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FLOOD MANAGEMENT PLAN FOR PROPOSED DEVELOPMENT AT 74 EDINBURGH ROAD, MARRICKVILLE NSW 2204

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1.0 INTRODUCTION

Richmond and Ross Pty Ltd, Consulting Engineers, has been commissioned by Woolworths Group Limited (the Applicant) to prepare this report in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs), and in support of the SSD- 10468 for the design, construction and operation of a warehouse and distribution centre with associated offices at 74 Edinburgh Road, Marrickville (the Site).

The warehouse will be fitted out for the purposes of a speculative warehouse(s) and Customer Fulfillment Centre which will service the inner west and city suburbs.

The requirements for the SEARs issued for SSD 10468 and where these requirements have been addressed are outlined in the table below:

Table 1 Secretary's environmental assessment requirements (SEARs)

Ref.	SEARs	Where addressed
9	An assessment of flood risk on site and consideration of any relevant provisions of the NSW Floodplain Development Manual (DIPNR, 2005), including the potential effects of climate change, sea level rise and an increase in rainfall intensity. The assessment must consider:	
a	the flood hazard in the area	Flood hazard pre development has been discussed in Section 6.0 whereas the post development flood hazard has been discussed in Sec 7.2.2
b	the impact of flooding on the proposed development	Post development flood impact has been addressed in Sec 7.2.2
c	the development's impact (including filling) on flood behavior of the site and adjacent lands	Flood impacts are addressed in Sec 9.0
d	adequate egress and safety procedures during a flood event	Evacuation of the site has been addressed in Sec 11.0

Table 2 Attachment to SEARs

Ref.	Requirement	Where addressed
Inner West Council	Flooding: <ul style="list-style-type: none"> Consider appropriate design measures to reduce the flood risk and flood liability on the site. Address Section 9.1 Ministerial Direction – Flood Prone Land including the amendments currently on exhibition. 	
Sydney Water	Strict requirements for Sydney Water's stormwater assets (for certain types of development) may apply to this site. The proponent should ensure that satisfactory steps/measures been taken to protect existing stormwater assets, such as avoiding building over and/or adjacent to stormwater assets and building bridges over stormwater assets. The proponent should consider taking measures to minimise or eliminate potential flooding, degradation of water quality, and avoid adverse impacts on any heritage items, and create pipeline easements where required.	Building over/adjacent to assets will be in strict accordance with Sydney Water published guidelines for building over/adjacent to assets. Flooding has been addressed in Sec 7.0. Water quality has been addressed in the Stormwater Management Plan.

Ref.	Requirement	Where addressed
DPIE Flooding and coastal hazards	<p>10. The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including:</p> <ol style="list-style-type: none"> Flood prone land. Flood planning area, the area below the flood planning level. Hydraulic categorization (floodways and flood storage areas) Flood Hazard. <p>11. The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 5% Annual Exceedance Probability (AEP), 1% AEP, flood levels and the probable maximum flood, or an equivalent extreme event.</p> <p>12. The EIS must model the effect of the proposed development (including fill) on the flood behavior under the following scenarios:</p> <ol style="list-style-type: none"> Current flood behavior for a range of design events as identified in 14 above. This includes the 0.5% and 0.2% AEP year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change. <p>13. Modelling in the EIS must consider and document:</p> <ol style="list-style-type: none"> Existing council flood studies in the area and examine consistency to the flood behaviour documented in these studies. The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood, or an equivalent extreme flood. Impacts of the development on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazard categories and hydraulic categories Relevant provisions of the NSW Floodplain Development Manual 2005. <p>14. The EIS must assess the impacts on the proposed development on flood behaviour, including:</p> <ol style="list-style-type: none"> Whether there will be detrimental increases in the potential flood affection of other properties, assets, and infrastructure. Consistency with Council floodplain risk management plans. Consistency with any Rural Floodplain Management Plans. Compatibility with the flood hazard of the land. Compatibility with the hydraulic functions of flow conveyance in floodways and storage in 	<p>Hydraulic modelling carried out has been discussed in Sec 5.0</p> <p>Existing flood behaviour has been discussed in Sec 6.0</p> <p>Post development flood mapping has been addressed in Sec 7.2 and Appendix B</p> <p>Most up to date flood model has been obtained from Inner West council to model the pre development scenario</p> <p>Impact of the proposed development has been addressed in Sec 9.0</p> <p>Evacuation of the site in accordance with council flood Plain Risk Management Study has been discussed in Sec 11.0</p>

Ref.	Requirement	Where addressed
	<p>flood storage areas of the land.</p> <p>f. Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.</p> <p>g. Whether there will be direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or watercourses.</p> <p>h. Any impacts the development may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the NSW SES and Council.</p> <p>i. Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the NSW SES and Council.</p> <p>j. Emergency management, evacuation and access, and contingency measures for the development considering the full range of flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the NSW SES.</p> <p>k. Any impacts the development may have on the social and economic costs to the community as consequence of flooding.</p>	As above

2.0 DESCRIPTION OF SITE

The Site is legally described as Lot 202 in DP 1133999, Lot 3 in DP 318232 and Lot 3 in DP 180969, commonly known as 74 Edinburgh Road, Marrickville (see Figure 1). The Site has an area of approximately 27,315sqm and has frontages to both Edinburgh Road (north) and Sydney Steel Road (east).

The key elements within and surrounding the Site include:

- The Site is located within the industrial area of Marrickville and currently accommodates several large freestanding industrial buildings and associated car parking and loading areas;
- Vehicular access to the Site is via an existing entry and exit driveway at the Edinburgh Road frontage. Access is also available from Sydney Steel Road;
- The Site contains minimal vegetation which is fragmented by buildings and areas of hardstand surfaces. Vegetation is limited to scattered trees and shrubs within the Site and planted within the nature strip;
- Is located within 1km of Sydenham Railway Station, which is currently being upgraded as part of the Sydney Metro Chatswood to Bankstown metro line; and
- The Site is well positioned in terms of access to arterial and main roads, public transport modes of bus and rail, Sydney Airport and the retail centre of Marrickville.



Figure 1 Aerial view of the Site (Source: SixMaps)



Figure 2 The Site: Location of proposed warehouse and CFC (Source: Nettleton Tribe)

3.0 THE SITE AND THE SURROUNDING CONTEXT

The Site is well positioned in terms of access to arterial and main roads, public transport modes of bus and rail, Sydney Airport and the retail centre of Marrickville. The Site is located on the northern periphery of the Sydenham Precinct which is part of the Sydenham to Bankstown Urban Renewal Corridor, earmarked for significant employment growth.

