ZAIT
Engineering Solutions Pty Ltd

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Postal Po Box 11 Oatlands NSW 2117

54 Gold Parade, Manly

Flood Management Plan

Disclaimer

The advice and information contained within this report relies on the quality of the records and other data provided by the Client and obtained from local authority along with the time and budgetary constraints imposed.

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Project Number: 19DZ1913

Address: 54 Golf Parade, Manly

Issue: B

Date of issue: 10/08/2019

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1. Introduction

A pre-development lodgement meeting was held with Northern Beaches Council for the proposed single residential dwelling at No.54 Golf Parade, Manly. Council indicated that the site is flood affected and a flood management plan is required to investigate the Post developed 100 year ARI water surface level, the impact the proposal will have on the inundation levels of the neighbouring sites, and the boundary fencing treatments necessary to pass the floodway flows.

The site is affected by flooding as stated in the Prelodgement advice from Northern Beaches Council dated 05/02/2019, and *Manly Lagoon Flood Study 2013*. *Zait Engineering Solutions* have been commissioned to assess the flood characteristics of the site and to provide a Flood Management Report demonstrating compliance with 'Manly DCP 2013 Amendment 11', the NSW Government Department of Planning's 'Floodplain Development Manual', and council's Flood Management Report guidelines.

2. Site Analysis

The site is located within the municipality of Northern Beaches Council and is identified as Lot 25B on DP 391974. The site is located on the Northern side of Golf Parade and has a total site area of approximately 406.2m² in total. The site is a corner lot bounded by residential allotments to the North and East. The block is bounded by located Golf Parade to the South, Balgowlah Rd to the West, and Pittwater Rd to the North (See Figure 1 – Site location).

The proposed development consists of the demolition of an existing single storey dwelling & carport and detached garage, and the construction of a new two storey residential dwelling. The dwelling will have a total area of 336.27m2, and a footprint area of approximately 190.85m2 (See Figures 2 & 3 Pre-developed & post-developed site plans).

3. Flood Assessment and Recommendations

The flood information provided by council dated 05/02/19 states that the subject site is affected by *Manly Lagoon Flood Study 2013*.

As per the information provided, the Flood Planning Level (FPL) for the site is set at RL 3.65mAHD. This level includes 500mm Freeboard. The 100 Year ARI Flood Level for the lot is RL3.15mAHD. In addition to this, Council have provided that the lot is identified as a High Flood Risk Precinct.

The 100 Year ARI Flood extent has been plotted as per the information provided and a current survey on site and are shown in Figure 4. It can be seen that the whole site is inundated with flood water during the 100YR ARI. The 100YR Flood Depths vary across the site, ranging from approximately 0.6-1.49m.

3.1 Finished Floor Levels

As per 'Manly DCP 2013 Amendment 11', for flood affected sites, all habitable floor levels are to have a 500mm freeboard above the 100 Year ARI flood level. The DCP also states that enclosed garages are to be located at or above the 1% AEP Level.

For the subject site, the 100 year Flood level is set at 3.15mAHD. Therefore the proposed dwelling is to have a finished floor level of minimum **FFL3.65mAHD,** and a minimum garage level of **GFL3.15mAHD.**

In the case that flooding exceeds the 100YR AEP level, the first floor of the dwelling is to be set to a minimum floor level of the Probable Maximum Flood or greater. Therefore the first floor is to be set at a finished floor level of **min.5.65mAHD.** This ensures that all occupants are able to seek refuge until directed by authorities.

3.2 Building Components and Structural Soundness

The lowest natural ground level in the vicinity of the proposed dwelling is approximately RL1.934. With a required habitable finished floor level of 3.65mAHD, the dwelling will be suspended a maximum of 1.716m from the surface.

Due to this, the dwelling must be constructed on **piers** to the structural engineer's details**.**

All materials proposed in the construction of the dwelling below the 100YR ARI are to be flood compatible material with supporting brick piers/steel columns.

This form of construction will ensure structural soundness and the ability to withstand all forces of flowing waters, including debris and buoyancy. All building components below the 100YR ARI plus freeboard (i.e the Flood Planning Level) are to be flood compatible materials as described above. All power points are to be at least 500mm above the 1:100 flood levels.

