COSTIN ROE CONSULTING

CIVIL & STRUCTURAL ENGINEERS

CIVIL ENGINEERING REPORT FOR DEVELOPMENT APPLICATION

DEVELOPMENT SITE

75 OLD PITTWATER ROAD, BROOKVALE NSW 2100

Prepared for:
Harrison SPARC
75 Old Pittwater Road
BROOKVALE NSW 2100

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1 INTRODUCTION

1.1 Location

Harrison SPARC proposes to develop/install a new demountable laboratory at 75 Old Pittwater Road, Brookvale, NSW. The site consists of a total area of approximately 2.37Ha with the proposed development consisting of approximately 790 square metres.

1.2 Scope

Costin Roe Consulting Pty Ltd has been commissioned by Harrison SPARC, to prepare this Engineering Report in support of the Development Application for the proposed Development Application for the site.

This report provides a summary of the design principles and planning objectives for the following civil engineering components of the project:

- Stormwater Management;
- Erosion and Sediment Control;
- Flooding/Overland Flow; and
- Finished Levels.

The engineering objectives for the development are to create a site which, based on the proposed architectural layout, responds to the topography and site constraints and to provide an appropriate and economical stormwater management system which incorporates best practice in water sensitive urban design and is consistent with the requirements of council's water quality objectives.

A set of drawings have been prepared to show the proposed finished levels and stormwater drainage requirements for the development. These drawings are conceptual only and subject to change during detail design.

1.3 Pre-lodgement Meeting/Consultation

Consultation with Northern Beaches Council was conducted to provide advice on specific issues related to the proposed development. This has been addressed in the form of a pre-lodgement meeting resulting in comprehensive correspondence on the provision of On-Site Detention (OSD), flood measures & considerations, and stormwater management. The discussions during the meeting have been documented in the pre-lodgement meeting notes, referencing *PLM2023/0125* (dated 17 October 2023), refer to **Appendix C.**

1.4 Authority Jurisdiction

The consent authority for the development is Northern Beaches Council (NBC). The requirements of the former *Warringah DCP 2011, Warringah Local Environmental Plan 2011 (WLEP)* and *Water Management for Development Policy* apply to the engineering design for the development.

2 DEVELOPMENT SITE

2.1 Location

The proposed development is located in the suburb of Brookvale on the southern side of Old Pittwater Road as shown in **Figure 2.1**.

The development area forms a portion of the centre of a large industrial lot comprising of several single level warehouse buildings, offices, hardstands, internal access roads, and car parking areas.

Figure 2.1. Locality Map

2.2 Existing Site

The proposal applies to land at 75 Old Pittwater Road, Brookvale, being Lot 2/DP600059 (subject site).

The property has an area of 2.37Ha with the proposed development consisting of approximately 790 square metres. The site is surrounded by a mix of industrial and commercial development including Warringah Mall along the southern boundary. Brookvale Creek is located, and forms, the eastern boundary of the property and conveys run off from the north to the south.

Levels over the site vary between RL 14.7m AHD on the northern boundary (adjacent to Old Pittwater Road), to RL 12.0m AHD on the southern boundary near Brookvale Creek.

2.3 Proposed Development

The proposed development consists of the installation of a new raised demountable laboratory and relocation of existing demountable with stairs and access ramps. Part of the 790 square metre works includes concrete surfacing to the east of the new demountable as well as resurfacing the existing stone pathway between the new proposed development and existing offices to the west. The proposed site layout has been shown on the architectural layout by Watch This Space Design PTY LTD as included in **Figure 2.2** below.

Civil works scope will include stormwater drainage and pavements.

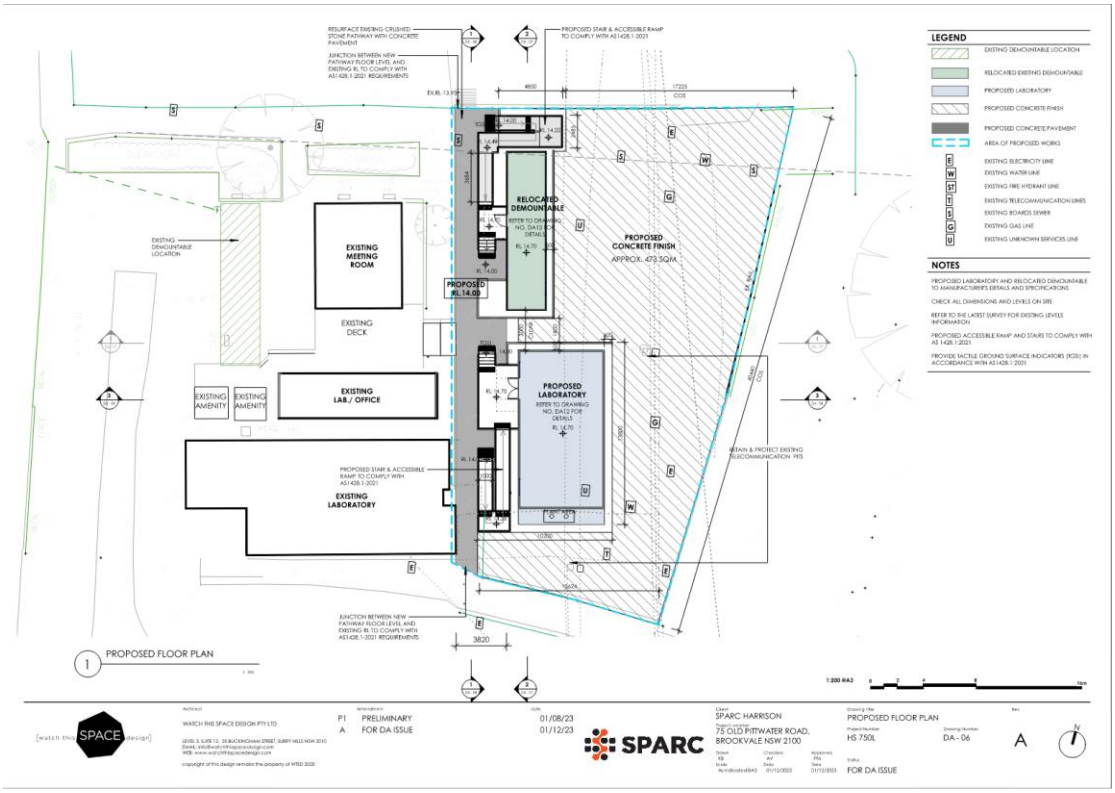

Figure 2.2 Proposed Site Layout

3 SITE WORKS

3.1 Earthworks

The proposed development require earthworks to be considered in future detailed design.

The final bulk earthworks levels and filling quantities will be subject to detailed earthworks modelling and volume assessment.

Soil Erosion and Sediment Control measures including sedimentation basins are to be placed in accordance with submitted drawings and the Soil and Water Management Plan in **Section 8** of this report.

3.2 Embankment Stability

To assist in maintaining embankment stability, permanent batter slopes will be no steeper than 3 horizontal to 1 vertical while temporary batters will be no steeper than 2 horizontal to 1 vertical.

Permanent batters will also be adequately vegetated or turfed which will assist in maintaining embankment stability.

Stability of batters and reinstatement of vegetation shall be in accordance with the submitted drawings and the Soil and Water Management Plan in **Section 8**.

3.3 Supervision of Earthworks

All geotechnical testing and inspections performed during the filling operations will be undertaken to Level 1 geotechnical control, in accordance with AS3798-2007.

4 STORMWATER DRAINAGE

4.1 Existing Site Drainage

The existing property comprises of an in-ground drainage system as part of the existing facility.

The current in-ground stormwater drainage system comprises of multiple pit and pipe systems which is understood to mostly convey the stormwater to the east of the site discharging out of several headwalls located along the eastern boundary and into Brookvale Creek.

4.2 Proposed Site Drainage

As per general engineering practice and the guidelines of Northern Beaches Council, the requirement for the site is to comprise of a minor and major system to safely and efficiently convey collected stormwater run-off from the development.

The minor system comprises of a piped drainage system which has been designed to accommodate the 1 in 20-year ARI storm event (Q20). This results in the piped system being able to convey all stormwater runoff up to and including the Q20 event, which meets the requirements of the Northern Beaches Council and is the minimum recommended capacity for industrial development.

The major system will be designed to cater for storms up to and including the 1 in 100-year ARI storm event (Q100). The major system employs the use of defined overland flow paths to safely convey excess run-off from the site.

The design of the stormwater system for this site will be based on relevant national design guidelines, Australian Standard Codes of Practice, the standards of Northern Beaches Council and accepted engineering practice. Runoff from buildings will generally be designed in accordance with AS 3500.3 National Plumbing and Drainage Code Part 3 – Stormwater Drainage. Overall site runoff and stormwater management will generally be designed in accordance with the Institution of Engineers, Australia publication “Australian Rainfall and Runoff” (1988 Edition), Volumes 1 and 2 (AR&R).

Stormwater management must be provided for water quantity and quality per the requirements of the Northern Beaches Development Control Plan 2011.

Further discussion on the Stormwater Management Strategy is provided in **Section 5** and **6** of this report. The reference to drawing **CO12664.01-DA40** shows the proposed drainage layout.

5 WATER QUANTITY MANAGEMENT

5.1 General Design Principles

Northern Beaches Council requires on-site detention to be provided to limit the runoff discharged from private property into the underground pipe drainage system to pre-developed flow and to assist in mitigation the increased stormwater runoff generated by the development.

Northern Beaches Council adopts the principle of water quantity management, also known as "On-site Detention (OSD)", to ensure the cumulative effect of development does not have a detrimental impact on the existing stormwater infrastructure and watercourse located within their LGA downstream from the development site.

Section 9.2 of the Northern Beaches Councils *Water Management for Development Policy* states, "On-site Detention will not be required where the site of the development is located within a Council established 1% AEP flood plain".

Flood information has been obtained from Northern Beaches Council *Flood Information Report (Comprehensive)* (dated 2 August 2023) included in **Appendix B.** It states the current site is heavily affected by flooding and overland flow during a 1 in 100 year storm, therefore On-site detention is not required.

5.2 Pre-development & Post-development Peak Flows

In relation to the water runoff assessment, the current site can be considered to be predominately comprised of impermeable surfaces. Following construction of the proposed development, the extent of impermeable surface remains consistent with existing, hence it can be concluded the change in peak flows associated with the development should be negligible.

No detention is proposed nor required to limit runoff from the new development as the new development will not exceed pre-development runoff levels.

Based on the assessment it is concluded that additional mitigation measures are not required to mitigate impact associated with water quantity during operational phase of the proposed development.

6 STORMWATER QUALITY CONTROLS

6.1 Stormwater Quality Objectives

There is a need to provide a design which incorporates the principles of Water Sensitive Urban Design (WSUD) and to target pollutants that are present in the stormwater so as to minimise the adverse impact these pollutants could have on receiving waters and to also meet the requirements specified by Northern Beaches Council.

Northern Beaches Council requirements for stormwater quality are found in *Section 4.1.1* of their *Water Management for Development Policy* and states, *"*It is necessary to install a filtration device that removes organic matter and coarse sediments from stormwater prior to discharge from the land" for "commercial/industrial lots with a site area less than 1000m^2 that propose to increase impervious area by more than 50m^2". General stormwater quality requirements including pollutant reduction and MUSIC modelling are not required for this development.

6.2 Proposed Stormwater Treatment System

Roof, hardstand, car parking, roads and other extensive paved areas are required to be treated by the Stormwater Treatment Measures (STM). The STM shall be sized according to the whole catchment area of the Site. The STM's for the development are based on a treatment train approach as discussed in the NSW EPA document Managing Urban Stormwater: Treatment Techniques to ensure that all of the objectives above are met.

Components of the treatment train for the development are as follows:

- Primary treatment of the site catchment will be performed via the provision of OceanGuard OG200 Pit Inserts (or approved equivalent);

Reference to drawings **CO12664.01-DA40** shows the location of the proposed STM. The proposed water quality treatment system provides a suitable level of treatment which meets councils engineering policy, based on the base water demands and the requirements of Northern Beaches Council.

6.3 Maintenance and Monitoring

It is important that each component of the water quality treatment train is properly operated and maintained. In order to achieve the design treatment objectives, an indicative maintenance schedule has been prepared (refer to **Table 6.1** below).

Note that inspection frequency may vary depending on site specific attributes and rainfall patterns in the area. In addition to the maintenance requirements below it is also recommended that inspections are made following heavy rainfall or major storm events. Event heavy rain inspections should be carried out as soon as practicable following an intense period of rainfall, (i.e. greater than 100mm over 48 hours), as measured at Sydney Olympic Park Weather Station No. 66212.

Table 6.1 Indicative Maintenance Schedule

MAINTENANCE ACTION	FREQUENCY RANGE	RESPONSIBILITY	PROCEDURE
SWALES/ LANDSCAPED AREAS			
Check density of vegetation and ensure minimum height of 150mm is maintained. Check for any evidence of weed infestation	Between six months and one year	Maintenance Contractor	Replant and/or fertilise, weed and water in accordance with landscape consultant specifications
Inspect swale for excessive litter and sediment build up	Between six months and one year	Maintenance Contractor	Remove sediment and litter and dispose in accordance with local authorities' requirements.
Check for any evidence of channelisation and erosion	Six monthly/ After Major Storm	Maintenance Contractor	Reinstate eroded areas so that original, designed swale profile is maintained
Weed Infestation	Three to six Monthly	Maintenance Contractor	Remove any weed infestation ensuring all root ball of weed is removed. Replace with vegetation where required.
Inspect swale surface for erosion	Between six months and one year	Maintenance Contractor	Replace top soil in eroded area and cover and secure with biodegradable fabric. Cut hole in fabric and revegetate.
INLET & JUNCTION PITS			
Inside Pit	Six Monthly	Maintenance Contractor	Remove grate and inspect internal walls and base, repair where required. Remove any collected sediment, debris, litter.
Outside of Pit	Four Monthly/ After Major Storm	Maintenance Contractor	Clean grate of collected sediment, debris, litter and vegetation.
STORMWATER SYSTEM			

MAINTENANCE ACTION	FREQUENCY RANGE	RESPONSIBILITY	PROCEDURE
General Inspection of complete stormwater drainage system	Bi-annually	Maintenance Contractor	Inspect all drainage structures noting any dilapidation in structures and carry out required repairs.
OCEAN PROTECT PIT INSERTS			
Refer to manufacturer operation and maintenance manual.	Refer to manufacturer operation and maintenance manual.	Refer to manufacturer operation and maintenance manual.	Refer to manufacturer operation and maintenance manual.

7 FLOODING AND OVERLAND FLOW

7.1 Introduction

A desktop review of overland flow and flooding about the proposed development has been completed. The assessment confirms the requirements of Northern Beaches Council's DCP have been met.

Our assessment has been based on a review of the detailed survey, the proposed development, and the evaluation of the site regarding the flood modelling and documented flood behaviour included in Northern Beaches Council *Flood Information Report (Comprehensive) (dated 02/08/2023)* included in **Appendix B**.

The site is located around 2km north of Manly Dam and has Manly creek running adjacent to the eastern boundary. The site is noted as not required to provide stormwater attenuation, as discussed **in Sections 5.1** & **5.2** of this report.

It is understood that the existing buildings on the property discharge their roof water and part of the carparking out of several headwalls located along Brookvale Creek.

Brookvale Creek traverses the eastern boundary of the site and conveys runoff from the north to the south. The creek is comprised of an open channel with roughly trapezoidal shape. The invert of the creek varies between RL 10.9m AHD on the north to RL 9.1m AHD on the south. The Creek continues south of the property as an underground box culvert system (details not known).

7.2 Council Flood Information Report (Comprehensive)

Flood information has been obtained from Northern Beaches Council via a Flood Information Report application. The report involved a hydrological and hydraulic assessment of the site's catchment.

We provide excerpts of flooding associated with the 1% AEP storm event from the report in **Figures 7.1**, **7.2** & **7.3** below. Figure 7.1 is an excerpt of the 1% AEP Flood Extent; **Figure 7.2** is an excerpt of the 1% AEP Flood Category; **Figure 7.3** is an excerpt of the PMF Flood Extent.

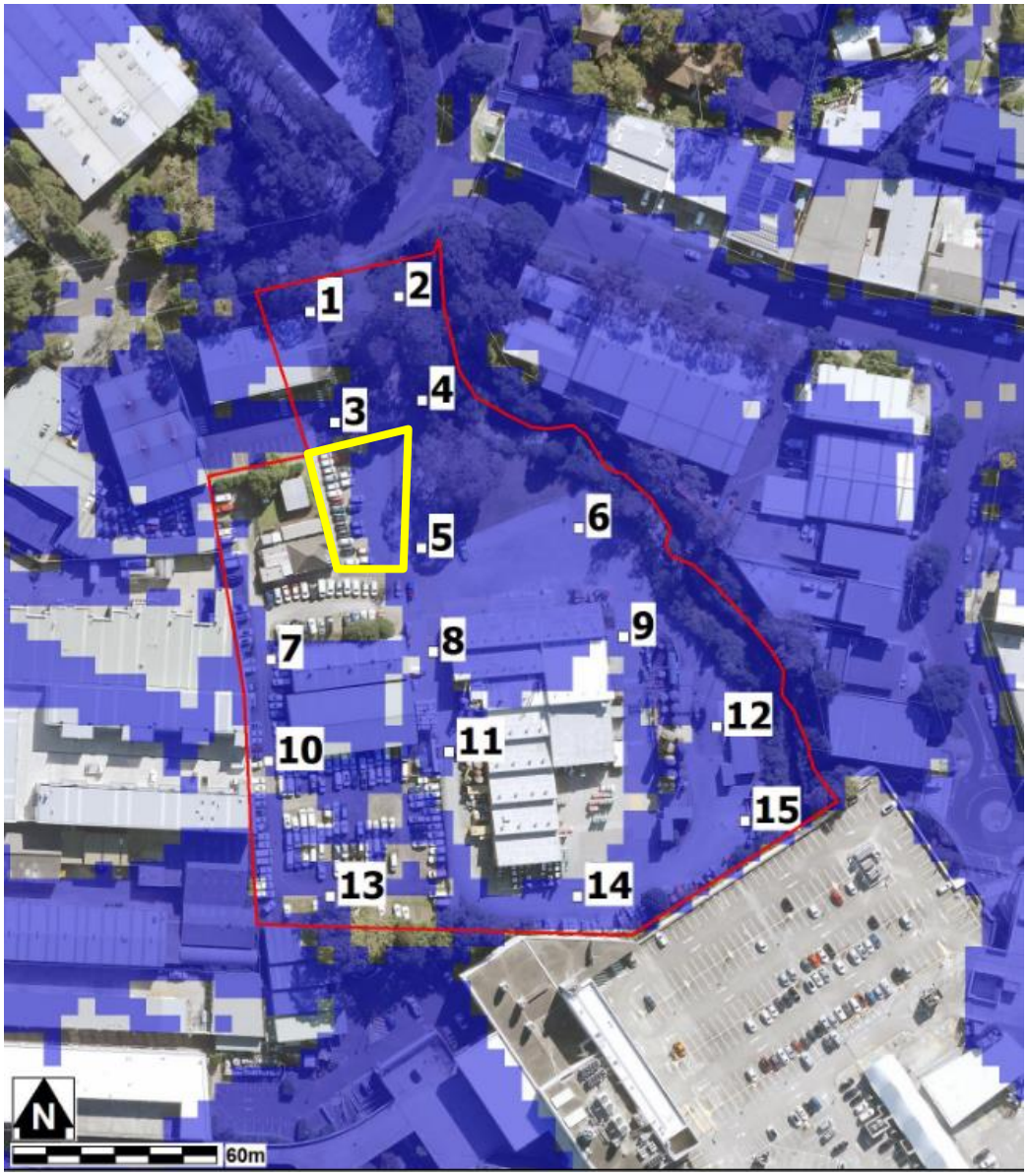

Figure 7.1. 1% AEP Flooding Extent

ID	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)	Flood Planning Level (m)	PMF Max WL (m AHD)	PMF Max Depth (m)	PMF Max Velocity (m/s)
1	14.21	0.26	14.38	0.43	1.89	14.88	15.13	1.18	2.45
2	13.04	1.08	13.21	1.24	4.33	13.71	14.73	2.76	3.19
3	N/A	N/A	13.53	0.10	1.25	14.03	14.66	1.23	3.69
4	N/A	N/A	12.97	0.22	2.04	13.47	14.68	1.92	3.82
5	N/A	N/A	12.99	0.37	0.28	13.49	14.68	2.06	0.45
6	12.46	0.24	12.96	0.74	0.88	13.46	14.67	2.45	2.47
7	13.25	0.24	13.35	0.34	0.18	N/A	14.68	1.67	0.88
8	N/A	N/A	12.99	0.08	0.54	13.49	14.67	1.76	1.07
9	N/A	N/A	12.93	0.16	0.45	13.43	14.66	1.89	1.01
10	13.24	0.02	13.31	0.08	0.45	13.81	14.67	1.44	1.93
11	12.92	0.02	12.99	0.09	0.41	13.49	14.67	1.76	0.79
12	N/A	N/A	12.86	0.37	0.54	13.36	14.65	2.17	0.82
13	13.08	0.06	13.10	0.08	0.58	13.60	14.66	1.64	1.39
14	N/A	N/A	12.84	0.41	0.48	13.34	14.67	2.23	1.04
15	12.32	0.10	12.86	0.64	0.76	13.36	14.66	2.44	1.27