The Site also forms part of a large industrial precinct bounded by Edinburgh Road to the north, Railway Parade and the railway line to the east, Marrickville Road/the railway line to the south and Meeks Road/Farr Street/Shepherd Street to the west. The Industrial precinct includes:

- Large free stranding industrial buildings;
- Industrial estates including smaller individual warehouse buildings to the south and east;
- Manufacturing, freight and logistics uses and includes storage facilities, car smash repairs, warehousing and factories.

The Marrickville Metro Shopping Centre also lies to north of the Site. Residential uses are well separated from the Site to the south and east. The Site is also physically separated from residential dwellings to the north and north-west by Edinburgh Road.

4.0 PROJECT DESCRIPTION

The proposed works comprise the following:

- Demolition of the existing buildings, associated structures and landscaping;
- Construction of a two storey warehouse comprising a speculative warehouse at level 1 (ground level) and Customer Fulfillment Centre (CFC) at level 2;
- Construction of associated offices across five levels to be used by Woolworths in conjunction with the warehouse and CFC;
- Two storey car park adjacent to Edinburgh Road;
- Two storey hardstand loading and delivery area adjacent Sydney Steel Road;
- Private vehicle access from two points on Edinburgh Road;
- Heavy vehicle / loading vehicle access from four points on Sydney Steel Road; and,
- Tree removal and landscaping works.

Use of the warehouse will be on a 24-hour, 7-day basis, consistent with surrounding operations.

5.0 HYDRAULIC MODELLING

A previous flood study prepared for the project catchment has been used as an input into the 74 Edinburgh Road flood model. This flood study was originally prepared by WMAwater in 2013 and later updated by Cardno in 2017. The model was obtained from council and consisted of a 1D-2D TufLOW hydraulic model.

5.1 74 EDINBURGH ROAD FLOOD MODEL PARAMETERS

The 74 Edinburgh Road Flood Study incorporated the following parameters:

- Hydrologic Inputs – 1D network as provided within the Marrickville Valley flood study. The 1D network for the development scenario has been updated to reflect the diversion of the Sydney water owned culvert that passes through the site.
- TUFLOW Version – 2013_12-AE – Version used to create the Marrickville Valley flood study and therefore the same version has been used for the flood model for 74 Edinburgh Rd to maintain compatibility with the findings from the Marrickville Valley flood study
- Roughness Values – As per the Marrickville Valley flood study.
- Building footprints – As per the Marrickville Valley flood study with modifications to suit building footprints within the subject development site.
- Events simulated – The 74 Edinburgh Road flood model has been run for the 2yr, 5yr, 10yr and the 100yr average recurrence interval (ARI). The critical storm duration for these storms is as per the Marrickville Valley flood study ie 2hrs. A PMF event has also been simulated to determine the impact of the development during a worst case scenario including potential increase in rainfall due to climate change. The critical storm duration for the PMF is also as per the Marrickville Valley flood study ie 60mins.
- Blockage scenario – Blockage of pipes outside the site was not considered as this is not within the scope of the study. To model the blockage of the flood diversion channels, the outlet from the flood storage chamber (which also drains the site) was modelled as 100% blocked for the 100yr ARI. Refer APPENDIX C.5 for change in flood depth between existing conditions and post development conditions with the site outlet fully blocked.

6.0 EXISTING FLOOD AND DRAINAGE BEHAVIOUR

Floodwaters enter the site via Edinburgh road as well as surcharge from a pit on the Sydney Water owned drainage culvert passing through the site. The site is subject to flood inundation during storm event greater than the 2yr average recurrence interval. Once flood inundation has occurred, the flows continue along the North Western Boundary and eventually flow into adjoining properties via a dedicated overland flow path. During a 1% AEP storm event, the maximum depth of flow within the site is less than 500mm. The flood hazard categorization of the existing site is “low hazard”. See Sec 7.2.2 - Flood Hazard for more details regarding the hazard categorization used.

During the PMF flood event, the site experiences significant inundation with peak flow depth exceeding 2m and is categorized as a high hazard flood area.

Refer to Appendix A - Pre Development Flood Model Results, for images showing the expected flood depths, velocities and hazard for the pre development conditions for the various storm events.

7.0 PROPOSED DEVELOPMENT FLOOD BEHAVIOUR

7.1 PROPOSED FLOOD DIVERSION/DETENTION MEASURES

It is proposed to collect the flood flow via a network of pit inlets and divert it to an underground flood detention chamber via drainage culverts. The flood detention chamber is proposed with a volume equal to the existing site’s above ground 1% AEP flood storage (Approx. 1200m³) and therefore there will be no net loss in available flood storage up to the 1% AEP storm event.

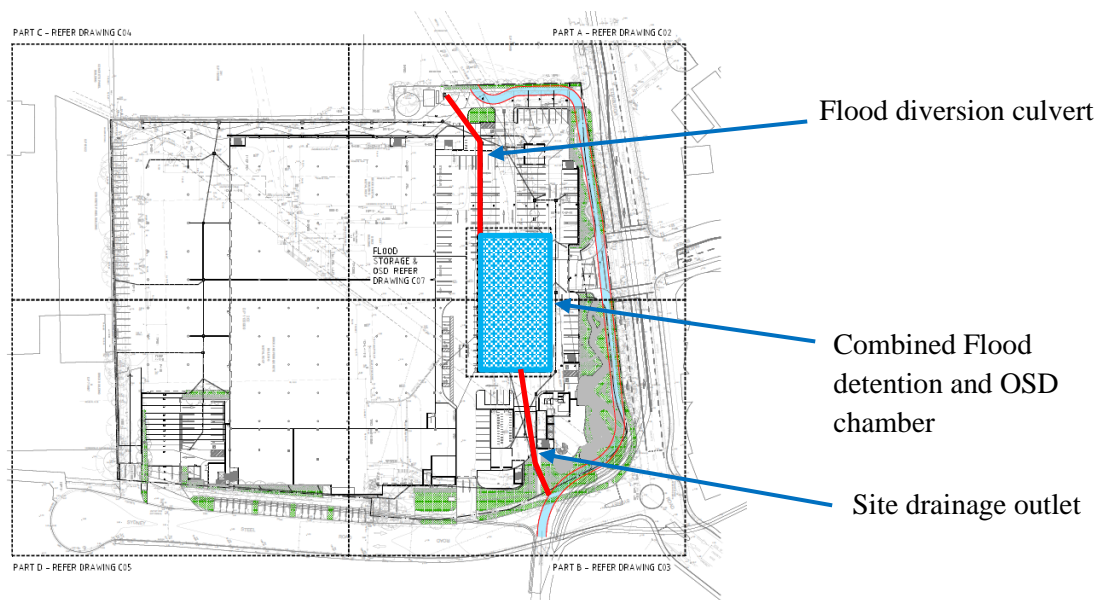


Figure 3 Extract of Stormwater concept plan DWG C01

7.2 POST DEVELOPMENT FLOOD BEHAVIOUR

The above-mentioned flood diversion/detention measures, expected post development topography and geometry amendments (proposed finished ground level and building extents within the site) were added to the Marrickville Valley flood study. Refer to Appendix B - Post Development Flood Model Results, for images showing the expected flood depths, velocities and hazard for the post development conditions. The flood level applicable to the site based on modelling is 4.61mAHD.