3.3 Boundary fencing

Any new boundary fences are to be flood fences so as to allow water to pass and not cause a blockage. Boundary fences should have a minimum gap of 100mm from Natural Ground Level in order to allow flood waters to pass (See Figure 6 – Flood Fence Detail). These details are to be reflected on the stormwater plans.

3.4 Volume

The existing flood storage volume of the site during a 1% ARI is approximately 123.95m^3. The proposed dwelling will be built on piers at 1.8m c/c (or as per structural details) allowing water to pass beneath the structure. Piers are to be designed to withstand all forces of flowing water including flood waters, debris and buoyancy. The Post-developed Flood storage volume will be less than that of the existing flood storage of the site. This is due to the proposed dwelling being on piers.

3.5 Velocity

The proposed dwelling will have a 5.22m set back from the rear boundary, a 4.20m setback from the front boundary, a 1.30m set back from the eastern boundary, and a 2.50m set back from the western boundary (See attached Figure 3). The removal of the existing dwelling and detached garage as an obstruction, to be replaced with a dwelling on piers, the proposed setbacks above will create a greater minimum widths of flow through the site. In accordance with the survey and the proposed plans, the existing width of flow will be increased by approximately 3.8m. With the proposed setbacks, the implementation of flood fences, and the dwelling being built on piers, the velocity of water upon flooding is expected to be equal to the existing flow rate.

3.6 Impact on adjacent lands

As per the Flood Extent shown in Figure 4, it can be seen that the whole site is affected by the 1 in 100YR Flood. The site will be inundated with approximately 0.6-1.49m of flood water. The proposal consists of removing an existing dwelling and detached garage and replacing it with a dwelling that is to be constructed on piers as to not obstruct the flow. The piers are to be at 1.8m c/c and therefore the flood inundation impact is expected to decrease on the neighbouring properties.

4. Evacuation

It is recommended that evacuation procedures shall be carried out pending instructions from authorities i.e. State Emergency Services.

For Storms up to the 1% AEP, all occupants are to remain within the proposed dwelling, due to the proposed elevated level, and the short length of time of concentration. However, if previous warning is given, evacuation to Golf Parade is safer. Evacuation during flooding may be quite dangerous and is NOT be recommended.

In the event of a probable maximum flood, all residents to seek refuge on the first floor of the dwelling. The FFL of the first floor of the dwelling is to be set at a minimum level of the PMF or greater. This level has been calculated to be **min.FFL5.65.**

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5. Conclusion

We certify that the proposed dwelling as presented in this Flood Management plan will meet the requirements of Department of Planning's 'Floodplain Development Manual', Northern Beaches Council's Flood requirements as specified in 'Manly DCP 2013 Amendment 11', the Flood Information provided by council dated 05/02/19, provided that all procedures and recommendations presented in this report are implemented.

It is also noted that so long as this report is adhered to, the proposed development will not produce a net loss of flood storage below the 1% AEP flood level and will not have any adverse flood impacts on neighbouring properties.

As per Northern Beaches Council's requirements, the *Attachment A Certification form* has been included at the end of this report.

Should you require any further explanations, please do not hesitate to contact our office.

Yours faithfully,

David Zaiter

(BEng(Hons), MIEAust, CPENG, NER, RPEQ)

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Figure 1 - Site Plan (Source: SIX Maps website accessed 03/06/19)

