Flood Risk Management Plan

31 October 2023

431 Pittwater Road
North Manly

We acknowledge the Guringai people of the land of the Garigal, upon those ancestral lands we work & live. We acknowledge the Traditional Custodians as the first place makers on this land. We pay our respects to Elders past and present, acknowledging them as the Traditional Custodians of knowledge of these lands, waterways and Country.

TAYLOR

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1.0 INTRODUCTION

431 Pittwater Road, North Manly is identified by Northern Beaches Council as being flood affected for the 1 in 100 year and Probable Maximum Precipitation (PMP) storm events. This document details the measures to be taken to ensure that the risks to both the proposed Gymnastics Centre and occupants are managed and minimised in accordance with Section E.11 of the Warringah Development Control Plan 2011.

It is the intention of the author that copies of this plan are kept on site by The Owner where it can be produced for action in case of a significant storm event.

It is also intended that the emergency response signage be fixed to a wall in a clearly visible location. The Owner will ultimately be responsible for the implementation of this plan. The Owner will also be responsible for ensuring tasks are undertaken (or the delegation of those tasks) for major flood events.

The technical data referred to in this Section is drawn from the 2013 Manly Lagoon Flood Study by BMT WBM.

2.0 SITE DESCRIPTION

The site is located in the suburb of North Manly and is situated approximately 2km upstream of Manly Lagoon. A site locality map is included in Appendix A as is a detailed survey plan of the site.

The site covers approximately 1023m^2 in area and grades slightly to the western boundary of the property.

The site currently comprises of a single storey Bowling Club clubhouse along with four lawn bowling greens located at the rear of the primary dwelling. The clubhouse itself is constructed using double brick and is the primary building on site.

2.1 PROPOSED WORKS

The proposed works could be summarised as:

- A new gymnastics centre
- Car Park Facility

Architectural plans for the proposed works are attached in Appendix B.

3.0 FLOOD EVENTS

The site is identified as being flood affected for the 1 in 100 year and Probable Maximum Precipitation (PMP) storm events and maps illustrating subsequent flood hazard extents for the site are contained within Appendix C.

3.1 FORECASTS AND WARNINGS

There are usually no specific warnings issued by the Bureau of Meteorology for North Manly and as such the monitoring of general warnings for the Sydney metropolitan area with respect to severe weather warnings will be critical in the process of managing risks to the site.

The Bureau of Meteorology website (www.bom.gov.au) has rainfall forecast maps and also any warnings for predicted severe weather events.

The Owner should have their mobile phone number added to the SES contact list for the issue of SMS alerts for severe weather warnings.

3.2 FLOOD DATA FOR THE SITE

The site is categorised by the 2013 Manly Lagoon Flood Study as being affected by the 1 in 100 year and Probable Maximum Flood (PMF) events. A summary of Council flood information for the site is as follows:

- Flood Risk Precinct: High & Medium Risk
- 1 in 100 year Flood Level: 3.21 m A.H.D.
- 1 in 100 year Flood Planning Level (FPL): 3.71m A.H.D.
- Probable Maximum Flood level (PMF): 5.69m A.H.D.

Note that the Council issued flood data for the site is contained within Appendix C.

3.3 FLOOD BEHAVIOUR

The site sits within the Manly Lagoon catchment. The Manly Lagoon Flood Study has determined that the site is at risk of significant inundation for major flood events.

The study has determined that during major storm events, the site is subject to flooding due to the development of the floodplain.

It is expected that a major flood event would typically be an event where flood waters of relatively low velocity would rise and fall over durations of typically less than 6 hours.

Note that a typical 1 in 100 year flood depth in the central portion of the relatively level site would be approximately 500mm, albeit at a relatively low velocity.

4.0 EMERGENCY RESPONSE

This Flood Risk Management Plan recognises that protection of life is of primary importance, followed by a secondary philosophy of attempting to minimise damage to the proposed dwellings on the site.

The emergency response to a potential flood event will be initiated upon the occurrence of certain 'trigger' threshold, upon which the emergency response plan will be actioned.

4.1 THE EMERGENCY TRIGGER

It is critical to the success of this plan that during extremely heavy and intense rainfall events the owners are able to closely monitor the drainage conditions in Kentwell & Pittwater Road as well as the boundaries of the site which are situated within Nolan Reserve.

The initial trigger for commencement of the emergency response plan follows the observation of stormwater beginning to inundate the western boundary following extremely heavy & intense rainfall events or through instruction to evacuate by emergency services including the S.E.S.

Upon the visual confirmation of this trigger event the emergency responses described in Section 5 are to be enacted.

4.2 TIME NEEDED TO RESPOND

It is considered that a total period of 15 minutes would be required for The Facilities Operator to turn off the relevant mains, services and ensure that all persons within the premises have been notified to evacuate.

4.3 THE EMERGENCY ASSEMBLY POINT

The emergency response to a flood event is to evacuate east on Kentwell Road & north along Pittwater Road.

An emergency response plan showing the evacuation plan towards Pittwater Road is provided in Appendix D. Should shelter in place be required provisions are to be kept on the mezzanine level.

5.0 FACILITIES OPERATORS RESPONSIBILITIES

The following section describes the on-going responsibilities of The Facilities Operator with respect to flood risk management.

5.1 BEFORE THE FLOOD

TRIGGER FOR ACTION: ALWAYS

- The Facilities Operator will ultimately be responsible for the implementation of this plan. The Facilities Operator will be responsible for ensuring tasks are undertaken or delegating those tasks;

- Through a systematic induction process, all occupants are to be made aware of the possibility of flooding and the procedures to be followed if a flood were to occur;

- A copy of this plan is to be provided to all occupants, together with an Actions Checklist (Appendix E) and a single page notice (Appendix D);

- The Facilities Operator should continue to develop detailed procedures to support the actions required by this plan. Procedures will include clear responsibilities in the event of a flood, and back up resources should key persons not be present;

- The emergency response sign is to be permanently affixed to a wall in a highly visible external location.

- Check the facilities within the mezzanine level for use in a flood emergency, should occupants need to take shelter there. As a minimum these facilities comprise drinking water, toilets, blankets and emergency lighting.

5.2 WHEN A FLOOD IS LIKELY

TRIGGER FOR ACTION: When the forecasts predict severe weather or significant amounts of rainfall (Land is saturated) are observed.

- The Facilities Operator will monitor weather forecasts and warnings; and

- The Facilities Operator to enact the emergency response plan

- The Facilities Operator should prepare for the emergency evacuation.

- Secure car parking area to prevent vehicle from leaving premises

5.3 DURING A FLOOD

TRIGGER FOR ACTION: When floodwater has inundated the western boundary of the site in Nolan reserve &/or the western portion of the site.

- The phases of the emergency response shall be:

- The Facilities Operator are to request all occupants to evacuate via the emergency evacuation route.

- Follow direction of emergency services including state emergency service.

- All occupants should have evacuated by the time the flood waters start to significantly inundate the site.

- The Facilities Operator is to sweep the premises following emergency response to ensure that all occupants have evacuated the facility.

- The Facilities Operator is to turn off all power and water and other relevant services.

- The Facilities Operator is to evacuate via the emergency evacuation route.

- Emergency services to be notified by The Facilities Operator of the situation at the site (Appendix F).

5.4 AFTER A FLOOD

TRIGGER FOR ACTION: When emergency services give the all clear to return.

- No occupants should be allowed to leave the site while flooding is occurring or has recently occurred;

- Occupants can enter the site only after the all clear has been given by emergency services or Council;

- Where necessary, the site is to be checked by professionals before any re-use of the site;

- Where possible the Facilities Operator are to organise the safe removal of any flood debris from the site;

- The Facilities Operator are to arrange an inspection of the sub-floor area under the building and remove any flood debris if required.

- A de-brief is to be held between the occupants and The Facilities Operator and may involve emergency services and/or council staff. The flood event and response procedures, including the use of this plan, are to be reviewed; and

- Changes may be made to the plan and the requirements for future emergency evacuations should be reviewed and identify any improvements which may be necessary.

6.0 FLOOD COMPLIANCE

It is proposed to develop the site such that the objectives of Council's Flood Risk Management Policy are met.

6.1 SPECIFIC CONTROLS

Section E.11 of the Warringah DCP controls are to be applied to the proposed development:

		High Flood Risk Precinct				
		Vulnerable & Critical Use	Residential Use	Business & Industrial Use	Recreational & Environmental Use	Subdivision & Civil Works
A	Flood effects caused by Development	A1 A2	A1 A2	A1 A2	A1 A2	A1 A2
B	Building Components & Structural	B1 B2 B3	B1 B2 B3	B1 B2 B3	B1 B2 B3	
C	Floor Levels	C2 C3	C1 C3 C4 C6	C1 C3 C4 C6 C7	C3	C5
D	Car Parking	D1 D2 D3 D4 D7	D1 D2 D3 D4 D5 D6	D1 D2 D3 D4 D5 D6	D1 D2 D3 D4 D5 D6	D1
E	Emergency Response	E1 E2	E1	E1	E1	E3
F	Fencing	F1	F1	F1	F1	F1
G	Storage of Goods	G1	G1	G1	G1	
H	Pools	H1	H1	H1	H1	H1

High Flood Risk Matrix – Business & Industrial Category

Flood Effects Caused By Development

A1 – ***Development shall not be approved unless it can be demonstrated in a Flood Management Report that it has been designed and can be constructed so that in all events up to the 1% AEP event:***

There are no adverse impacts on flood levels or velocities caused by alterations to the flood conveyance; and

There are no adverse impacts on surrounding properties; and

It is sited to minimise exposure to flood hazard

Major developments and developments likely to have a significant impact on the PMF flood regime will need to demonstrate that there are no adverse impacts in the Probable Maximum Flood.

Outcome – The provisions of this Flood Risk Management Report demonstrates that the flood risks have been adequately addressed in accordance with the provisions of the *Flood Prone Land Design Standard.*

A2 – ***Development shall not be approved unless it can be demonstrated in a Flood Management Report that in all events up to the 1% AEP event there is no net loss of flood storage.***

Consideration may be given for exempting the volume of standard piers from flood storage calculations.

If Compensatory Works are proposed to balance the loss of flood storage from the development, the Flood Management Report shall include detailed calculations to demonstrate how this is achieved.

Outcome – There are no significant ground level works that will reduce the site's flood storage. The proposed gymnastics centre is to be constructed on an open pier/footing system that will be above the 1 in 100 year flood level of 3.21m. Furthermore, that car parking area is to maintain existing site levels.

Building Components and Structural Soundness

B1 - ***All buildings shall be designed and constructed as flood-compatible buildings in accordance with Reducing Vulnerability of Buildings to Flood Damage: Guidance on Building in Flood Prone Areas, Hawkesbury-Nepean Floodplain Management Steering Committee (2006).***

Outcome – All new building elements below the Flood Planning Level of R.L. 3.71 A.H.D shall be constructed from flood-compatible materials.

A table of equivalent flood-compatible materials is contained in Appendix G.

B2 – ***All new development must be designed and constructed to ensure structural integrity up to the Flood Planning Level, taking into account the forces of floodwater, wave action, flowing water with debris, buoyancy and immersion. Where shelter-in-place refuge is required, the structural integrity of the refuge is to be up to the Probable Maximum Flood level. Structural certification shall be provided confirming the above.***

Outcome – All new building elements are to be designed, constructed and/or modified to ensure structural integrity or immersion and impact of velocity and debris up to the Flood Planning Level of R.L. 3.71m A.H.D.

B3 – ***All new electrical equipment, power points, wiring, fuel lines, sewerage systems or any other service pipes and connections must be waterproofed and/or located above the Flood Planning Level.***

All existing electrical equipment and power points located below the Flood Planning Level must have residual current devices installed that turn off all electricity supply to the property when flood waters are detected.

Outcome – All new electrical equipment, wiring, fuel lines, ventilation and other service pipes and connections are to be lifted or waterproofed to the Flood Planning Level.