7.2.1 FLOOD DEPTH AND VELOCITY

Based on the model results, the expected flood depth within the site boundary during a 1% AEP storm event is less than 0.2m and is located around the inlet to the flood diversion structure. The maximum velocity of flow within the site boundary during a 1% AEP storm event is less than 1.05m/s.

7.2.2 FLOOD HAZARD

Flood hazard is defined as potential of a flood to cause damage to the community. With respect to the depth and velocity of floodwaters, it is referred to as provisional flood hazard. In this report, provisional flood hazard is categorized based on Figure 4 (Figure L2 of the NSWG Floodplain Development Manual, 2005) below.

The flooding within the site post development is categorised as low hazard during a 1% AEP storm event.

The site is subject to low hazard flooding during a PMF event being a reduction in hazard category for the post development scenario.

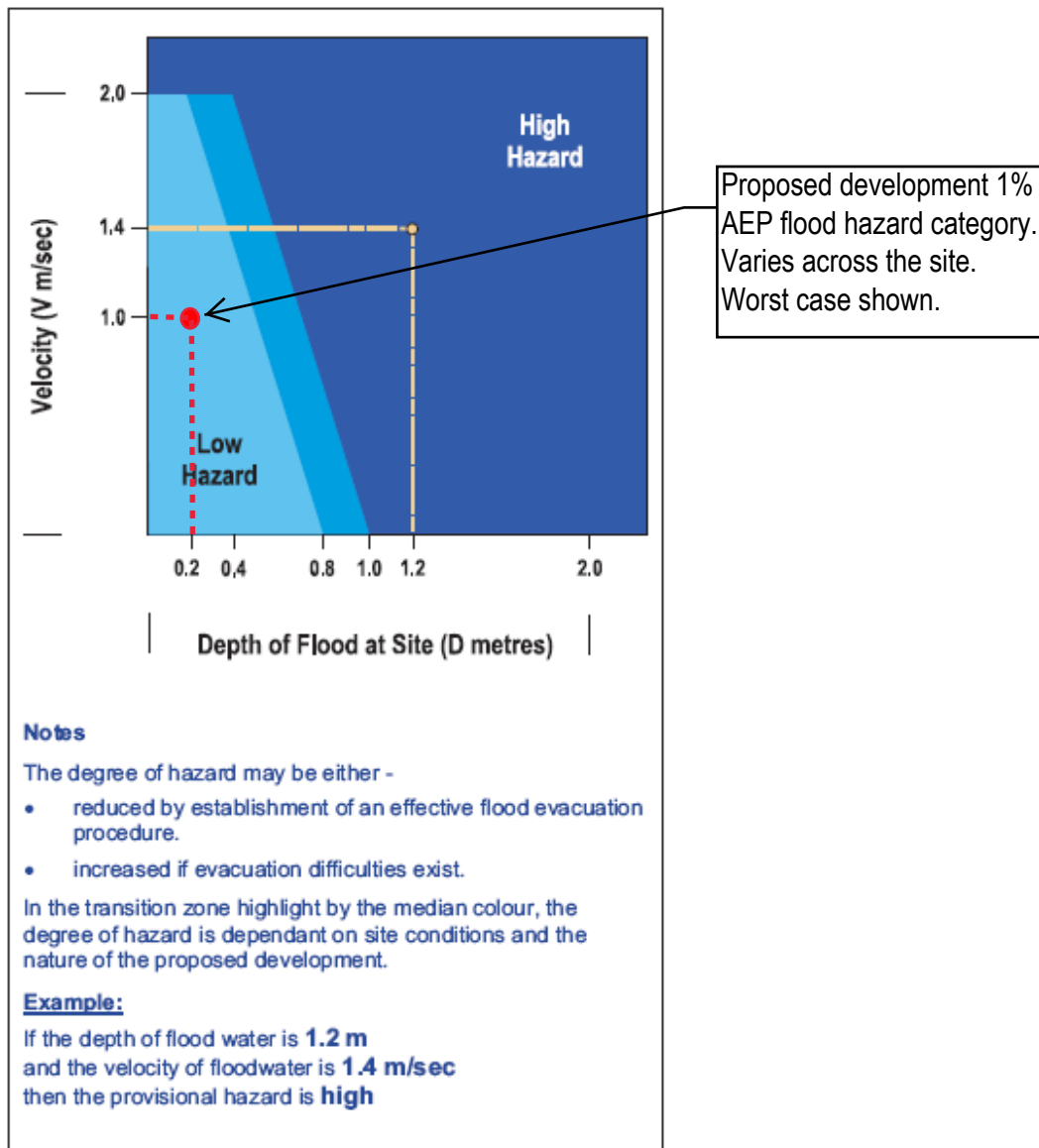


Figure 4 Provisional Flood Hazard (NSWG, 2005)

8.0 PROPOSED DEVELOPMENT FLOOD PROTECTION MEASURES

Referring to Council's DCP for flood management, Sec 2.22.5, control C13, "*Floor levels (except for access-ways) must be at least 500mm above the 1% AEP flood level, or the buildings must be flood-proofed to at least 500mm above the 1% AEP flood level. For areas of minor overland flow (a depth of 300mm or less or overland flow of 2cum/sec or less) a lower freeboard of 300mm may be considered on its merits.*" Based on the modelled flood extent, the area in the immediate vicinity of the building has less than 100mm of flood depth and therefore is considered an area of minor overland flow. The floor level of the proposed is 4.86mAHD while the 1% AEP flood level is 4.61mAHD. Therefore, it is proposed to construct 35mm threshold ramps at all access doorways on the ground floor and locally grade (additional 15mm) the external ground level around the doorways to achieve the flood planning level of 4.91mAHD.

9.0 IMPACT OF PROPOSED DEVELOPMENT ON FLOOD DEPTHS ON ADJACENT LANDS

The proposed development will result in a negligible increase in the flood depths during a 1% AEP storm event. A greater than 200mm reduction in flood depths can be expected within the neighbouring property 10-14 Lilian Fowler Place. The impact of the project on the flood depths on adjacent lands can be seen in Figure 5 below. The approx. 250mm increase in flood depth in the external pavement area of 87 Fitzroy St, Marrickville is as a result of the flood water overtopping a ridge in the digital elevation model of the flood model by 10mm. Review of aerial imagery has revealed stormwater drainage pits in this area which indicates this area will be subject to flooding in the existing scenario due to the backwater flooding. Modelling of individual allotment stormwater modelling is not within the scope of the flood model. Furthermore, if rainfall on a grid modelling technique were to be used (in lieu of the catchment-based flow boundaries in the current model as obtained from council), this area will show flooding in the pre development scenario as well as the post development scenario ie negligible change. However, rainfall on a grid is susceptible severe volume imbalances and this will significantly underestimate flows. Therefore, rainfall on a grid is not a preferred modelling technique.