Table 7.1. Key Point Flood Levels and Velocities

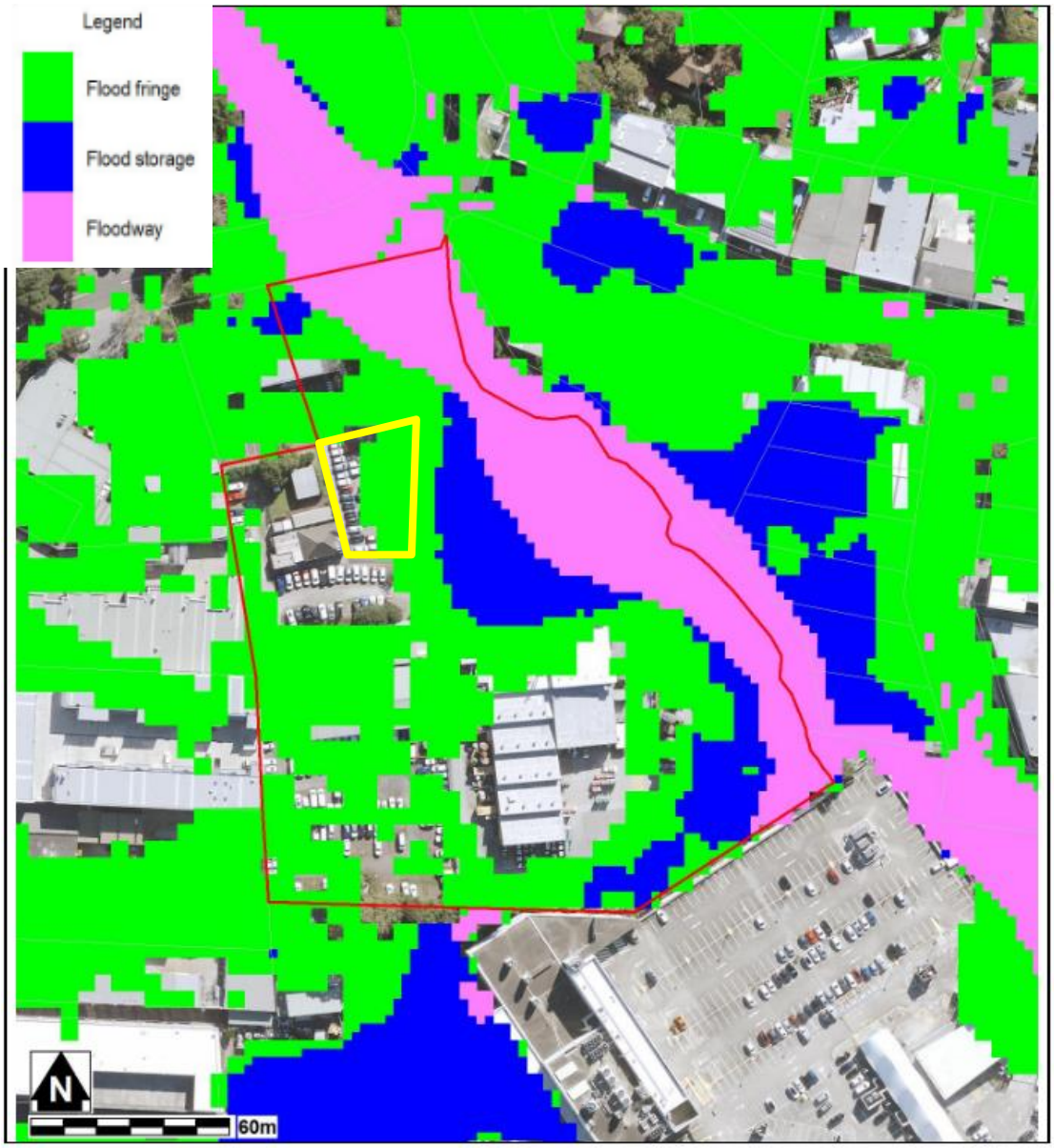

Figure 7.2. AEP Flood Hydraulic Category Extent

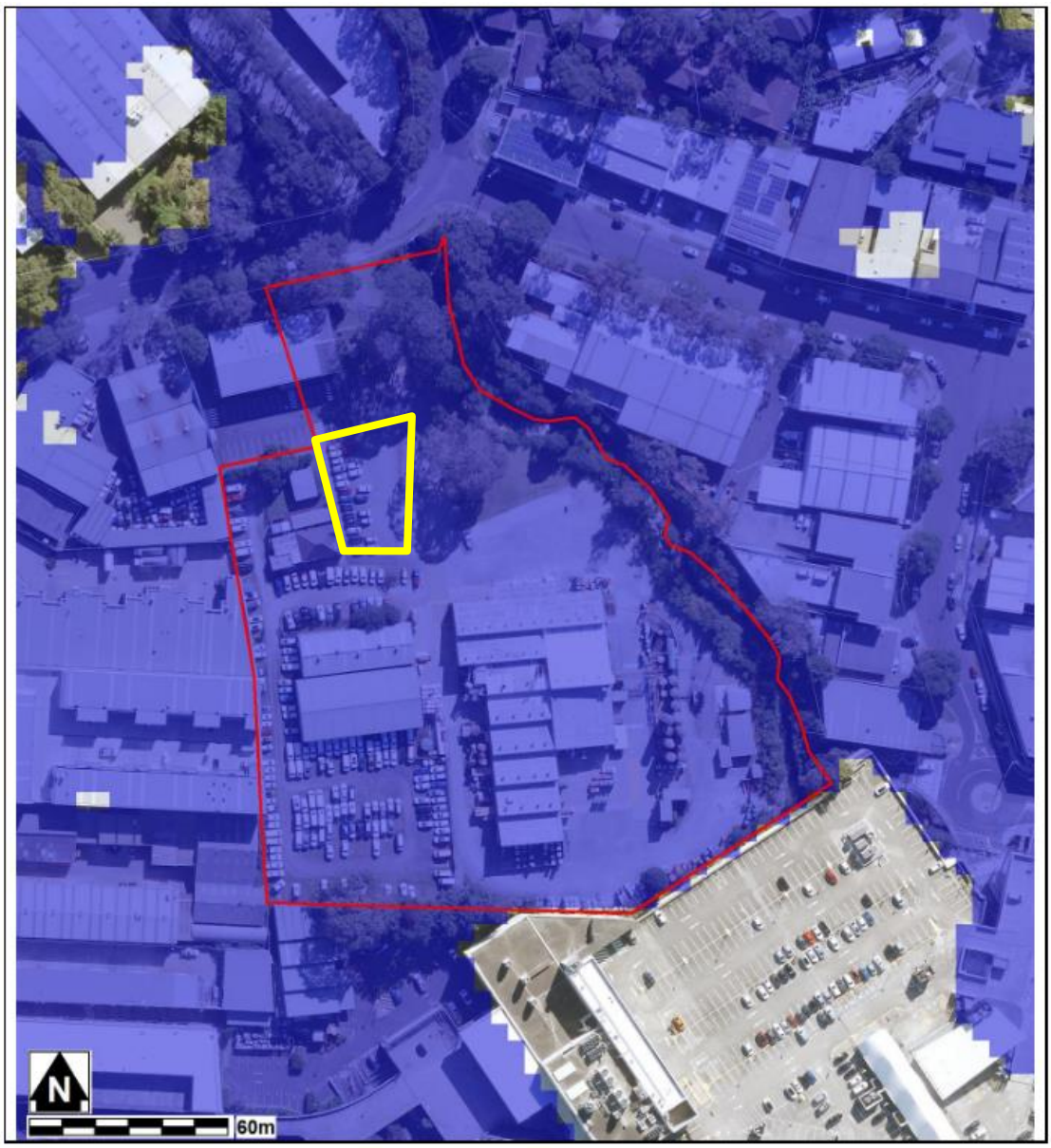

Figure 7.3. PMF Flooding Extent

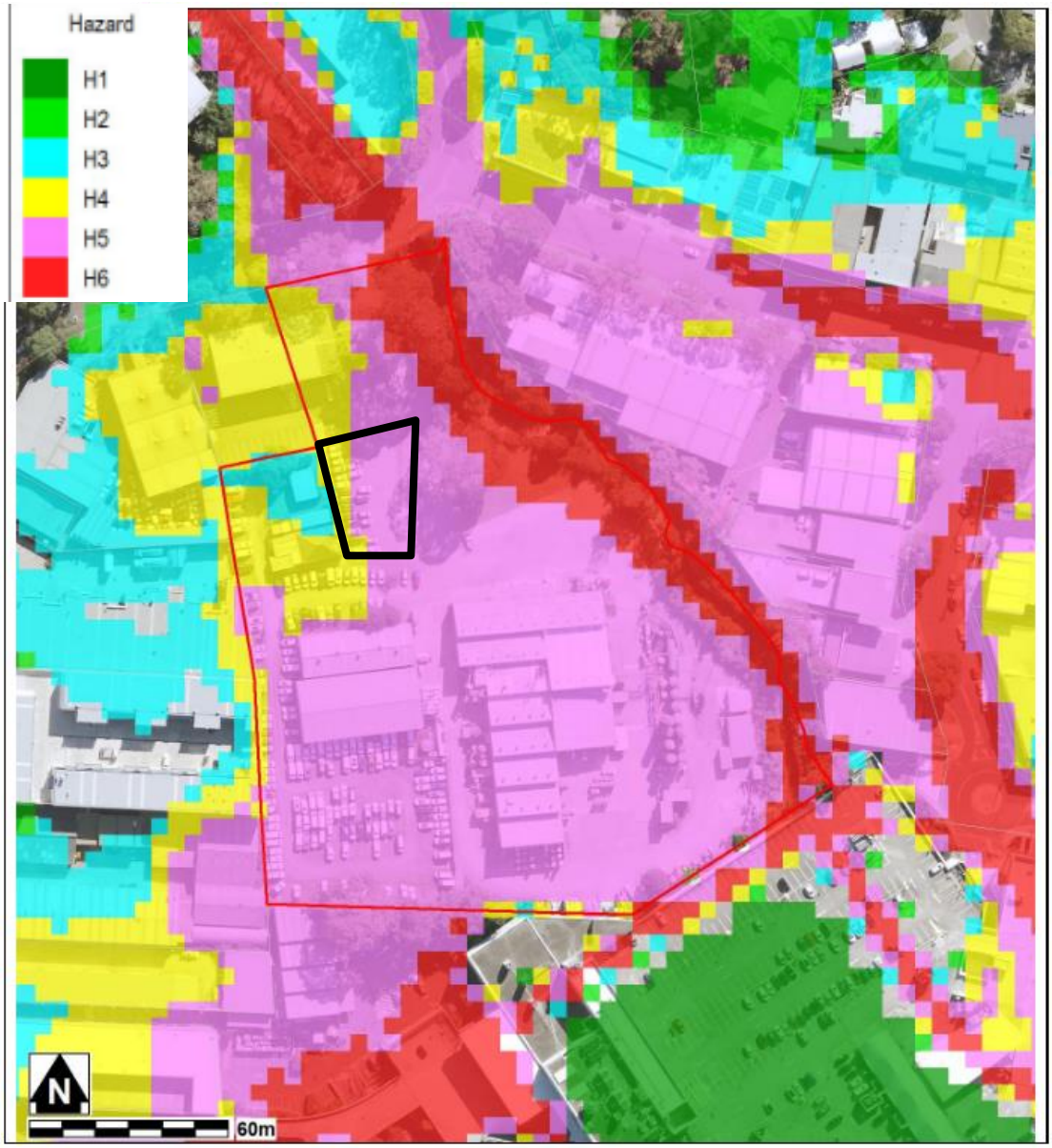

Figure 7.4. PMF Flood Life Hazard Categories

Figures 7.1 & **7.3** illustrate flood extents for the 1% AEP and PMF events. It is evident that the site is heavily affected by flooding.

During the 1% AEP event, flood levels near the proposed works are approximately between RL 12.99m and RL 13.53m AHD according to **Table 7.1** with part of the area not being affected by flooding.

The flood planning level for the development area should be above RL 14.03m which is 0.5m freeboard above the 1% AEP water level. The proposed floor level for the development is at RL 14.70m which is also clear of the max PMF water level.

7.3 External Catchments and Overland Flow Provisions

Council's flood assessment confirms that the site is affected by mainstream flooding in the local 1% AEP flood event by overland flow from Old Pittwater Road as seen in **Figure 7.5**. With reference to **Figure 7.1**, a significant overland flow path is conveyed through the site from the north to south-east of the entire site. With reference to **Figure 7.1**, there is flooding up to 0.37m deep to the west of the proposed demountable during the 1% AEP event. The site is impacted by the Probable Maximum Flood (PMF) which, per council's flood report, is at approximately RL 14.68m AHD near the proposed works.

Figure 7.5. Contributing Catchment

As seen in the council figures, a portion of the site located close to the proposed works is affected by slow-moving floodwater. This likely indicates local depressions on the site that provide a minor degree of flood storage.

Given the above, the site is shown to be impacted by flooding during the 1% AEP and in more intense storm events.

7.4 Floodplain Management Considerations

7.4.1 Flood Planning Level

Introducing a Flood Planning Level (FPL) is an important flood risk management measure. FPLs are derived from a combination of a designated flood event, which can either be a historic flood or a design flood of a certain recurrence interval, plus a nominated freeboard depth.

The *NSW Floodplain Development Manual, 2005* recommends that the FPL generally be based on the 100-year ARI event. It suggests that although this event can vary, it should only be done in exceptional circumstances. Adopting the 1% AEP event for the proposed industrial development is considered appropriate.

The freeboard in an FPL is the flood level difference between its base level and the FPL. Freeboard is designed to provide reasonable certainty that the reduced risk exposure provided by the chosen FPL is warranted, taking into account factors such as:

- Uncertainties in the estimate of flood levels;
- Differences in water levels across the floodplain;
- Wave action resulting from wind and vehicular/marine traffic during the flood event;
- Changes in rainfall patterns due to climate change;
- The cumulative effect of subsequent infill development on existing zoned land.

The *Floodplain Development Manual* recommends a freeboard of 0.5m for most new industrial developments, and it is considered appropriate to adopt this freeboard for the proposed development.

The FPL defined in the *Floodplain Development Manual* is noted to be consistent with that of the Northern Beaches Council.

7.4.2 Hydraulic and Hazard Categorisation

Floodwaters can vary significantly, both in time and place across the floodplain. They can flow fast and deep at some locations and slow and shallow at other locations. That can result in large variations in the personal danger and physical property damage from the flood.

The Floodplain Development Manual recognises three hydraulic categories of flood-prone land: floodway, flood storage and flood fringe. These are then further separated into two hazard categories: high and low.

Floodways

Floodways are those areas where a significant volume of water flows during floods and are often aligned with natural channels. They are areas that, even if only partially blocked, would cause a substantial redistribution of flood flow, which could adversely affect other areas. They can also be areas with deeper and higher velocity flow.

Flood Storage

Flood storage areas are the parts of the floodplain that provide temporary storage for floodwaters during the passage of a flood. If a reduction in the flood storage area is experienced due to the filling of land or construction of a levee bank, it can result in adverse effects on the flood levels and peak flow rates in other areas.

Flood Fringe

Flood fringe areas are the remaining area of land affected by flooding. The development of flood fringe land does not generally have any major impact on the pattern of flood flows and/or levels.

The preparation of a flood study is almost always required in the determination of hydraulic categories. That is so that peak depths, velocities and the extent of flooding can be determined across the catchment.

Hazard Categories

Flood hazard categories are divided into high and low hazards for each hydraulic category. High-hazard areas are defined as those with a possible danger to personal safety and the potential for significant structural damage. Non-disabled adults would have difficulty wading to safety. With low-hazard areas, should it be necessary, a truck could evacuate people and their possessions, and non-disabled adults would have little difficulty in wading to safety.

Flood hazard criteria within the site have been defined as H1 in relation to the overland flow path on site.

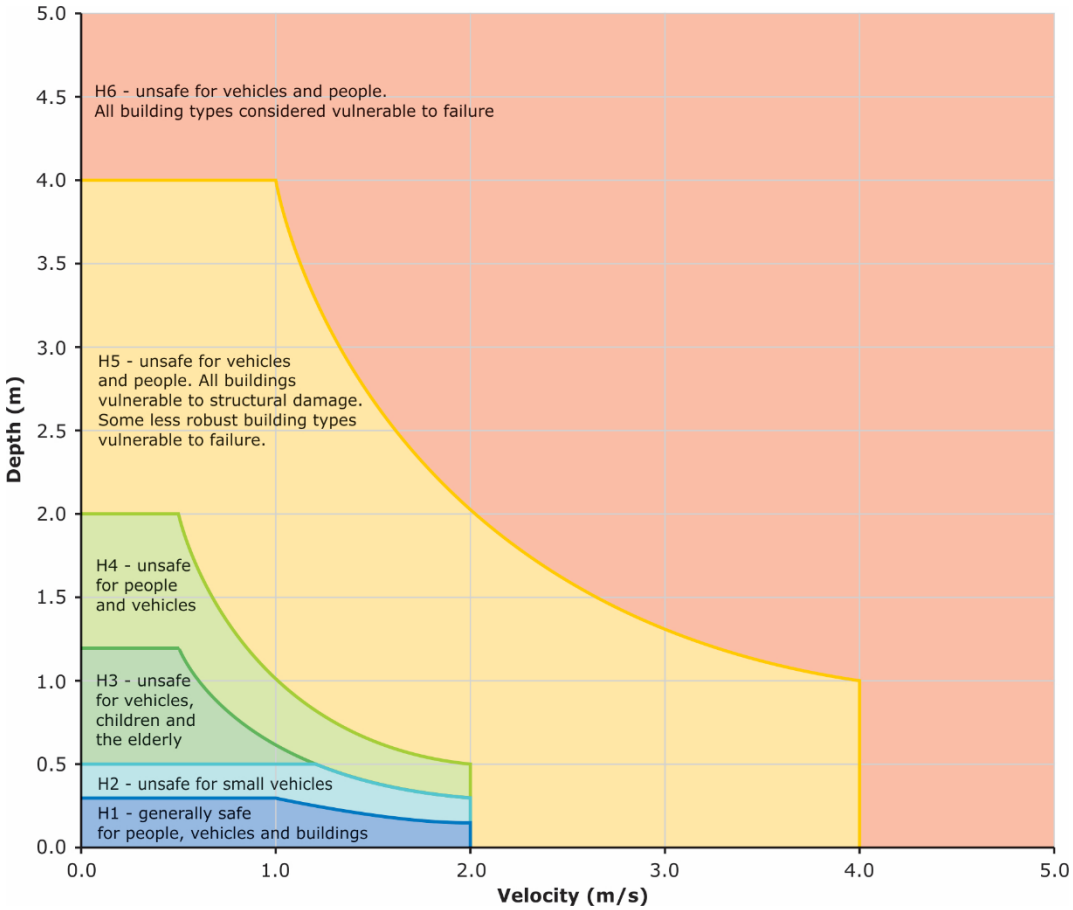

Figure 7.6. Combine Flood Hazard Curves (Smith et al., 2014)

Table 6.7.3. Combined Hazard Curves - Vulnerability Thresholds (Smith et al., 2014)

Hazard Vulnerability Classification	Description
H1	Generally safe for vehicles, people and buildings.
H2	Unsafe for small vehicles.
H3	Unsafe for vehicles. children and the elderly.
H4	Unsafe for vehicles and people.
H5	Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6	Unsafe for vehicles and people. All building types considered vulnerable to failure.