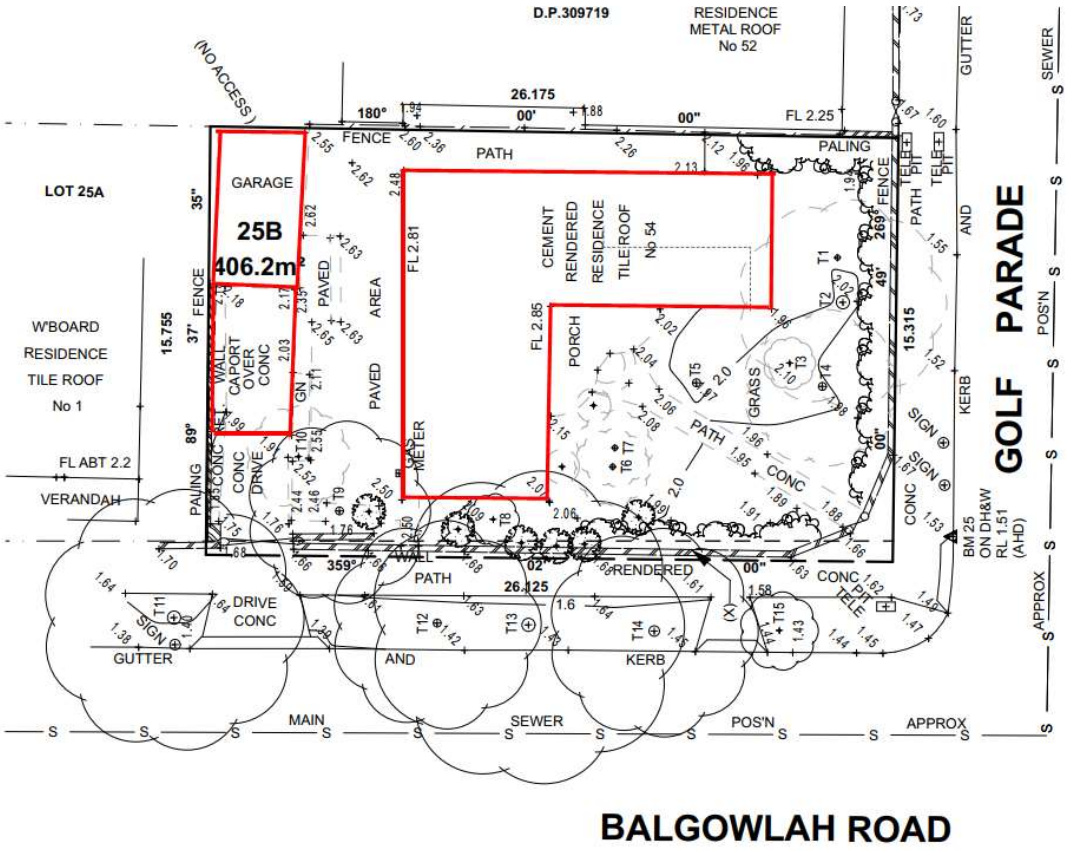

Figure 2 - Pre-Developed Site Plan (Source: Plans by Hall & Hart dated 30/07/19)

