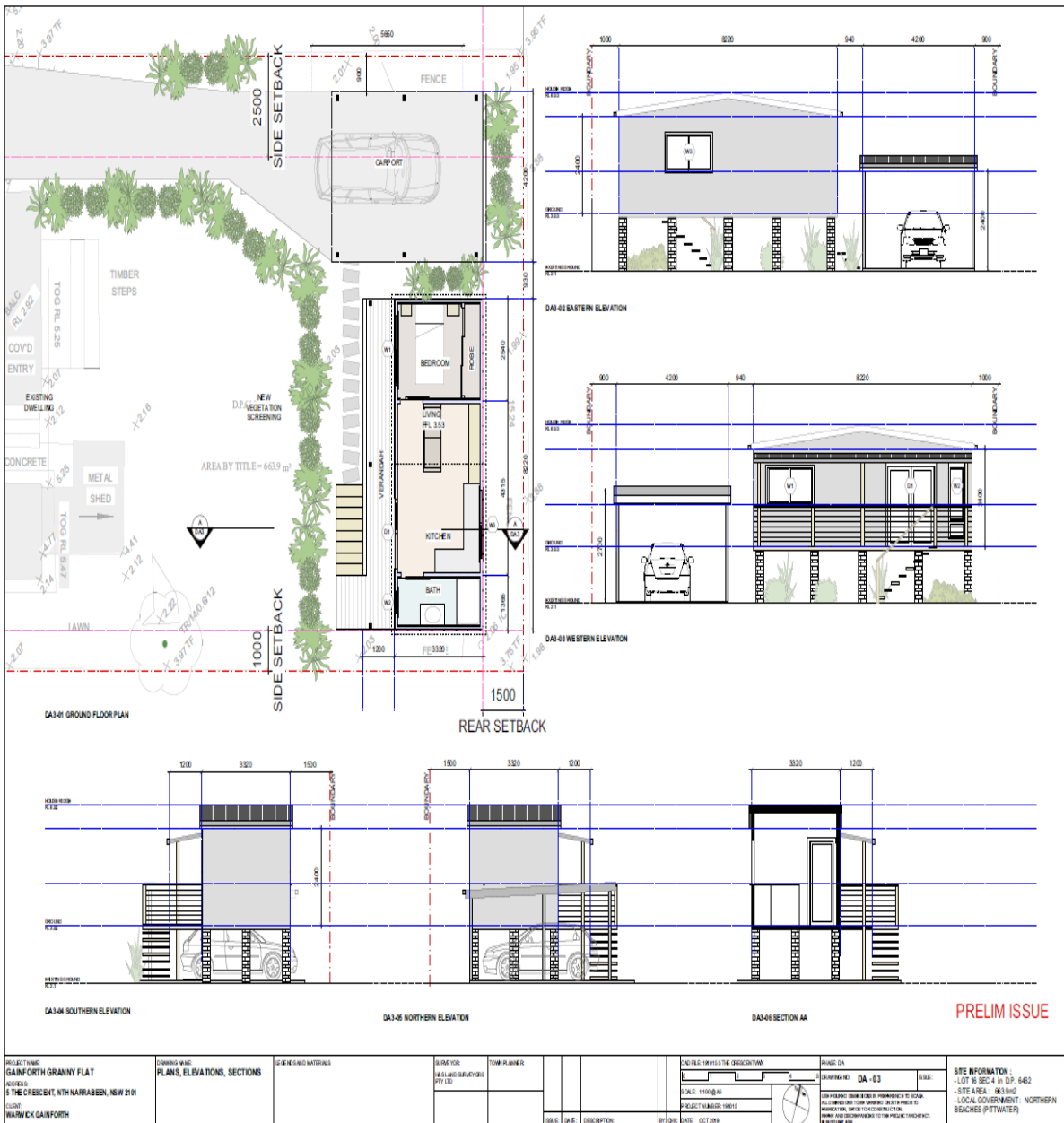
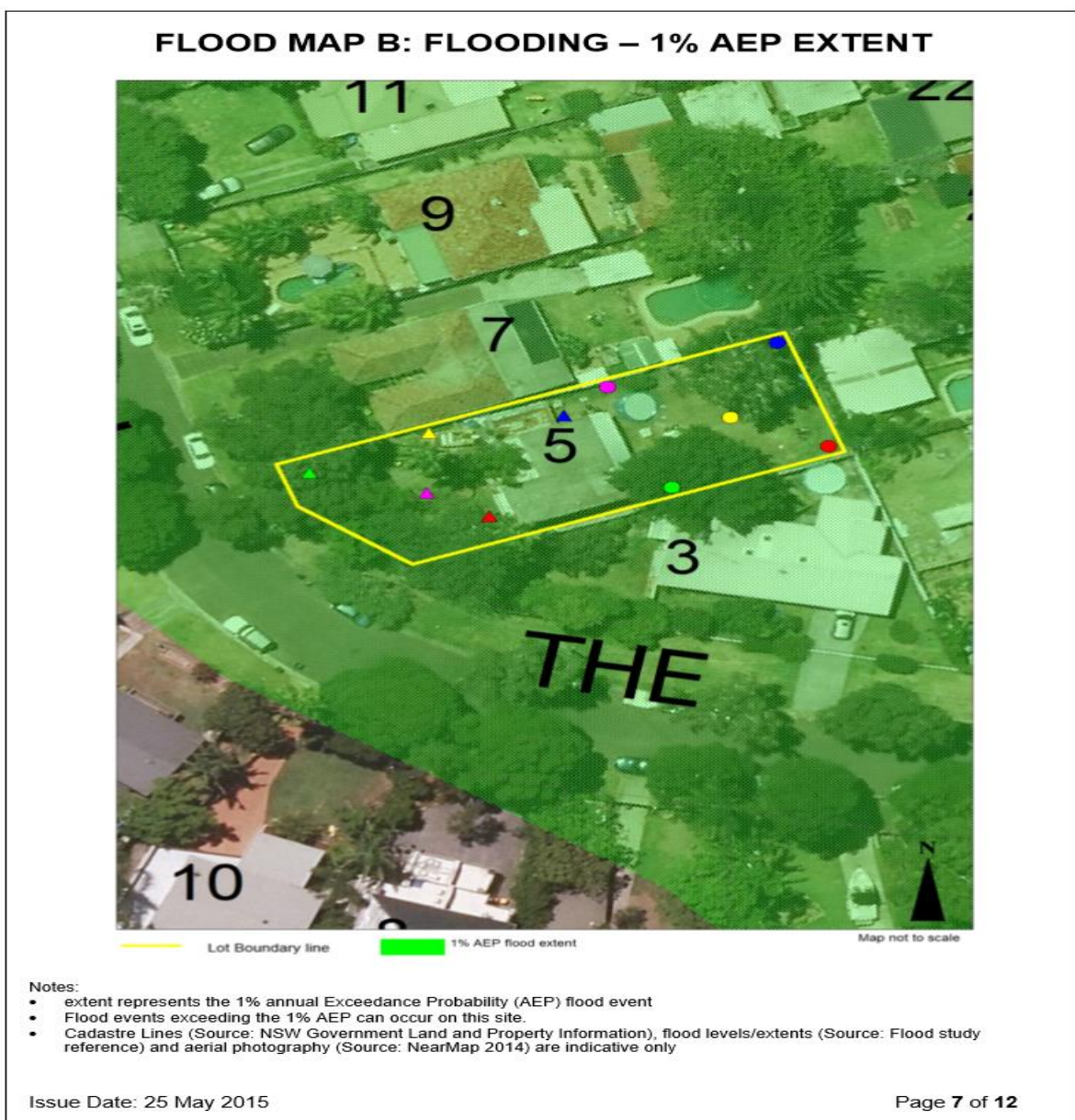