Table 6.7.4. Combined Hazard Curves - Vulnerability Thresholds Classification Limits (Smith et al., 2014)

Hazard Vulnerability Classification	Classification Limit (D and V in combination)	Limiting Still Water Depth (D)	Limiting Velocity (V)
H1	D*V ≤ 0.3	0.3	2.0
H2	D*V ≤ 0.6	0.5	2.0
H3	D*V ≤ 0.6	1.2	2.0
H4	D*V ≤ 1.0	2.0	2.0
H5	D*V ≤ 4.0	4.0	4.0
H6	D*V > 4.0	-	-

Figure 7.7. Adopted Hazard Criteria and Provisional Flood Hazard Chart (Australian Rainfall and Runoff 2019)

7.4.3 Flood Damages

Damage caused by floods is generally categorised as either tangible or intangible. Tangible damages are financial in nature and can be readily measured in monetary terms. They include direct damages, such as damage or loss caused by floodwaters wetting goods and property, and indirect damages, such as lost wages incurred during clean-up periods after the flood event. Intangible damage includes emotional stress and even mental and physical illness caused by the flood. It is difficult, if not impossible, to quantify intangible damages in financial terms.

From a flood planning perspective, it is important to consider the following direct damage categories:

- Contents Damage – refers to damage to the contents of buildings, including carpets, furniture, and other personal property;
- Structural Damage – refers to damage to the structural fabric of buildings, such as foundations, walls, floors, windows, and built-in fittings; and
- External Damage – includes damage to all items external to buildings, such as cars, landscaping, and other outdoor features.

As there is no way to prevent a flood from occurring and excluding all development within flood-prone areas is unrealistic, establishing an FPL is to minimise the risk of direct damage when a flood occurs. By minimising the direct damage, there is a carry-on effect, whereby other associated indirect tangible damages and intangible damages are also minimised.

7.4.4 Emergency Response Planning

Flood planning refers to preparing a formal community-based plan of action to deal with the threat, onset and aftermath of flooding. It involves planning an event equal to or greater than the event used to derive the FPL.

The action plan should include an on-site response plan that addresses what measures should be undertaken once the threat of a flood is imminent. A flood evacuation strategy should also be included so that all persons within the precinct are familiar with the processes required if a flood occurs.

7.5 Flood Assessment Conclusion

In conclusion, the report indicated that the proposed development project in Northern Beaches Council has a high flood risk. The desktop review of overland flow and flooding revealed that the site is susceptible to mainstream flooding in the local 1% AEP flood event and flooding in the PMF flood event from the Brookvale Creek Catchment.

The proposed building FFL is set above the flood planning level specified by Northern Beaches Council, and safe refuge is available on the site for users during an extreme flood event.

Based on the assessment and management strategy proposed, the development meets current council flood policy and shows acceptable impacts in relation to flooding and flood safety.

8 EROSION & SEDIMENT CONTROLS

An erosion and sediment control plan (ESCP) is shown on drawing **CO12664.01-DA20** with details on **DA25**. These are conceptual plans only providing sufficient detail to clearly show that the works can proceed without undue pollution to receiving waters. A detailed plan will be prepared once consent is given and before works start.

8.1 General Conditions

1. The ESCP will be read in conjunction with the engineering plans, and any other plans or written instructions that may be issued in relation to development at the subject site.
2. Contractors will ensure that all soil and water management works are undertaken as instructed in this specification and constructed following the guidelines stated in Managing Urban Stormwater, Soils and Construction (1998) and Northern Beaches Council specifications.
3. All subcontractors will be informed of their responsibilities in minimising the potential for soil erosion and pollution to down slope areas.

8.2 Land Disturbance

1. Where practicable, the soil erosion hazard on the site will be kept as low as possible and as recommended in Table 1

Land Use	Limitation	Comments
Construction areas	Limited to 5 (preferably 2) metres from the edge of any essential construction activity as shown on the engineering plans.	All site workers will clearly recognise these areas that, where appropriate, are identified with barrier fencing (upslope) and sediment fencing (downslope), or similar materials.
Access areas	Limited to a maximum width of 5 metres	The site manager will determine and mark the location of these zones onsite. They can vary in position so as to best conserve existing vegetation and protect downstream areas while being considerate of the needs of efficient works activities. All site workers will clearly recognise these boundaries.
Remaining lands	Entry prohibited except for essential management works	

Table 8.1. Limitations to access

8.3 Erosion Control Conditions

1. Clearly visible barrier fencing shall be installed as shown on the plan and elsewhere at the discretion of the site superintendent to ensure traffic control and prohibit unnecessary site disturbance. Vehicular access to the site shall be limited to only those essential for construction work and they shall enter the site only through the stabilised access points.
2. Soil materials will be replaced in the same order they are removed from the ground. It is particularly important that all subsoils are buried and topsoils remain on the surface at the completion of works.
3. Where practicable, schedule the construction program so that the time from starting land disturbance to stabilisation has a duration of less than six months.
4. Notwithstanding this, schedule works so that the duration from the conclusion of land shaping to completion of final stabilisation is less than 20 working days.
5. Land recently established with grass species will be watered regularly until an effective cover has properly established and plants are growing vigorously. Further application of seed might be necessary later in areas of inadequate vegetation establishment.
6. Where practical, foot and vehicular traffic will be kept away from all recently established areas
7. Earth batters shall be constructed in accordance with the Geotechnical Engineers Report or with as law a gradient as practical but not steeper than:
    - 2H:1V where slope length is less than 7 meters
    - 2.5H:1V where slope length is between 7 and 10 meters
    - 3H:1V where slope length is between 10 and 12 meters
    - H:1V where slope length is between 12 and 18 meters
    - 5H:1V where slope length is between 18 and 27 meters
    - 6H:1V where slope length is greater than 27 meters
8. All earthworks, including waterways/drains/spillways and their outlets, will be constructed to be stable in at least the design storm event.
9. During windy weather, large, unprotected areas will be kept moist (not wet) by sprinkling with water to keep dust under control. In the event water is not available in sufficient quantities, soil binders and/or dust retardants will be used or the surface will be left in a cloddy state that resists removal by wind.

8.4 Pollution Control Conditions

1. Stockpiles will not be located within 5 meters of hazard areas, including likely areas of high velocity flows such as waterways, paved areas and driveways. Silt/ sediment fences and appropriate stabilisation of stockpiles are to be provided as detailed on the drawings.

2. Sediment fences will:
   a) Be installed where shown on the drawings, and elsewhere at the discretion of the site superintendent to contain the coarser sediment fraction (including aggregated fines) as near as possible to their source.
   b) Have a catchment area not exceeding 720 square meters, a storage depth (including both settling and settled zones) of at least 0.6 meters, and internal dimensions that provide maximum surface area for settling, and
   c) Provide a return of 1 meter upslope at intervals along the fence where catchment area exceeds 720 square meters, to limit discharge reaching each section to 10 litres/second in a maximum 20 year tc discharge.
3. Sediment removed from any trapping device will be disposed in locations where further erosion and consequent pollution to down slope lands and waterways will not occur.
4. Water will be prevented from directly entering the permanent drainage system unless it is relatively sediment free (i.e. the catchment area has been permanently landscaped and/or likely sediment has been treated in an approved device). Nevertheless, stormwater inlets will be protected.
5. Temporary soil and water management structures will be removed only after the lands they are protecting are stabilised.

8.5 Waste Management Conditions

Acceptable bind will be provided for any concrete and mortar slurries, paints, acid washings, lightweight waste materials and litter. Clearance service will be provided at least weekly.

8.6 Site Inspection and Maintenance

1. A self-auditing program will be established based on a Check Sheet. A site inspection using the Check Sheet will be made by the site manager:
   - At least weekly.
   - Immediately before site closure.
   - Immediately following rainfall events in excess of 5mm in any 24 hour period.

   The self audit will include:

   - Recording the condition of every sediment control device
   - Recording maintenance requirements (if any) for each sediment control device
   - Recording the volumes of sediment removed from sediment retention systems, where applicable
   - Recording the site where sediment is disposed
   - Forwarding a signed duplicate of the completed Check Sheet to the project manager/developer for their information
2. In addition, a suitably qualified person will be required to oversee the installation and maintenance of all soil and water management works on the

site. The person shall complete a short monthly written report with records kept on site as part of the contractor Quality Assurance Documentation. The responsible person will ensure that:

- The plan is being implemented correctly
- Repairs are undertaken as required
- Essential modifications are made to the plan if and when necessary

The report shall carry a certificate that works have been carried out in accordance with the plan.

3. Waste bins will be emptied as necessary. Disposal of waste will be in a manner approved by the Site Superintendent.
4. Proper drainage will be maintained. To this end drains (including inlet and outlet works) will be checked to ensure that they are operating as intended, especially that,
   - No low points exist that can overtop in a large storm event
   - Areas of erosion are repaired (e.g. lined with a suitable material) and/or velocity of flow is reduced appropriately through construction of small check dams of installing additional diversion upslope.
   - Blockages are cleared (these might occur because of sediment pollution, sand/soil/spoil being deposited in or too close to them, breached by vehicle wheels, etc.).
5. Sand/soil/spoil materials placed closer than 2 meters from hazard areas will be removed. Such hazard areas include and areas of high velocity water flows (e.g. waterways and gutters), paved areas and driveways.
6. Recently stabilised lands will be checked to ensure that erosion hazard has been effectively reduced. Any repairs will be initiated as appropriate.
7. Excessive vegetation growth will be controlled through mowing or slashing.
8. All sediment detention systems will be kept in good, working condition. In particular, attention will be given to:
   a) Recent works to ensure they have not resulted in diversion of sediment laden water away from them
   b) Degradable products to ensure they are replaced as required, and
   c) Sediment removal, to ensure the design capacity or less remains in the settling zone.
9. Any pollutants removed from sediment basins or litter traps will be disposed of in areas where further pollution to down slope lands and waterways should not occur.
10. Additional erosion and/or sediment control works will be constructed as necessary to ensure the desired protection is given to down slope lands and waterways, i.e. make ongoing changes to the plan where it proves inadequate in practice or is subjected to changes in conditions at the work site or elsewhere in the catchment.
11. Erosion and sediment control measures will be maintained in a functioning condition until all earthwork activities are completed and the site stabilised
12. Litter, debris and sediment will be removed from the gross pollutant traps and trash racks as required.

9 CONCLUSION

This Civil Engineering Report has been prepared to support a Development Application for the installation of a demountable laboratory to an existing industrial/commercial facility on the property at 75 Old Pittwater Road, Brookvale NSW.

A civil engineering strategy for the site has been developed which provides a best practice solution within the constraints of the existing landform and proposed development layout. Within this strategy a stormwater quality management strategy has been developed to reduce pollutant loads in the stormwater leaving this site. The stormwater management for the development has been designed in accordance with the Northern Beaches Council's *Water Management for Development Policy.*

During the construction phase, a Sediment and Erosion Control Plan will be in place to ensure the downstream drainage system and receiving waters are protected from sediment laden runoff.

During the operational phase of the development, Oceanguard pit inserts (or approved equivalent) have been proposed to mitigate any increase in stormwater pollutant load generated by the development. Best management practices have been applied to the development to ensure that the quality of stormwater runoff is not detrimental to the receiving environment.

Flooding and overland flow across the site is proposed to be managed by maintaining the existing overland flow path to prevent adverse affectation of water levels upstream or downstream of the property.

The detail contained in this report provides sufficient information to show the consent authority that a suitable stormwater management strategy is available for the development and the requirements associated with the strategy. It is recommended the management strategies in this report be approved and incorporated into the future detailed design.

10 REFERENCES

- Managing Urban Stormwater: Source Control – 1998 (NSW EPA);
- Managing Urban Stormwater: Treatment Techniques – 1997 (NSW EPA);
- Managing Urban Stormwater: Soils & Construction – 2004(LANDCOM);
- Managing Urban Stormwater, Soils and Construction (1998) – The Blue Book, Landcom
- Northern Beaches Council WSUD & MUSIC Modelling Guidelines (2016)
- Water Management for Development Policy (2021), Warringah
- Warringah Council On-site Stormwater Detention Technical Specification
- Warringah Development Control Plan (2011)
- Manly Lagoon Floodplain Risk Management Study & Plan (2018)
- Managing Urban Stormwater, Soils and Construction (1998) – The Blue Book, Landcom

Appendix A

DRAWINGS BY COSTIN ROE CONSULTING

PROPOSED INDUSTRIAL DEVELOPMENT

75 OLD PITTWATER ROAD, BROOKVALE, NSW, 2100

CIVIL DEVELOPMENT APPLICATION PACKAGE

DRAWING LIST

DRAWING NO.	DRAWING TITLE
C012664.01-DA10	DRAWING LIST & GENERAL NOTES
C012664.01-DA20	EROSION & SEDIMENT CONTROL PLAN
C012664.01-DA25	EROSION & SEDIMENT CONTROL DETAILS
C012664.01-DA40	STORMWATER DRAINAGE PLAN
C012664.01-DA45	STORMWATER DRAINAGE DETAILS - SHEET 1
C012664.01-DA50	FINISHED LEVELS PLAN
C012664.01-DA55	TYPICAL SECTIONS - SHEET 1

SITE PREPARATION NOTES:

1. ALL EARTHWORKS SHALL BE COMPLETED GENERALLY IN ACCORDANCE WITH THE GUIDELINES SPECIFIED BY THE GEOTECHNICAL REPORT.
2. EXISTING LEVELS ARE BASED ON INFORMATION PROVIDED BY BEE & LETHBRIDGE PTY LTD REFERENCE NUMBER 19372 DATED 10.10.2023.
3. STRIP ANY TOP SOIL OR DELETERIOUS MATERIAL AND DISPOSE OF FROM SITE OR STORE AS DIRECTED. TOPSOIL BLENDING IS NOT ACCEPTABLE. ANY BLENDING PROPOSAL IS TO BE REFERRED TO THE ENGINEER.
4. COMPLETE CUT TO FILL EARTHWORKS TO ACHIEVE THE REQUIRED LEVELS AS INDICATED ON THE DRAWINGS WITHIN A TOLERANCE OF +0mm/-10mm THROUGH BUILDING PADS/PAVEMENTS AND +0mm/-20mm ELSEWHERE.
5. PREPARE STEEP BATTERS TO RECEIVE FILL BY CONSTRUCTING BENCHING TO FACILITATE FILL PLACEMENT AND COMPACTION. WHERE EXPOSED ROCK (WEATHERED SHALE OR SANDSTONE) IS ENCOUNTERED AT CUT SUBGRADE LEVEL, THE EARTHWORKS CONTRACTOR IS TO ALLOW TO RIP THE SURFACE TO A NOMINAL 0.3-0.4m DEPTH AND RECOMPACT (PER THE ENGINEERING SPEC) AS REQUIRED.
6. AREAS TO RECEIVE FILL (THAT ARE NOT ON BENCHED BATTERS) AND AREAS IN CUT SHALL BE PROOF ROLLED TO IDENTIFY ANY SOFT HEAVING MATERIAL. SOFT MATERIAL SHALL BE BOXED OUT AND REMOVED PRIOR TO FILL PLACEMENT. PROOF ROLLING TO BE INSPECTED BY A GEOTECHNICAL ENGINEER OR THE EARTHWORKS DESIGNER.
7. SITE WON FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
8. IMPORTED FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
9. ALL ENGINEERED FILL PARTICLES SHALL BE ABLE TO BE INCORPORATED WITHIN A SINGLE LAYER. FURTHER, LESS THAN 30% OF PARTICLES SHALL BE RETAINED ON THE 37.5 mm SIEVE. ENGINEERED FILL SHALL BE ABLE TO BE TESTED IN ACCORDANCE WITH THE STANDARD COMPACTION METHOD (AS1289.5.4.1) OR HILF TEST METHOD (AS1289.5.7.1). THESE METHODS REQUIRE LESS THAN 20% RETAINED ON THE 37.5 mm SIEVE. WHERE BETWEEN 20% AND 30% OF PARTICLES ARE RETAINED ON THE 37.5 mm SIEVE THE ABOVE TEST METHODS SHALL STILL BE ADOPTED AND TEST REPORTS ANNOTATED APPROPRIATELY. THESE REQUIREMENTS SHOULD BE MET BY THE MATERIAL AFTER PLACEMENT AND COMPACTION
10. ALL THE EARTHWORKS UNDERTAKEN AND THE SUBGRADE CONDITION IN THE CUT AREAS (IN THE STATED PERIOD) ARE DOCUMENTED IN THE REPORTS AND HAVE BEEN UNDERTAKEN IN ACCORDANCE WITH THE SPECIFICATION.
11. PRIOR TO ANY EARTHWORKS, EROSION CONTROL AS OUTLINED IN THE EROSION AND SEDIMENTATION CONTROL PLAN SHALL BE COMPLETED.
12. EXISTING ROCK, IF ANY, SHALL BE REMOVED BY HEAVY ROCK BREAKING OR RIPPING.
13. MATCH EXISTING LEVELS AT BATTER INTERFACE.
14. CONTRACTOR TO MATCH EXISTING LEVELS AT THE INTERFACE OF EARTHWORKS AND EXISTING SURFACE AT BATTER LOCATIONS OR WHERE NO RETAINING WALLS ARE PRESENT. ANY DISCREPANCY BETWEEN DESIGN AND EXISTING LEVELS TO BE REFERRED TO THE ENGINEER FOR DIRECTION OR ADJUSTMENTS TO DESIGN LEVELS.
15. DURING EARTHWORKS THE CONTRACTOR IS TO ENSURE ALL AREAS ARE FREE DRAINING & WILL NOT RETAIN WATER DURING RAINFALL. PROVIDE TEMPORARY MEASURES AS REQUIRED TO ENSURE FREE FLOWING RUNOFF THROUGH MANAGED DRAINAGE PATHS, DIVERSION DRAINS OR OTHER SUITABLE DISPOSAL METHOD AS AGREED DURING THE WORKS. REFER ANY CONCERNS TO THE ENGINEER. REFER TO EROSION AND SEDIMENT CONTROL DRAWINGS AND NOTES.

EXISTING SERVICES NOTES:

1. DURING THE EXECUTION OF WORKS, THE CONTRACTOR SHALL MAINTAIN THE INTEGRITY OF EXISTING SERVICES. THE CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED TO THE EXISTING SERVICES TO THE SATISFACTION OF THE SUPERINTENDENT AND THE RELEVANT SERVICE AUTHORITY, AT NO COST TO THE PRINCIPAL.
2. WHERE IT IS NECESSARY TO REMOVE, DIVERT OR CUT INTO ANY EXISTING SERVICE, THE CONTRACTOR SHALL GIVE AT LEAST THREE (3) DAYS NOTICE OF ITS REQUIREMENTS TO THE SUPERINTENDENT, WHO WILL ADVISE WHAT ARRANGEMENTS SHOULD BE MADE FOR THE ALTERATION OF SUCH EXISTING WORKS.
3. EXISTING SERVICES HAVE BEEN PLOTTED FROM SUPPLIED DATA. THE ACCURACY IS NOT GUARANTEED. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ESTABLISH THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO COMMENCING WORK. ALL CLEARANCES AND APPROVALS SHALL ALSO BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY PRIOR TO THE COMMENCEMENT OF WORK.
4. ALL NEW AND EXHUMED SERVICES THAT CROSS EXISTING AND FUTURE ROADS/PAVEMENTS WITHIN THE SITE SHALL BE BACKFILLED WITH DGB20 MATERIAL TO SUBGRADE LEVEL AND COMPACTED TO 98% STANDARD DENSITY RATIO. SUBJECT TO PRIOR APPROVAL FROM RELEVANT AUTHORITY.
5. ON COMPLETION OF SERVICES INSTALLATION. ALL DISTURBED AREAS SHALL BE RESTORED TO ORIGINAL, INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL AREAS, GRASSED AREAS AND ROAD PAVEMENTS.
6. CARE TO BE TAKEN WHEN EXCAVATING NEAR UTILITY SERVICES. NO MECHANICAL EXCAVATION TO BE UNDERTAKEN OVER SERVICES. LIAISE WITH RELEVANT AUTHORITY.
7. THE CONTRACTOR SHALL ALLOW FOR THE CAPPING OFF, EXCAVATION AND REMOVAL IF REQUIRED OF ALL EXISTING SERVICES IN AREAS AFFECTED BY THE WORKS WITHIN THE CONTRACT AREA AS SHOWN ON THE DRAWINGS UNLESS DIRECTED OTHERWISE BY THE SUPERINTENDENT. ALL TO REGULATORY AUTHORITY STANDARDS AND APPROVAL.
8. THE CONTRACTOR IS TO MAINTAIN EXISTING STORMWATER DRAINAGE FLOWS THROUGH THE ROADS AT ALL TIMES. MAKE DUE ALLOWANCE FOR ALL SUCH FLOWS AT ALL TIMES.
9. PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL OBTAIN THE SUPERINTENDENT'S APPROVAL OF THE PROGRAM FOR THE RELOCATION/CONSTRUCTION OF TEMPORARY SERVICES.
10. CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES AS REQUIRED TO MAINTAIN EXISTING SUPPLY TO BUILDINGS REMAINING IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVERSION IS COMPLETE AND COMMISSIONED THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.
11. INTERRUPTION TO SUPPLY OF EXISTING SERVICES SHALL BE DONE SO AS NOT TO CAUSE ANY INCONVENIENCE OR DAMAGE TO THE ADJACENT RESIDENCES. CONTRACTOR TO GAIN APPROVAL OF THE SUPERINTENDENT FOR TIME OF INTERRUPTION.
12. THE CONTRACTOR SHALL UNDERTAKE A DIAL BEFORE YOU DIG (DBYD 1100) SERVICES SEARCH BEFORE THE COMMENCEMENT OF ANY WORKS.

