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Flood Impact Assessment Report

60 Federal Parade and 37 Federal Parade, Brookvale NSW 2100

CORE PROJECT CONSULTING

28/07/2022

CORE PROJECT CONSULTING

Report Details

Address

60 Federal Parade and 37 Federal Parade, Brookvale NSW 2100

Client

Artazan Property Group (APG)
Carter Gaze

Revision History

REVISION	DATE	AUTHOR	REVIEWED
1	28/07/2022	Hasan Rana Civil Engineer	Joshua Roberts QA-QC

This Report has been prepared for Cian Fitzgerald of APG Group in accordance with the terms and conditions of CORE Project Consulting Pty Ltd (ABN 73 054 959 036) Fee Proposal dated 22/07/2022. CORE Project Consulting will not accept responsibility for any use of, or reliance on its contents by any third party.

The comments and recommendations provided in this report are based on our visual observations and our experience with similar issues in the past. Unless noted otherwise, no destructive investigations were undertaken.

Disclaimer
Information in this document is current as at the date of issue by Core. While all professional care has been undertaken in preparing the document the author Hasan Rana accepts no liability for loss or damages incurred as a result of reliance placed on its content. Regulatory Authority is to access the report and give consent to development. This report is generated to develop an understanding of overland flow and its expected scenario (effected water level) on the basics of information provided. This report should only be considered as the guidance to evaluate the possible impacts. This report does not authorise or provide any advice to the client or any regulatory body and does not cover any labiality occurred due to any decision made as per this report. The acceptance of this report is based upon Council engineer's final verdict to accept the evaluation or reject the report as the Council have the associated study of higher catchment areas and may have other EIA reports which the author is not aware of.

CONTENTS

1 Background

The Client has engaged CORE to prepare a Flood Impact Assessment report and Evacuation Management Plan to fulfil Council SSR requirement to demonstrate adequate documentation as per DCP. The client is proposing a new building at 60 Federal Parade and 37 Federal Parade, Brookvale NSW 2100.

This report is prepared for council compliance. It is anticipated that this report will be issued to council for respective Engineer's assessment.

The background information for this report obtained from previous reports provided by the contractor mainly covering Macro Reserve Amenities and Council provided SSR report.

2 Site Description

2.1 Site Location

The site is located on 60 Federal Parade and 37 Federal Parade, Brookvale NSW 2100, which forms part of St Augustine's College. These sites are identified for reference in Figure 1 and Figure 2. The area of the site is approximately 5.8 ha, with most of the area utilized as sporting fields, as shown in Figure 1. These two sites are being proposed as a Car Park, as has been lodged with Council. The site where the works are to be undertaken is outlined red.

Figure 1 – Location of Site (Source: Six Maps)