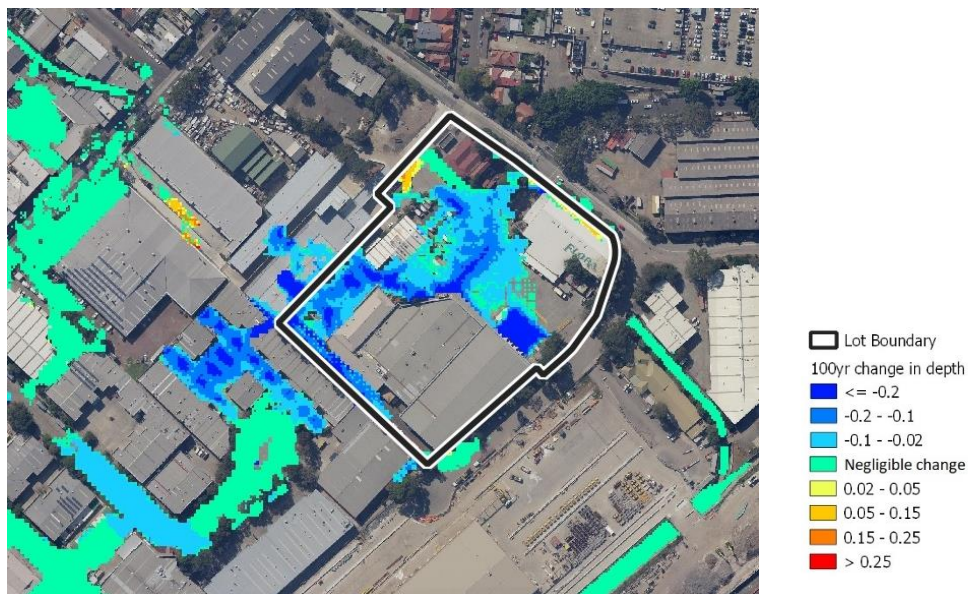


Figure 5 Change in 1% AEP flood depth (Refer Appendix C for wider extent)

10.0 OVERLAND FLOW PATHS

In the event of blockage of the site's drainage network, the site has been graded to allow overland flow paths to direct water away from buildings and minimise the impact on the development. Refer to civil drawings for overland flow path directions.

11.0 EVACUATION OF SITE

11.1 EVACUATION ROUTE

Referring to the Marrickville Valley Floodplain Risk Management Study, evacuation from the Marrickville Industrial area of which the site is a part will be very difficult as the area is expected to be significantly inundated within 30mins of the onset rainfall for both 1% AEP and PMF flood events. The site is located within the outer regions of the Industrial area and therefore evacuation of the occupants within the site is feasible. Occupants with vehicles should exit the site via the North Western Driveway and head further northwest towards Victoria Road. At the intersection, vehicles can continue West onto Victoria Road and left onto Black Street and continue along the flood evacuation route shown in Figure 6 below. Pedestrian traffic can evacuate via the North Western driveway and towards Bourne street and eventually continue North towards Black Street. It should be noted that there is no dedicated pedestrian crossing facility to cross Edinburgh Road at the driveway and no kerb ramp access onto Bourne Street. Evacuation from the site should be carried out in safe and organised manner and undertaken early within the flood event (prior flood waters isolating the area). Do not try to evacuate via flood waters. If all evacuation could not be carried out on time and the development has been flooded, it is safer to stay within the site at a high-level refuge as the site is expected to be a low hazard area including during a PMF flood event. If people do become trapped by rising flood waters without access to a flood refuge, emergency evacuation will be required. In this case, contact State Emergency Services (SES) on 13 25 00.

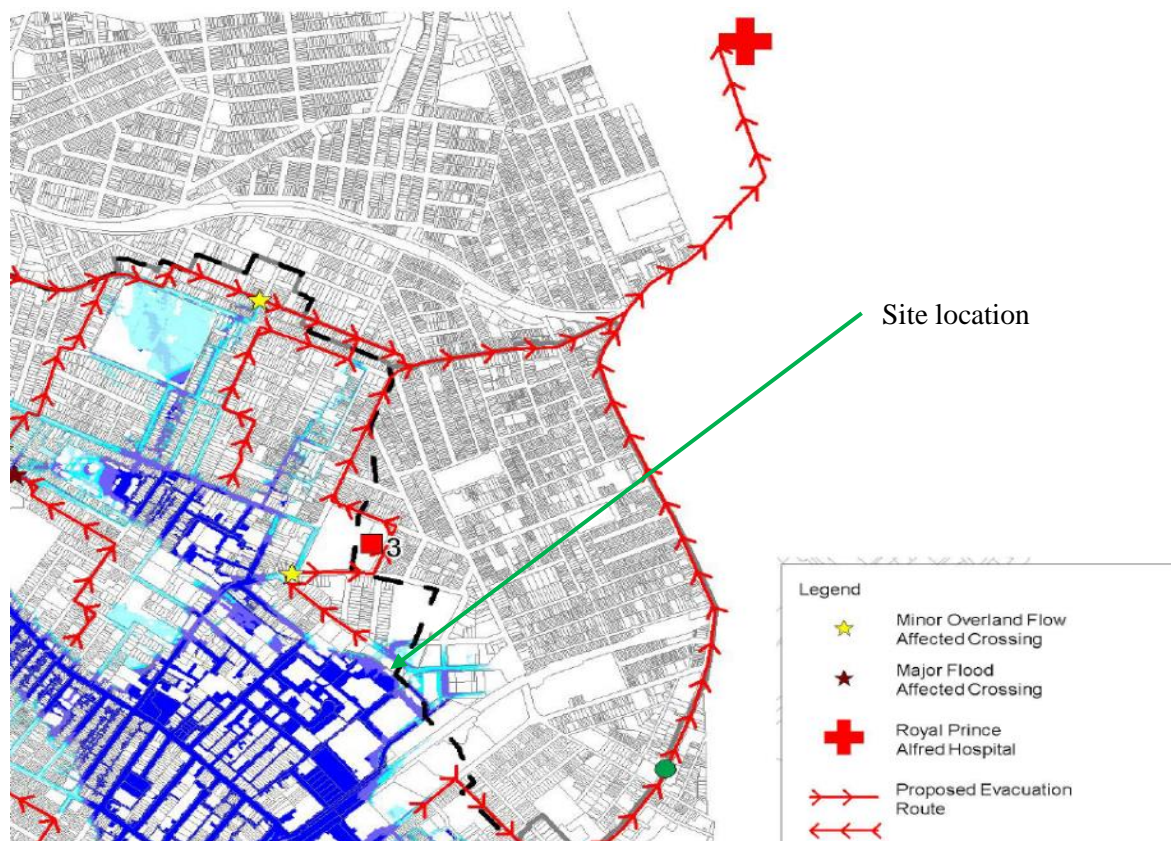


Figure 6 Flood Evacuation Route (Extract, Cardno 2017)