GENERAL NOTES:

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
2. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT STANDARDS AUSTRALIA CODES AND WITH THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION.
3. ALL DIMENSIONS SHOWN SHALL BE VERIFIED BY THE BUILDER ON SITE. ENGINEER'S DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS. ENGINEER'S DRAWINGS ISSUED IN ANY ELECTRONIC FORMAT MUST NOT BE USED FOR DIMENSIONAL SETOUT. REFER TO THE ARCHITECT'S DRAWINGS FOR ALL DIMENSIONAL SETOUT INFORMATION.
4. DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED. TEMPORARY BRACING SHALL BE PROVIDED BY THE BUILDER TO KEEP THE WORKS AND EXCAVATIONS STABLE AT ALL TIMES.
5. UNLESS NOTED OTHERWISE ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES.
6. ALL WORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH ACCEPTABLE SAFETY STANDARDS & APPROPRIATE SAFETY SIGNS SHALL BE INSTALLED AT ALL TIMES DURING THE PROGRESS OF THE JOB.

ELECTRONIC INFORMATION NOTES:

1. THE ISSUED DRAWINGS IN HARD COPY OR PDF FORMAT TAKE PRECEDENCE OVER ANY ELECTRONICALLY ISSUED INFORMATION, LAYOUTS OR DESIGN MODELS.
2. THE CONTRACTOR'S DIRECT AMENDMENT OR MANIPULATION OF THE DATA OR INFORMATION THAT MIGHT BE CONTAINED WITHIN AN ENGINEER-SUPPLIED DIGITAL TERRAIN MODEL AND ITS SUBSEQUENT USE TO UNDERTAKE THE WORKS WILL BE SOLELY AT THE DISCRETION OF AND THE RISK OF THE CONTRACTOR.
3. THE CONTRACTOR IS REQUIRED TO HIGHLIGHT ANY DISCREPANCIES BETWEEN THE DIGITAL TERRAIN MODEL AND INFORMATION PROVIDED IN THE CONTRACT AND/OR DRAWINGS AND IS REQUIRED TO SEEK CLARIFICATION FROM THE SUPERINTENDENT.
4. THE ENGINEER WILL NOT BE LIABLE OR RESPONSIBLE FOR THE POSSIBLE ON-GOING NEED TO UPDATE THE DIGITAL TERRAIN MODEL, SHOULD THERE BE ANY AMENDMENTS OR CHANGES TO THE DRAWINGS OR CONTRACT INITIATED BY THE CONTRACTOR.

LOCALITY PLAN
NTS

FOR INFORMATION

ISSUED FOR INFORMATION	02.02.24	A
AMENDMENTS	DATE	ISSUE

ARCHITECT
[watch this SPACE design]

CLIENT
SPARC

PROJECT
PROPOSED DEVELOPMENT
75 OLD PITTWATER ROAD, BROOKVALE
NSW, 2100

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
FR	FR	FEB '24	DS	A1	AS SHOWN	C012664.01-DA10

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DRAWING TITLE
DRAWING LIST & GENERAL NOTES

DRAWING No C012664.01-DA10

ISSUE A

EROSION CONTROL NOTES:

ALL CONTROL WORK INCLUDING DIVERSION BANKS AND CATCH DRAINS, V-DRAINS AND SILT FENCES SHALL BE COMPLETED DIRECTLY FOLLOWING THE COMPLETION OF THE EARTHWORKS.

1. SILT FENCES AND SILT FENCE RETURNS SHALL BE ERECTED CONVEX TO THE CONTOUR TO POND WATER.
2. HAY BALE BARRIERS AND GEOFABRIC FENCES ARE TO BE CONSTRUCTED TO TOE OF BATTER, PRIOR TO COMMENCEMENT OF EARTHWORKS, IMMEDIATELY AFTER CLEARING OF VEGETATION AND BEFORE REMOVAL OF TOP SOIL.
3. ALL TEMPORARY EARTH BERMS, DIVERSION AND SILT DAM EMBANKMENTS ARE TO BE MACHINE COMPACTED, SEEDED AND MULCHED FOR TEMPORARY VEGETATION COVER AS SOON AS THEY HAVE BEEN FORMED.
4. CLEAR WATER IS TO BE DIVERTED AWAY FROM DISTURBED GROUND AND INTO THE DRAINAGE SYSTEM.
5. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING AND PROVIDING ON GOING ADJUSTMENT TO EROSION CONTROL MEASURES AS REQUIRED DURING CONSTRUCTION.
6. ALL SEDIMENT TRAPPING STRUCTURES AND DEVICES ARE TO BE INSPECTED AFTER STORMS FOR STRUCTURAL DAMAGE OR CLOGGING, TRAPPED MATERIAL IS TO BE REMOVED TO A SAFE, APPROVED LOCATION.
7. ALL FINAL EROSION PREVENTION MEASURES INCLUDING THE ESTABLISHMENT OF GRASSING ARE TO BE MAINTAINED UNTIL THE END OF THE DEFECTS LIABILITY PERIOD.
8. ALL EARTHWORKS AREAS SHALL BE ROLLED ON A REGULAR BASIS TO SEAL THE EARTHWORKS.
9. ALL FILL AREAS ARE TO BE LEFT WITH A BUND AT THE TOP OF THE SLOPE AT THE END OF EACH DAYS EARTHWORKS. THE HEIGHT OF THE BUND SHALL BE A MINIMUM OF 200mm.
10. ALL CUT AND FILL SLOPES ARE TO BE SEEDED AND HYDROMULCHED WITHIN 10 DAYS OF COMPLETION OF FORMATION.
11. AFTER REVEGETATION OF THE SITE IS COMPLETE AND THE SITE IS STABLE IN THE OPINION OF A SUITABLY QUALIFIED PERSON ALL TEMPORARY WORK SUCH AS SILT FENCE, DIVERSION DRAINS ETC SHALL BE REMOVED.
12. ALL TOPSOIL STOCKPILES ARE TO BE SUITABLY COVERED TO THE SATISFACTION OF THE SITE MANAGER TO PREVENT WIND AND WATER EROSION.
13. ANY AREA THAT IS NOT APPROVED BY THE CONTRACT ADMINISTRATOR FOR CLEARING OR DISTURBANCE BY THE CONTRACTOR'S ACTIVITIES SHALL BE CLEARLY MARKED AND SIGN POSTED, FENCED OFF OR OTHERWISE APPROPRIATELY PROTECTED AGAINST ANY SUCH DISTURBANCE.
14. ALL STOCKPILE SITES SHALL BE SITUATED IN AREAS APPROVED FOR SUCH USE BY THE SITE MANAGER. A 6m BUFFER ZONE SHALL EXIST BETWEEN STOCKPILE SITES AND ANY STREAM OR FLOW PATH. ALL STOCKPILES SHALL BE ADEQUATELY PROTECTED FROM EROSION AND CONTAMINATION OF THE SURROUNDING AREA BY USE OF THE MEASURES APPROVED IN THE EROSION AND SEDIMENTATION CONTROL PLAN.
15. ACCESS AND EXIT AREAS SHALL INCLUDE SHAKE-DOWN OR OTHER METHODS APPROVED BY THE SITE MANAGER FOR THE REMOVAL OF SOIL MATERIALS FORM MOTOR VEHICLES.
16. THE CONTRACTOR IS TO ENSURE RUNOFF FROM ALL AREAS WHERE THE NATURAL SURFACE IS DISTURBED BY CONSTRUCTION, INCLUDING ACCESS ROADS, DEPOT AND STOCKPILE SITES, SHALL BE FREE OF POLLUTANTS BEFORE IT IS EITHER DISPERSED TO STABLE AREAS OR DIRECTED TO NATURAL WATERCOURSES.
17. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN SLOPES, CROWNS AND DRAINS ON ALL EXCAVATIONS AND EMBANKMENTS TO ENSURE SATISFACTORY DRAINAGE AT ALL TIMES WATER SHALL NOT BE ALLOWED TO POND ON THE WORKS UNLESS SUCH PONDING IS PART OF AN APPROVED ESCP / SWMP.

LEGEND:

PROVIDE 1m RETURNS TO SILT FENCE AT 30m MAX. INTERVALS.
TYPICAL (N.S.O.P.)

- DENOTES SILT FENCE WITH CATCH DRAIN
- DENOTES SILT FENCE ONLY
- DENOTES CONSTRUCTION ENTRY
- DENOTES EXTENT OF WORKS
- DENOTES OVERLAND FLOW PATH

RUSLE CALCULATION:

TOTAL CATCHMENT AREA = 2.37 Ha
DISTURBED CATCHMENT AREA = 0.079 Ha

A = R x K x LS x P x C

1. 2-yr, 6-hr ARI (S) = 10.8;
2. RAINFALL EROSIVITY FACTOR (R)
   R = $164.74(11.117)^{\beta}$ $S^{0.4444}$ = 2540;
3. SOIL ERODIBILITY FACTOR (K) = 0.075;
4. LENGTH/GRADIENT FACTOR (LS) = 0.64
5. EROSION CONTROL PRACTICE FACTOR (P) = 1.3;
6. COVER FACTOR (C) = 1.0

SOIL LOSS (A) = $158.5m^3$/ha/yr
= $12.5m^3$/yr

PER BLUE BOOK GUIDELINES SECTION 6.3.2.d, FOR SITES WITH AVERAGE ANNUAL SOIL LOSS (A) < 150m3/yr, A SEDIMENT RETENTION BASIN MAY BE CONSIDERED UNNECESSARY

EROSION & SEDIMENT CONTROL PLAN
SCALE 1:200

2m 0 5 10 15 20m
SCALE 1:200 AT A1 SIZE SHEET

FOR INFORMATION

ISSUED FOR INFORMATION	02.02.24	A
AMENDMENTS	DATE	ISSUE

ARCHITECT: [watch this SPACE design]

CLIENT: SPARC

PROJECT
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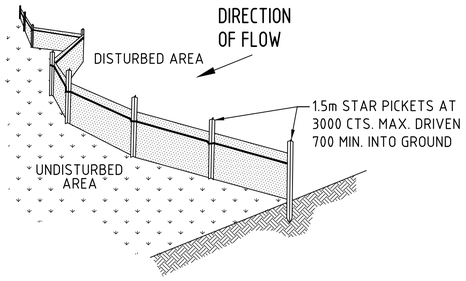
DRAWING TITLE
EROSION & SEDIMENT CONTROL PLAN

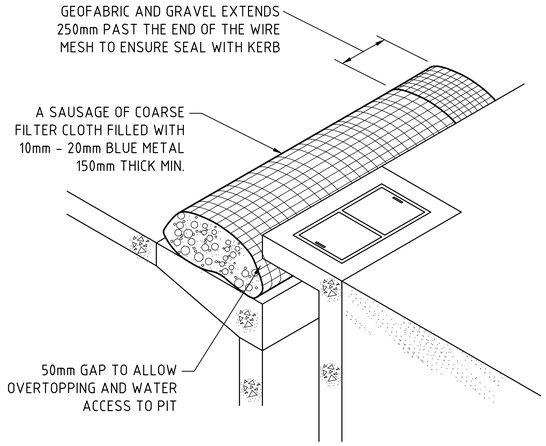
DRAWING No C012664.01-DA20
ISSUE A



TYPICAL SILT FENCE DETAIL

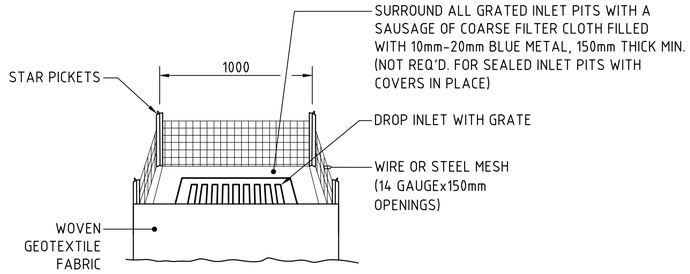
N.T.S

NOTE: PROVIDE 1m RETURNS AT 30m INTERVALS. TYPICAL



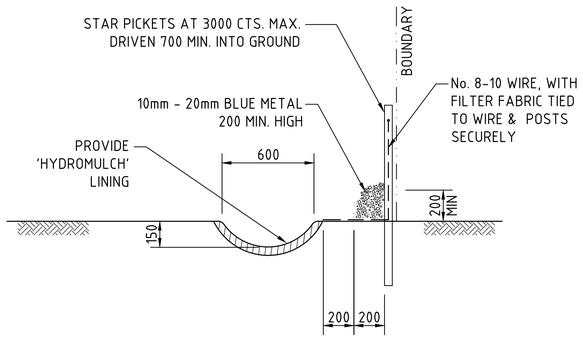
KERB INLET CONTROL

N.T.S



GRATED INLET PIT FILTER DETAIL

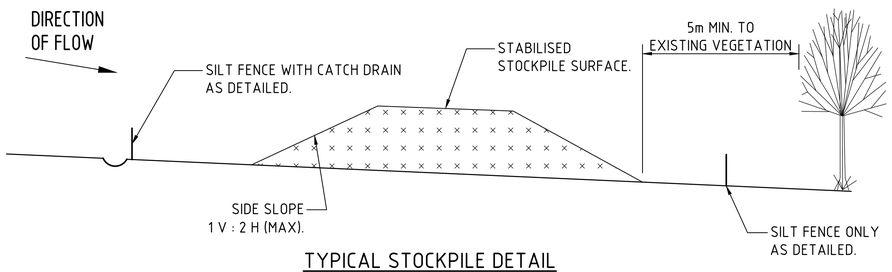
N.T.S



TYPICAL OPEN DRAIN & SILT FENCE

SCALE 1:20

NOTE :
ADOPT ABOVE DETAILS AROUND ALL PITS WITHIN AREA ENCOMPASSED BY SILT FENCE & TO PITS ON THE ROAD ADJACENT TO SITE BOUNDARY.

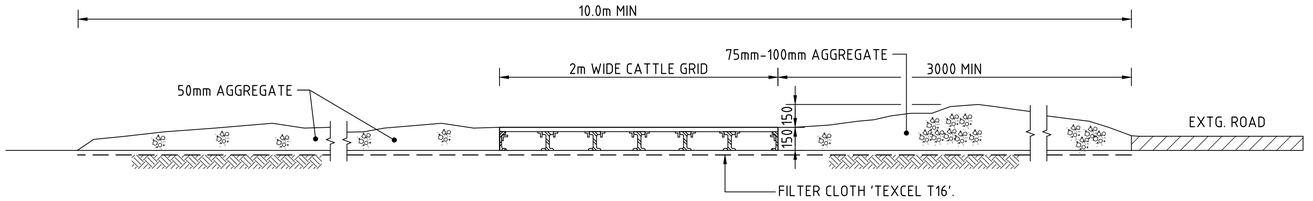


TYPICAL STOCKPILE DETAIL

N.T.S

STOCKPILE NOTES

1. PLACE ALL STOCKPILES IN LOCATIONS MORE THAN 5m FROM EXISTING VEGETATION, ROADS & HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT ELONGATED MOUNDS. SIDE SLOPE TO BE 1 V: 2 H MAX.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE STOCKPILES ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE USING WOOD CHIP MULCH - 16 TONNE/Ha.
5. CONSTRUCT SILT FENCE WITH CATCH DRAIN ON UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES & SILT FENCE ONLY 1 TO 2m DOWNSLOPE AS SHOWN.



SECTION 1:20 1/- : STABILISED CONSTRUCTION ENTRANCE 'TRUCK SHAKER'

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT A1 SIZE SHEET

FOR INFORMATION

ISSUED FOR INFORMATION	02.02.24	A
AMENDMENTS	DATE	ISSUE

ARCHITECT: SPACE

CLIENT: SPARC

PROJECT: PROPOSED DEVELOPMENT
75 OLD PITTWATER ROAD, BROOKVALE
NSW, 2100

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
FR	FR	FEB '24	DS	A1	AS SHOWN	C012664.01-DA25

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DRAWING TITLE: EROSION & SEDIMENT CONTROL DETAILS

DRAWING No: C012664.01-DA25

ISSUE: A

EXISTING RL TO COMPLY WITH

STORMWATER DRAINAGE NOTES:

1. ALL STORMWATER WORKS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS3500.3 PLUMBING AND DRAINAGE, PART 3: STORMWATER DRAINAGE.
2. THE MINOR (PIPED) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 20 YEAR ARI STORM EVENT AND THE MAJOR (OVERLAND) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 100 YEAR ARI STORM EVENT.
3. ALL FINISHED PAVEMENT LEVELS SHALL BE AS INDICATED ON FINISHED LEVELS PLANS C012664.01-DA50.
4. PIT SIZES SHALL BE AS INDICATED IN THE SCHEDULE WHILE PIPE SIZES AND DETAILS ARE PROVIDED ON PLAN.
5. EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFIRMED BY SURVEY PRIOR TO COMMENCING WORKS ON SITE.
6. ALL STORMWATER PIPES Ø375 OR GREATER SHALL BE CLASS 2 (WITH HS2 SUPPORT) REINFORCED CONCRETE WITH RUBBER RING JOINTS UNLESS NOTED OTHERWISE.
7. ALL PIPES UP TO AND INCLUDING Ø300 TO BE uPVC GRADE SN8 UNO.
8. PIPE CLASS NOMINATED ARE FOR IN-SERVICE LOADING CONDITIONS ONLY. CONTRACTOR IS TO MAKE ANY NECESSARY ADJUSTMENTS REQUIRED FOR CONSTRUCTION CONDITIONS.
9. ALL CONCRETE PITS GREATER THAN 1000mm DEEP SHALL BE REINFORCED USING N12-200 EACH WAY CENTERED IN WALL AND BASE. LAP MINIMUM 300mm WHERE REQUIRED. ALL CONCRETE FOR PITS SHALL BE F'c=25 MPa. PRECAST PITS MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
10. IN ADDITION TO ITEM 9 ABOVE, ALL CONCRETE PITS GREATER THAN 3000mm DEEP SHALL HAVE WALLS AND BASE THICKNESS INCREASED TO 200mm.
11. PIPES SHALL BE LAID AS PER PIPE LAYING DETAILS. PARTICULAR CARE SHALL BE TAKEN TO ENSURE THAT THE PIPE IS FULLY AND EVENLY SUPPORTED. RAM AND PACK FILLING AROUND AND UNDER BACK OF PIPES AND PIPE FAUCETS, WITH NARROW EDGED RAMMERS OR OTHER SUITABLE TAMPING DETAILS.
12. CONCRETE PIPES UNDER, OR WITHIN THE ZONE OF INFLUENCE OF PAVED AREAS SHALL BE LAID USING HS2 TYPE SUPPORT, AS A MINIMUM, IN ACCORDANCE WITH AS 3725. AGGREGATE BACKFILL SHALL NOT BE USED FOR PIPE BEDDING AND OR HAUNCH/SIDE SUPPORT.
13. WHERE PIPE LINES ENTER PITS, PROVIDE 2m LENGTH OF STOCKING WRAPPED SLOTTED Ø100 uPVC TO EACH SIDE OF PIPE.
14. ALL SUBSOIL DRAINAGE LINES SHALL BE Ø100 SLOTTED uPVC WITH APPROVED FILTER WRAP LAID IN 300mm WIDE GRANULAR FILTER UNLESS NOTED OTHERWISE. LAY SUBSOIL LINES TO MATCH FALLS OF LAND AND/OR 1 IN 200 MINIMUM. PROVIDE CAPPED CLEANING EYE (RODDING POINT) AT UPSTREAM END OF LINE AND AT 30m MAX. CTS. PROVIDE SUBSOIL LINES TO ALL PAVEMENT/ LANDSCAPED INTERFACES, TO REAR OF RETAINING WALLS (AS NOMINATED BY STRUCTURAL ENGINEER) AND AS SHOWN ON PLAN.
15. WHERE SUBSOIL DRAINAGE PASSES UNDER A PAVEMENT OR A SLAB, UNSLOTTED UPVC ARE TO BE PROVIDED UNLESS NOTED OTHERWISE.
16. ALL PIPE GRADES 1 IN 200 MINIMUM UNO.
17. PROVIDE STEP IRONS IN PITS DEEPER THAN 1000mm.
18. MIN. 600 COVER TO PIPE OBVERT BENEATH ROADS & MIN. 400 COVER BENEATH LANDSCAPED AND PEDESTRIAN AREAS.
19. PIT COVERS IN TRAFFICABLE PAVEMENT SHALL BE CLASS D 'HEAVY DUTY'. WHERE FORKLIFT USE IS REQUIRED EXTERNAL TO THE BUILDING PIT COVERS SHALL BE MIN. CLASS E. PIT COVERS IN CONTAINER PAVEMENTS ARE TO BE MIN. CLASS G. REFER TO ENGINEER FOR SPECIAL DETAILS.THOSE LOCATED IN NON-TRAFFICABLE AREAS SHALL BE CLASS B 'MEDIUM DUTY' U.N.O.
20. PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
21. DOWN PIPES (DP) TO BE AS PER HYDRAULIC ENGINEERS DETAILS WITH CONNECTOR TO MATCH DP SIZE U.N.O. ON PLAN. PROVIDE CLEANING EYE AT GROUND LEVEL.
22. PIPE LENGTHS NOMINATED ON PLAN OR LONGSECTIONS ARE MEASURED FROM CENTER OF PITS TO THE NEAREST 0.5m AND DO NOT REPRESENT ACTUAL LENGTH. THE CONTRACTOR IS TO ALLOW FOR THIS.
23. WHERE CONNECTION TO EXISTING INGROUND DRAINAGE SYSTEMS, OPEN SWALES, CHANNELS OR ANY OTHER EXISTING SYSTEM, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION AND INVERT ON SITE AT THE BEGINNING OF THE CONSTRUCTION PERIOD. REFER ANY VARIANCE FROM DOCUMENTATION OR SURVEYS TO THE ENGINEER FOR CLARIFICATION.