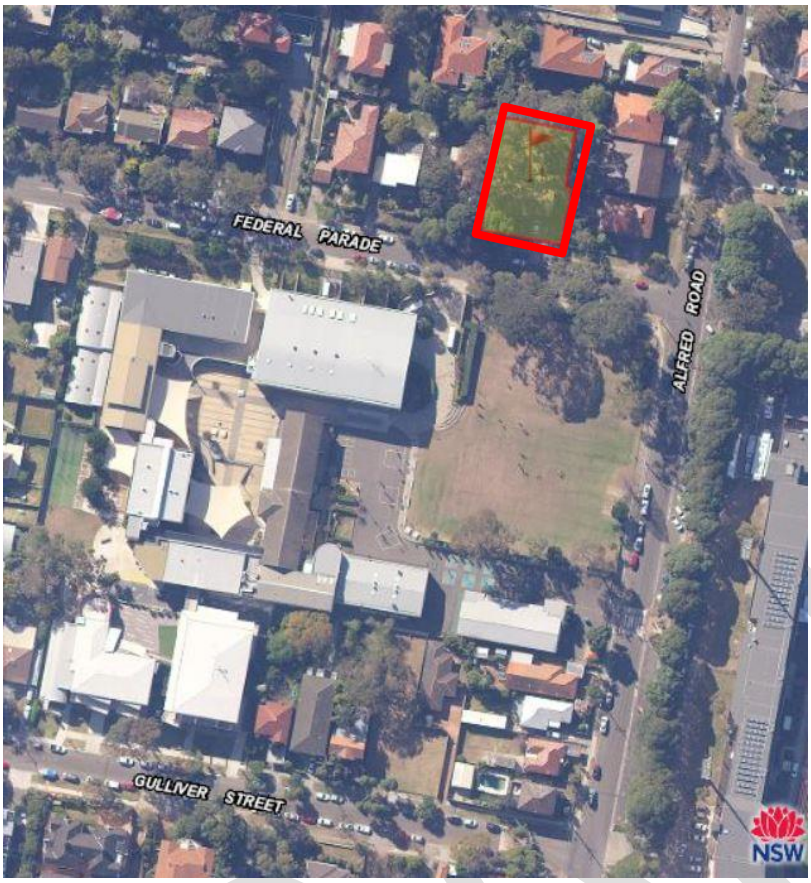

Figure 2 – Location of Site (Source: Six Maps)

2.2 Current Situation

These two sites are being proposed to Council as a Car Park to support the additional number of students to the existing School Building. A Development Application (DA) has been lodged and submitted to Council. Council has reviewed the submitted documentation and advised that, as per the recent flood study, the sites exist in a flood effected area. Therefore, we have prepared this Report after discussion with the Council Flood Engineer and Stormwater Engineer.

2.3 Proposed Development

The two sites have been proposed as a Car Park to support the increase in student numbers to the existing educational facility, St Augustine's College.

On 60 Federal Parade, Brookvale, the existing dwelling is to be demolished and a hardstand is proposed on the same ground levels. This site has a Council drainage easement opening and access lid, which exists within in the proposed Car Park layout.

On 37 Federal Parade, Brookvale, the proposed Car Park will be situated on the rear lawn, located on Alfred Road and Gulliver Street. The proposed Car Park will utilize the existing entry and exit points on Alfred Road and Gulliver Street.