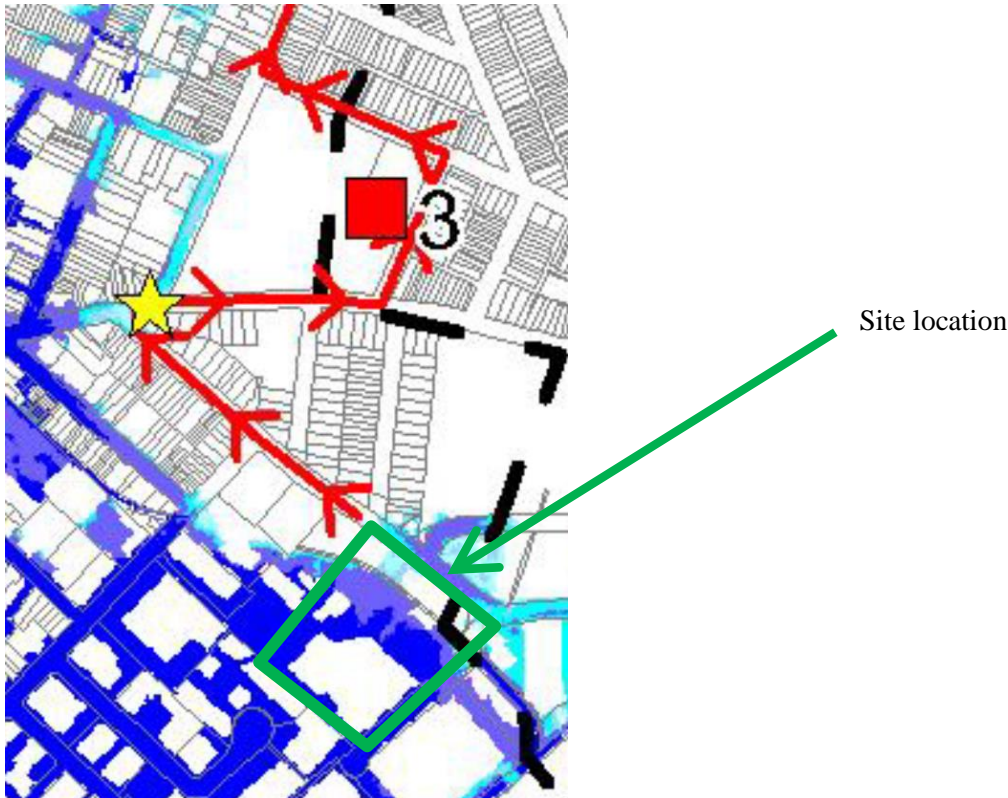


Figure 7 Flood Evacuation Route – Closeup of area around the site (Extract, Cardno 2017)

11.2 STAFF EDUCATION

All staff is to be informed and made aware of the evacuation route mentioned above. This plan will form part of the site induction for the proposed development site.

The site Occupational Health and Safety (OH&S) committee will be responsible for:

- a) Liaising with other services such as NSW Police and State Emergency Services (SES)
- b) Directing flood monitoring
- c) Damage minimisation measures
- d) Co-ordination of evacuation as required.

11.3 PATRONS INFORMATION

A designated member of staff to inform and direct patrons towards the Flood Evacuation Paths in the event of emergency. Furthermore, copies of the Evacuation Plan shall be displayed throughout the tenancies in full view of customers.

11.4 ACTIVATION

The OH&S committee shall activate this plan based on the Flood Warning Announcement from the local authority. The Flood Wardens are required to monitor SES, Council announcements and local radio in an event of severe weather forecast.

The OH&S committee is to carry out the following tasks once the plan is activated:

- a) Monitor flooding and water levels in the area, on Edinburgh Rd, ground level parking area within the site along Edinburgh rd., and along the site boundaries
- b) Maintain contact with SES.
- c) Using information obtained make decision on the following:
 - Install floodgates/barriers in designated areas where infrastructure may be at risk.
 - Evacuate personnel and patrons away from the flood zone

12.0 CONCLUSION

Subject to the implementation of the following flood mitigation measures:

- Flood flow diversion channels and detention chambers and
- Construction of threshold ramps and localized grading to all doorways to RL 4.91mAHD (Floor level being 4.86mAHD)

We advise that the new development:

- can be constructed at the proposed minimum FFL 4.86mAHD and meet council's flood control requirements,
- will have no significant impact on current flood volumes, flood depths and existing flood hazard categories upto the 1% AEP storm event,
- will not result in any additional private properties being inundated during a 1% AEP flood event because of the development,
- proposes flood mitigation measures that minimize the increase in 1% AEP flood depth as far as practicable especially within private properties.

13.0 GLOSSARY

Term	Definition
The Site	74 Edinburgh Road, Marrickville (Lot 202 in DP 1133999, Lot 3 in DP 318232 and Lot 3 in DP 180969)
The Project	Demolition and the construction of a new warehouse and distribution centre with associated offices.
Customer Fulfilment Centre	The purpose built Woolworths occupied warehouse and distribution facility located on Level 2.
Associated Office	When referring to the office component of the development

14.0 ABBREVIATIONS

Abbreviation	Meaning
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
ARI	Average Recurrence Interval
Council	Inner West Council
DCP	Development Control Plan
FFL	Finished Floor Level
OH&S	Occupational Health and Safety
OSD	On Site Detention
PMF	Probable Maximum Flood
SES	State Emergency Services

APPENDIX A.
APPENDIX A.1

PRE DEVELOPMENT FLOOD MODEL RESULTS
PRE DEVELOPMENT 2 YR ARI FLOOD

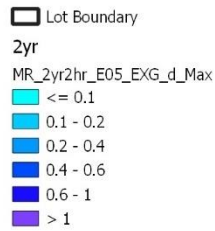


Figure 8 Pre Development 2yr ARI Flood Depth (m)

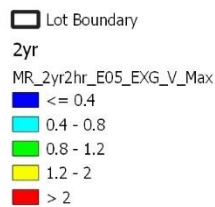


Figure 9 Pre Development 2yr ARI Flood Velocity (m/s)