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY BEE & LETHBRIDGE PTY LTD DATED 10.10.23.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- SW> – PROPOSED DRAINAGE LINE
- SW> – EXISTING DRAINAGE LINE
- PROPOSED DISH DRAIN
- DP – ROOFWATER DOWNPIPE (INDICATIVE)
- rw> – ROOFWATER LINE
- OVERLAND FLOW DIRECTION
- 50.00 – FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 – FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- W W W – EXISTING WATER SERVICSE
- E E E – EXISTING UNDERGROUND ELECTRICAL SERVICES
- G G G – EXISTING GAS SERVICES
- T T T – EXISTING TELECOMMUNICATION SERVICES
- S S S – EXISTING SEWER LINE

NOTE:

SURFACE INLET PITS TO BE FITTED WITH OCEAN PROTECT OCEANGUARD OG200 INSERTS SHOWN THUS ◇
TOTAL NUMBER OF PIT INSERTS = 2

RELOCATED DEMOUNTABLE
REFER TO DRAWING
RELOCATED DEMOUNTABLE RL 14.70

PROPOSED CONCRETE FINISH
APPROX. 473 SQM

PROPOSED RL.14.00

PROPOSED LABORATORY

PROPOSED DEMOUNTABLE RL 14.70

PROVIDE ROOFWATER CONNECTIONS. ALLOW FOR Ø225 DOWNPIPES AND Ø300 INGROUND COLLECTION TO PIT A01

PIT A01

PIT A02

PIT A03

Ø300

900mm WIDE DISH DRAIN TO DIVERT WATER FROM CONCRETE PAVEMENT

WATER QUALITY NOTE: ON HOLD SUBJECT TO DESIGN PROGRESSION.

REINSTATE TO MATCH EXISTING

EXISTING DISCHARGE TO BROOKVALE CREEK Ø450 PIPE AT IL 10.31

CONNECT TO EXISTING Ø300 PIPE AND PROVIDE NEW SEALED JUNCTION PIT

RETAIN & PROTECT EXISTING TELECOMMUNICATION PITS

BENCH MARK CUT IN CONCRETE RL. 12.61 A.H.D.

900mm WIDE DISH DRAIN TO DIVERT WATER FROM CONCRETE PAVEMENT

SEWER ACCESS CHAMBER INLET INVERT 10.33 BOTTOM 9.29

EXISTING CONCRETE HEADWALL INVERT 10.31

GRATE 12.01 INVERT 11.23

0.225Ø PIPE 11.93

STORMWATER DRAINAGE PLAN
SCALE 1:100

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT A1 SIZE SHEET

FOR INFORMATION

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ARCHITECT [watch this SPACE design]

CLIENT SPARC

PROJECT
PROPOSED DEVELOPMENT
75 OLD PITTWATER ROAD, BROOKVALE
NSW, 2100

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
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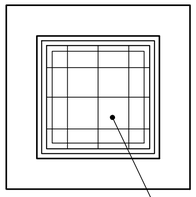
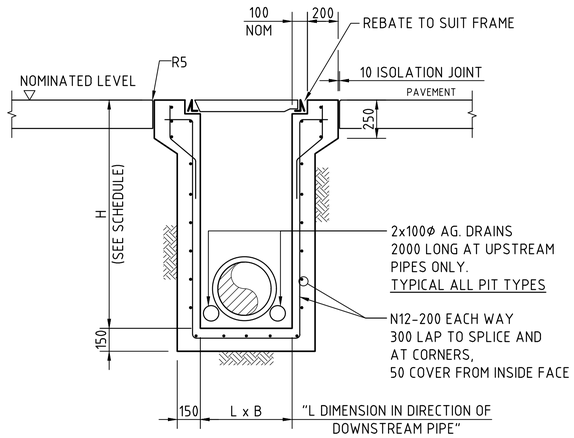
DRAWING TITLE
STORMWATER DRAINAGE PLAN

DRAWING No C012664.01-DA40
ISSUE A

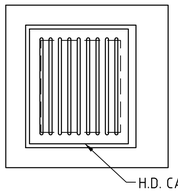


PLAN
SCALE 1:20



SECTION
SCALE 1:20

SEALED JUNCTION PIT - SJP



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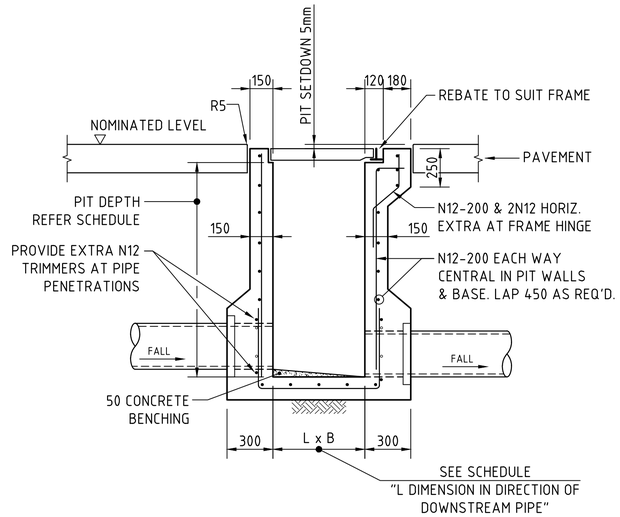
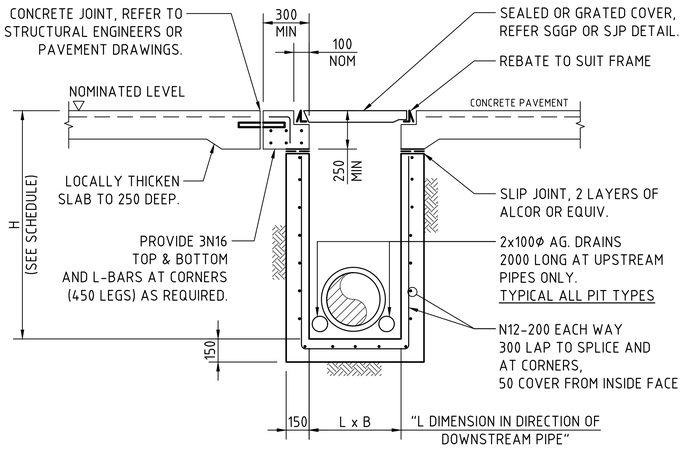
SCALE 1:20



SECTION
SCALE 1:20

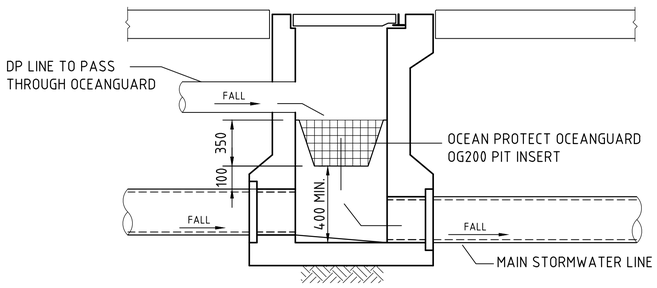
SINGLE GRATED GULLY PIT - SGGP



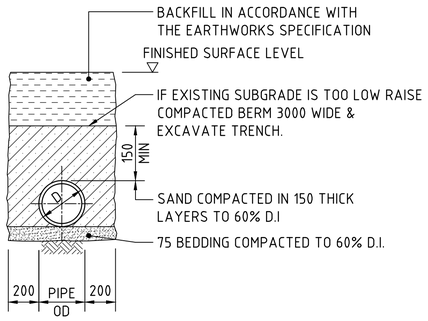
SECTION
SCALE 1:20

SJP/CIS & SGGP/CIS (CAST IN SLAB) PIT DETAIL
GRATE/COVER SUPPORT
CAST-INTO PAVEMENT SLAB

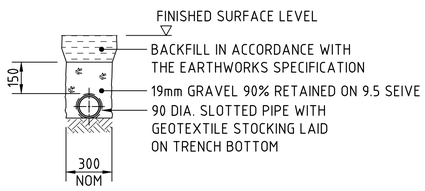
(ADOPT IN CONCRETE PAVEMENT FOR SGGP's & SJP's,
WHERE PITS ARE LOCATED IN THE CORNER OF SLAB
PANELS OR ADJACENT TO SLAB PANEL JOINTS)



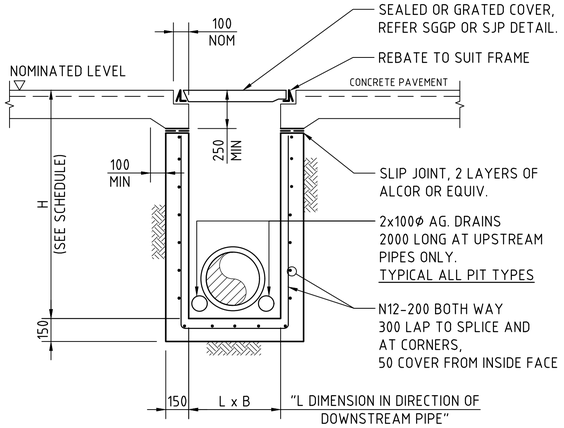
ROOFWATER/STORMWATER PIT WITH
OCEANGUARD CONFIGURATION
SCALE 1:20



SUPPORT TO uPVC PIPES
SCALE 1:20



SUPPORT TO AGRICULTURAL DRAIN
SCALE 1:20



SECTION
SCALE 1:20

SJP/CIS & SGGP/CIS (CAST IN SLAB) PIT DETAIL
GRATE/COVER SUPPORT
CAST-INTO PAVEMENT SLAB

(ADOPT IN CONCRETE PAVEMENTS FOR SGGP's & SJP's, WHERE
JOINTS ARE NOT LOCATED WITHIN PROXIMITY OF THE GRATE)

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT A1 SIZE SHEET

FOR INFORMATION

ISSUED FOR INFORMATION	02.02.24	A
AMENDMENTS	DATE	ISSUE

ARCHITECT [watch this SPACE design]

CLIENT SPARC

PROJECT
PROPOSED DEVELOPMENT
75 OLD PITTWATER ROAD, BROOKVALE
NSW, 2100

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
FR	FR	FEB '24	DS	A1	AS SHOWN	C012664.01-DA45

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DRAWING TITLE
STORMWATER DRAINAGE DETAILS
SHEET 1

DRAWING No C012664.01-DA45 ISSUE A

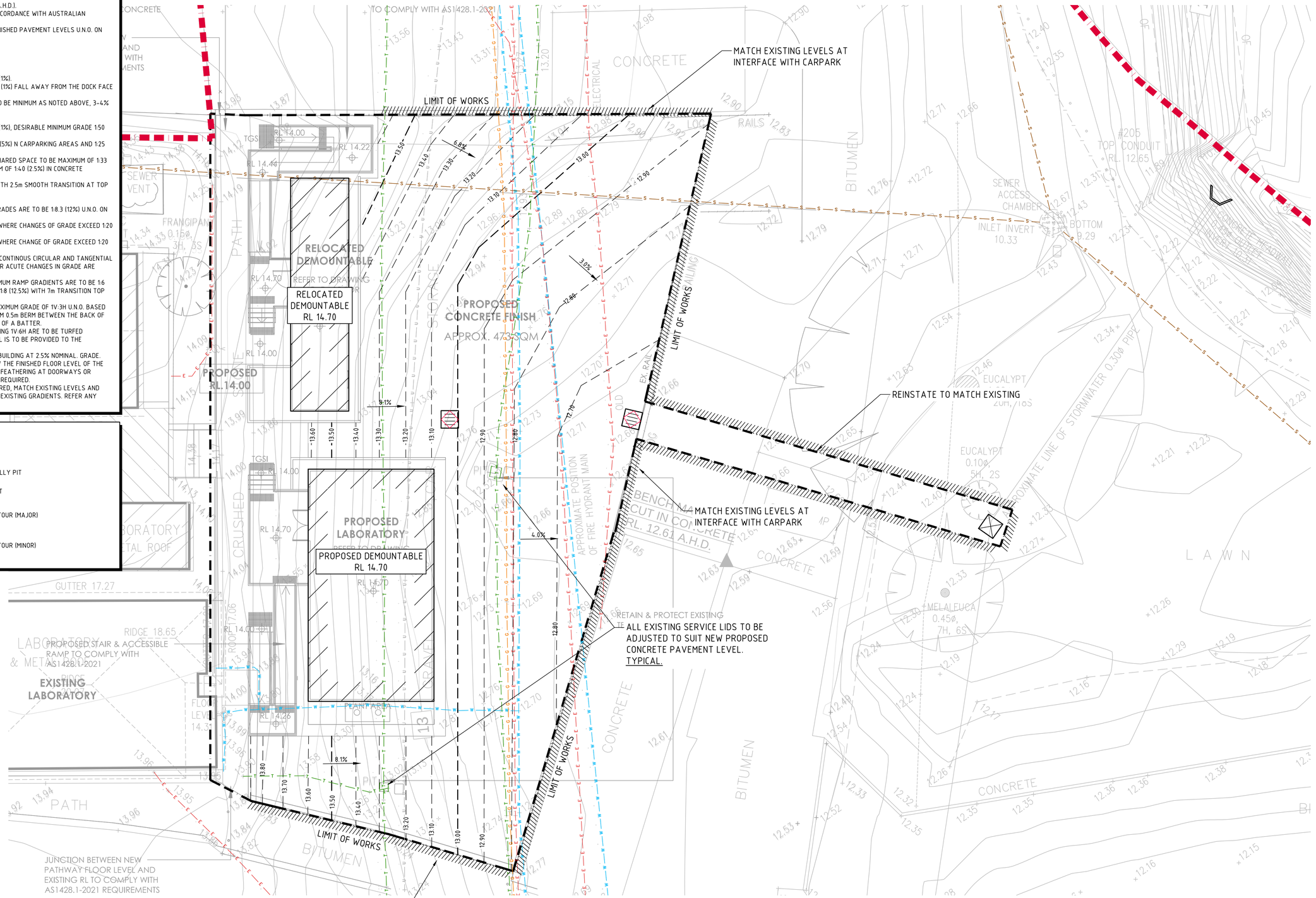
FINISHED LEVELS PLAN NOTES:

1. LEVELS DATUM IS AUSTRALIAN HEIGHT DATUM (A.H.D.).
2. GRADING REQUIREMENTS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS2890.1, AS2890.2 AND AS2890.6.
3. ALL CONTOUR LINES & SPOT LEVELS INDICATE FINISHED PAVEMENT LEVELS U.N.O. ON PLAN.
4. CONTOUR INTERVALS
   - THE MINOR CONTOUR INTERVAL IS 0.1m.
   - THE MAJOR CONTOUR INTERVAL IS 0.5m.
5. HARDSTAND GRADING
   - MINIMUM PAVEMENT GRADE IS TO BE 1:100 (1%).
   - GRADING OF ON-GRADE DOCKS TO BE 1:100 (1%) FALL AWAY FROM THE DOCK FACE FOR A LENGTH OF 15m U.N.O.
   - GRADING OF TRUCK CIRCULATION ZONES TO BE MINIMUM AS NOTED ABOVE, 3-4% NOMINAL AND MAX. 5%.
6. CAR PARKING AREA GRADES
   - MINIMUM PAVEMENT GRADE IS TO BE 1:100 (1%), DESIRABLE MINIMUM GRADE 1:50 (2%).
   - MAXIMUM PAVEMENT GRADE IS TO BE 1:20 (5%) N CARPARKING AREAS AND 1:25 (4%) ELSEWHERE.
   - DISABLED ACCESS PARKING ZONES AND SHARED SPACE TO BE MAXIMUM OF 1:33 (3%) IN ASPHALT PAVEMENT AND MAXIMUM OF 1:40 (2.5%) IN CONCRETE PAVEMENT.
   - CARPARK RAMP GRADES TO BE MAX 1:5 WITH 2.5m SMOOTH TRANSITION AT TOP AND BOTTOM U.N.O.
7. TRUCK RAMP GRADES
   - MAXIMUM B-DOUBLE OR 19.0m AV RAMP GRADES ARE TO BE 1:8.3 (12%) U.N.O. ON PLAN
   - PROVIDE MINIMUM 4.0m LONG TRANSITION WHERE CHANGES OF GRADE EXCEED 1:20 (5%) AT A CREST U.N.O.
   - PROVIDE MINIMUM 3.0m LONG TRANSITION WHERE CHANGE OF GRADE EXCEED 1:20 (5%) AT A SAG U.N.O.
   - TRANSITIONS ARE TO PROVIDE A SMOOTH CONTINOUS CIRCULAR AND TANGENTIAL CHANGE IN GRADE TO ENSURE NO SHARP OR ACUTE CHANGES IN GRADE ARE PRESENT.
8. WHERE FIRE BRIGADE ACCESS IS REQUIRED, MAXIMUM RAMP GRADIENTS ARE TO BE 1:6 (16.6%), DESIRABLE RAMP GRADIENTS ARE TO BE 1:8 (12.5%) WITH 7m TRANSITION TOP AND BOTTOM U.N.O. ON PLAN.
9. PERMANENT BATTER SLOPES ARE TO HAVE A MAXIMUM GRADE OF 1V:3H U.N.O. BASED ON GEOTECHNICAL ASSESSMENT. PROVIDE MINIMUM 0.5m BERM BETWEEN THE BACK OF KERB OR PAVEMENT EDGES AND THE TOP OR TOE OF A BATTER.
10. ALL BATTER SLOPE WITH GRADES AT OR EXCEEDING 1V:6H ARE TO BE TURFED IMMEDIATELY OR APPROPRIATE EROSION CONTROL IS TO BE PROVIDED TO THE SATISFACTION OF THE ENGINEER.
11. ALL FOOTPATHS ARE TO FALL AWAY FROM THE BUILDING AT 2.5% NOMINAL. GRADE.
12. ALL PAVEMENTS ARE TO BE SET AT 30mm BELOW THE FINISHED FLOOR LEVEL OF THE WAREHOUSE AND OFFICE AREAS. PROVIDE LOCAL FEATHERING AT DOORWAYS OR ROLLER SHUTTERS TO PROVIDE FLUSH FINISH AS REQUIRED.
13. WHERE NEW AND EXISTING INTERFACING IS REQUIRED, MATCH EXISTING LEVELS AND PROVIDE SMOOTH INTERFACE BETWEEN NEW AND EXISTING GRADIENTS. REFER ANY CONCERNS TO THE ENGINEER.