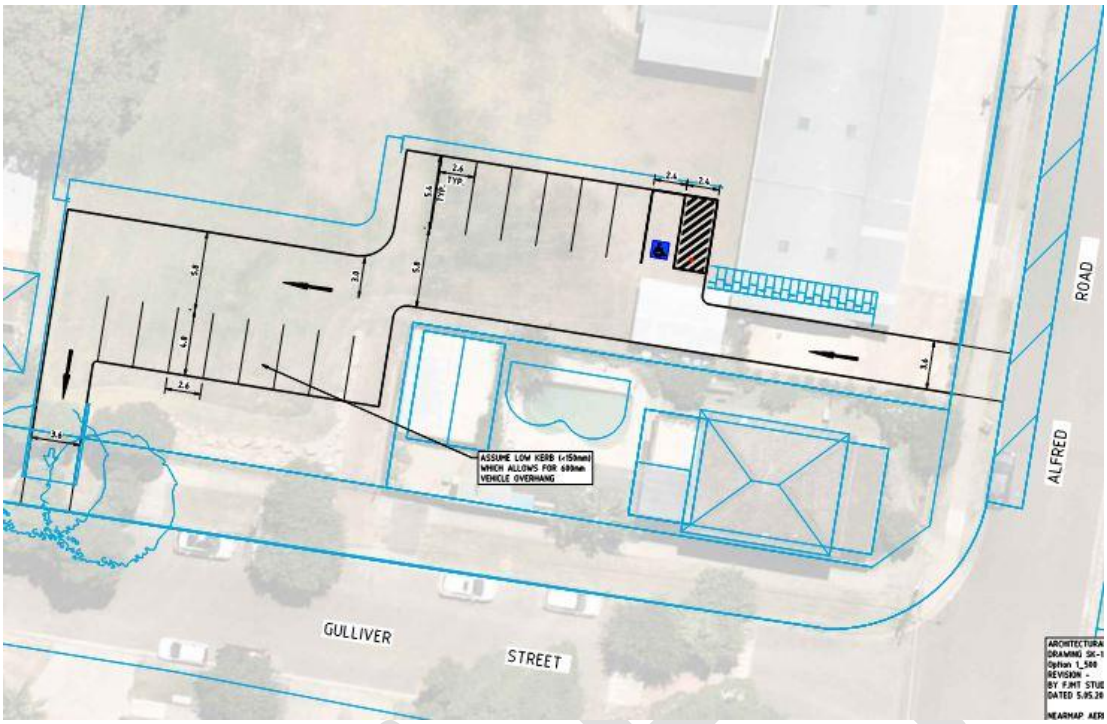

Figure 3 – Proposed Car Park layout at 37 Federal Parade (Source Stormwater Drawing)

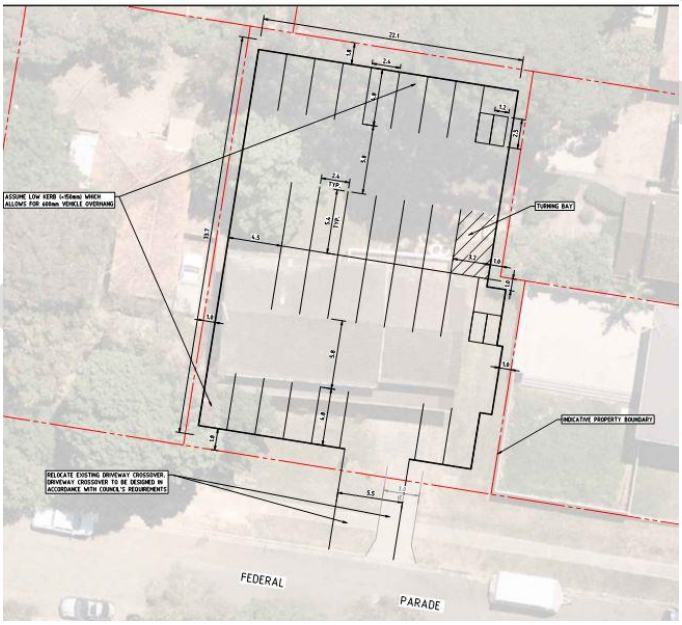

Figure 4 – Proposed Car Park layout at 60 Federal Parade (Source Stormwater Drawing)

3 The Current Scenario

3.1 Current Hydrology Scenario

During our assessment, we evaluated the Northern Beaches online maps and observed that both sites were not affected by the Flood. As shown in Figure's 5 & 6, it is evident that the sites do not exist in both the High and Medium flood risk planning precinct.

Figure 5 – Northern Beaches Councill Online Map showing High Flood Risk Planning Precinct (Source: Council Online Maps)

Figure 6 – Northern Beaches Councill Online Map showing High & Medium Flood Risk Planning Precinct (Source: Council Online Maps)

Upon further study of the Northern Beaches online maps, we can evaluate that the stormwater assets are present in both sites, as shown in Figure 7. On 60 Federal Parade, the asset was documented on a site survey. It was evaluated during our design stage to be connecting with the Kerb Lintel on Federal Parade. Whereas 37 Federal Parade assets were observed to be connected with the drainage asset on Gulliver Street. Since the proposed development did not involve any cut and fill, the existing cover on the asset remains as per the pre-development scenario. On 60 Federal Parade, an access lid was observed so the proposed car park hardstand was designed to not be disturbed.