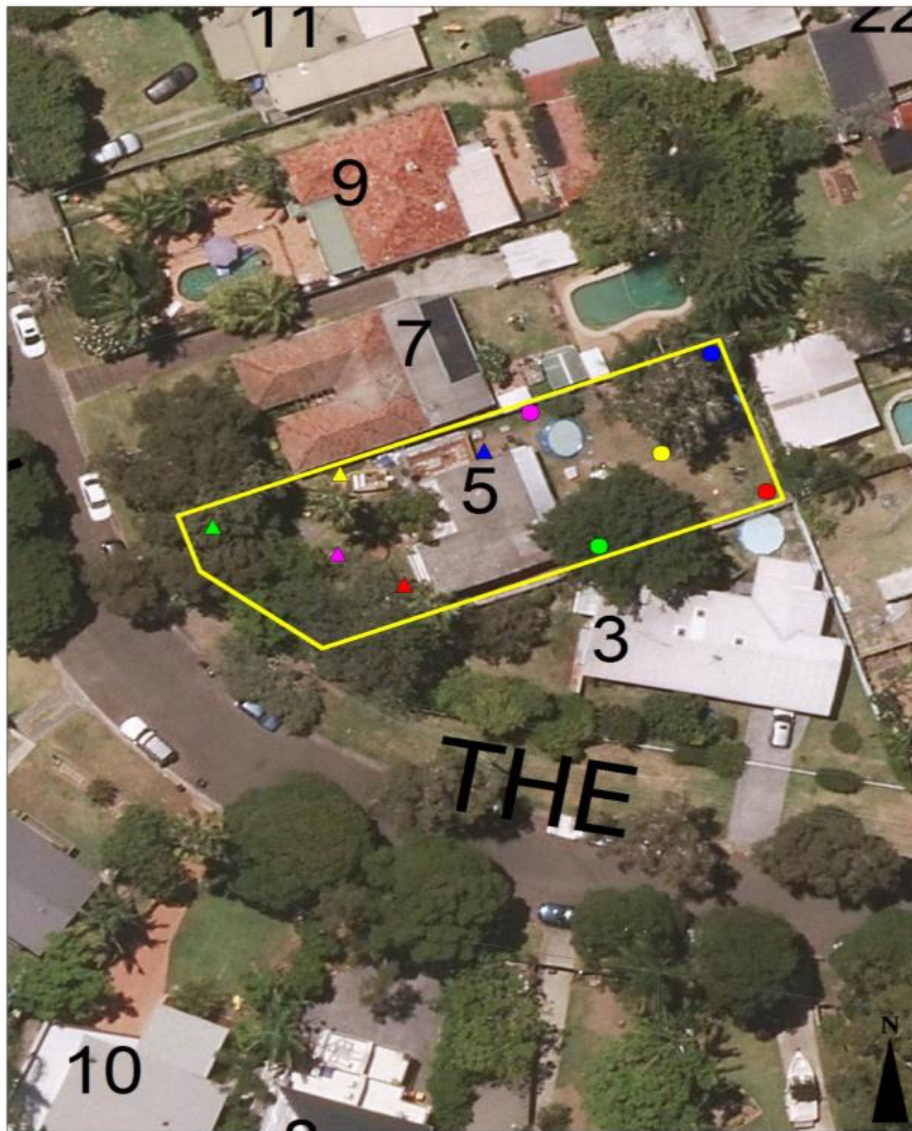