Floor Levels

C1 – ***New floor levels within the development shall be at or above the Flood Planning Level.***

Outcome – Complies as the proposed level of the gymnastics centre is above the Flood Planning Level.

All works associated with the gymnastics centre will follow the Council's requirements for 'Building Components and Structural Soundness' as described in this report.

C3 – ***All new development must be designed and constructed so as not to impede the floodway or flood conveyance on the site, as well as ensuring no net loss of flood storage in all events up to the 1% AEP event.***
For suspended pier/pile footings:

The underfloor area of the dwelling below the 1% AEP flood level is to be designed and constructed to allow clear passage of floodwaters, taking into account the potential for small openings to block; and

At least 50% of the perimeter of the underfloor area is of an open design from the natural ground level up to the 1% AEP flood level; and

No solid areas of the perimeter of the underfloor area would be permitted in a floodway

Outcome – No net loss of flood storage in all events up to the 1% AEP event. Note, more than 50% of the underfloor area is of an open design from the natural ground level up to the 1% AEP flood level. Secondly, no structure is proposed within the floodway.

C4 ***- A one-off addition or alteration below the Flood Planning Level of less than 30 square metres (in total, including walls) may be considered only where:***

It is an extension to an existing room; and

The Flood Planning Level is incompatible with the floor levels of existing room; and

Out of the 30sqm, not more than 10 sqm is below the 1% AEP flood level

This control will not be permitted if this provision has previously been utilised since the making of this Plan.

The structure must be flood-proofed to the Flood Planning Level, and the Flood Management Report must demonstrate that there is no net loss of flood storage in all events up to the 1% AEP event.

Outcome - Not applicable as no new habitable floor levels below the Flood Planning Level are proposed.

C6 ***- Consideration may be given to the retention of an existing floor level below the Flood Planning Level when undertaking a first-floor addition provided that:***

It is not located within a floodway; and

The original foundations are sufficient to support the proposed final structure above them. The Flood Management Report must include photos and the structural certification required as per Control B2 must consider whether the existing foundations are adequate or should be replaced; and

none of the structural supports/framing of existing external walls of are to be removed unless the building is to be extended in that location; and

the ground floor is flood-proofed

Outcome - Not applicable as no existing infrastructure is proposed to be retained.

C7 ***- Consideration may be given to a floor level below the Flood Planning Level within the first 5 metres from the street front in an existing business zone provided it can be demonstrated that:***

- ***(a) The minimum floor level is no lower than the adjacent footpath level, and***
- ***(b) The maximum internal distance from the front of the building is 5 metres, which can only apply to one side of an individual premises, and***
- ***(c) The maximum area for the floor area to be below the Flood Planning Level for an individual premises is 30 square metres, and***
- ***(d) There is direct internal access between areas above and below the Flood Planning Level for each individual premises***

Outcome - Not applicable as no new habitable floor levels below the Flood Planning Level are proposed.

Car Parking

D1 - ***Open carpark areas and carports shall not be located within a floodway.***

Outcome – No car parking is proposed within the floodway.

D2 - ***The lowest floor level of open carparks and carports shall be constructed no lower than the natural ground levels, unless it can be shown that the carpark or carport is free draining with a grade greater than 1% and that flood depths are not increased.***

Outcome – Complies as car parking facility is at existing surface level.

D3 - ***Carports must be of open design, with at least 2 sides completely open such that flow is not obstructed up to the 1% AEP flood level. Otherwise it will be considered to be enclosed.***

When undertaking a like-for-like replacement and the existing garage/carport is located on the street boundary and ramping is infeasible, consideration may be given for dry floodproofing up to the 1% AEP flood level.

Outcome – *No new carport is proposed.*

D4 - ***Where there is more than 300mm depth of flooding in a car park or carport during a 1% AEP flood event, vehicle barriers or restraints are to be provided to prevent floating vehicles leaving the site. Protection must be provided for all events up to the 1% AEP flood event***

Outcome – As depth is greater than 300mm, vehicle barriers and other restraints will be provided to prevent floating cars leaving the site. This will include a proposed spreadhead fence as well as a system of bollards at 1.8m spacing. Spacing of bollards has been determined based upon AS2890.1 - B.2.3. The B85 Vehicle width of 1.87m. See appendix H for further details.

D5 - ***Enclosed Garages must be located at or above the 1% AEP level***

Outcome – This requirement is not applicable.

D6 - ***All enclosed car parks (including basement carparks) must be protected from inundation up to the Flood Planning Level. All access, ventilation, driveway crests and any other potential water entry points to any enclosed car parking shall be above the Flood Planning Level.***

Where a driveway is required to be raised it must be demonstrated that there is no net loss to available flood storage in any event up to the 1% AEP flood event and no impact on flood conveyance through the site.

Council will not accept any options that rely on electrical, mechanical or manual exclusion of the floodwaters from entering the enclosed car park

Outcome – This requirement is not applicable.

Emergency Response

E1 – ***If the property is affected by a Flood Life Hazard Category of H3 or higher, then Control E1 applies and a Flood Emergency Assessment must be included in the Flood Management Report.***

If the property is affected by a Flood Life Hazard Category of H6, then development is not permitted unless it can be demonstrated to the satisfaction of the consent authority that the risk level on the property is or can be reduced to a level below H6 or its equivalent.

If the property is flood affected but the Flood Life Hazard Category has not been mapped by Council, then calculations for its determination must be shown in the Flood Management Report, in accordance with the "Technical Flood Risk Management Guideline: Flood Hazard", Australian Institute for Disaster Resilience (2012).

Where flood-free evacuation above the Probable Maximum Flood level is not possible, new development must provide a shelter-in-place refuge where:

The floor level is at or above the Probable Maximum Flood level; and

The floor space provides at least 2m2 per person where the flood duration is long (six or more hours) in the Probable Maximum Flood event, or 1m2 per person for less than 6 hours;

It is intrinsically accessible to all people on the site, plainly evident, and self-directing, with sufficient capacity of access routes for all occupants without reliance on an elevator; and

It 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

Class 10 classified buildings and structures (as defined in the Building Codes of Australia) are excluded from this control.

In the case of change of use or internal alterations to an existing building, a variation to this control may be considered if justified appropriately by a suitably qualified professional.

Note that in the event of a flood, occupants would be required to evacuate if ordered by Emergency Services personnel regardless of the availability of a shelter-in-place refuge.

Outcome – As detailed in this report, the primary flood response is evacuation, however, the emergency response is to 'shelter-in-place' within the mezzanine level for significant flood events or otherwise off-site as directed by Emergency Services.

The proposed ground floor level R.L. 4.50m is above the Floor Planning Level.

The site owner should provide items as described in 'Emergency Response' of Part E11 of the Warringah DCP to provide for a shelter-in-place scenario in a potential extreme storm event.

Fencing

F1 ***- Fencing, (including pool fencing, boundary fencing, balcony balustrades and accessway balustrades) shall be designed so as not to impede the flow of flood waters and not to increase flood affectation on surrounding land. At least 50% of the fence must be of an open design from the natural ground level up to the 1% AEP flood level. Less than 50% of the perimeter fence would be permitted to be solid. Openings should be a minimum of 75 mm x 75mm.***

Outcome – The proposed spreadhead fence will have a minimum opening of 75mm x 75mm.

Storage of Goods

G1 ***– Hazardous or potentially polluting materials shall not be stored below the Flood Planning Level unless adequately protected from floodwaters in accordance with industry standards.***

Outcome – The Owner is to ensure that storage of toxic or potentially polluting goods, materials or other products, which may be hazardous or pollute floodwaters, is to be above the Flood Planning Level.

Pools

H1 ***- Pools located within the 1% AEP flood extent are to be in-ground, with coping flush with natural ground level. Where it is not possible to have pool coping flush with natural ground level, it must be demonstrated that the development will result in no net loss of flood storage and no impact on flood conveyance on or from the site.***

All electrical equipment associated with the pool (including pool pumps) is to be waterproofed and/or located at or above the Flood Planning Level.

All chemicals associated with the pool are to be stored at or above the Flood Planning Level.

Outcome – No pool is proposed.

7.0 SUMMARY

This report is a plan for the site for major flood events to be incorporated by The Facilities Operator into the on-going management protocols for the site to manage the flood risks.

The report contains procedural information to ensure the safety of occupants during flood events and also to ensure the satisfactory performance of any new building elements.

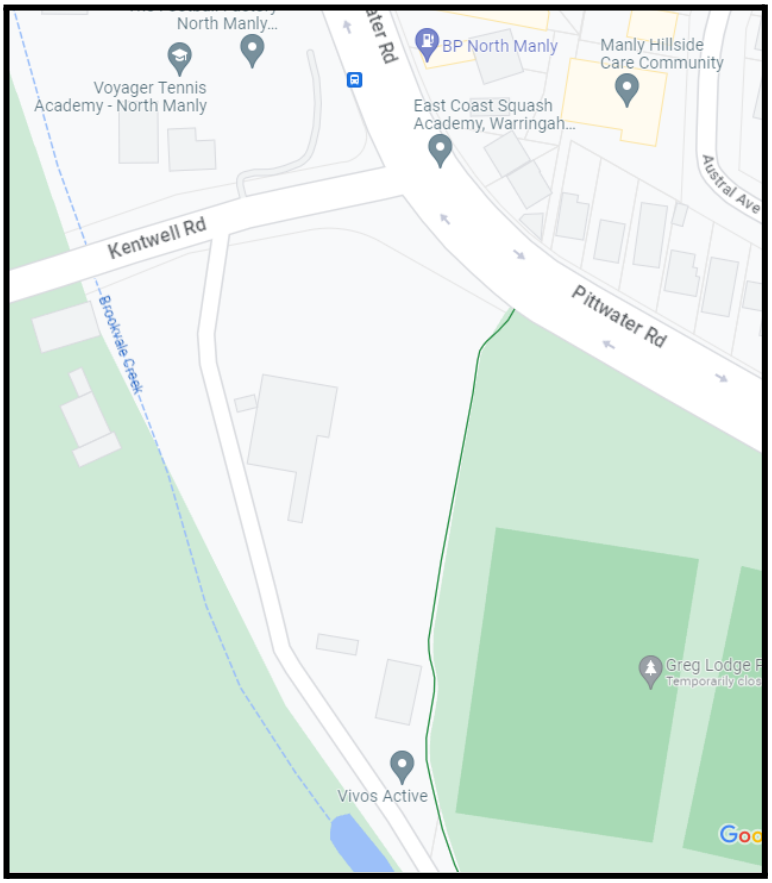
The recommendations and strategies within this report ensure compliance with the Warringah DCP Part E11 Flood Prone Land.

Should you have any questions or queries please do not hesitate to contact the undersigned.

TAYLOR CONSULTING

D M SCHAEFER - Director
B.E. Civil (Hons) M.I.E. Aust. N.E.R.