- Lot Boundary
- 2yr
- MR_2yr2hr_E05_EXG_Z1_Max
- Low hazard
- Intermediate Hazard
- High Hazard



Figure 10 Pre Development 2yr ARI Flood Hazard Category

APPENDIX A.2 PRE DEVELOPMENT 20% AEP FLOOD



Figure 11 Pre Development 20% AEP Flood Depth (m)

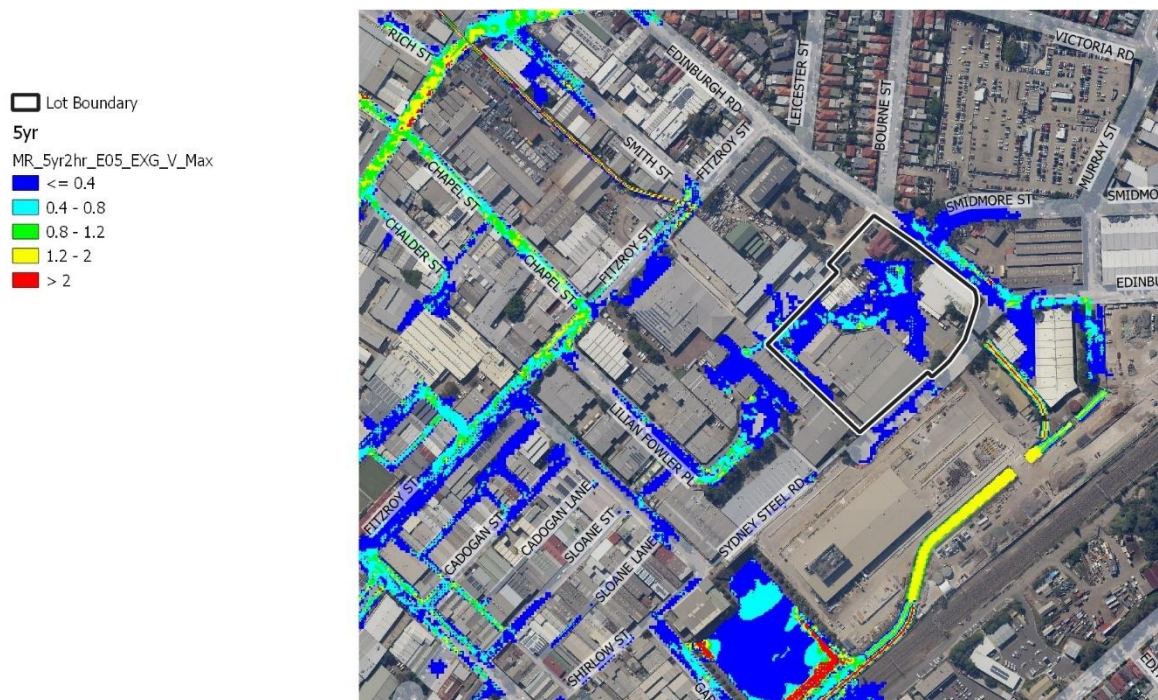


Figure 12 Pre Development 20% AEP Flood Velocity (m/s)

Lot Boundary
 5yr
 MR_5yr2hr_E05_EXG_Z1_Max
 Low hazard
 Intermediate Hazard
 High Hazard



Figure 13 Pre Development 20% AEP Flood Hazard Category

APPENDIX A.3 PRE DEVELOPMENT 10% AEP FLOOD



Figure 14 Pre Development 10% AEP Flood Depth (m)

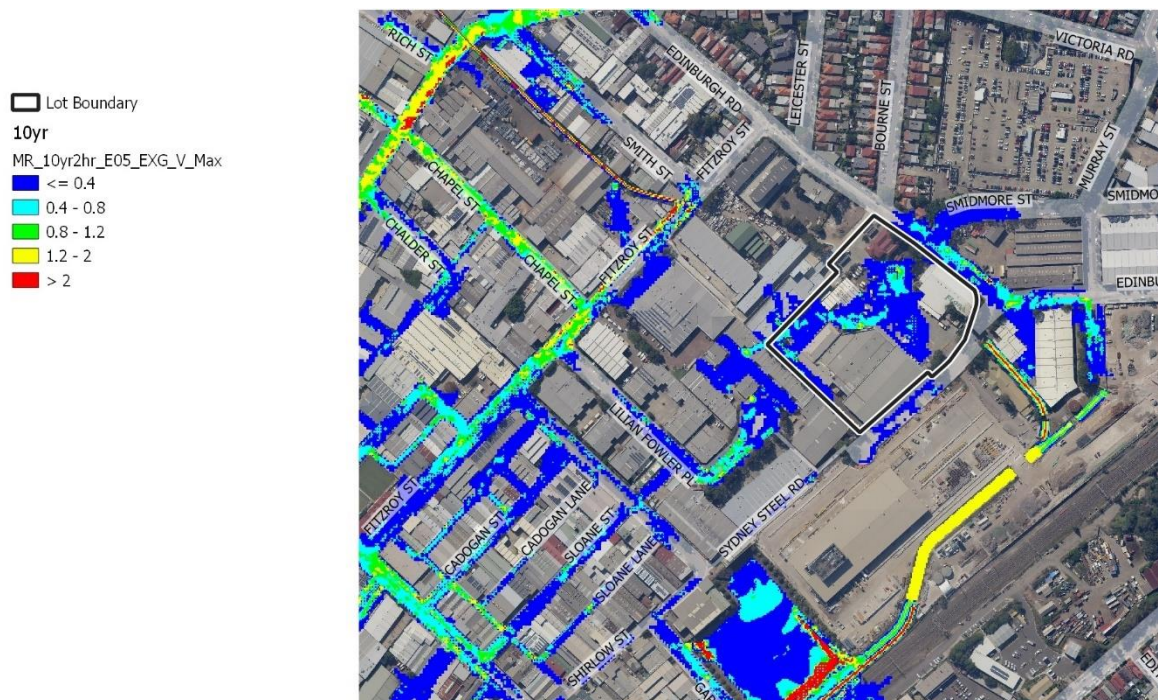


Figure 15 Pre Development 10% AEP Flood Velocity (m/s)

Lot Boundary
 10yr
 MR_10yr2hr_E05_EXG_Z1_Max
 Low hazard
 Intermediate Hazard
 High Hazard