LEGEND:

LEVELS DATUM IS AHD.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- 50.00 – FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 – FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS



FINISHED LEVELS PLAN
SCALE 1:100

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT A1 SIZE SHEET

FOR INFORMATION

ISSUED FOR INFORMATION	02.02.24	A
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ARCHITECT

CLIENT SPARC

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PROPOSED DEVELOPMENT
75 OLD PITTWATER ROAD, BROOKVALE
NSW, 2100

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
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DRAWING TITLE
FINISHED LEVELS PLAN

DRAWING No C012664.01-DA50 ISSUE A

Appendix B

COUNCIL FLOOD LETTER FOR LOT 2/DP600059 (DATED 02/08/2023)

FLOOD INFORMATION REPORT (COMPREHENSIVE)

Property: 75 Old Pittwater Road BROOKVALE NSW 2100
Lot DP: Lot 2 DP 600059
Issue Date: 02/08/2023
Flood Study Reference: Manly Lagoon Flood Study 2013, BMT WBM

Flood Information[1]:

Map A - Flood Risk Precincts
Maximum Flood Planning Level (FPL) [2, 3, 4]: 15.22 m AHD

Map B - 1% AEP Flood & Key points
1% AEP Maximum Water Level [2, 3]: 14.72 m AHD
1% AEP Maximum Depth from natural ground level[3]: 4.62 m
1% AEP Maximum Velocity: 5.84 m/s

Map C - 1% AEP Hydraulic Categorisation
1% AEP Hydraulic Categorisation: Floodway

Map D - Probable Maximum Flood
PMF Maximum Water Level (PMF) [4]: 15.69 m AHD
PMF Maximum Depth from natural ground level: 6.42 m
PMF Maximum Velocity: 7.04 m/s

Map E - Flooding with Climate Change
Climate change flood levels are not available for this property. Based on other similar studies in the LGA it can be assumed in this area that the levels are approximately 0.2m higher than the 1% AEP levels.

Map F - Flood Life Hazard Category in PMF

Map G - Indicative Ground Surface Spot Heights

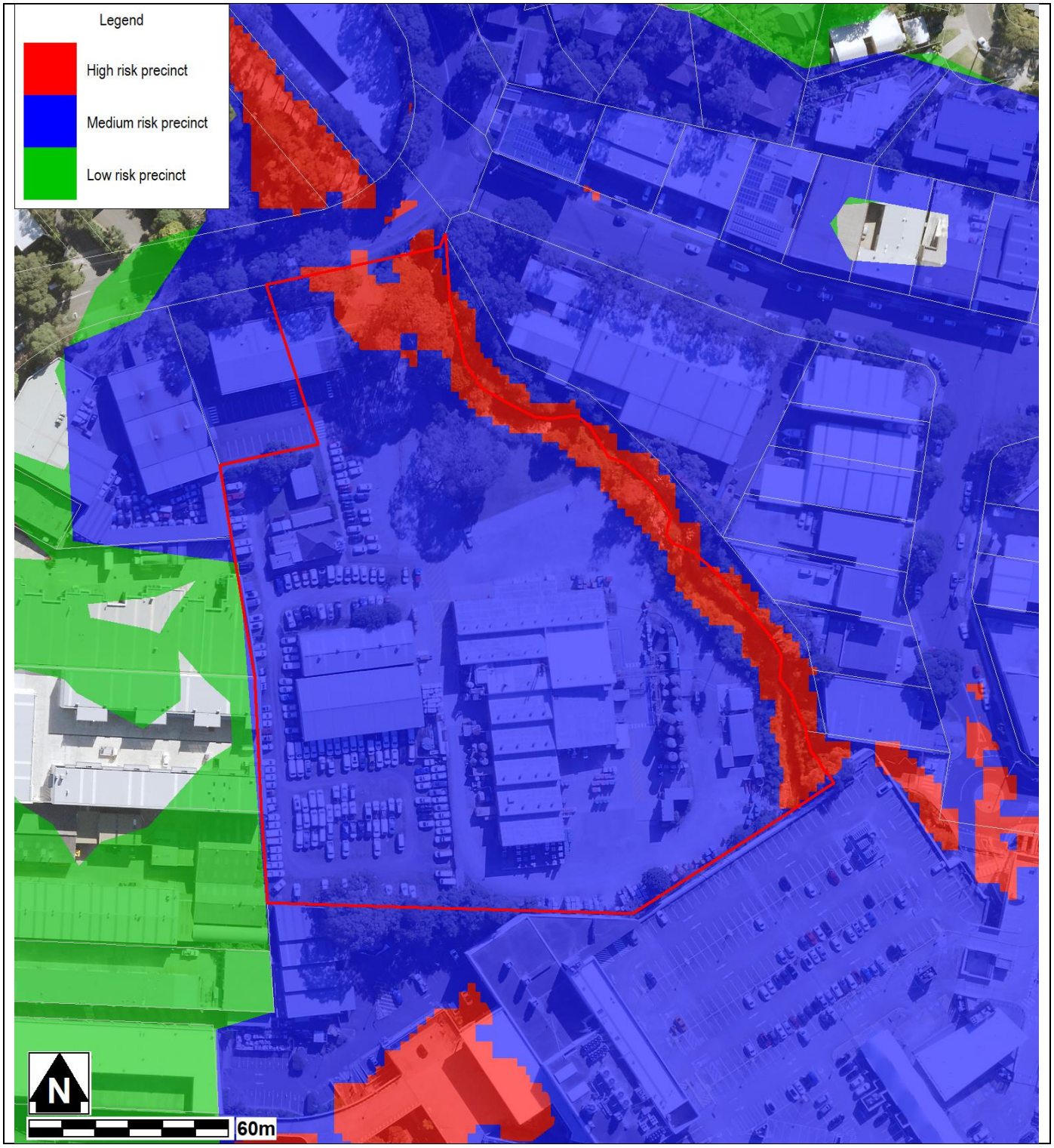
(1) The provided flood information does not account for any local overland flow issues nor private stormwater drainage systems.
(2) Overland flow/mainstream water levels may vary across a sloping site, resulting in variable minimum floor/ flood planning levels across the site. The maximum Flood Planning Level may be in a different location to the maximum 1% AEP flood level.
(3) Intensification of development in the former Pittwater LGA requires the consideration of climate change impacts which may result in higher minimum floor levels.
(4) Vulnerable/critical developments require higher minimum floor levels using the higher of the PMF or FPL

Notes

General

- All levels are based on Australian Height Datum (AHD) unless otherwise noted.
- This is currently the best available information on flooding; it may be subject to change in the future.
- Council recommends that you obtain a detailed survey of the above property and surrounds to AHD by a registered surveyor to determine any features that may influence the predicted extent or frequency of flooding. It is recommended you compare the flood level to the ground and floor levels to determine the level of risk the property may experience should flooding occur.
- Development approval is dependent on a range of issues, including compliance with all relevant provisions of Northern Beaches Council's Local Environmental Plans and Development Control Plans.
- Please note that the information contained within this letter is general advice only as a detail survey of the property as well as other information is not available. Council recommends that you engage a suitably experienced consultant to provide site specific flooding advice prior to making any decisions relating to the purchase or development of this property.
- The Flood Studies on which Council's flood information is based are available on Council's online Flood Study Reports webpage.
- If the FPL is higher than the PMF level, then the FPL should still be used as the FPL, as it includes freeboard which the PMF does not.
- If the property is affected by an Estuarine Planning Level (EPL) which is higher than the FPL, then the EPL should be used as the FPL.
- Areas affected by an EPL in the former Pittwater LGA are mapped on Council's online Estuarine Hazard Map. Note that areas in the former Manly LGA affected by an EPL have been identified and will be soon added to this map.
- Council's drainage infrastructure is mapped on Council's Stormwater Map. Note that locations are indicative only and may not be exactly as shown.

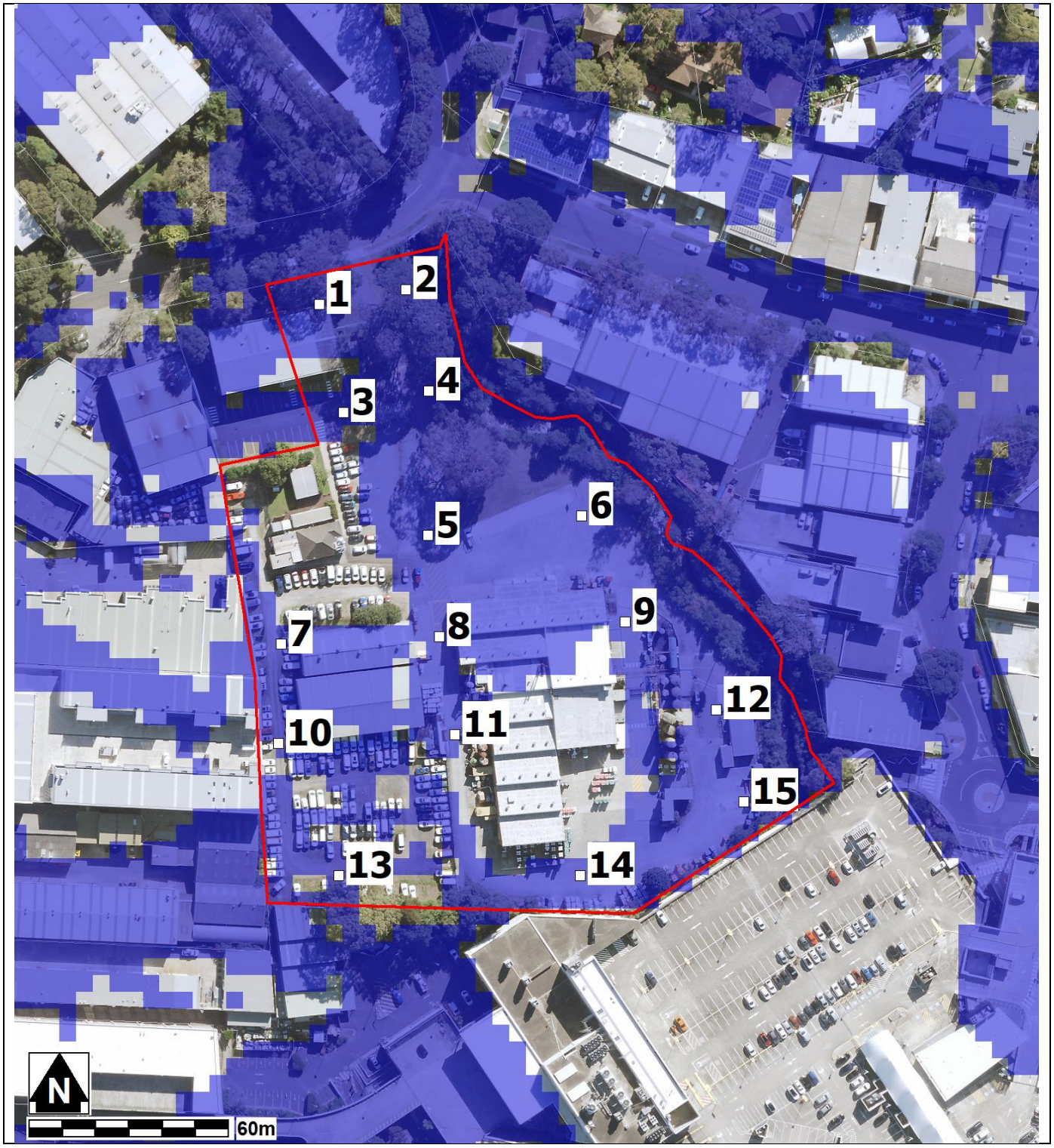
MAP A: FLOOD RISK PRECINCTS



Notes:

- **Low Flood Risk precinct** means all flood prone land not identified within the High or Medium flood risk precincts.
- **Medium Flood Risk precinct** means all flood prone land that is (a) within the 1% AEP Flood Planning Area; and (b) is not within the high flood risk precinct.
- **High Flood Risk precinct** means all flood prone land (a) within the 1% AEP Flood Planning Area; and (b) is either subject to a high hydraulic hazard, within the floodway or subject to significant evacuation difficulties (H5 or H6 Life Hazard Classification).
- The **Flood Planning Area** extent is equivalent to the Medium Flood Risk Precinct extent and includes the High Flood Risk Precinct within it. The mapped extent represents the 1% annual Exceedance Probability (AEP) flood event + freeboard.
- None of these mapped extents include climate change.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Manly Lagoon Flood Study 2013, BMT WBM) and aerial photography (Source: NearMap 2014) are indicative only.

MAP B: FLOODING - 1% AEP EXTENT & KEY POINTS



Notes:

- Extent represents the 1% annual Exceedance Probability (AEP) flood event.
- Flood events exceeding the 1% AEP can occur on this site.
- Extent does not include climate change.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Manly Lagoon Flood Study 2013, BMT WBM) and aerial photography (Source Near Map 2014) are indicative only.

Flood Levels

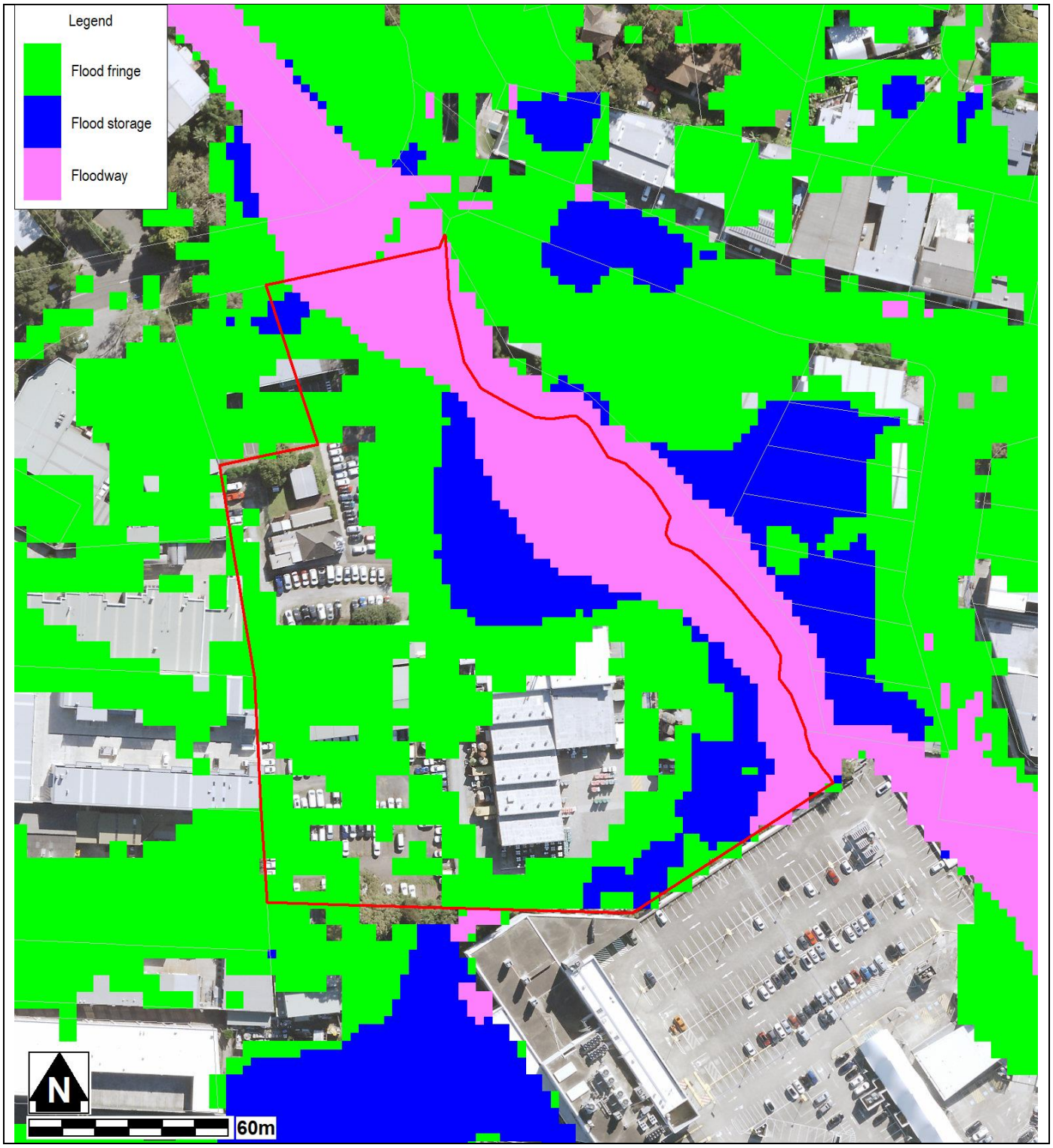
ID	5% AEP Max WL (m AHD)	5% AEP Max Depth (m)	1% AEP Max WL (m AHD)	1% AEP Max Depth (m)	1% AEP Max Velocity (m/s)	Flood Planning Level (m)	PMF Max WL (m AHD)	PMF Max Depth (m)	PMF Max Velocity (m/s)
1	14.21	0.26	14.38	0.43	1.89	14.88	15.13	1.18	2.45
2	13.04	1.08	13.21	1.24	4.33	13.71	14.73	2.76	3.19
3	N/A	N/A	13.53	0.10	1.25	14.03	14.66	1.23	3.69
4	N/A	N/A	12.97	0.22	2.04	13.47	14.68	1.92	3.82
5	N/A	N/A	12.99	0.37	0.28	13.49	14.68	2.06	0.45
6	12.46	0.24	12.96	0.74	0.88	13.46	14.67	2.45	2.47
7	13.25	0.24	13.35	0.34	0.18	N/A	14.68	1.67	0.88
8	N/A	N/A	12.99	0.08	0.54	13.49	14.67	1.76	1.07
9	N/A	N/A	12.93	0.16	0.45	13.43	14.66	1.89	1.01
10	13.24	0.02	13.31	0.08	0.45	13.81	14.67	1.44	1.93
11	12.92	0.02	12.99	0.09	0.41	13.49	14.67	1.76	0.79
12	N/A	N/A	12.86	0.37	0.54	13.36	14.65	2.17	0.82
13	13.08	0.06	13.10	0.08	0.58	13.60	14.66	1.64	1.39
14	N/A	N/A	12.84	0.41	0.48	13.34	14.67	2.23	1.04
15	12.32	0.10	12.86	0.64	0.76	13.36	14.66	2.44	1.27

WL – Water Level
PMF – Probable Maximum Flood
N/A - No Peak Water Level/Depth/Velocity Available.

Notes:

- The flood planning levels above are calculated by adding a 0.5m freeboard to the 1% AEP water level. However, if the depth of flow is less than 0.3m and a Velocity X Depth product is less than 0.3m^2/s, a freeboard of 0.3m may be able to be justified for development.