Appendix A



Locality Map - 431 Pittwater Road, North Manly

Appendix B

MANLY WARRINGAH GYMNASTICS CLUB - CENTRE OF EXCELLENCE

DRAWING LIST		
SHEET NUMBER	SHEET NAME	CURRENT REVISION
000	COVER SHEET	
001	EXISTING SITE SURVEY	
100	GROUND FLOOR	
100A	GROUND FLOOR - DIMENSIONED	
101	FIRST FLOOR	
102	ROOF	
200	ELEVATIONS	
201	ELEVATIONS	
300	SECTIONS	
301	SECTION DETAILS	
400	SHADOW DIAGRAMS	

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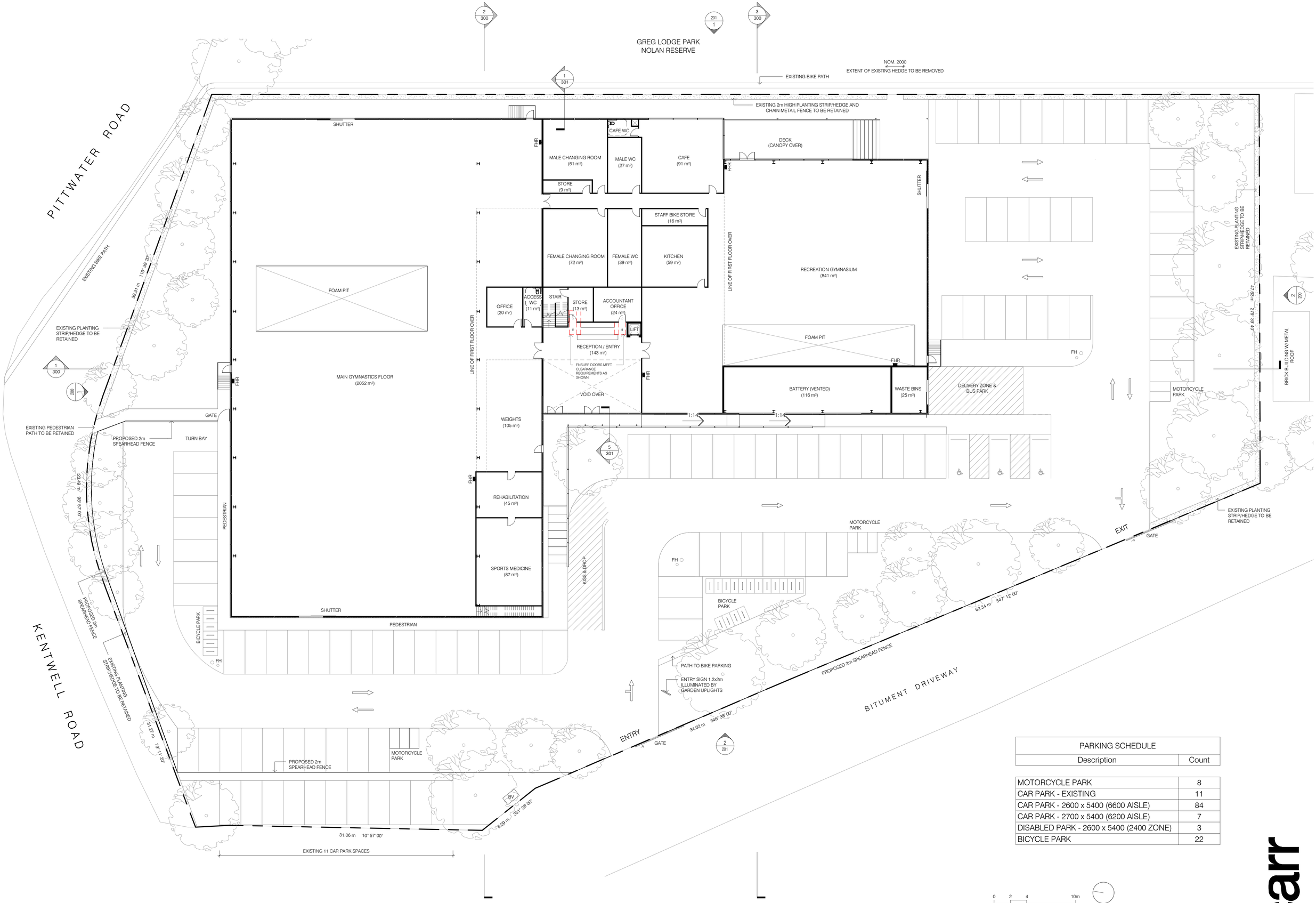

PARKING SCHEDULE	
Description	Count
MOTORCYCLE PARK	8
CAR PARK - EXISTING	11
CAR PARK - 2600 x 5400 (6600 AISLE)	84
CAR PARK - 2700 x 5400 (6200 AISLE)	7
DISABLED PARK - 2600 x 5400 (2400 ZONE)	3
BICYCLE PARK	22

0 2 4 10m
SCALE 1:200

NORTH

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GREG LODGE PARK
NOLAN RESERVE

PITTWATER ROAD

KENTWELL ROAD

BITUMENT DRIVEWAY

EXISTING BIKE PATH

EXISTING 2m HIGH PLANTING STRIP/HEDGE AND CHAIN METAIL FENCE TO BE RETAINED

NOM. 2000
EXTENT OF EXISTING HEDGE TO BE REMOVED

EXISTING PLANTING STRIP/HEDGE TO BE RETAINED

EXISTING PEDESTRIAN PATH TO BE RETAINED

PROPOSED 2m SPEARHEAD FENCE

MAIN GYMNASTICS FLOOR
(2052 m²)

FOAM PIT

RECREATION GYMNASIUM
(841 m²)

MALE CHANGING ROOM (61 m²)
MALE WC (27 m²)
CAFE WC
CAFE (91 m²)
STORE (9 m²)
DECK (CANOPY OVER)
STAFF BIKE STORE (16 m²)
FEMALE CHANGING ROOM (72 m²)
FEMALE WC (39 m²)
KITCHEN (59 m²)
OFFICE (20 m²)
ACCESS WC (11 m²)
STAIR
STORE (13 m²)
ACCOUNTANT OFFICE (24 m²)
RECEPTION / ENTRY (143 m²)
ENSURE DOORS MEET CLEARANCE REQUIREMENTS AS SHOWN OVER
WEIGHTS (105 m²)
REHABILITATION (45 m²)
SPORTS MEDICINE (87 m²)
BATTERY (VENTED) (116 m²)
WASTE BINS (25 m²)
DELIVERY ZONE & BUS PARK
MOTORCYCLE PARK
BICYCLE PARK
KISS & DROP
LINE OF FIRST FLOOR OVER
SHUTTER
PEDESTRIAN
GATE
TURN BAY
FHR
FH
1:14

ENTRY
EXIT
PATH TO BIKE PARKING
ENTRY SIGN 1.2x2m ILLUMINATED BY GARDEN UPLIGHTS

BRICK BUILDING W/ METAL ROOF

PARKING SCHEDULE	
Description	Count
MOTORCYCLE PARK	8
CAR PARK - EXISTING	11
CAR PARK - 2600 x 5400 (6600 AISLE)	84
CAR PARK - 2700 x 5400 (6200 AISLE)	7
DISABLED PARK - 2600 x 5400 (2400 ZONE)	3
BICYCLE PARK	22

SCALE 1:200

NORTH

MANILY WARRINGAH GYMNASTICS CLUB - CENTRE OF EXCELLENCE GROUND FLOOR - DIMENSIONED 100A

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GREG LODGE PARK
NOLAN RESERVE

PITTWATER ROAD

KENTWELL ROAD

BITUMENT DRIVEWAY

EXH

OFFICE
(79 m²)

STORE
(27 m²)

F WC
(17 m²)

OFFICE
(41 m²)

M WC
(11 m²)

STAIR

KITCHEN
& LOUNGE
(39 m²)

LIFT

FHR

PARENT SEATING

PARENT SEATING

FREE G AREA
(362 m²)

CANOPY

VOID TO RECREATION GYMNASIUM BELOW

TOP OF BATTERY ROOM (2600 AFFL)

VOID TO GYMNASTICS FLOOR BELOW

VOID TO RECEPTION
BELOW

CANOPY

1:14

SENIOR COACH
(63 m²)

BRICK BUILDING W/ METAL ROOF

0 2 4 10m
SCALE 1:200

NORTH

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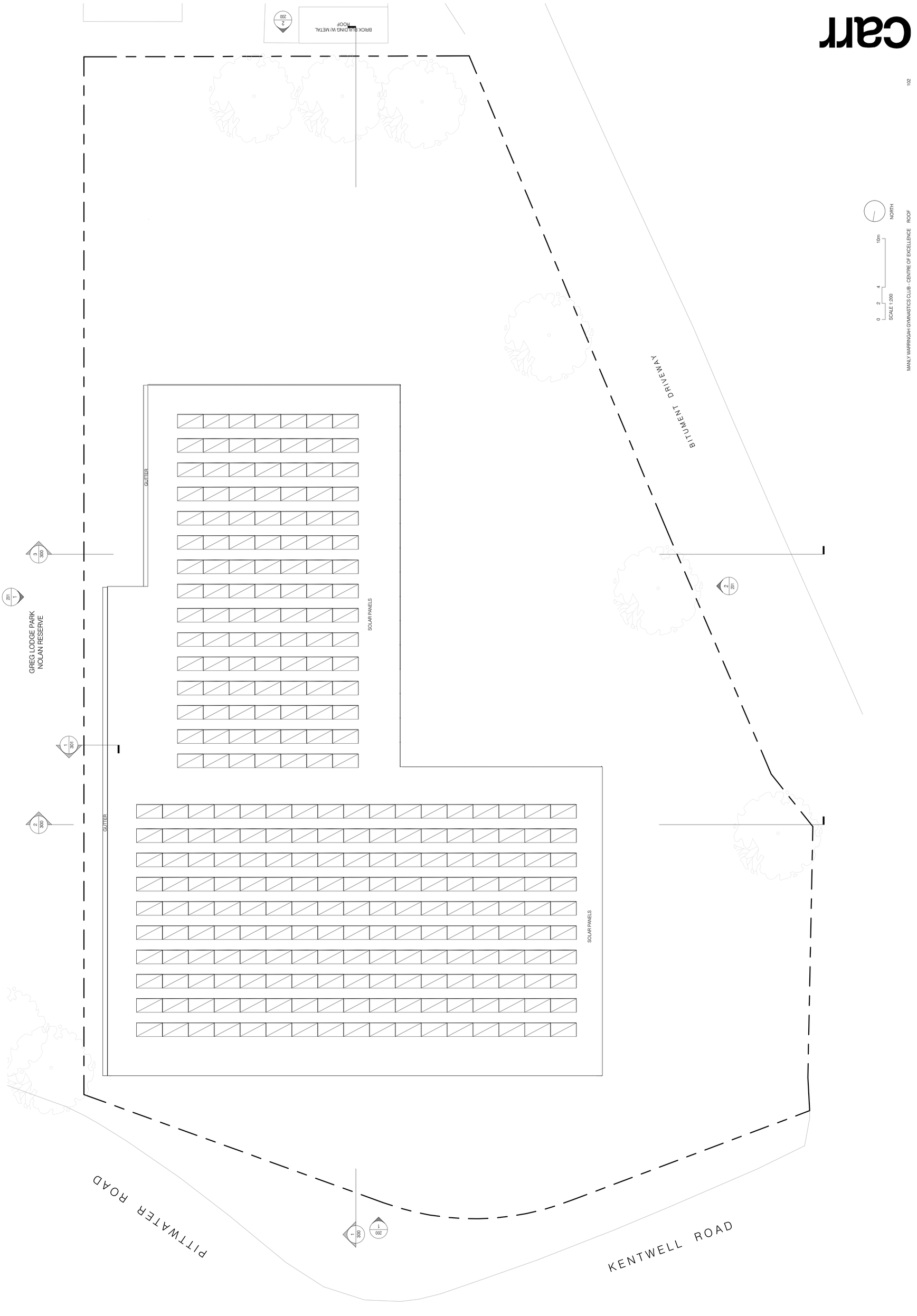