FIGURE 3 – 100 YEAR ARI FLOOD LEVEL INFORMATION

Source: Pittwater Council



FLOOD LEVEL POINTS



Lot Boundary

Map not to Scale

Note: Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Flood study reference) and aerial photography (Source: NearMap 2014) are indicative only

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Flood Levels

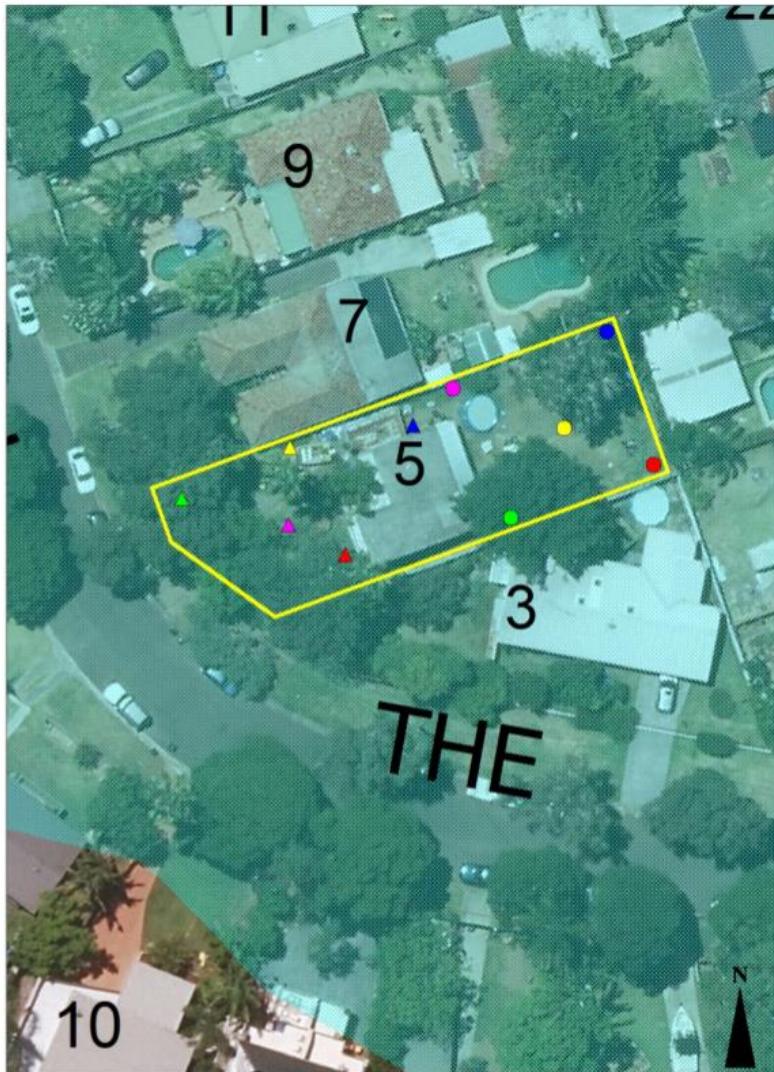
	5% AEP Max WL (m AHD)	5% AEP Max Depth (m)	1% AEP Max WL (m AHD)	1% AEP Max Depth (m)	1% AEP Max Velocity (m/s)	PMF Max WL (m AHD)	PMF Max Depth (m)	PMF Max Velocity (m/s)
●	2.68	0.60	3.03	0.96	0.15	4.87	2.79	0.31
●	2.68	0.49	3.03	0.85	0.25	4.87	2.68	0.27
●	2.68	0.68	3.03	1.04	0.14	4.87	2.87	0.31
●	2.68	0.47	3.03	0.83	0.03	4.87	2.66	0.26
●	2.68	0.50	3.03	0.86	0.03	4.87	2.69	0.21
▲	2.68	0.48	3.03	0.84	0.08	4.87	2.67	0.16
▲	2.68	0.43	3.03	0.78	0.07	4.87	2.62	0.38
▲	2.68	0.40	3.03	0.75	0.02	4.87	2.59	0.13
▲	2.68	0.41	3.03	0.77	0.08	4.87	2.60	0.50
▲	2.68	0.42	3.03	0.78	0.05	4.87	2.61	0.32