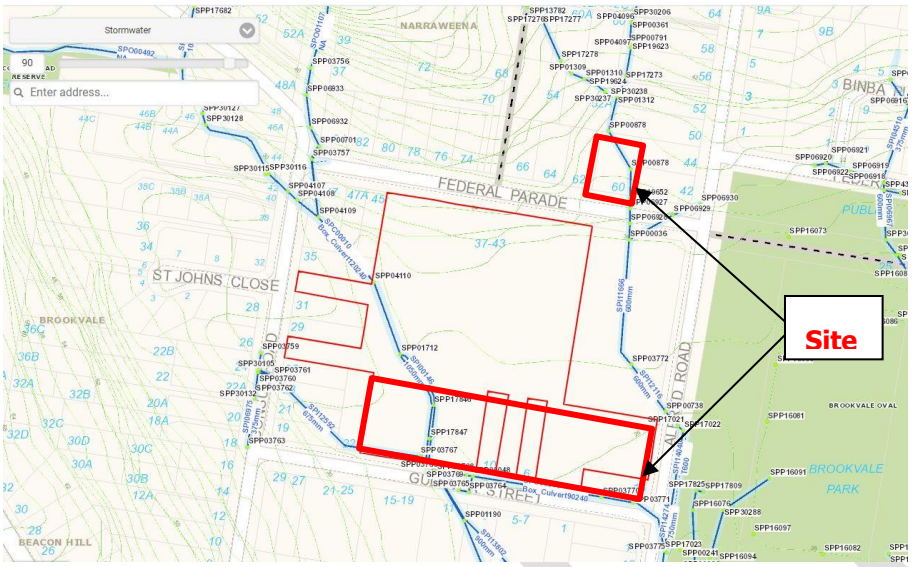

Figure 7 – Indicative location of site and associated Council drainage asset (Source: Council Online Maps)

3.2 Council Provided Information and Critical Levels

During the Council's assessment of the submitted Development Application plans, the below information was advised by the Planning Officer that in a recent flood study of Greendale Creek, conducted by Council engaged consultants, shown in Figure 8 below, shows the location of the two sites with 1% AEP and PMF extents. From the provided input, critical locations where the maximum water level is observed in the catchment (at predevelopment conditions) can be seen.

The following information was received by the planner involved in the Development Application, as per Council provided email, and I quote;

"The Greendale Creek Flood Study is still a draft and is anticipated to go on public exhibition later this year. Once it goes on public exhibition, the flood level data from it will be used for assessing DAs.

The mapping below shows the 1%, FPA and PMF extents from the draft study. We only have the extents, not the actual flood levels.

The results will probably change a bit before the study is finalised, as we will probably re-calibrate the model to include flood data from the recent March flood event.

The mapping below provides a general idea about the flooding, but the applicant may need to investigate the flood situation with their own modelling. I'm not aware of what development is proposed."

Figure 8a – Council provided input. Flood Advice Extract (Councill provided input)

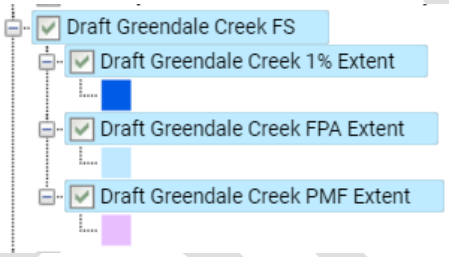

Figure 8b – legend of the Draft Flood Report (Councill provided input)

As this information was provided from the draft flood study of the proposed site location, proposed development and extent of flooding was discussed with the Flood Engineer and Council Drainage Engineer.

In lieu of such discussion with the Council Engineer and Flood Engineer, it was agreed that no flood or overland flow study is required. This is because the proposed works do not include works that are causing any construction to the flood path and overland flow route. In fact, the proposed development for 60 Federal Parade, Brookvale is to demolish the existing two storey dwelling which will improve the overland flow path. Whereas the development of 37 Federal Parade, Brookvale, at the rear side with Gulliver Street acting as the main flood pathway, the proposed Car Park development is only affected by PMF extent. Based on this information, no flood report shall be presented to overview the impacts of the proposed Car Park development on the overland flow.