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NORTH

0 2 4 10m

SCALE 1:200

MANLY WARRINGAH GYMNASTICS CLUB - CENTRE OF EXCELLENCE ROOF

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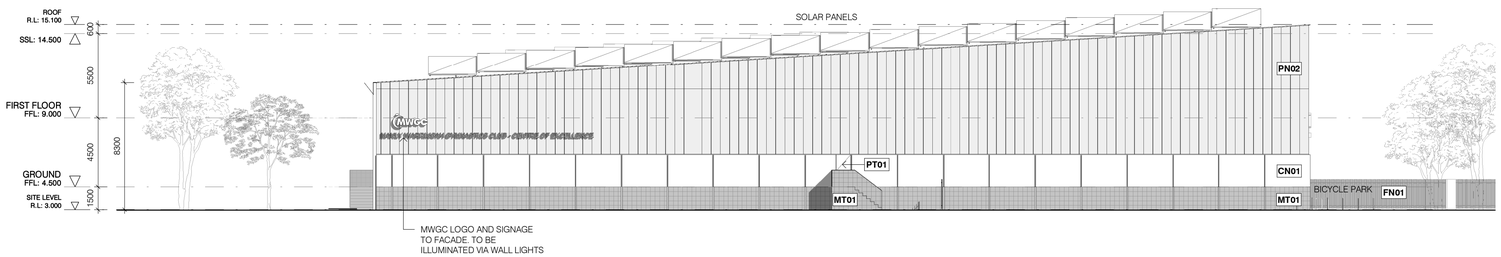
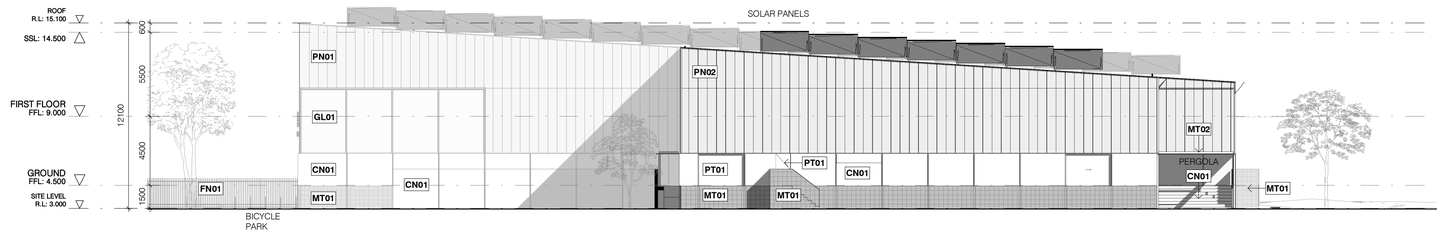


1 / 200 NORTH ELEVATION
SCALE 1 : 200



2 / 200 SOUTH ELEVATION
SCALE 1 : 200

MATERIALS

PN01	SUNPAL MULTI WALL PANEL - WHITE OPAL 18mm
PN02	DELTA SECRET FIX WALL PANEL - SURFMIST OR EQUIV.
CN01	PRECAST CONCRETE PANEL
PT01	PAINT FINISH - TO MATCH PRECAST CONCRETE
MT01	WEBFORGE EXPANDED MESH
MT02	COLORBOND STEEL - SURFMIST or EQUIVALENT
MT03	PAINTED METAL - TO MATCH COLORBOND
FN01	LIGHTWEIGHT FENCING - GREY/METAL FINISH
GL01	CLEAR GLAZING (LOW IRON)
RF01	DELTA TRIM - TPC ROOF PANEL - FINISH TO MATCH PN02

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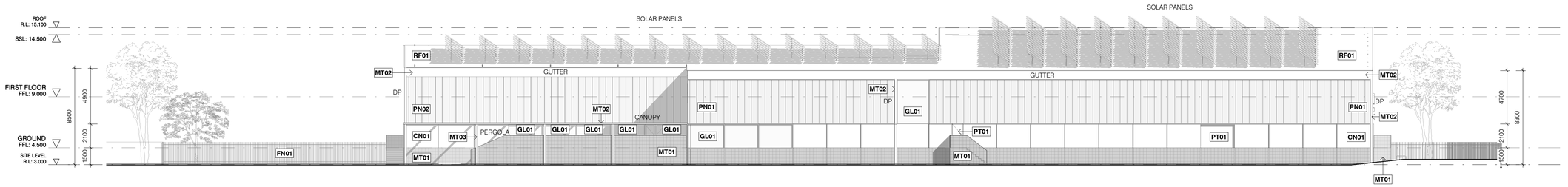
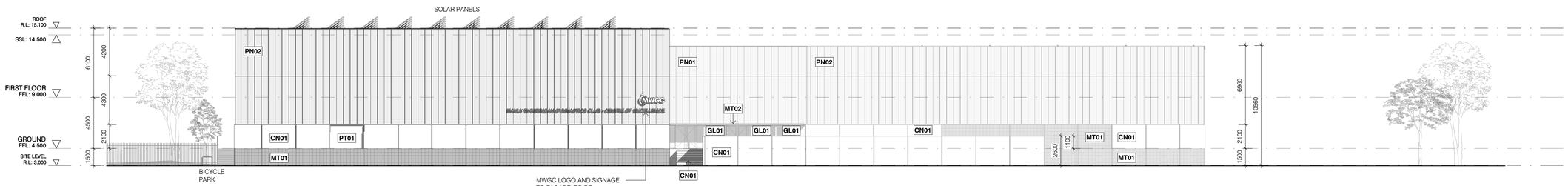


1 / 201 EAST ELEVATION
SCALE 1 : 200



2 / 201 WEST ELEVATION
SCALE 1 : 200

MATERIALS

PN01	SUNPAL MULTI WALL PANEL - WHITE OPAL 18mm
PN02	DELTA SECRET FIX WALL PANEL - SURFMIST OR EQUIV.
CN01	PRECAST CONCRETE PANEL
PT01	PAINT FINISH - TO MATCH PRECAST CONCRETE
MT01	WEBFORGE EXPANDED MESH
MT02	COLORBOND STEEL - SURFMIST or EQUIVALENT
MT03	PAINTED METAL - TO MATCH COLORBOND
FN01	LIGHTWEIGHT FENCING - GREY/METAL FINISH
GL01	CLEAR GLAZING (LOW IRON)
RF01	DELTA TRIM - TPC ROOF PANEL - FINISH TO MATCH PN02

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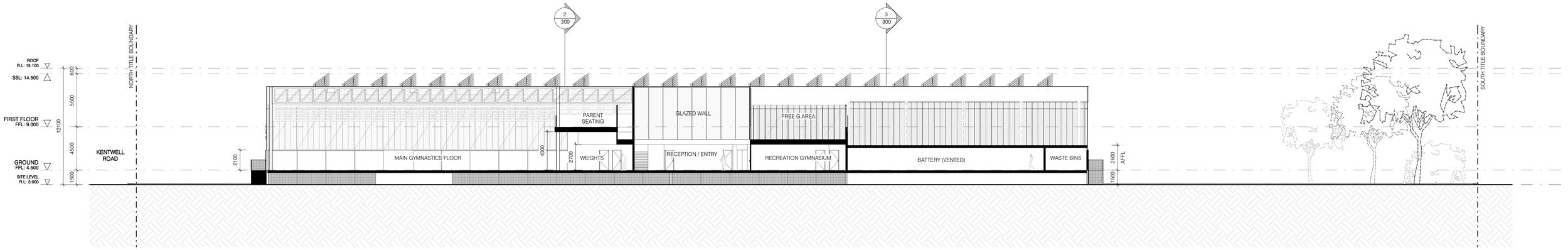

1 / 300 SECTION 1
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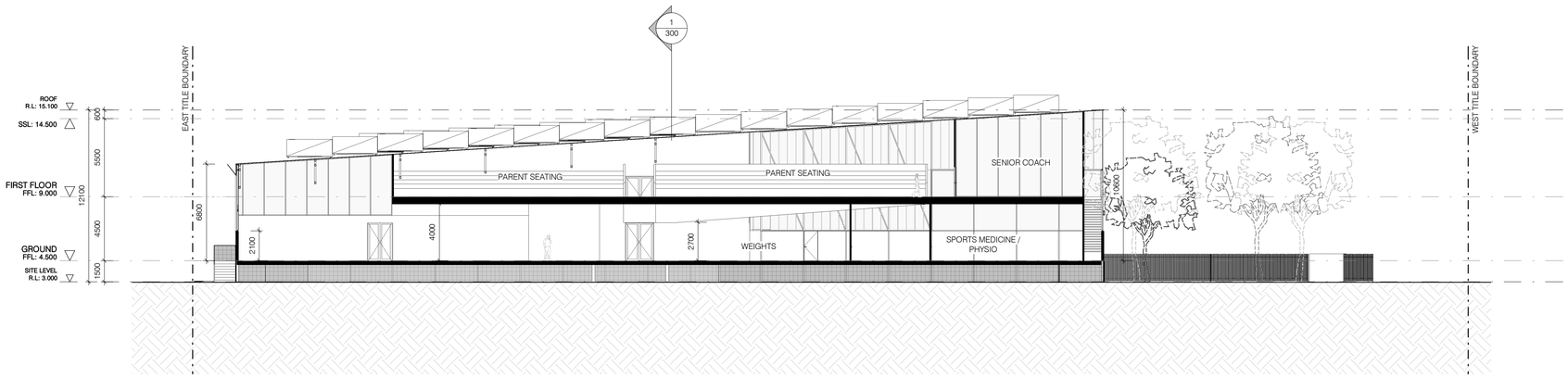

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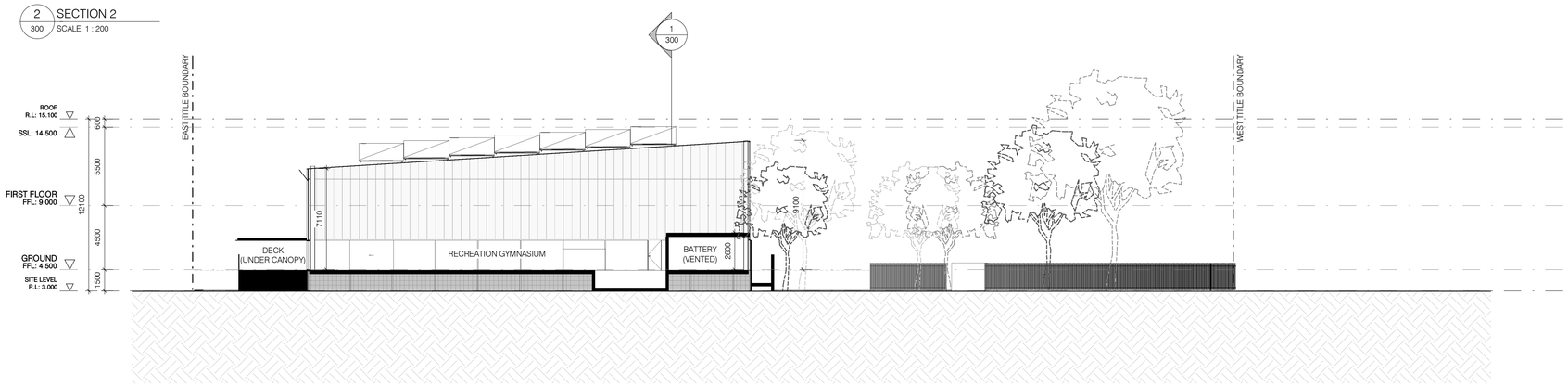

3 / 300 SECTION 3
SCALE 1 : 200

Rev	Date	Chkd	Issue

Project	MANLY WARRINGAH GYMNASTICS CLUB - CENTRE OF EXCELLENCE			Project No	21020
	Manly				
Title	SECTIONS				
Scale @A1	1 : 200			Dwg No	300
Drawn By	Author	Date	01/24/23	Rev	