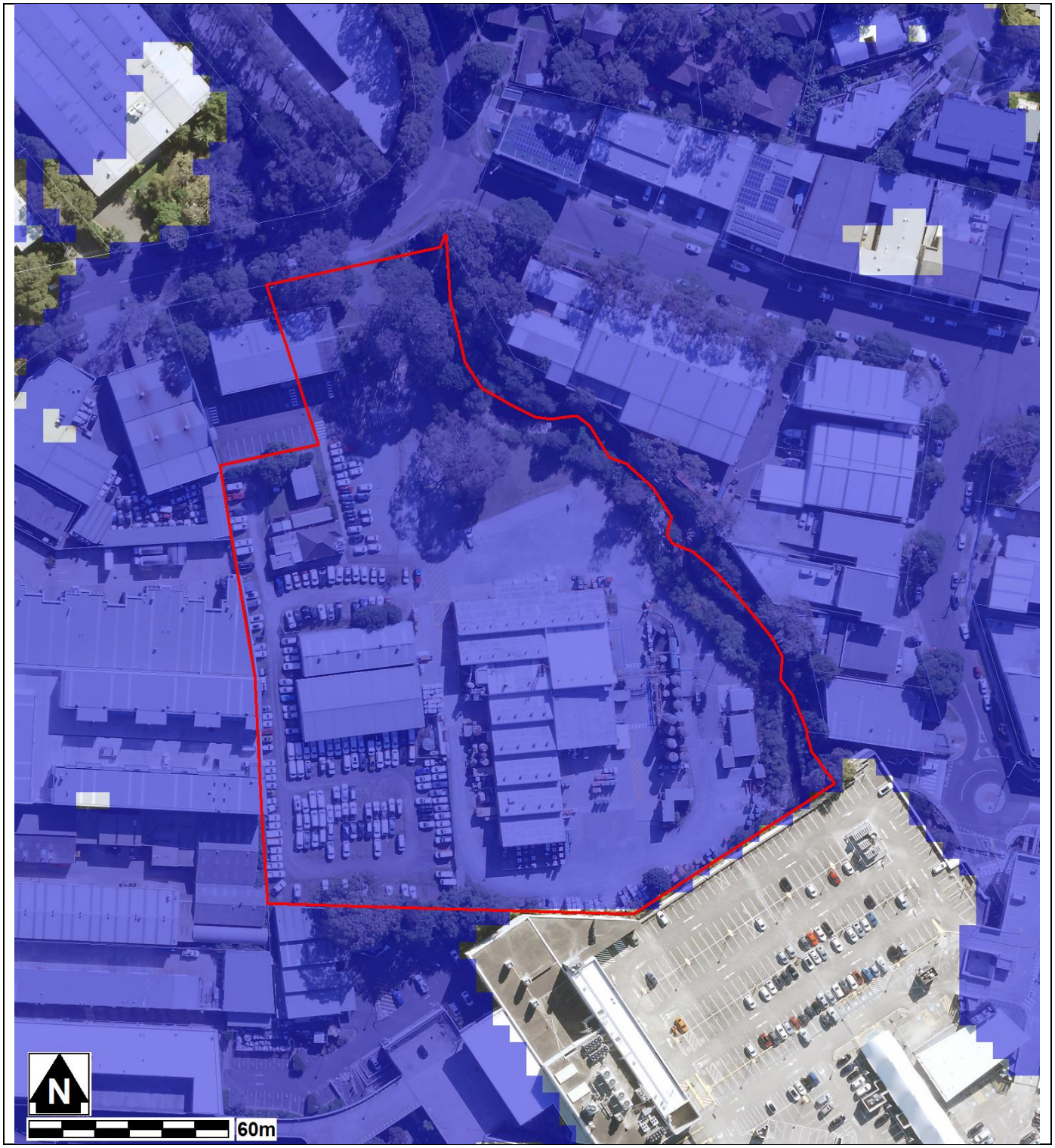
MAP C: 1% AEP FLOOD HYDRAULIC CATEGORY EXTENT MAP



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: Manly Lagoon Flood Study 2013, BMT WBM) and aerial photography (Source: NearMap 2014) are indicative only

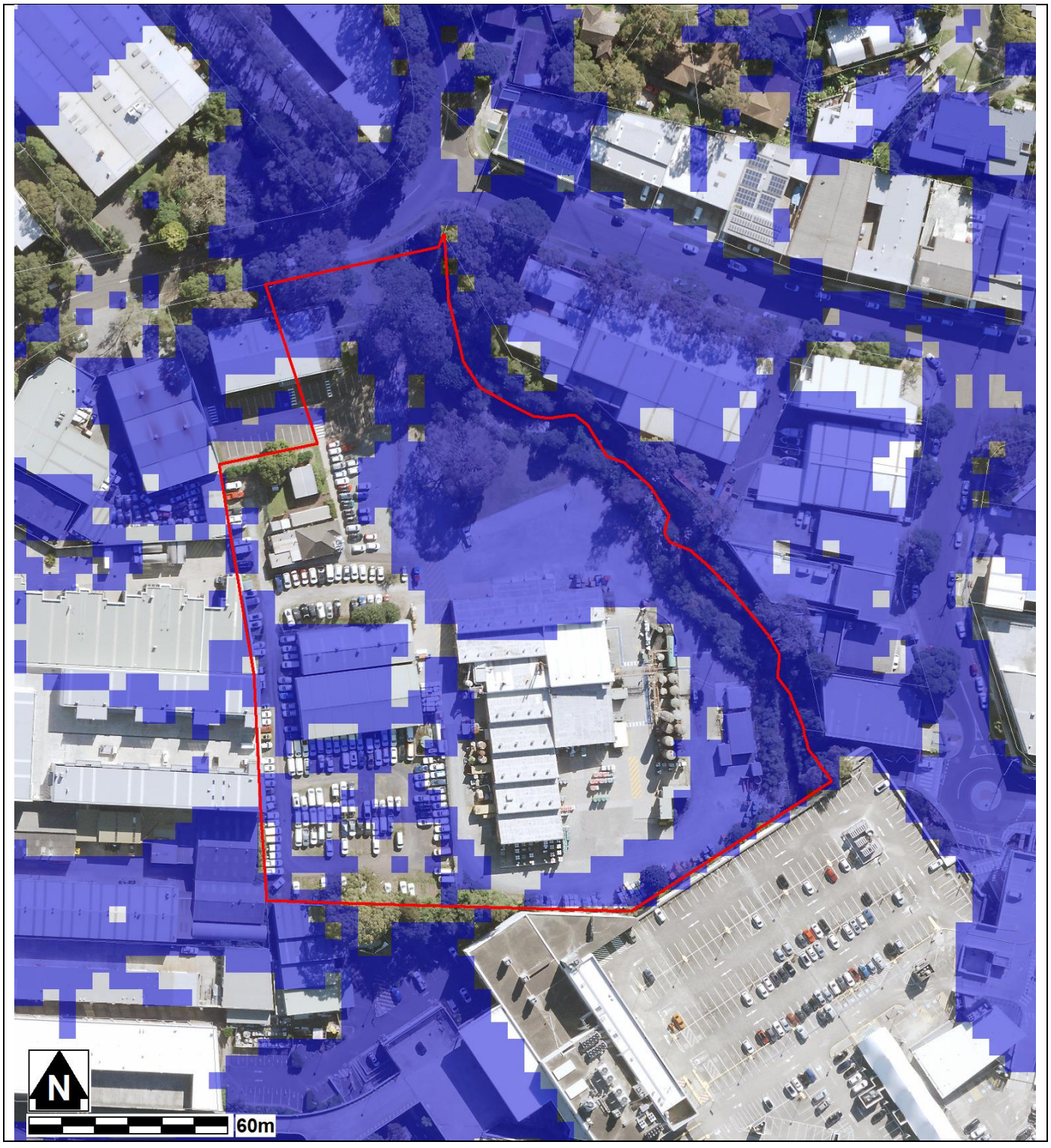
MAP D: PMF EXTENT MAP



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: Manly Lagoon Flood Study 2013, BMT WBM) and aerial photography (Source: NearMap 2014) are indicative only

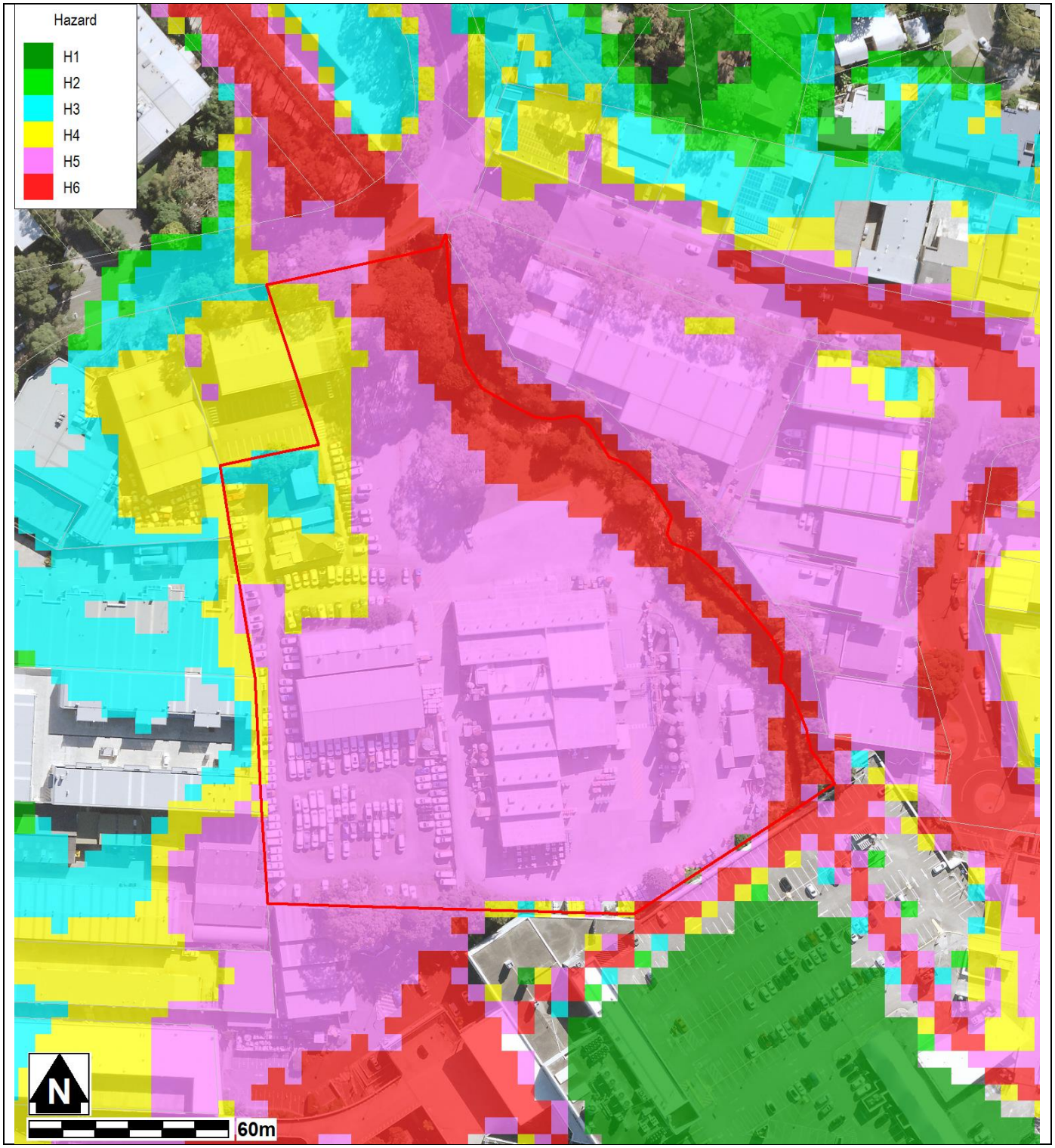
MAP E: FLOODING – 1% AEP EXTENT PLUS CLIMATE CHANGE



Notes:

- Extent represents the 1% annual Exceedance Probability (AEP) flood event including 30% rainfall intensity and 0.9m Sea Level Rise climate change scenario
- Flood events exceeding the 1% AEP can occur on this site.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Manly Lagoon Flood Study 2013, BMT WBM) and aerial photography (Source: NearMap 2014) are indicative only

MAP F: FLOOD LIFE HAZARD CATEGORY IN PMF



Notes:

- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Manly Lagoon Flood Study 2013, BMT WBM) and aerial photography (Source Near Map 2014) are indicative only.

MAP G: INDICATIVE GROUND SURFACE SPOT HEIGHTS

Notes:

- The surface spot heights shown on this map were derived from Airborne Laser Survey and are indicative only.
- Accuracy is generally within ± 0.2m vertically and ± 0.15m horizontally, and Northern Beaches Council does not warrant that the data does not contain errors.
- If accuracy is required, then survey should be undertaken by a registered surveyor.

Preparation of a Flood Management Report

Introduction

These guidelines are intended to provide advice to applicants on how to determine what rules apply on flood prone land, and how to prepare a Flood Management Report. The purpose of a Flood Management Report is to demonstrate how a proposed development will comply with flood related planning requirements.

Planning Requirements for Flood Prone Land

Development must comply with the requirements for developing flood prone land set out in the relevant Local Environment Plan (LEP) and Development Control Plan (DCP). There are separate LEPs and DCPs for each of the former Local Government Areas (LGAs), although preparation of a LGA-wide LEP and DCP is currently under way.

The clauses specific to flooding in the LEPs and DCPs are as follows:

LEP Clauses	DCP Clauses
Manly LEP (2013) – 6.3 Flood Planning	Manly DCP (2013) – 5.4.3 Flood Prone Land
Warringah LEP (2011) – 6.3 Flood Planning Warringah LEP (2000) – 47 Flood Affected Land *	Warringah DCP (2011) – E11 Flood Prone Land
Pittwater LEP (2014) – 7.3 Flood Planning Pittwater LEP (2014) – 7.4 Flood Risk Management	Pittwater 21 DCP (2014) – B3.11 Flood Prone Land Pittwater 21 DCP (2014) – B3.12 Climate Change

* The Warringah LEP (2000) is relevant only for the “deferred lands” which affects only a very small number of properties, mostly in the Oxford Falls area.

Development on flood prone land must also comply with Council’s Water Management for Development Policy, and if it is in the Warriewood Release Area, with the Warriewood Valley Water Management Specification. Guidelines for Flood Emergency Response Planning are available for addressing emergency response requirements in the DCP. These documents can be found on Council’s website on the Flooding page.

Note that if the property is affected by estuarine flooding or other coastal issues, these need to be addressed separately under the relevant DCP clauses.

When is a Flood Management Report required?

A Flood Management Report must be submitted with any Development Application on flood prone land (with exceptions noted below), for Council to consider the potential flood impacts and applicable controls. For Residential or Commercial development, it is required for development on land identified within the Medium or High Flood Risk Precinct. For Vulnerable or Critical development, it is required if it is within any Flood Risk Precinct.

There are some circumstances where a formal Flood Management Report undertaken by a professional engineer may not be required. However the relevant parts of the DCP and LEP would still need to be addressed, so as to demonstrate compliance. Examples where this may apply include:

- If all proposed works are located outside the relevant Flood Risk Precinct extent
- First floor addition only, where the floor level is above the Probable Maximum Flood level
- Internal works only, where habitable floor areas below the FPL are not being increased

Note that development on flood prone land will still be assessed for compliance with the relevant DCP and LEP, and may still be subject to flood related development controls.

What is the purpose of a Flood Management Report?

The purpose of a Flood Management Report is to demonstrate how a proposed development will comply with flood planning requirements, particularly the development controls outlined in the relevant LEP and DCP clauses. The report must detail the design, measures and controls needed to achieve compliance, following the steps outlined below.

A Flood Management Report should reflect the size, type and location of the development, proportionate to the scope of the works proposed, and considering its relationship to surrounding development. The report should also assess the flood risk to life and property.

Preparation of a Flood Management Report

The technical requirements for a Flood Management Report include (where relevant):

1. Description of development
   - Outline of the proposed development, with plans if necessary for clarity
   - Use of the building, hours of operation, proposed traffic usage or movement
   - Type of use, eg vulnerable, critical, residential, business, industrial, subdivision, etc

2. Flood analysis
   - 1% AEP flood level
   - Flood Planning Level (FPL)
   - Probable Maximum Flood (PMF) level
   - Flood Risk Precinct, ie High, Medium or Low
   - Flood Life Hazard Category
   - Mapping of relevant extents
   - Flood characteristics for the site, eg depth, velocity, hazard and hydraulic category, and the relevance to the proposed development

   If the property is affected by an Estuarine Planning Level (EPL) which is higher than the FPL, then the EPL should be used as the FPL. If the FPL is higher than the PMF level, then the FPL should still be used as the FPL, as it includes freeboard which the PMF does not.

3. Assessment of impacts

- Summary of compliance for each category of the DCP, as per the table below.

	Compliance		
	N/A	Yes	No
A) Flood effects caused by Development			
B) Building Components & Structural Soundness			
C) Floor Levels			
D) Car parking			
E) Emergency Response			
F) Fencing			
G) Storage of Goods			
H) Pools			

- Demonstration of how the development complies with any relevant flood planning requirements from the DCP, LEP, Water Management for Development Policy, and if it is in the Warriewood Valley Urban Land Release Area, with the Warriewood Valley Water Management Specification (2001)
- For any non-compliance, a justification for why the development should still be considered.

- Calculations of available flood storage if compensatory flood storage is proposed
- Plan of the proposed development site showing the predicted 1% AEP and PMF flood extents, as well as any high hazard or floodway affectation
- Development recommendations and construction methodologies
- Qualifications of author - Council requires that the Flood Management Report be prepared by a suitably qualified Engineer with experience in flood design / management who has, or is eligible for, membership to the Institution of Engineers Australia
- Any flood advice provided by Council
- Any other details which may be relevant

Further information and guidelines for development are available on Council's website at:

https://www.northernbeaches.nsw.gov.au/planning-and-development/building-and-renovations/development-applications/guidelines-development-flood-prone-land

Council's Flood Team may be contacted on 1300 434 434 or at floodplain@northernbeaches.nsw.gov.au .

Appendix C

PRE-LODGEMENT MEETING NOTES PLM2023/0125 (17 October 2023)

Pre-lodgement Meeting Notes

Application No:	PLM2023/0125
Meeting Date:	17 October 2023
Property Address:	75 Old Pittwater Road BROOKVALE
Proposal:	Research Laboratory, demountable building and new concrete slab
Attendees for Council:	Julie Edwards – Planner Lachlan Rose – Student Planner Valerie Tulk – Acting Team Leader, Floodplain Planning & Response Rosemary Roche – Environmental Health Officer Jason Ruszczyk - Acting Team Leader – Catchments David Hellot - Senior Environment Officer – Catchments Matthew Makomaski - Senior Development Engineer
Attendees for applicant:	Andrew Cohen Mark Wilson Tony Granville

General Comments/Limitations of these Notes

These notes have been prepared by Council's Development Advisory Services Team on the basis of information provided by the applicant and a consultation meeting with Council staff. Council provides this service for guidance purposes only.

These notes are an account of the advice on the specific issues nominated by the Applicant and the discussions and conclusions reached at the meeting.

These notes are not a complete set of planning and related comments for the proposed development. Matters discussed and comments offered by Council will in no way fetter Council's discretion as the Consent Authority.

A determination can only be made following the lodgement and full assessment of the application.

In addition to the comments made within these Notes, it is a requirement of the applicant to address the relevant areas of legislation, including (but not limited to) any State Environmental Planning Policy (SEPP) and any applicable sections of the Warringah Local Environmental Plan 2011 (WLEP) and Warringah Development Control Plan 2011 (WDCP), within the supporting documentation including a Statement of Environmental Effects, Modification Report or Review of Determination Report.

You are advised to carefully review these notes and if specific concern have been raised or non-compliances that cannot be supported, you are strongly advised to review your proposal and consider amendments to the design of your development prior to the lodgement of any development application.

SPECIFIC ISSUES RAISED BY APPLICANT FOR DISCUSSION

Response to Matters Raised by the Applicant
Flooding Comment: A Flood Management Report prepared by a suitably qualified engineer should be submitted with the DA. The Flood Management Report should demonstrate compliance with all requirements in Part E11 of the WDCP and Clause 5.21 of the WLEP. Please see the Flood Engineering comments under Specialist Advice for full details.
Approved Use Comment: The Statement of Environmental Effects (SEE) will need to detail the history of the site, detailing past approvals for the use and structures.

WARRINGAH LOCAL ENVIRONMENTAL PLAN 2011 (WLEP)

WLEP can be viewed at https://www.legislation.nsw.gov.au/view/html/inforce/current/epi-2011-0649

Part 2 - Zoning and Permissibility	
Definition of proposed development: **(ref. WLEP Dictionary)**	***General Industry*** general industry means a building or place (other than a heavy industry or light industry) that is used to carry out an industrial activity.
Zone:	E4 General Industrial
Permitted with Consent or Prohibited:	Permitted with Consent

Clause 4.6 - Exceptions to Development Standards

Clause 4.6 enables the applicant to request a variation to the applicable Development Standards listed under Part 4 of the LEP pursuant to the objectives of the relevant Standard and zone and in accordance with the principles established by the NSW Land and Environment Court.

A request to vary a development Standard is not a guarantee that the variation would be supported as this needs to be considered by Council in terms of context, impact and public interest and whether the request demonstrates sufficient environmental planning grounds for the variation.

Part 4 - Principal Development Standards			
Standard	**Permitted**	**Proposed**	**Compliance**
4.3 Height of Buildings	11m	3.316m – Lab Roof 6.31m – Flum Stack	Yes

WARRINGAH DEVELOPMENT CONTROL PLAN 2011 (WDCP)

WDCP can be viewed at https://eservices.northernbeaches.nsw.gov.au/ePlanning/live/pages/plan/book.aspx?exhibit=DCP

The following notes the identified non-compliant areas of the proposal only.

Part B Built Form Controls		
Control	**Permitted**	**Proposed**
C3 Carparking Facilities	1.3 spaces per 100m^2 GFA (including up to 20% of floor area as office space component. Office space component above 20% determined at office rate).	Parking rate not provided
Comment: See Traffic Engineers comments below.		