3.3 Planning Considerations

Planning considerations were adopted as per the guidelines of:

- The Northern Beaches Flood Risk Management Policy (Appendix E)
- Northern Beaches Council Design standards for Flood Prone areas (Appendix F)

- Norther Beaches Council Water Management for Development Policy V2 dated 26 February 2021 Chapter 10 (Appendix G)

In terms of the

10.1 FLOOD RISK MANAGEMENT OBJECTIVES	ENGINEERS COMMENTS
a) Public Awareness	The College Administration has been advised of the recent changes. Furthermore, the Draft flood study is also displayed for public awareness.
b) Flood Associated Risk is minimised	Since the proposed works on both sites do not propose any risk to habitable structures, flood associated risks in this area are not anticipated.
c) Manage the Risk of life	
d) Development is compatible with social economical and design consideration	Proposed Car Park is to facilitate the parking problems experienced by both Students and Teachers. It will present a positive impact socially and will reduce the load to Street parking felt by the area.
e) Impact on existing developments	The impact on existing developments is not anticipated, as the proposed Car Park will enhance the parking conditions of the college and put some ease on off street parking on adjacent roads.
f) Effective controls are applied for the proposed development	Associated Policy and DCP controls have been addressed in chapter 'Planning Consideration' of this report. Points 10.1, 10.2 and 10.3 of the DCP associated with flood risk management are also addressed in table X, Y and Z.
g) Flood assessment by qualified personal	I am a Chartered Civil Engineer with 17 years of Industry experience.

Table 1: Compliance of 10.1 of Northern Beaches Water Management for Development Policy v2

10.2 STRATEGIC FLOOD RISK MANAGEMENT MEASURES	
10.2.1 Risk Assessment and Management	No risks were observed, mainly due to the proposed development not obstructing the overland flow path.
10.2.2 Land Use Planning	The proposed planning is in alignment with the permissible development and no building structure is proposed which can affect the Land.
10.2.3 Combat Agencies	Evacuation plan and procedures are advised in accordance with NSW SES emergency services and the associated guidelines are attached in Appendix of this report.
10.2.4. Climate Change	A flood study of the Creek is currently being undertaken. We anticipate that the consultants have considered Climate Change and impact to/of impervious areas. A worst-case scenario will be proposed, as the previous online maps on the Northern Beaches Council website did not include the site and associated routes in critical flood precincts.

10.2 STRATEGIC FLOOD RISK MANAGEMENT MEASURES	
10.2.5. Community Engagement	As per the Council website, the current flood study is shared online for public viewing. Furthermore, School management has been advised of a flooding scenario to avoid any potential accidents.
10.2.6. Flood Monitoring Program	Due to there being no construction of any habitable areas, critical flood monitoring is anticipated. PMF levels are also viewable within the draft report snapshot.

Table 2: Compliance of 10.2 of Northern Beaches Water Management for Development Policy v2

10.3 OPERATIONAL FLOOD RISK MANAGEMENT ACTIVITIES	
10.3.1 Risk Response	Evacuation plans and procedures are advised, in accordance with NSW SES Emergency Services, and all associated guidelines are attached in Appendix of this report.
10.3.2 Education	
10.3.3 Mitigation Measures	
10.3.4 Development Application	This report is attached for reference.
10.3.5 Planning certificates	As the flood studies are currently in their draft stages, we anticipate that its implementations are not documented in the current section 149 planning certificates.
10.3.6 Provision of Data to the public	Since the report is in its draft stages, this information is not public, however, the provided information has assisted us to evaluate any anticipated flooding and advise that the proposed works are neither critical, nor pose any threat to the overland flow pathway.

Table 3: Compliance of 10.3 of Northern Beaches Water Management for Development Policy v2

3.4 Floor Levels

The proposed development is a Car Park, as shown in Figure 9 below. In this development, minimum cut and fill is proposed to support gravity flow.

Figure 10 below shows the critical levels with respect to the existing site levels. These plans are attached in the Appendix for Council evaluation.