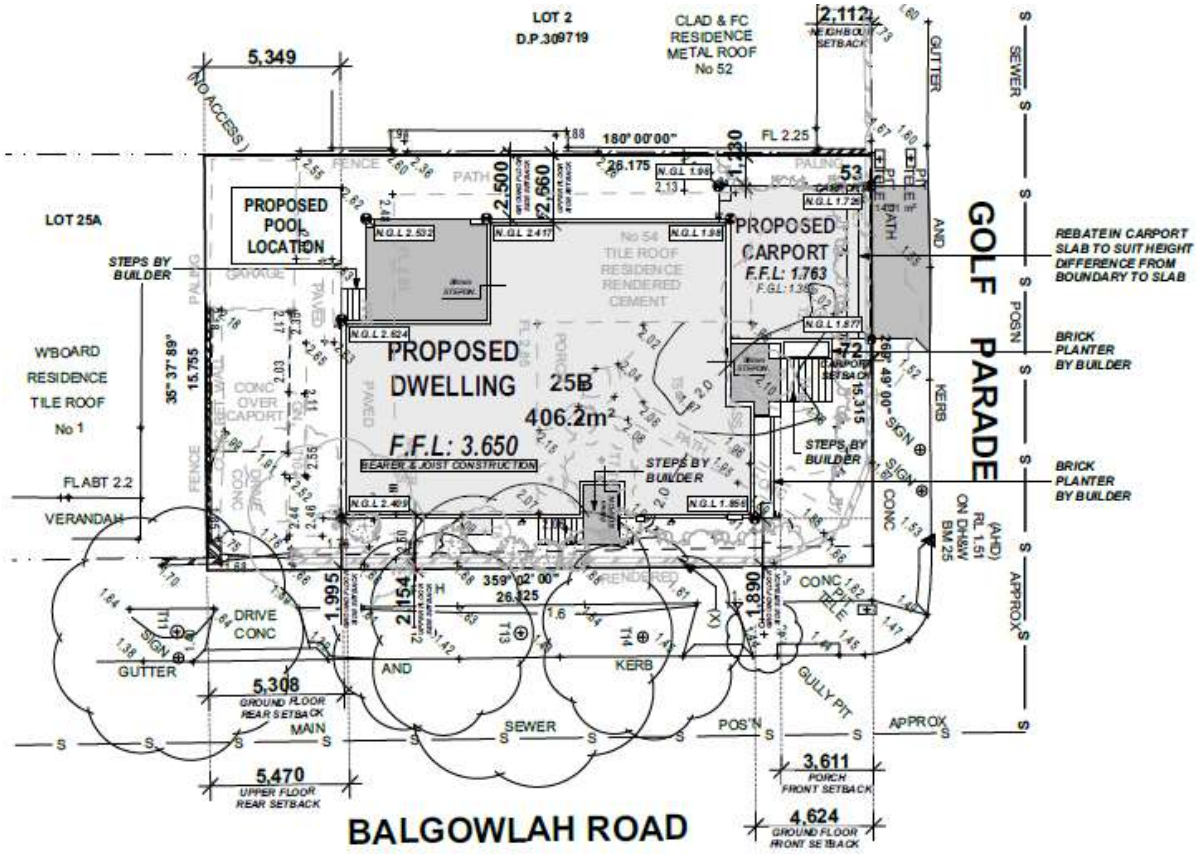

Figure 3 - Post-Developed Site Plan (Source: Hall & Hart dated 30/07/19)

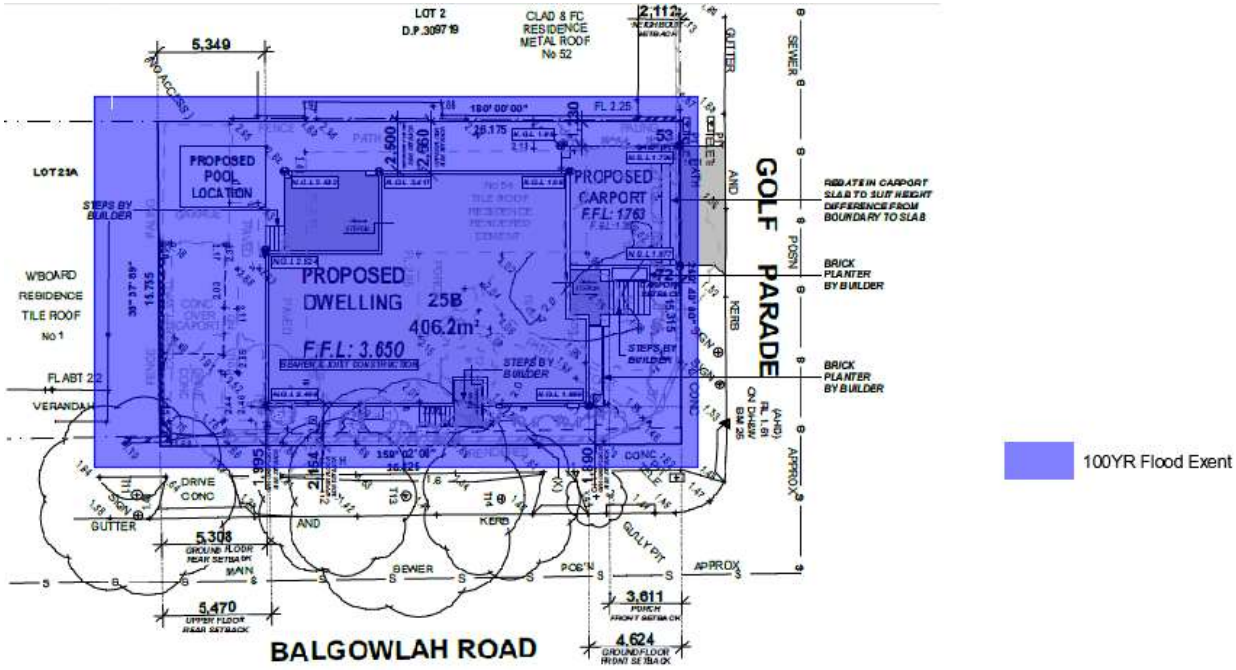

Figure 4 - 100YR Flood Extent (Source: Zait Engineering Solutions)