WL – Water Level

PMF – Probable Maximum Flood



FLOOD MAP C: MAINSTREAM FLOODING EXTENT



Category 1 (FPL) extent Lot Boundary

Map not to Scale

Notes:

- extent represents the 1% annual Exceedance Probability (AEP) flood event
- extent does not include climate change
- Mainstream FPL – Mainstream Flood Planning Level includes the 0.5m freeboard on the 1% AEP extent for planning purposes
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Flood study reference) and aerial photography (Source: NearMap 2014) are indicative only

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FLOOD MAP D - PMF EXTENT MAP



Category 2 extent Lot Boundary

Map not to Scale

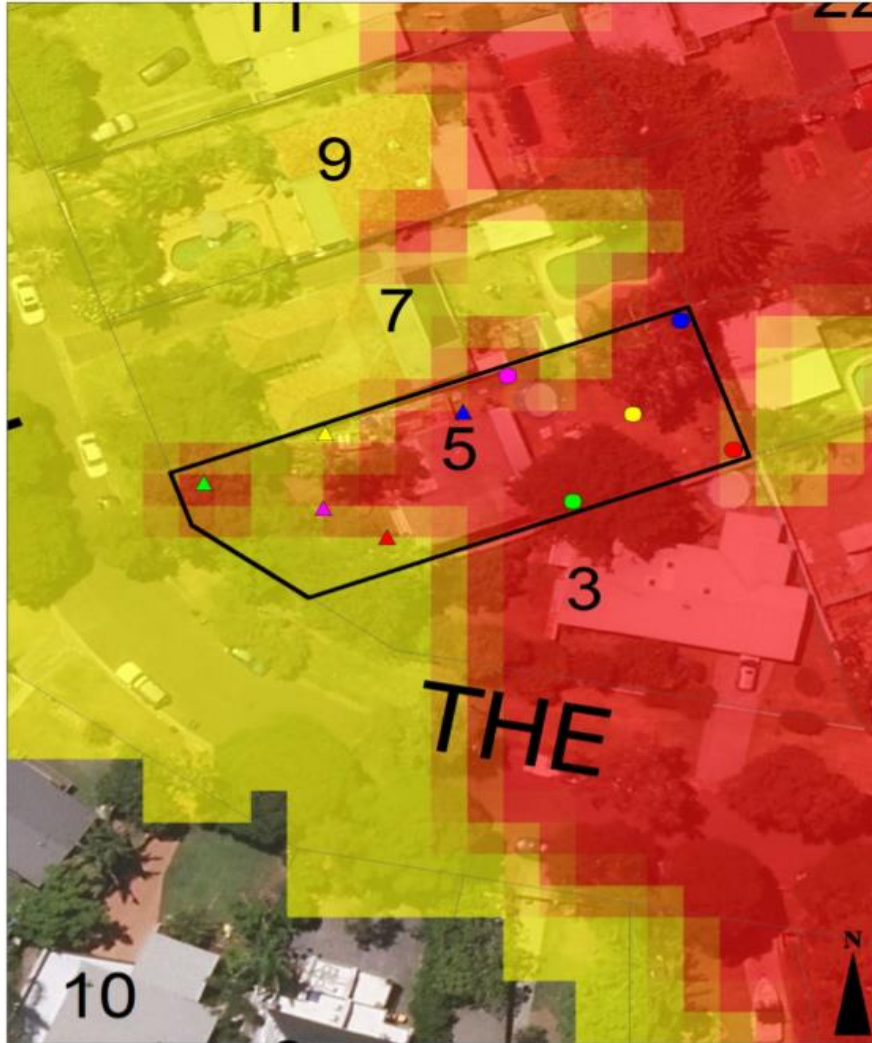
Notes:

- extent represents the Probable Maximum Flood (PMF) flood event
- extent does not include climate change
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Flood study reference) and aerial photography (Source: NearMap 2014) are indicative only

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FLOOD MAP F – 1% AEP FLOOD HAZARD EXTENT MAP



Map not to Scale

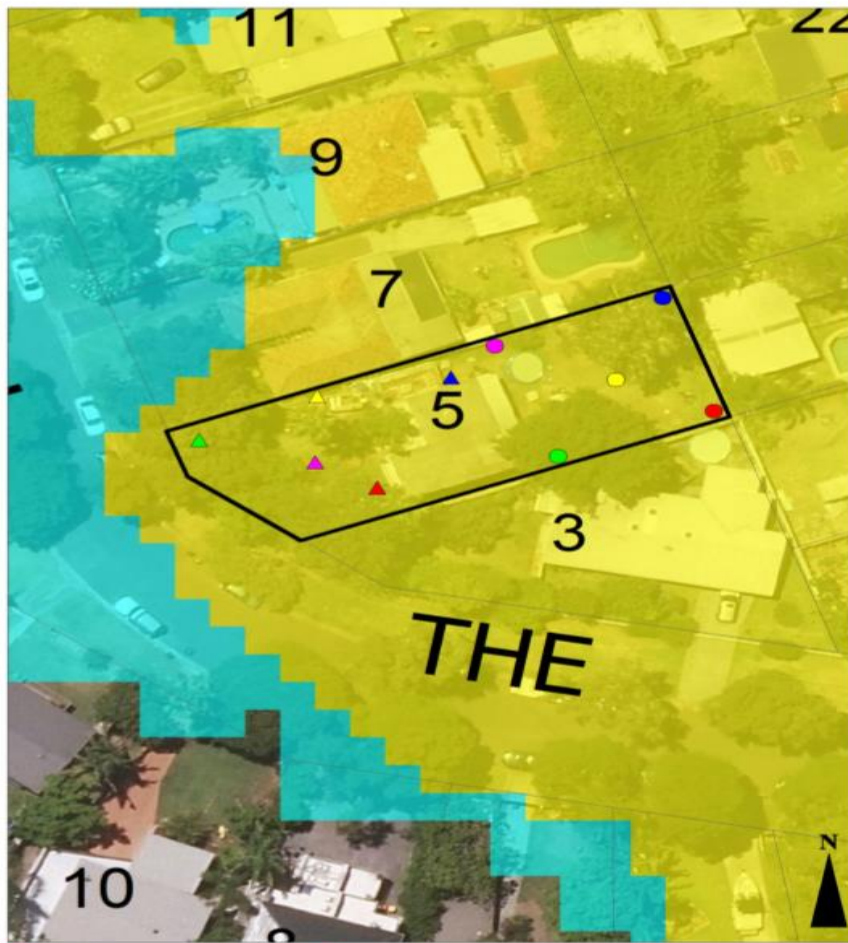
Notes:

- extent represents the 1% annual Exceedance Probability (AEP) flood event
- extent does not include climate change
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Flood study reference) and aerial photography (Source: NearMap 2014) are indicative only

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**FLOOD MAP G – 1% AEP FLOOD HYDRAULIC CATEGORY
EXTENT MAP**



Map not to Scale

Notes:

- extent represents the 1% annual Exceedance Probability (AEP) flood event
- extent does not include climate change
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Flood study reference) and aerial photography (Source: NearMap 2014) are indicative only

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FIGURE 5 – FLOOD ALERT SYSTEM LOCATION

Source: Plans by Vaughan Milligan - 191015