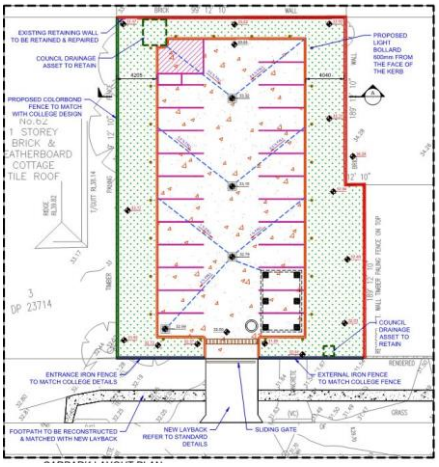

Figure 9 – 60 Federal Parade, level advised for the proposed development (Source: Stormwater set of documentation)

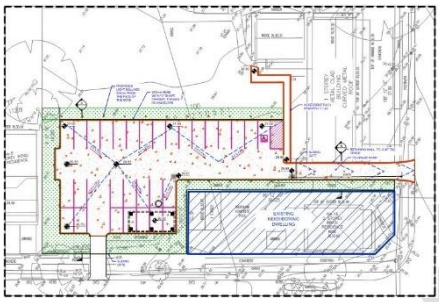

Figure 10 – 37 Federal Parade, level advised for the proposed development (Source: Stormwater set of documentation)

3.5 Building Components

No building components have been proposed in the Development Application. Thus, habitable floor area constraints are not considered as a critical component for this development.

The existing building on 60 Federal Parade, Brookvale, is proposed to be demolished and no building is proposed for the rear area at 37 Federal Parade, Brookvale.

Therefore, the proposed development does not pose any threat to the flooding or overland flow path. Rather, the proposed works will improve the overland flow path route.

The Client wishes to utilize the existing boundary wall at the rear of 60 Federal Parade, Brookvale, for a sustainable development, and if Council require, we can propose a flood safe and compliant boundary wall to support overland flow pathways.

Furthermore, the boundary located at the other site is already made of opened barrier fence materials which do not pose any threat to the overland flow route.

3.6 Structural Soundness

In the proposed Car Park development, no new buildings are proposed and therefore structural soundness is not anticipated to be critical for this hardstand area.

Due to the site being located on the overland flow pathway, we would appreciate if Council could share the documented flow velocity and maximum PMF levels, so the associated hardstand areas can be designed by the Pavement Engineer at the CC Stage to withstand any additional amount of stormwater inflow from upstream.

We also advised the Stakeholder's that upon receipt of Council's detailed input, to gain advice from a Geotechnical Engineer and Pavement Engineer to ensure the structural soundness of the structural members, especially and specifically the Pathway and Driveway.

Stakeholders are also advised to engage a Structural Engineer at the Construction stage to investigate the existing structures which currently lay within the flood path and are obviously already constructed. A Structural Engineer is also advised to provide support to the whole structure, which lies in the vicinity of flood water at critical areas advised by Council.

It is worth mentioning that during our evaluation, we did not observe any critical area which can be impacted by the critical overland flow. However, a Structural Engineer is required to ensure that there is no impact on the structural system that lies under ground level.

We highly recommended that a Structural Engineer provide this detailed report, along with a Geotechnical Engineer's findings on flooding along with the draft flood study report.

3.7 Flood Effects

As per the available information, we anticipate that the site is affected by a low to medium risk of overland flow. The overflow is majorly anticipated from the upstream, which already has boundary walls situated on 60 Federal Parade, Brookvale. The existing road is acting as a route of overland flow path on Gulliver Street, Brookvale. The existing site on Gulliver Street, Brookvale is already above the kerb. Also, the survey demonstrates that the proposed finished floor level is minimum 300mm above the kerb side of the road.

As per our evaluation, we observed that there are existing stormwater assets available and functional under both the site and intaking stormwater from upstream. If these pipes are not functional, or are blocked by any means, the stormwater from the road reserve may affect the conveyance of the proposed building. We therefore advise that an investigation of these drainage assets is conducted during the Construction stage.