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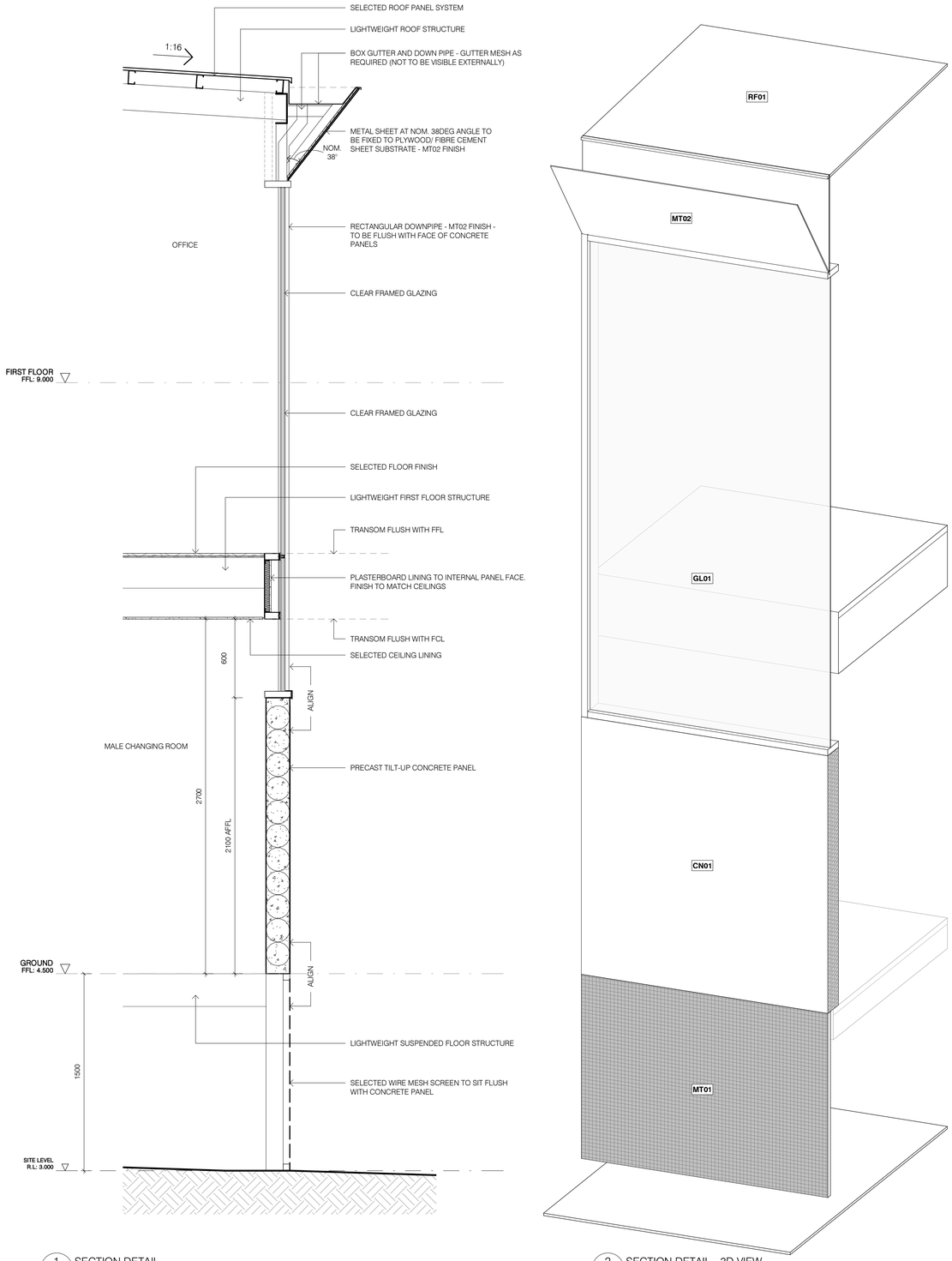
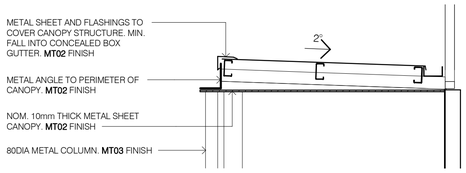
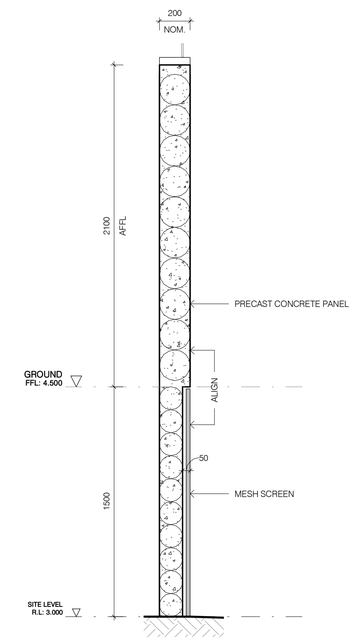


1 / 301 SECTION DETAIL
SCALE 1 : 20

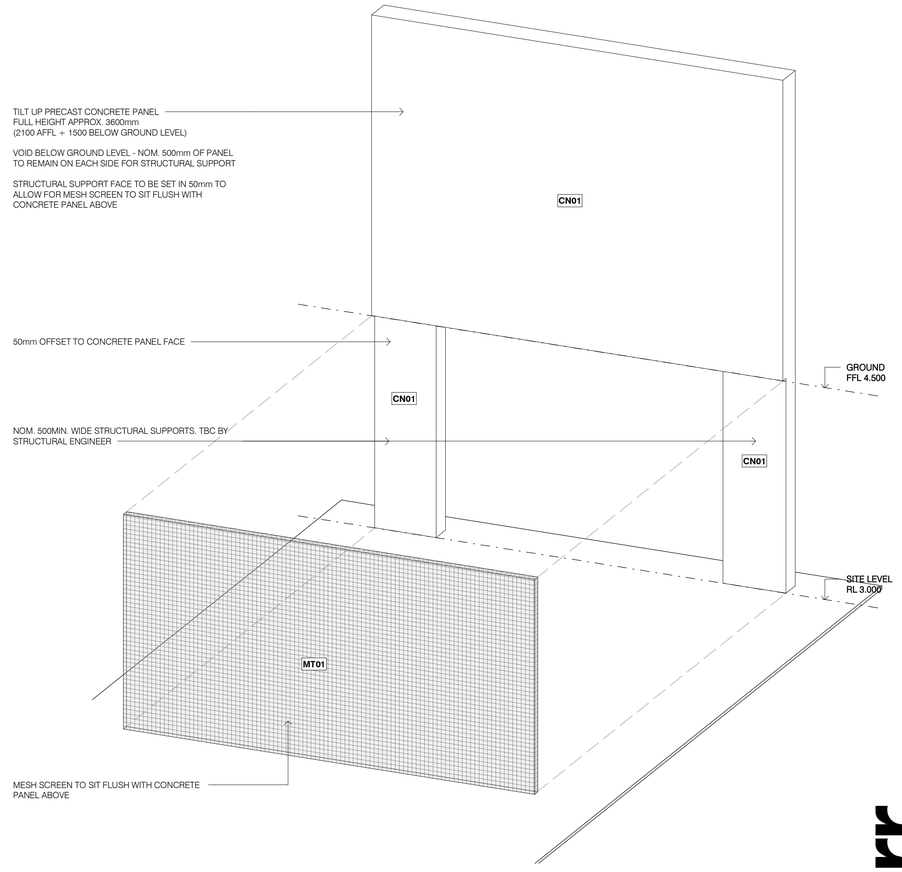
2 / 301 SECTION DETAIL - 3D VIEW
SCALE



5 / 301 TYPICAL CANOPY SECTION DETAIL
SCALE 1 : 20



3 / 301 PRECAST PANEL AND MESH SCREEN SECTION DETAIL
SCALE 1 : 20



4 / 301 PRECAST PANEL AND MESH SCREEN - 3D VIEW
SCALE

MATERIALS

PN01	SUNPAL MULTI WALL PANEL - WHITE OPAL 18mm
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Rev	Date	Chkd	Issue

Project	MANLY WARRINGAH GYMNASTICS CLUB - CENTRE OF EXCELLENCE			Project No	21020
	Manly				
Title	SECTION DETAILS				
Scale @A1	As indicated			Dwg No	301
Drawn By	Author	Date	01/24/23	Rev	

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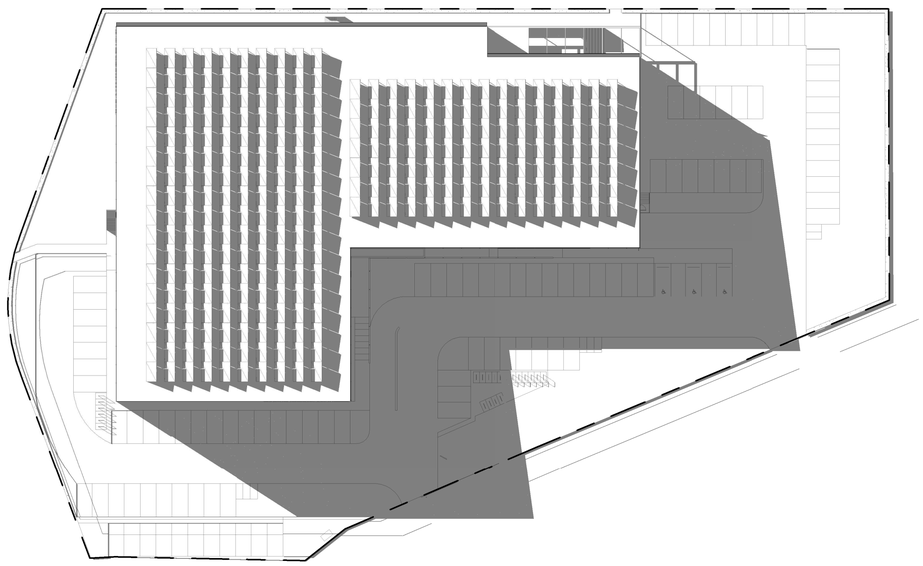
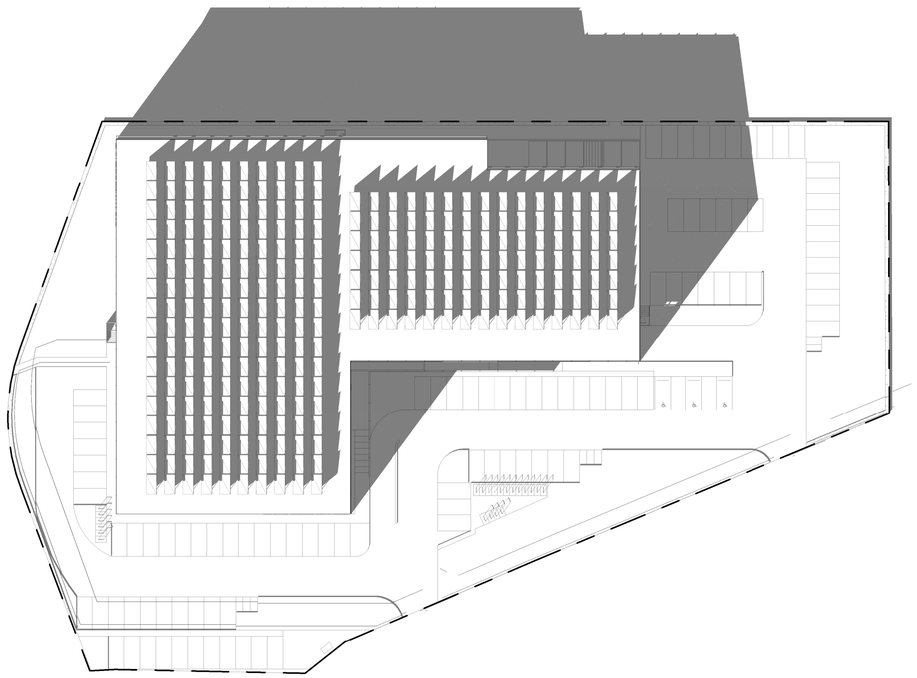


1 / 400 SHADOW DIAGRAM 9AM
SCALE 1 : 500

2 / 400 SHADOW DIAGRAM 12PM
SCALE 1 : 500



3 / 400 SHADOW DIAGRAM 3PM
SCALE 1 : 500

0 2 4 10m
SCALE 1:200

NORTH

MANLY WARRINGAH GYMNASTICS CLUB - CENTRE OF EXCELLENCE SHADOW DIAGRAMS

400

carr

Appendix C

FLOOD INFORMATION REPORT (COMPREHENSIVE)