Specialist Advice
Traffic Engineer The prelodgement proposal is for relocation of a demountable building on the site plus construction of a new industrial building (GFA 74.43m^2) and concreting of 520m^2 of the site The proposed works will have a minor level of impact in terms of traffic generation that is unlikely to result in any appreciable change to traffic conditions in the surrounding area. In terms of parking the prelodgement information has suggested that the new lab building will require parking at a rate of 1.3 spaces for every 100m^2 i.e the rates for industrial/warehouse premises. It is noted that the lab appears to be a place of work for at least 6 persons and as such the parking requirements would be more appropriately assessed as an office or premises use i.e 1 space per 40m^2. Never-the-less the parking requirement is low. Aerial photo imagery suggests that the new lab building will be sited on land that is currently used for parking. The DA should outline what approved parking is lost as a result of the work and any new or relocated parking that will be provided to offset the loss or to otherwise demonstrate that the parking requirements of the uses on the site are met or exceeded. On site loading areas and provisions for delivery truck turning should also be outlined to confirm that the proposed works are not going to impact upon the ability of delivery vehicles to enter and exit the site in a forwards direction. The development application should also include details of proposed bicycle parking facilities to support the development on the site (in compliance with WDCP requirements) to encourage travel by alternate travel modes.
Development Engineering • The site is flood affected and hence the provision of OSD is not required. • The method of stormwater disposal is to be in accordance with Council's Water Management for Development Policy. The policy is available in Council's web page. https://files.northernbeaches.nsw.gov.au/sites/default/files/documents/policies-register/water-management/water-management-development-policy/water-management-development-policy-aug2020.pdf. • Please refer to flood team for applicable flood controls.

Specialist Advice

Flood Engineering

The following flood data comes from the Manly Lagoon Flood Study (2013). The site to which these data apply is as shown on the Proposed Site Plan, Drawing DA-03.

Flood Level Data

- 1% AEP flood level: 13.0m AHD
- Flood Planning Level (FPL): 13.5m AHD
- Probable Maximum Flood (PMF) level: 14.66m AHD
- Flood Risk Precinct: Medium
- Flood Life Hazard Category: H5
- Hydraulic Category: Flood Fringe

Two buildings are proposed along the western part of the site. The proposed FFL of the laboratory is 14.0m AHD and the proposed FFL of the relocated demountable is 14.41m AHD.

A Flood Management Report prepared by a suitably qualified engineer should be submitted with the DA. The Flood Management Report should demonstrate compliance with all requirements in Part E11 of the WDCP and Clause 5.21 of the WLEP. In particular, please note the following controls:

- A2 – The site for the two buildings is partially affected by the 1% AEP event. The hydraulic category is Flood Fringe rather than Flood Storage, so even if the buildings were enclosed underneath, it is not considered that there would be a loss of flood storage or associated adverse impacts.
- B2 – As per Control E1, shelter-in-place refuge is required so the development must be designed and constructed to ensure structural integrity up to the PMF level, taking into account the forces of floodwater, wave action, flowing water with debris, buoyancy and immersion. Structural certification from a suitably qualified engineer will be required prior to issue of the construction certificate.
- B3 - Electrical equipment, points, wiring, fuel lines or any other service pipes and connections must be waterproofed and/or located above the FPL.
- C1 - Internal floor levels need to be at or above the FPL. However please note that as per Control E1, at least some of the internal floor needs to be at or above the PMF level.
- E1 - With a Flood Life Hazard Category of H5, the Flood Management Report should include a flood emergency assessment. Flood-free evacuation above the PMF is not available, so shelter-in-place refuge is required within each building. The floor level of the refuge should be at or above the PMF level, with an area large enough for at least 1m2 per person. It should be intrinsically accessible to all people on the site, plainly evident, and self-directing, and must contain as a minimum: sufficient clean water for all occupants; portable radio with spare batteries; torch with spare batteries; and a first aid kit
- G1 - Any hazardous or potentially polluting materials (including chemicals) are not to be stored below the FPL unless adequately protected from floodwaters.

Guidelines for development on flood prone land and how to prepare a Flood Management Report are available on Council's website.

The current design is not supported as appropriate shelter-in-place refuge is not available in each building.

Specialist Advice

Environmental Health

Harrison Manufacturing will need to engage a suitably qualified consultant to assess the quality of the air and odour emissions form the new laboratory operations. The consultant will need to assess any potential air pollution and odour issues that may arise from the additional laboratory onsite and identify any effective mitigation measures.

The assessment needs to provide information on the quality of the air being emitted and what potential impacts it may have on the air quality. Effective mitigation measures are to be provided within the report and submitted to Council with the Development Application.

Documentation to accompany the Development Application

- Lodge Application via NSW Planning Portal
- Statement of Environmental Effects
- Scaled and dimensioned plans:
  - Site Plan;
  - Floor Plans;
  - Elevations; and
  - Sections.
- Cost of works estimate/ Quote
- Survey Plan (Boundary Identification Survey)
- Site Analysis Plan
- Demolition Plan
- Excavation and fill Plan
- Waste Management Plan (Construction & Demolition)
- Driveway Design Plan (if any change is proposed to the driveway)
- Erosion and Sediment Control Plan / Soil and Water Management Plan
- Stormwater Management Plan / Stormwater Plans and On-site Stormwater Detention (OSD) Checklist
- Flood Management Report
- Air Quality and Odour Emissions Report

IMPORTANT NOTE FOR DA LODGEMENT

Please refer to the Development Application Lodgement Requirements on Council's website (link details below) for further detail on the above list of plans, reports, survey and certificates.

https://files.northernbeaches.nsw.gov.au/sites/default/files/documents/pdf-forms/development-application-da-modification-or-review-determination/2060-da-modification-lodgement-requirements-mar21.pdf

The lodgement requirements will be used by Council in the review of the application after it is lodged through the NSW Planning Portal to verify that all requirements have been met for the type of application/development.

Concluding Comments

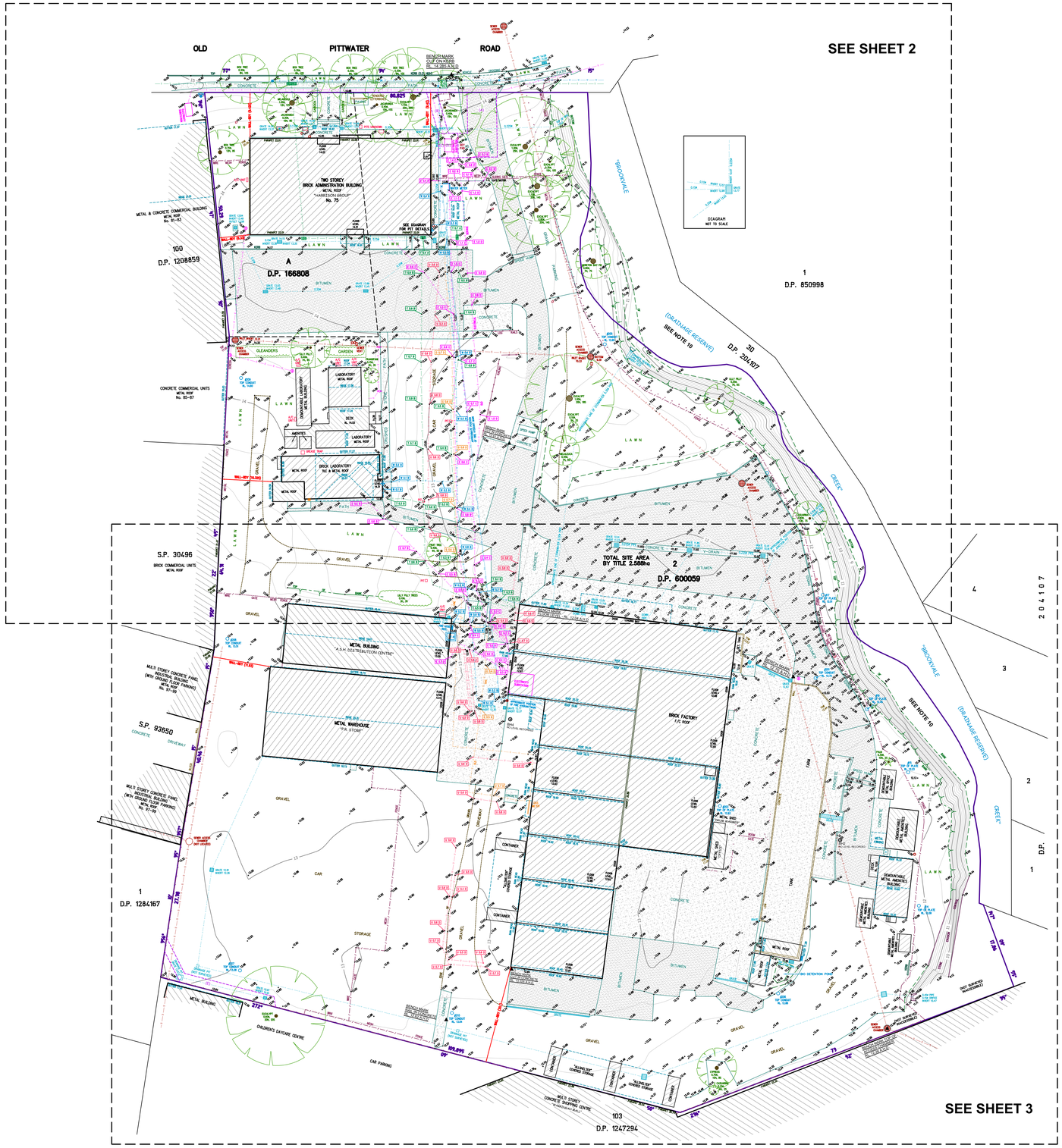
These notes are in response to a pre-lodgement meeting held on 17 October 2023 to discuss Alterations and Additions at 75 Old Pittwater Road BROOKVALE. The notes reference the plans prepared by Space Design Pty Ltd dated 01/08/2023.

Concluding Comments
The current proposal is not supported as it does not comply with shelter in place provisions. However, the application can be supported if the proposal is amended to comply with the recommendations of the Flood Management Report and the requirements of the WDCP and WLEP. The DA should outline what approved parking is lost as a result of the work and any new or relocated parking that will be provided to offset the loss or to otherwise demonstrate that the parking requirements of the uses on the site are met or exceeded. The SEE will also need to demonstrate that the site has approval for its existing 'Use' and structures.
Question on these Notes? Should you have any questions or wish to seek clarification of any matters raised in these Notes, please contact the member of the Development Advisory Services Team at Council referred to on the front page of these Notes.

Appendix D

SURVEY BY BEE & LETHBRIDGE PTY. LTD

M.G.A.
(MAP GRID of AUSTRALIA.)
(APPROXIMATE TRUE NORTH)



NOTES:

1) A BOUNDARY IDENTIFICATION HAS BEEN UNDERTAKEN.

2) OFFSET DIMENSIONS TO BOUNDARIES HEREON MUST NOT BE USED FOR CONSTRUCTION.

3) CAUTION: SHOULD ANY DEVELOPMENT OR CONSTRUCTION BE PLANNED ON OR NEAR THE BOUNDARIES, THE BOUNDARIES SHOULD BE CLEARLY MARKED ON SITE.

4) ORIGIN OF LEVELS ON A.H.D. IS TAKEN FROM P.M. 8734 RL 13.73 A.H.D.

5) TREE SPREADS ARE DIAGRAMMATIC ONLY AND ARE NOT SYMMETRICAL.

6) UNDERGROUND (NON VISIBLE) SERVICE LINES HAVE BEEN DETERMINED BY SURESEARCH. REFER TO NOTES ON SHEET 2.

7) BEARINGS SHOWN ARE ON M.G.A.-(MAP GRID of AUSTRALIA).

8) CONTOUR INTERVAL 0.25 METRE.

9) CONTOURS ARE INDICATIVE OF GROUND FORM ONLY. ONLY SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION.

10) THE POSITION OF THE EASTERN BOUNDARY ALONG THE WESTERN SIDE OF BROOKVALE CREEK HAS BEEN SCANNED FROM D.P. 204107 AND IS APPROXIMATE.

11) PLANT AND INDUSTRIAL EQUIPMENT HAS NOT BEEN SURVEYED.

INVESTIGATION OF "BEFORE YOU DIG AUSTRALIA" UNDERGROUND SERVICES HAS BEEN MADE. DETECTION OF UNDERGROUND SERVICES IS NOT AN INTEGRAL PART OF THIS SURVEY. ALL RELEVANT AUTHORITIES SHOULD BE NOTIFIED PRIOR TO ANY EXCAVATION ON OR NEAR THE SITE

DEVELOPERS & EXCAVATORS MAY BE HELD FINANCIALLY RESPONSIBLE BY THE ASSET OWNER SHOULD THEY DAMAGE UNDERGROUND NETWORKS.

CARELESS DIGGING CAN:
- CAUSE DEATH OR SERIOUS INJURY TO WORKERS AND THE GENERAL PUBLIC
- INCONVENIENCE USERS OF ELECTRICITY, GAS, WATER AND COMMUNICATIONS
- LEAD TO CRIMINAL PROSECUTION AND DAMAGES CLAIMS
- CAUSE EXPENSIVE FINANCIAL LOSSES TO BUSINESS
- CUT OFF EMERGENCY SERVICES
- DELAY PROJECT COMPLETION TIMES WHILE THE DAMAGE IS REPAIRED

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0 4 8 12 16 20 40 METRES
SCALE 1:400

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Suite 2, 14 Starkey Street,
PO Box. 330, Forestville, NSW 2087
Phone: 9451 6757
Email: survey@beeleth.com.au
ABN: 13 003 194 447
www.beeleth.com.au

COPLAND C. LETHBRIDGE
REGISTERED SURVEYOR N.S.W.
IDENTIFICATION No. 1470

PLAN SHOWING BOUNDARIES, RELATIVE HEIGHTS, PHYSICAL FEATURES & UNDERGROUND SERVICES INVESTIGATION OVER LOT A IN D.P. 166808 & LOT 2 IN D.P. 600059
KNOWN AS No. 75 OLD PITTWATER ROAD, BROOKVALE.

L.G.A.: NORTHERN BEACHES

CLIENT	HARRISON INVESTMENTS PTY LIMITED			REF No.	19372
PROPERTY	No. 75 OLD PITTWATER ROAD, BROOKVALE				
DATUM	A.H.D.	SCALE	1:400 @ B1	DATE	10/10/2023	SHEET No.	1 of 3
SURVEYED	C.L./J.G.	DRAWN	H.H./R.M./S.P./S.C.	DWG No.	19372H	REV No.	00

OLD PITTWATER ROAD

BENCH MARK
CUT ON KERB
RL. 14.285 A.H.D

EASEMENTS VIDE TRANSFER 2186823
(A) RIGHT OF WAY 6 & 8 WIDE
(B) EASEMENT FOR ELECTRICITY PURPOSES 2 WIDE
(C) RIGHT OF WAY & EASEMENT FOR ELECTRICITY PURPOSES
(D) SUBSTATION PREMISES No. 15986

M.G.A.
(MAP GRID of AUSTRALIA)
(APPROXIMATE TRUE NORTH)

0 2 4 6 8 10 20 METRES
SCALE 1:200

TWO STOREY
BRICK ADMINISTRATION BUILDING
METAL ROOF
"HARRISON GROUP"
No. 75

METAL & CONCRETE COMMERCIAL BUILDING
METAL ROOF
No. 81–83

100
D.P. 1208859

A
D.P. 166808

SEE DIAGRAM
FOR PIT DETAILS

"BROOKVALE"

DIAGRAM
NOT TO SCALE

1
D.P. 850998

(DRAINAGE RESERVE)
SEE NOTE 10

30
D.P. 204197

CONCRETE COMMERCIAL UNITS
METAL ROOF
No. 85–87

S.P. 30496
BRICK COMMERCIAL UNITS
METAL ROOF

TOTAL SITE AREA
BY TITLE 2.588ha

2
D.P. 600059

"CREEK"

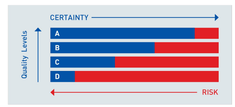
E 0.6 B DENOTES ELECTRICITY LINE DEPTH 0.6 B – LOCATERS POSITIONING CLASSIFICATION
W 0.6 B DENOTES WATER LINE DEPTH 0.6 B – LOCATERS POSITIONING CLASSIFICATION
ST 0.6 B DENOTES FIRE HYDRANT LINE DEPTH 0.6 B – LOCATERS POSITIONING CLASSIFICATION
S 0.6 B DENOTES SEWER LINE DEPTH 0.6 B – LOCATERS POSITIONING CLASSIFICATION
G 0.6 B DENOTES GAS LINE DEPTH 0.6 B – LOCATERS POSITIONING CLASSIFICATION
T 0.6 B DENOTES TELCOMMUNICATIONS LINE DEPTH 0.6 B – LOCATERS POSITIONING CLASSIFICATION
U 0.6 B DENOTES UNKNOWN SERVICES LINE DEPTH 0.6 B – LOCATERS POSITIONING CLASSIFICATION

CLEAR AND SIMPLE

The Locaters Utility Positioning Classification system uses four levels of classification to depict the varying precision of utility markings.

A = Validated	Measured directly to utility
B = Traced	Electronic detection of utility
C = Aligned	To utility surface features (pit to pit)
D = Indicative	As per utility plan or 'best guess'

With increasing accuracy there is increasing certainty and a corresponding reduction in risk.



With Class D indicating low-level accuracy, this classification can be used for non-traceable services like gas and sewers with subsequent investigations progressing the quality of the utility information.

Bee & Lethbridge
Quality Surveying & Development Solutions

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COPLAND C. LETHBRIDGE
REGISTERED SURVEYOR N.S.W.
IDENTIFICATION No. 1470

LEGEND

TREE 0.10ø, 5H, 4S — DENOTES APPROX. 0.1m DIAMETER OF TREE; DENOTES APPROX. 5m HEIGHT OF TREE; DENOTES APPROX. 4m SPREAD OF TREE
GUTTER — DENOTES TOP OF GUTTER
TOW — DENOTES TOP OF WALL
TOF — DENOTES TOP OF FENCE
FIRE HYDRANT LINES
UNDERGROUND ELECTRIC LINES
OVERHEAD ELECTRIC LINES
BOARDS SEWER
TELECOMMUNICATION LINES
WATER LINES
GAS LINES

LIGHT POLE · POWER POLE · ELECTRICITY PILLAR · TELECOM. PIT · SIGN
STOP VALVE · HYDRANT · TAP · FIRE HOSE REEL · WATER METER
WATER MONITORING POINT · SEWER VENT · INSPECTION CAP · DRAINAGE PIT · BOLLARD

PLAN SHOWING BOUNDARIES, RELATIVE HEIGHTS, PHYSICAL FEATURES & UNDERGROUND SERVICES INVESTIGATION OVER LOT A IN D.P. 166808 & LOT 2 IN D.P. 600059
KNOWN AS No. 75 OLD PITTWATER ROAD, BROOKVALE.

L.G.A.: NORTHERN BEACHES

CLIENT	HARRISON INVESTMENTS PTY LIMITED			REF No.	19372
PROPERTY	No. 75 OLD PITTWATER ROAD, BROOKVALE				
DATUM	A.H.D.	SCALE	1:200 @ B1	DATE	10/10/2023
SURVEYED	C.L./J.G.	DRAWN	H.H./R.M./S.P./S.C.	DWG No.	19372H
				SHEET No.	2 of 3
				REV No.	00

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LEGEND

TREE 0.10M, 5H, 4S	DENOTES APPROX. 0.1m DIAMETER OF TREE DENOTES APPROX. 5m HEIGHT OF TREE DENOTES APPROX. 4m SPREAD OF TREE	UNDERGROUND ELECTRIC LINES OVERHEAD ELECTRIC LINES BOARDS SEWER TELECOMMUNICATION LINES WATER LINES GAS LINES
GUTTER	DENOTES TOP OF GUTTER	
TOW	DENOTES TOP OF WALL	
TOF	DENOTES TOP OF FENCE	
	FIRE HYDRANT LINES	

LIGHT POLE	STOP VALVE	WATER MONITORING POINT
POWER POLE	HYDRANT	SEWER VENT
ELECTRICITY PILLAR	TAP	INSPECTION CAP
TELECOM. PIT	FIRE HOSE REEL	DRAINAGE PIT
SIGN	WATER METER	BOLLARD

PLAN SHOWING BOUNDARIES, RELATIVE HEIGHTS, PHYSICAL FEATURES & UNDERGROUND SERVICES INVESTIGATION OVER LOT A IN D.P. 166808 & LOT 2 IN D.P. 600059
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