Figure 16 Pre Development 10% AEP Flood Hazard Category

APPENDIX A.4 PRE DEVELOPMENT 1% AEP FLOOD

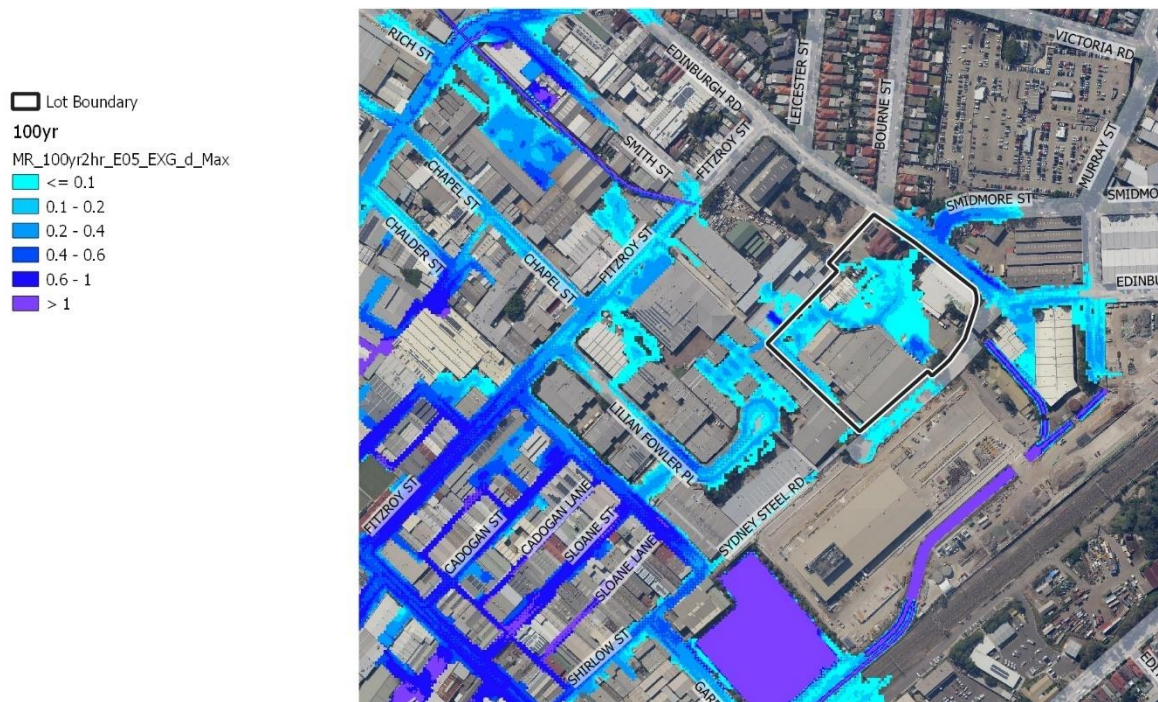


Figure 17 Pre Development 1% AEP Flood Depth (m)

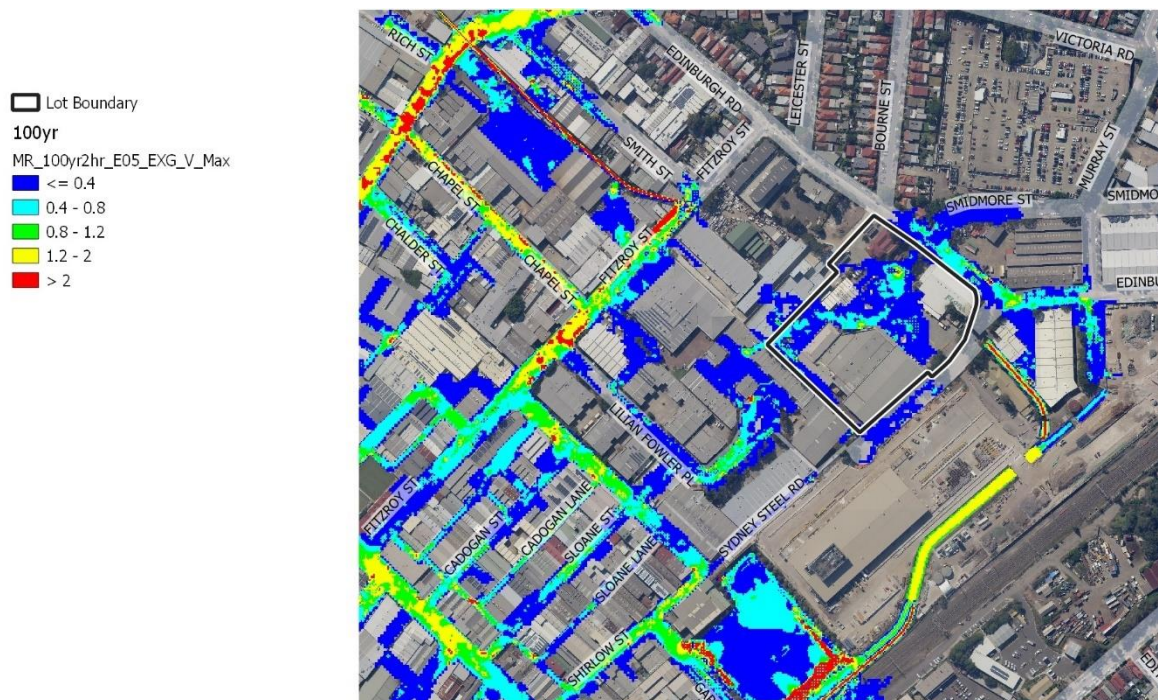


Figure 18 Pre Development 1% AEP Flood Velocity (m/s)

Lot Boundary
 100yr
 MR_100yr2hr_E05_EXG_Z1_Max
 Low hazard
 Intermediate Hazard
 High Hazard



Figure 19 Pre Development 1% AEP Flood Hazard Category

APPENDIX A.5 PRE DEVELOPMENT PMF



Figure 20 Pre Development PMF Flood Depth (m)