Property: 431 Pittwater Road, North Manly
Lot DP: Lot 5 DP 829465
Issue Date: 26/09/2023
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]: 3.71 m AHD

Map B - 1% AEP Flood & Key points
1% AEP Maximum Water Level [2, 3]: 3.21 m AHD
1% AEP Maximum Depth from natural ground level[3]: 1.79 m
1% AEP Maximum Velocity: 1.50 m/s

Map C - 1% AEP Hydraulic Categorisation
1% AEP Hydraulic Categorisation: Floodway, Flood Fringe, Flood Storage

Map D - Probable Maximum Flood
PMF Maximum Water Level (PMF) [4]: 5.69 m AHD
PMF Maximum Depth from natural ground level: 4.27 m
PMF Maximum Velocity: 1.98 m/s

Map E - Flooding with Climate Change
1% AEP Maximum Water Level with Climate change [3]: 3.49 m AHD
1% AEP Maximum Depth with Climate Change[3]: 2.07 m

Map F - Flood Life Hazard Category in PMF

Map G - Indicative Ground Surface Spot Heights

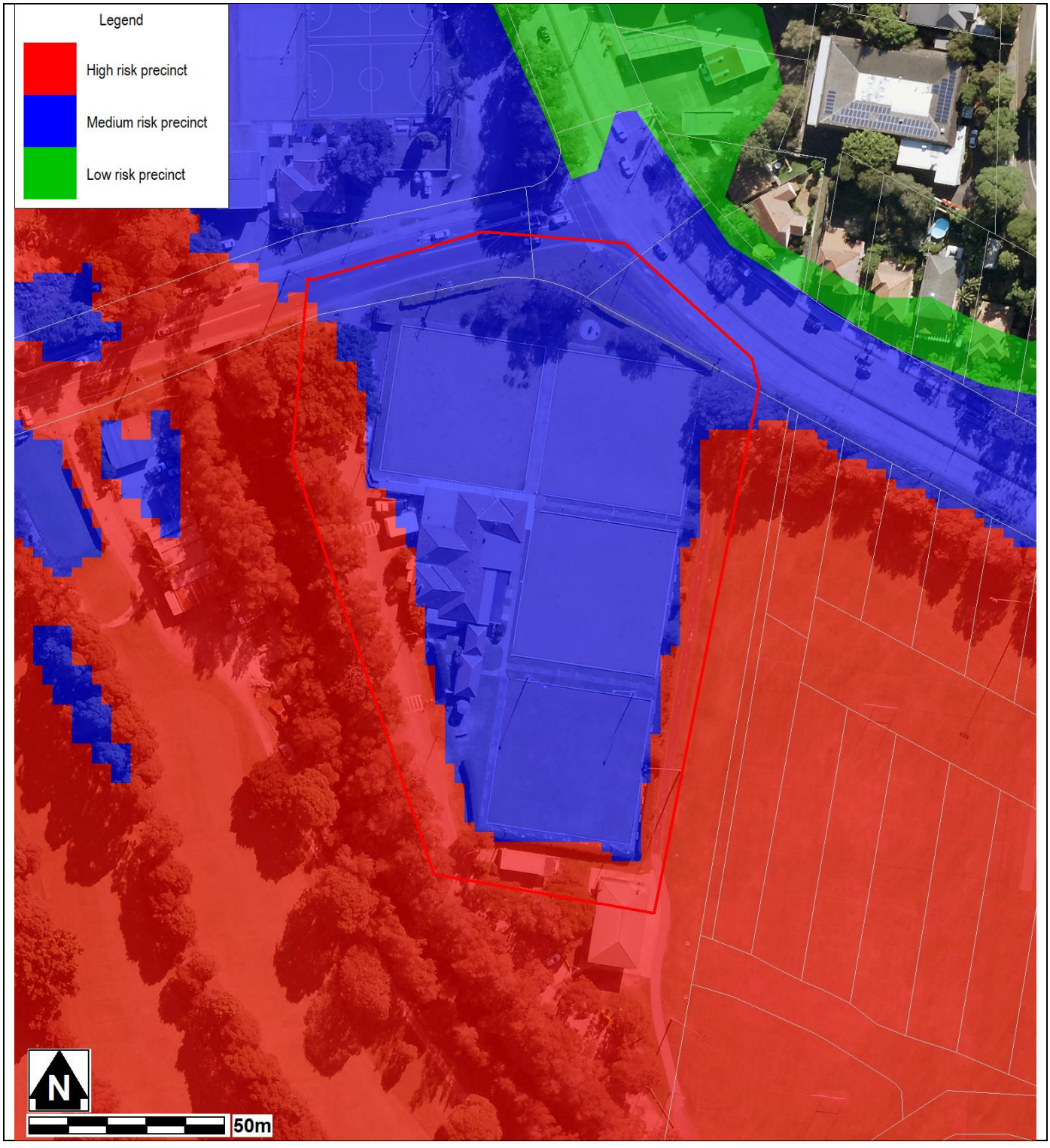
(1) The provided flood information does not account for any local overland flow issues nor private stormwater drainage systems.
(2) Overland flow/mainstream water levels may vary across a sloping site, resulting in variable minimum floor/ flood planning levels across the site. The maximum Flood Planning 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.

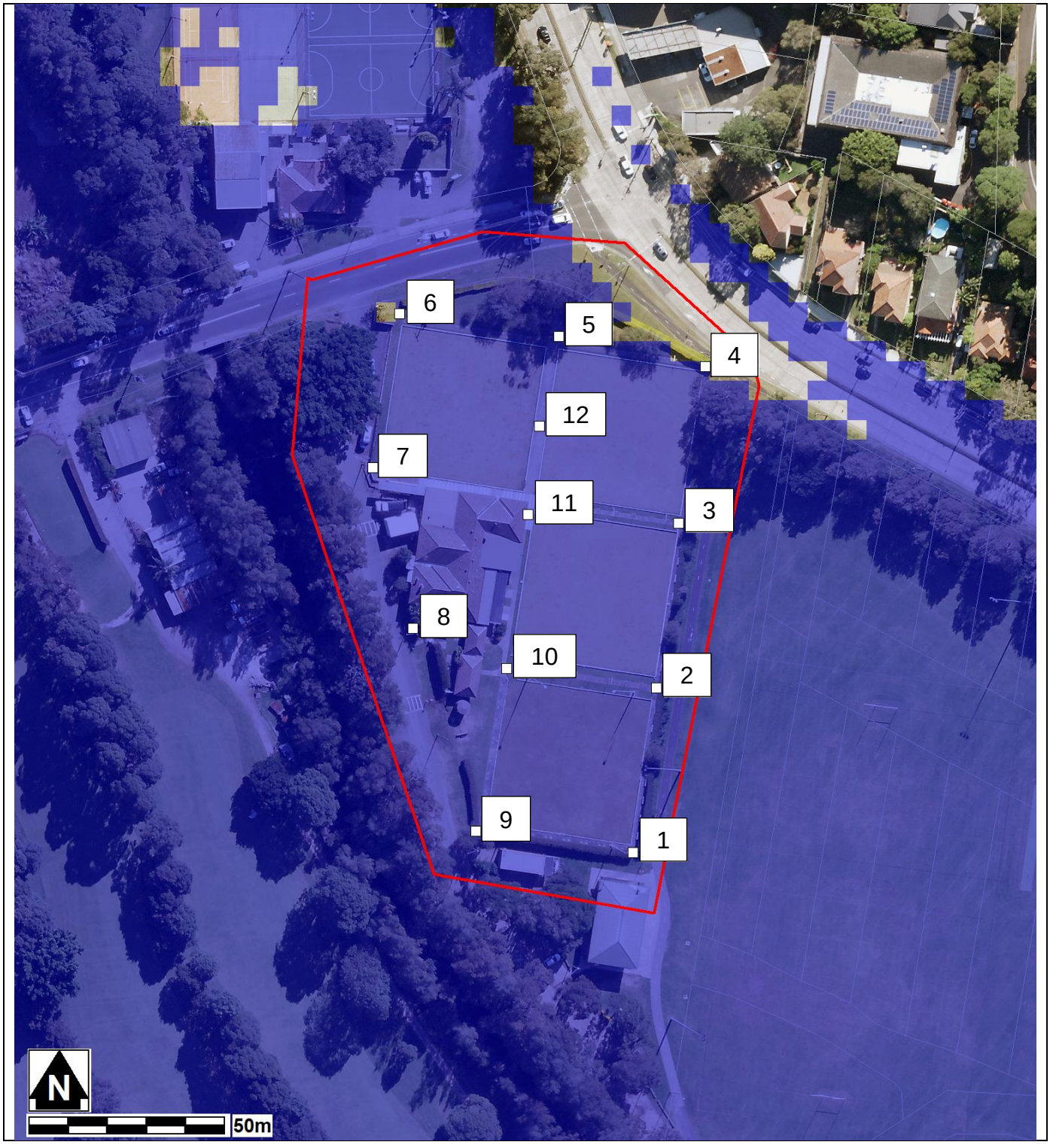
MAP A: FLOOD RISK PRECINCTS



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	2.81	0.45	3.20	0.84	0.70	3.70	5.69	3.33	1.19
2	2.81	0.23	3.20	0.56	0.19	3.70	5.69	3.05	0.52
3	N/A	N/A	3.20	0.27	0.08	3.70	5.69	2.76	0.80
4	N/A	N/A	3.20	0.04	0.03	3.70	5.69	2.42	0.71
5	N/A	N/A	3.21	0.18	0.16	3.71	5.69	2.67	0.78
6	N/A	N/A	3.21	0.11	0.07	3.71	5.69	2.59	0.65
7	2.84	0.24	3.21	0.53	0.54	3.71	5.69	3.01	1.07
8	2.83	0.72	3.21	1.09	0.76	3.71	5.69	3.58	1.02
9	2.82	0.31	3.20	0.69	1.06	3.70	5.69	3.18	1.60
10	N/A	N/A	3.20	0.34	0.36	3.70	5.69	2.83	1.12
11	N/A	N/A	3.21	0.23	0.12	3.71	5.69	2.72	0.74
12	N/A	N/A	3.21	0.23	0.12	3.71	5.69	2.71	0.74

Climate Change Flood Levels (30% Rainfall intensity and 0.9m Sea Level Rise)