3.8 Flood Storage

As per the provided information by Council, and the topographic evaluation of the relevant site, it is our understanding that both sites are on the higher side of flood pathway and overland flow route. Therefore, the proposed development neither plays a role in any potential flood storage, nor does it disturb any routes of overland flow.

3.9 Flood Evacuation Procedures

As per our site conditions, an evacuation procedure is not required. An evacuation should only need to be considered as a last resort scenario to save human lives in the event of an unprecedented act of God that cannot be anticipated or prevented. Also, the proposed development, being a Car Park, it is highly unlikely it will be occupied during evening times.

During floods, many local and major streets and roads will be cut off by floodwaters. Travelling through floodwaters on foot, or in a vehicle, can be extremely dangerous as stormwater may be polluted, obstructions can be hidden under the floodwaters, or you could potentially be swept away. Council recommends staying at home during such events, as much as possible, and recommend this as the safest option. If you need to leave home, do so early in a flood event before flood levels reach the road level in front of the dwelling.

Meanwhile, if there is a need for evacuation, the following evacuation options can be considered to keep driver's safe.

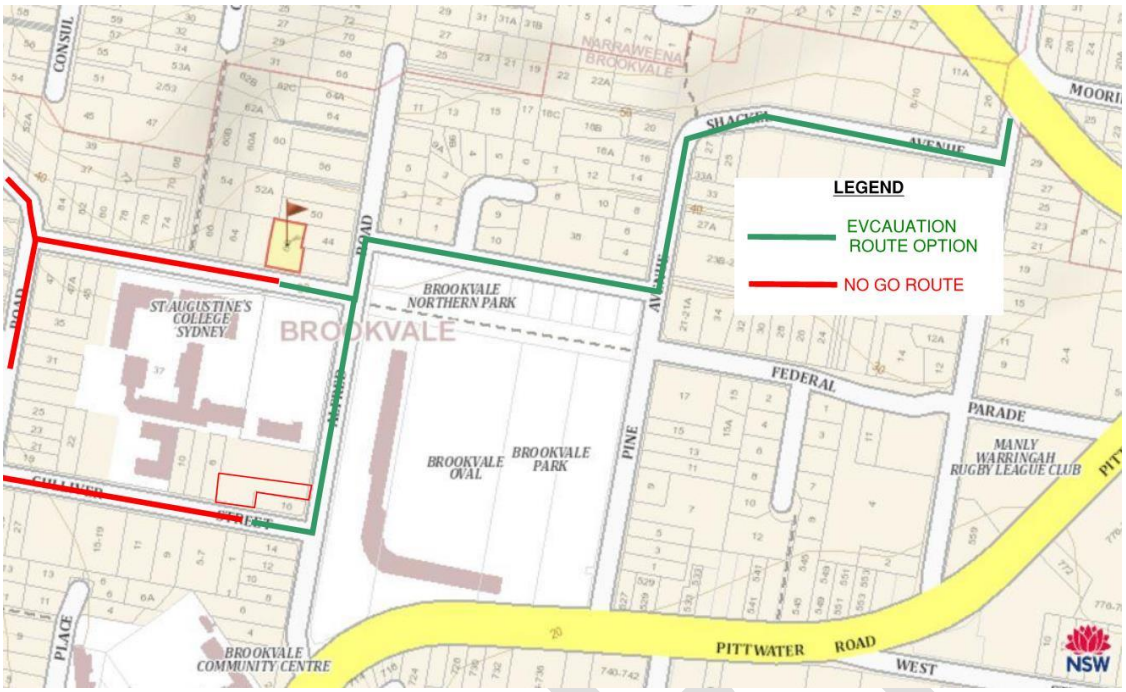

Figure 2 - Flood evacuation Plan (Image Source: Six Maps)

3.10 Self – Managed Evacuation/Relocation

This is a spontaneous type of evacuation involving the self-initiated movement of people as individuals, families or community groups. This may include circumstances where occupants are advised to leave early ahead of dangerous conditions (e.g., during days of Catastrophic fire danger). Self-evacuation or relocation can be helpful in that it reduces the number of people that remain within a potential impact/evacuation zone. This form of evacuation may result in a level of community expectation that authorities may not be able to immediately support.