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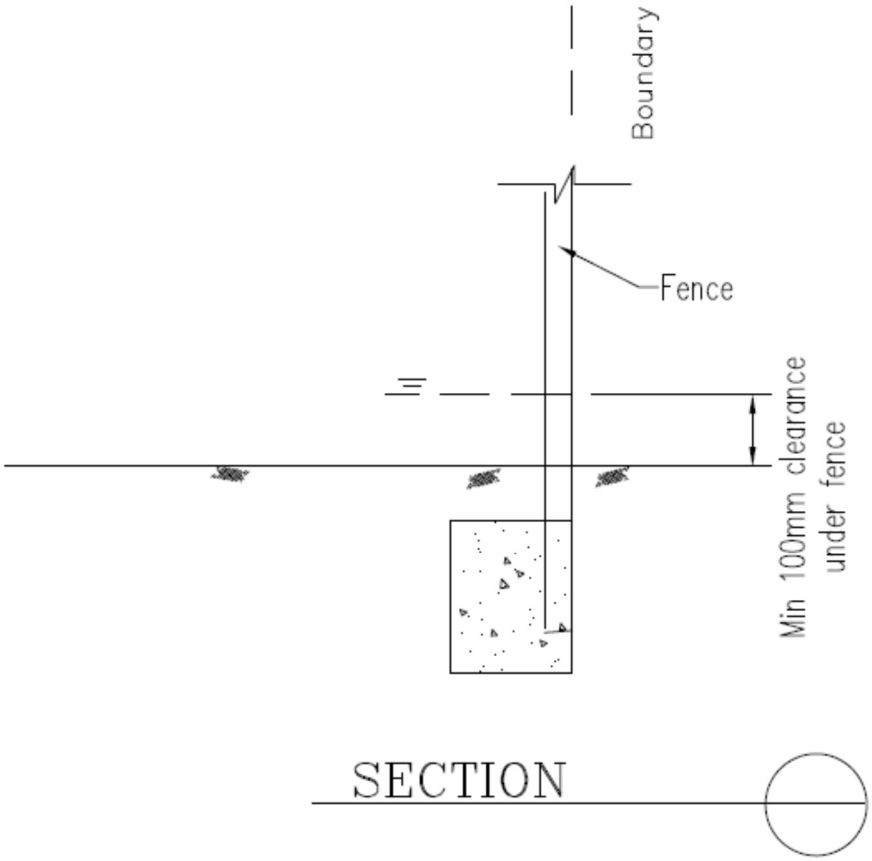

Figure 5 - Flood Fencing Detail

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NORTHERN BEACHES COUNCIL
STANDARD HYDRAULIC CERTIFICATION FORM
FORM A/A1 – To be submitted with Development Application

Development Application for

Address of site: 54 Golf Pde, Manly

Declaration made by hydraulic engineer or professional consultant specialising in flooding/flood risk management as part of undertaking the Flood Management Report:

I, David Zaiter (Insert Name) on behalf of Zait Engineering (Trading or Business/ Company Name)

on this the 10/08/19 (Date) certify that I am engineer or a professional consultant specialising in flooding and I am authorised by the above organisation/ company to issue this document and to certify that the organisation/ company has a current professional indemnity policy of at least $2 million.

***Flood Management Report* Details:**

Report Title: Flood Management Plan

Report Date: Rev B dated 10/08/19

Author: David Zaiter

Author's Company/Organisation: Zait Engineering

I: David Zaiter (Insert Name)

Please tick all that are applicable (more than one box can be ticked)

☒ have obtained and included flood information from Council (must be less than 12 months old) (**This is mandatory**)

☒ have followed Council's Guidelines for Preparing a Flood Management Report

☐ have requested a variation to one or more of the flood related development controls. Details are provided in the *Flood Management Report*.

Signature .....

Name David Zaiter MIEAust CPEng NER RPEQ