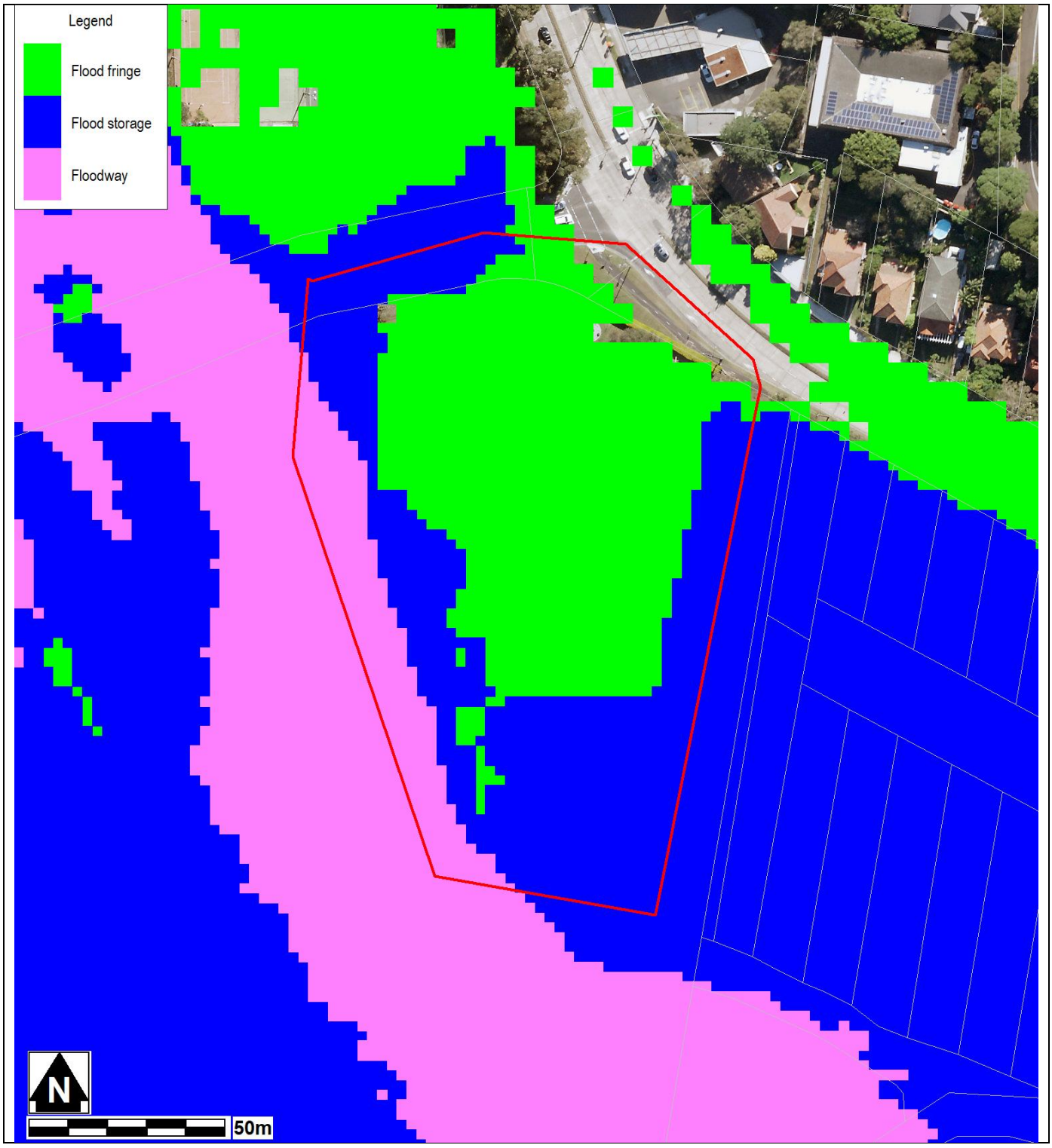
ID	CC 1% AEP Max WL (m AHD)	CC1 % AEP Max Depth (m)
1	3.48	1.12
2	3.48	0.84
3	3.48	0.55
4	3.48	0.21
5	3.48	0.46
6	3.49	0.39
7	3.49	0.81
8	3.48	1.37
9	3.48	0.97
10	3.48	0.62
11	3.48	0.51
12	3.48	0.51

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:

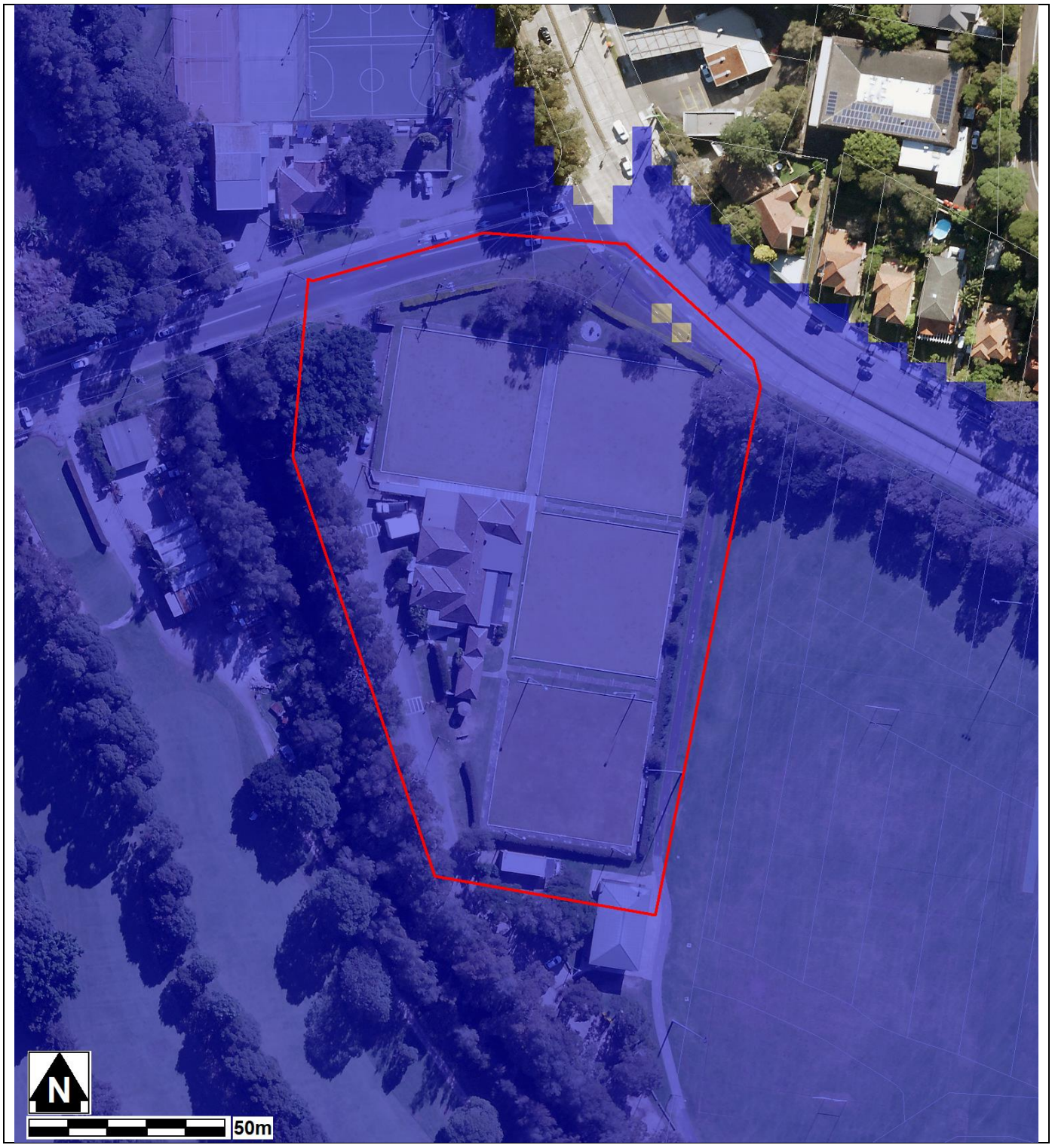
- Extent represents the 1% annual Exceedance Probability (AEP) flood event
- Extent does not include climate change
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Manly Lagoon Flood Study 2013, BMT WBM) and aerial photography (Source: NearMap 2014) 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

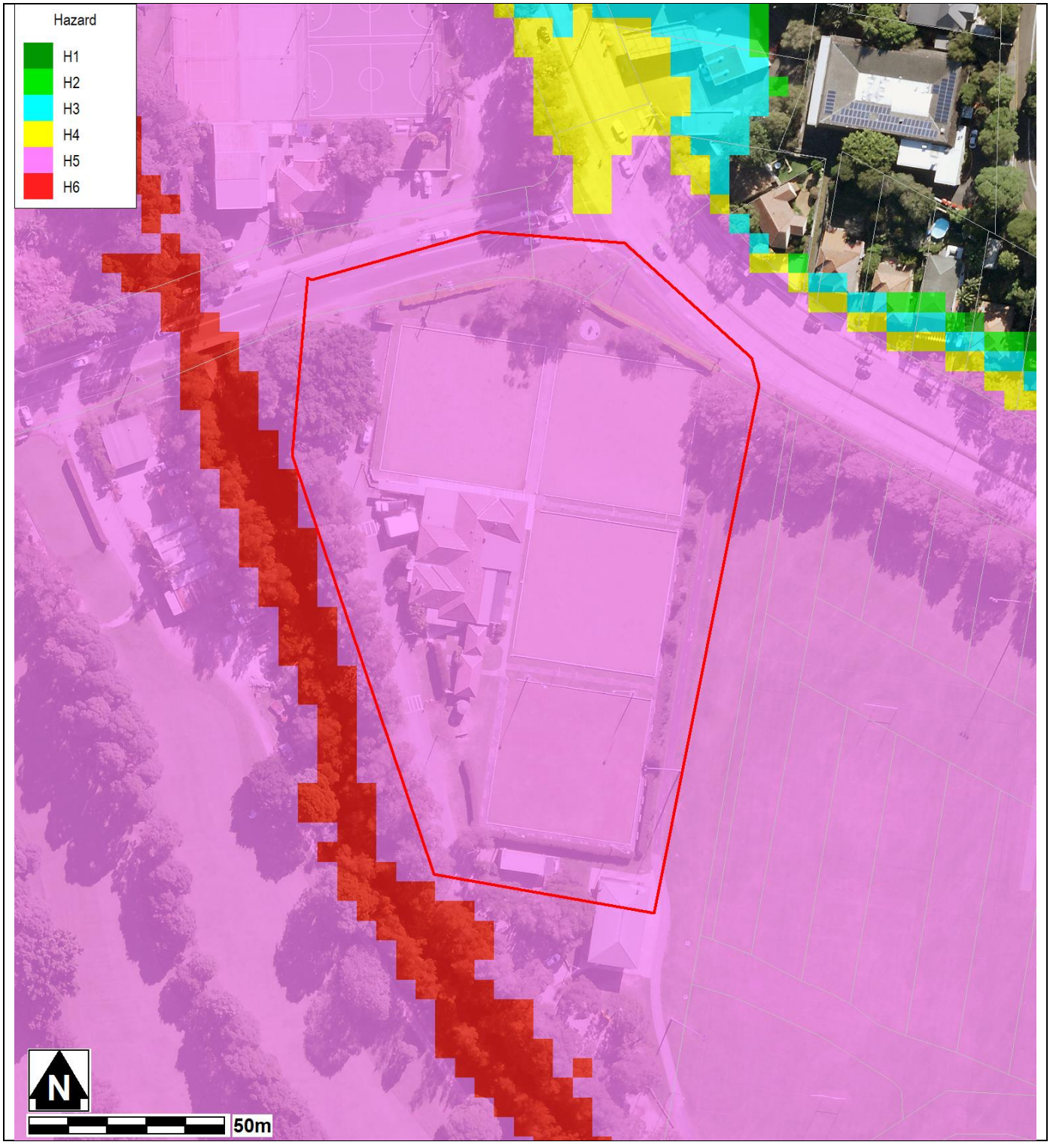
MAP E: FLOODING – 1% AEP EXTENT PLUS CLIMATE CHANGE



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) – 5.21 Flood Planning	Manly DCP (2013) – 5.4.3 Flood Prone Land
Warringah LEP (2011) – 5.21 Flood Planning Warringah LEP (2000) – 47 Flood Affected Land *	Warringah DCP (2011) – E11 Flood Prone Land
Pittwater LEP (2014) – 5.21 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 D

EMERGENCY FLOOD RESPONSE PROCEDURE

Flood waters can rise very rapidly on this site

Once a warning is received for a possible flood or floodwaters start to inundate the roadway frontage of the site:

1. All residents should be at the assembly point by the time the flood waters are observed to have inundated the roadway frontage of the site.
2. The Facilities Operator is to turn off all power, water and other relevant services.
3. Nominated occupants to sweep the promises to ensure that all occupants have sought refuge at the emergency assembly point.
4. Emergency services to be notified by The Facilities Operator of the situation at site.

THIS SITE CAN FLOOD

NEVER DRIVE, WALK OR RIDE THROUGH FLOODWATERS

When emergency services give the all clear to leave:

The site will only be opened for Occupants to leave once floodwaters have subsided and the emergency services have given the all clear.