In our case, a building is not being constructed, and the Car Park is not designed to be functional at night. In the hypothetical scenario that the situation becomes worse, and evacuation is required, then a self-managed evacuation relocation plan is advised. SES emergency management plan and procedures should be followed prior of making any decisions. Furthermore, to act upon this option, the school's management is also advised to develop their own safety flood plan. It is advised that the people who are in continuous use of this facility should talk to the Council to determine the safer travel routes that are less likely to be cut by floodwaters.

3.11 Immediate Evacuation

This results from a hazard impact that forces immediate action, thereby allowing little or no warning and limited preparation time. Hazardous materials incidents, air crashes, bush fires, flash flooding or earthquakes are examples that may require immediate action.

Generally, the occupants at ground level can be asked to move to the upper level, followed by the procedure highlighted as per SES emergency plan. However, in our case there is no first floor, so the condition is to be monitored and acted upon appropriately in this potential instance.

3.12 Special Consideration During Flood Conditions

During a flash flooding scenario, the following precautions should be considered to avoid any possible danger.

1. As the flood level approaches the ground level (but only if safe to do so) relocate any items that may be damaged by water, or poisons, or wastes to as high a level as possible.

2. Usually when the flood level approaches to the habitable floor levels following advice is provided however our development has no habitable floor proposed therefore the following advice is for the adjacent habitable buildings:

a. Gather medicines, special requirements for babies or the elderly, mobile phones, first aid kit, special papers and any valuables into one location,

b. Put on strong shoes, raise any items within habitable floor area that may be damaged by water (e.g., photo albums) to as high a level as possible, with electrical items on top. Turn off and disconnect any large electrical items such as TV, fridge, dishwasher that cannot be raised.

c. Place wet towels across the bottom and lower sides of external doors to slow down the entry of water through the door.

3. In the case of a medical emergency ring 000 as normal but explain about the flooding.

4. A laminated copy of this plan should be permanently attached (glued) on an inside cupboard door in the kitchen and laundry.
5. This flood management plan should be reviewed every 5 years, particularly with the potential effects of Climate Change with sea level rise and increased rainfall intensities.

6. Remember floodwaters are much deeper and flow much faster outside.

7. In the very rare event that floodwaters may enter the home if it does collect items which are necessary and move to the upper floors' common space.

8. Do not evacuate the vicinity unless instructed to do so.

9. Before moving to the upper level or evacuating the premises switch off main power supply to avoid short circuit and chances of electrocuting those who have contact with overflow water.

3.13 SES Emergency Plan Documentation

To educate the general public in how to react in emergency situation NSW State Emergency Services (SES) has prepared "Awareness" documents which provides general procedure how to response in an emergency situation.

This document is known as NSW SES Home Emergency Plan 2017 and attached with this Flood Evacuation Management Plan. This document along with the SES Home Emergency Plan 2017 shall be provided to following person for effective remedial action at flooding

- Residents of the proposed development
- Strata manager
- Emergency Evacuation management committee of the development
- Associated SES representative for future training and actions

4 Limitation and Assumptions

All requirements addressed in the Northern Beaches guidelines and available information provided by the Client, have been incorporated in this report. This report is prepared to provide description to the stakeholder about the critical issues and covers all the aspects required by the regulatory authority. However, it is the council engineers final verdict to accept the evaluation or reject the report as the Council have the associated study of higher catchment areas and may have other EIA reports which the author is not aware of.

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5 Appendices

Appendix A: Survey Plan

Appendix B: Site Plan of Proposed Development

Appendix C: Council provided information

Appendix D: SES- NSW Evacuation Management Plan

Appendix E: The Northern Beaches Flood Risk management Policy

Appendix F: Northern Beaches Council Design standards for Flood Prone areas

Appendix G: Northern Beaches Council Water Management for Development Policy V2 dated 26 February 2021 (Chapter 10)