Appendix E

Flood Checklists

BEFORE A FLOOD

Trigger for action: Always

Action	Status
● All Occupants to be made aware of site flooding potential	
● Develop detailed emergency procedures, responsibilities and resources	
● Provide all Occupants with an emergency response plan and advise of their responsibilities and delegations	
● Maintain an emergency contacts list	
● Update emergency response procedures annually	

WHEN A FLOOD IS LIKELY

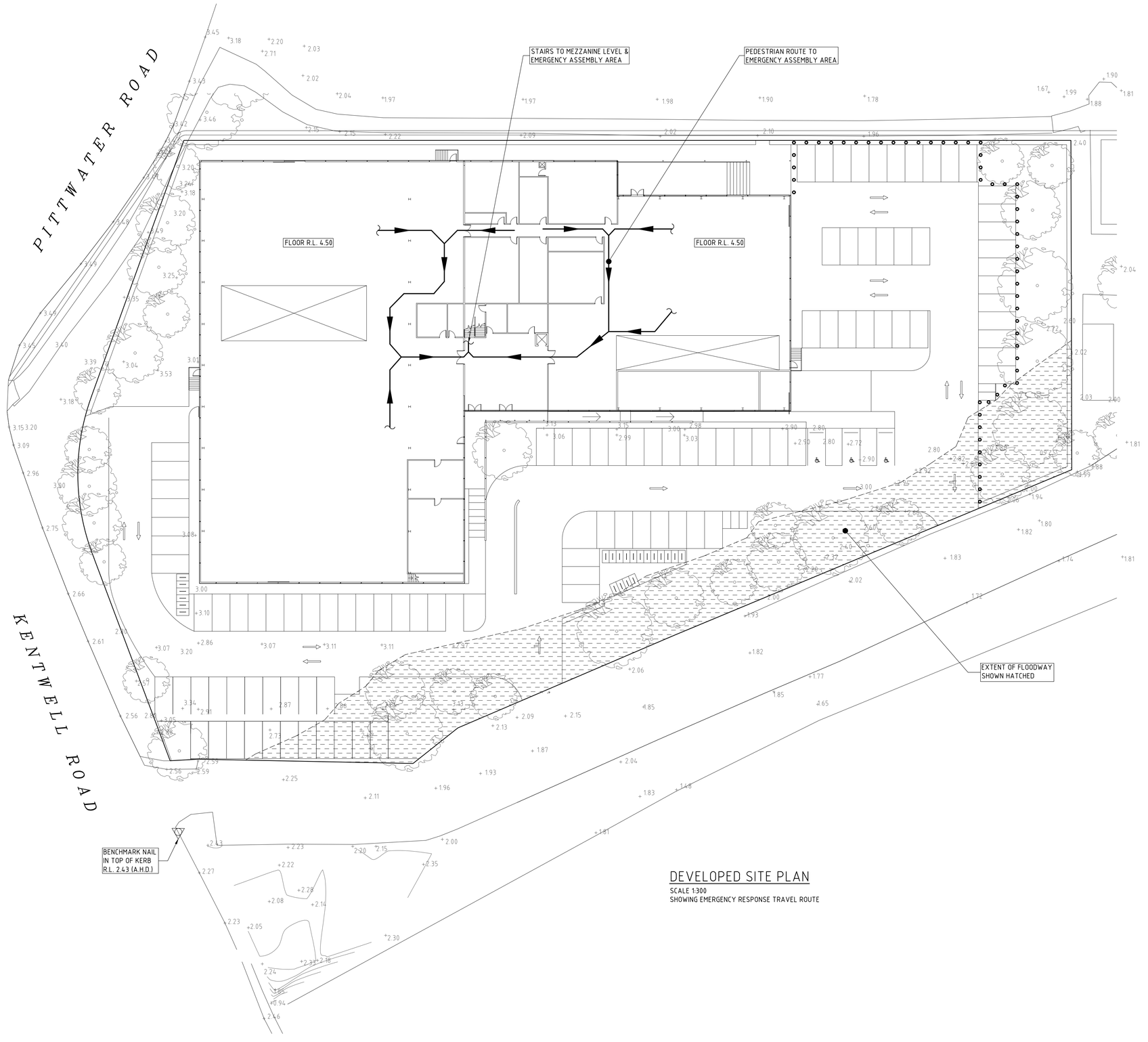
Trigger for action: When the forecasts predict severe weather or significant amounts of rainfall are observed:

Action	Status
● Monitor the severe weather forecasts and predictions	
● The Facilities Operator to monitor conditions at the rear of the site	
● The Facilities Operator to notify Occupants to proceed to the emergency response area	
● The Facilities Operator to shut off nominated services	

DURING A FLOOD

Trigger for action: When water are observed inundating the street frontage or parkland area to the rear of the site:

Action	Status
● Emergency response to be undertaken in an orderly fashion	
● The phases of the emergency response shall be:	
□ The Facilities Operator to request all occupants to proceed to the emergency assembly point.	
□ All occupants should be at the assembly point by the time the flood waters overtopping the flood barrier.	
□ The Facilities Operator to sweep premises for remaining persons	
□ The Facilities Operator to retreat to the emergency assembly area.	
● Emergency services to be notified by The Facilities Operator of the situation at site.	



DEVELOPED SITE PLAN

SCALE 1:300
SHOWING EMERGENCY RESPONSE TRAVEL ROUTE

ISSUE DATE	REVISION

TITLE
EMERGENCY ASSEMBLY POINT PLAN
431 PITTWATER ROAD, NORTH MANLY

DRAWN	DATE	CHECKED	SCALE @ A1
L I	30 OCTOBER 2023	BE Civil (Hons) MIE Aust.	1:300
ENGINEER R B			

TAYLOR CONSULTING
CIVIL & STRUCTURAL ENGINEERS

DRAWING NO. FLOOD–1

"Seascape" Suite 7 22-26 Fisher Rd Dee Why NSW 2099 | T 02 9982 7092 | F 02 9982 5898 | enquire@taylorconsulting.net.au | www.taylorconsulting.net.au

Appendix F

Maintenance and Emergency Contacts

Organisation	Role Contact
SPEL Stormwater	1300 773 500
Emergency Services	Fire/ambulance/ police 000
Northern Beaches Council	Disaster Coordination Centre 1300 434 434
State Emergency Service	SES Local Controller 132 500
Northern Beaches Hospital	02 9105 5000

Appendix G

Flood Compatible Materials and Building Components for New Works

BUILDING COMPONENT	FLOOD COMPATIBLE MATERIAL	BUILDING COMPONENT	FLOOD COMPATIBLE MATERIAL
Flooring and Sub-floor Structure	▪ concrete slab-on ground monolith construction ▪ suspended reinforced concrete slab	Doors	▪ solid panel with water proof adhesives ▪ flush door with marine ply filled with closed cell foam ▪ painted metal construction ▪ aluminium or galvanised steel frame
Floor Covering	▪ clay tiles ▪ concrete, precast or in situ ▪ concrete tiles ▪ epoxy, form-in-place ▪ mastic flooring, formed in-place ▪ rubber sheets or tiles with chemical-set adhesives ▪ silicone floors formed in-place ▪ vinyl sheets or tiles with	Wall and Ceiling Linings	▪ fibro-cement board ▪ brick, face or glazed ▪ clay tile glazed in waterproof mortar ▪ concrete ▪ concrete block ▪ steel with waterproof applications ▪ stone, natural solid or veneer, waterproof grout ▪ glass blocks ▪ glass

	chemical-set adhesive ▪ ceramic tiles, fixed with mortar or chemical-set adhesive ▪ asphalt tiles, fixed with water resistant adhesive ▪ linoleum		▪ plastic sheeting or wall with waterproof adhesive
Wall Structure	▪ solid brickwork, blockwork, reinforced, concrete or mass concrete	Insulation Windows	▪ foam (closed cell types) ▪ aluminium frame with stainless steel ▪ rollers or similar corrosion and water resistant material
Roofing Structure (for Situations where the Relevant Flood Level is Above the Ceiling)	▪ reinforced concrete construction ▪ galvanised metal construction	Nails, Bolts, Hinges and Fittings	▪ brass, nylon or stainless steel ▪ removable pin hinges ▪ hot dipped galvanised steel wire, nails or similar.

Electrical and Mechanical Equipment For buildings constructed on land to which this Plan applies, the electrical and mechanical materials, equipment and Installation should conform to the following requirements.	Heating and Air Conditioning Systems Heating and air conditioning systems should, to the maximum extent possible, be installed in areas and spaces of the building above the relevant flood level. When this is not feasible every precaution should be taken to minimise the damage caused by submersion according to the following guidelines.
Main power supply Subject to the approval of the relevant authority the incoming main commercial power service equipment including all metering equipment, shall be located above the relevant flood level. Means shall be available to easily disconnect the building from the main power supply.	Fuel Heating systems using gas or oil as a fuel should have a manually operated valve located in the fuel supply line to enable fuel cut-off.
Wiring All wiring, power outlets, switches, etc, should to the maximum extent possible, be located above the relevant flood level. All electrical wiring installed below the relevant flood level should be suitable for continuous submergence in water and should contain no fibrous	Installation The heating equipment and fuel storage tanks should be mounted on and securely anchored to a foundation pad of sufficient mass to overcome buoyancy and prevent movement that could damage the

components. Earth core linkage systems (or safety switches) are to be installed. Only submersible-type splices should be used below the relevant flood level. All conducts located below the relevant designated flood level should be so installed that they will be self draining if subjected to flooding.	fuel supply line. All storage tanks should be vented to the FPL.
Equipment All equipment installed below or partially below the relevant flood level should be capable of disconnection by a single plug and socket assembly.	Ducting All ductwork located below the relevant flood level should be provided with openings for drainage and cleaning. Self draining may be achieved by constructing the ductwork on a suitable grade. Where ductwork must pass through a water-tight wall or floor below the relevant flood level, the ductwork should be protected by a closure assembly operated from above relevant flood level.
Reconnection Should any electrical device and/or part of the wiring be flooded it should be thoroughly cleaned or replaced and checked by an approved electrical contractor before reconnection.	Ancillary Structures (steps, pergolas, etc) Suitable water tolerant materials should be used such as reinforced concrete, masonry, sealed hardwood and corrosive resistant metals. Copper Chrome Arsenate (CCA) treated timber is not a suitable material.

Appendix H

PITTWATER ROAD

KENTWELL ROAD

PROVIDE FLOOD PROTECTION BOLLARD AT 1.8m c/c MAX. (TYP)

A

EXTENT OF PROPOSED SPEARHEAD FENCE SHOWN DASHED

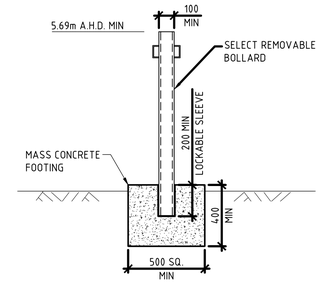
EXTENT OF FLOODWAY SHOWN HATCHED

BENCHMARK NAIL IN TOP OF KERB R.L. 2.43 (A.H.D.)

DEVELOPED SITE PLAN

SCALE 1:300

SHOWING BOLLARD & SPEARHEAD FENCE LOCATION



TYPICAL FLOOD PROTECTION BOLLARD DETAIL

DETAIL A

SCALE 1:20

PROBABLE MAXIMUM FLOOD (P.M.F.)

P.M.F. MAXIMUM WATER LEVEL = 5.69 m A.H.D.
P.M.F. MAXIMUM DEPTH FROM NATURAL GROUND LEVEL = 2.89 m APPROX
P.M.F. MAXIMUM VELOCITY = 1.98 m/s

ISSUE DATE	REVISION

TITLE

SITE PLAN
431 PITTWATER ROAD, NORTH MANLY

DRAWN	DATE	CHECKED	SCALE @ A1
L I	30 OCTOBER 2023	BE Civil (Hons) MIE Aust.	1:300
ENGINEER R B			

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