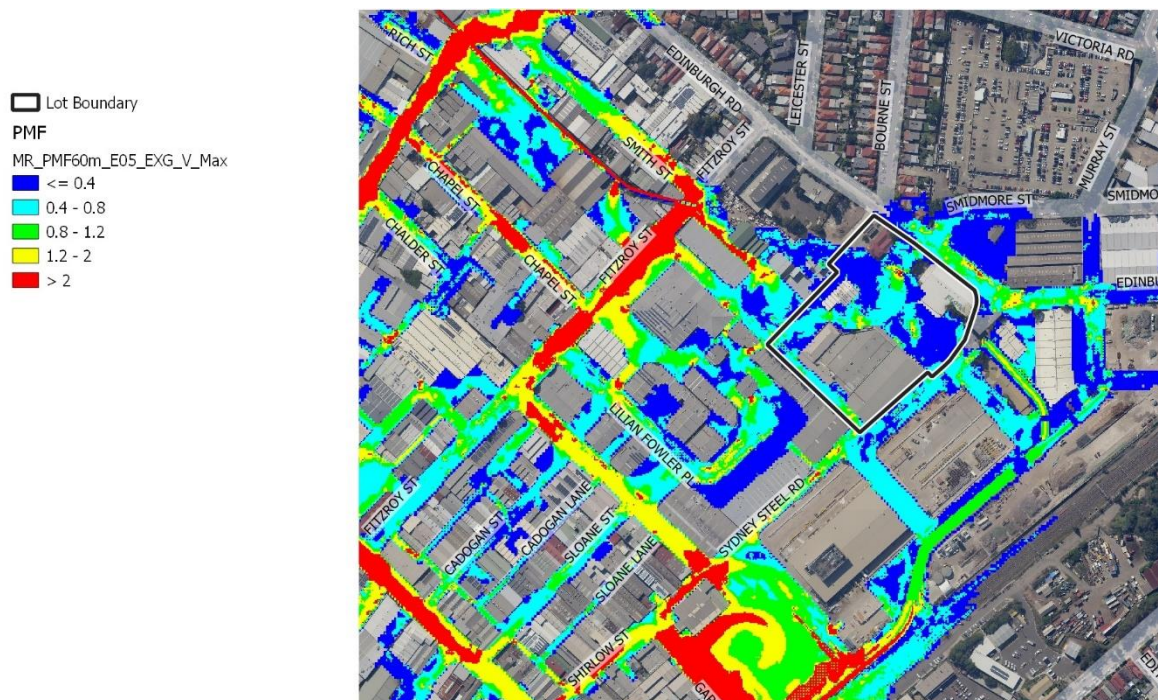


Figure 21 Pre Development PMF Flood Velocity (m/s)

- Lot Boundary
 PMF
 MR_PMF60m_E05_EXG_Z1_Max
 Low hazard
 Intermediate Hazard
 High Hazard

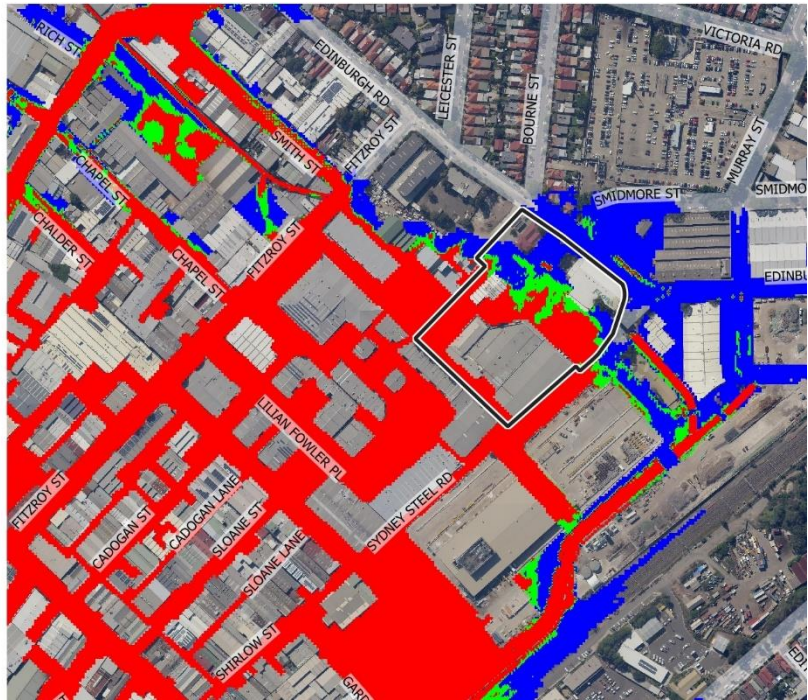


Figure 22 Pre Development PMF Flood Hazard Category

APPENDIX B.
APPENDIX B.1

POST DEVELOPMENT FLOOD MODEL RESULTS
POST DEVELOPMENT 2 YR ARI FLOOD



Figure 23 Post Development 2yr ARI Flood Depth (m)

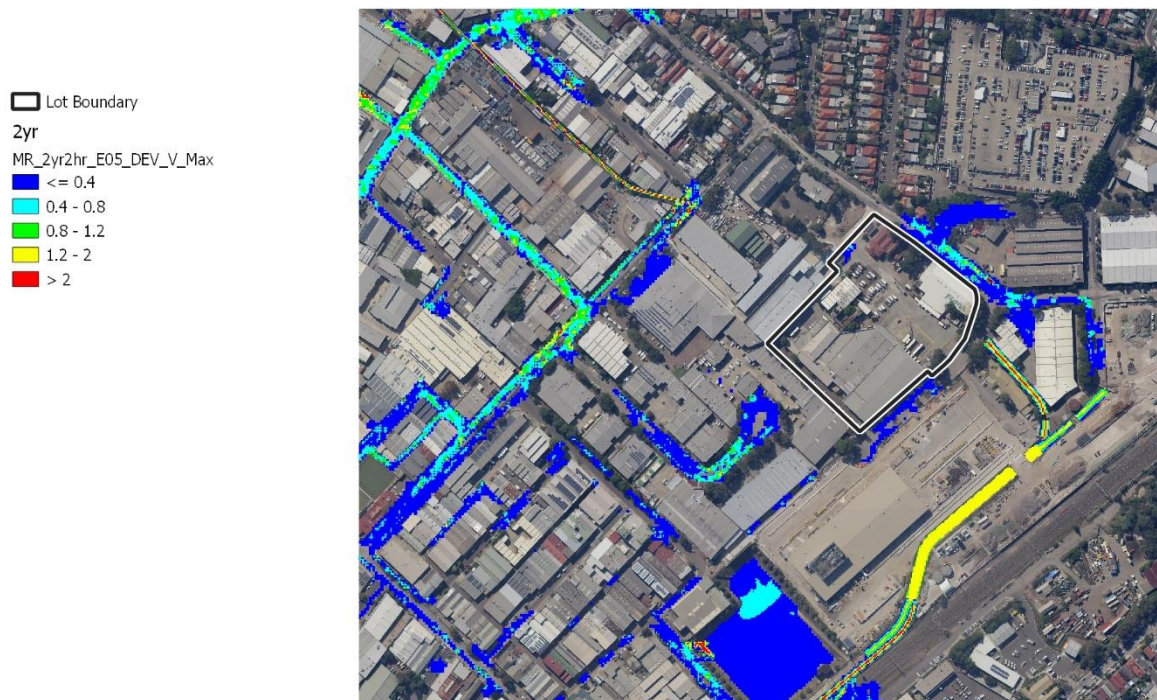


Figure 24 Post Development 2yr ARI Flood Velocity (m/s)

Lot Boundary
 2yr
 MR_2yr2hr_E05_DEV_Z1_Max
 Low hazard
 Intermediate Hazard
 High Hazard



Figure 25 Post Development 2yr ARI Flood Hazard Category

APPENDIX B.2 POST DEVELOPMENT 20% AEP FLOOD

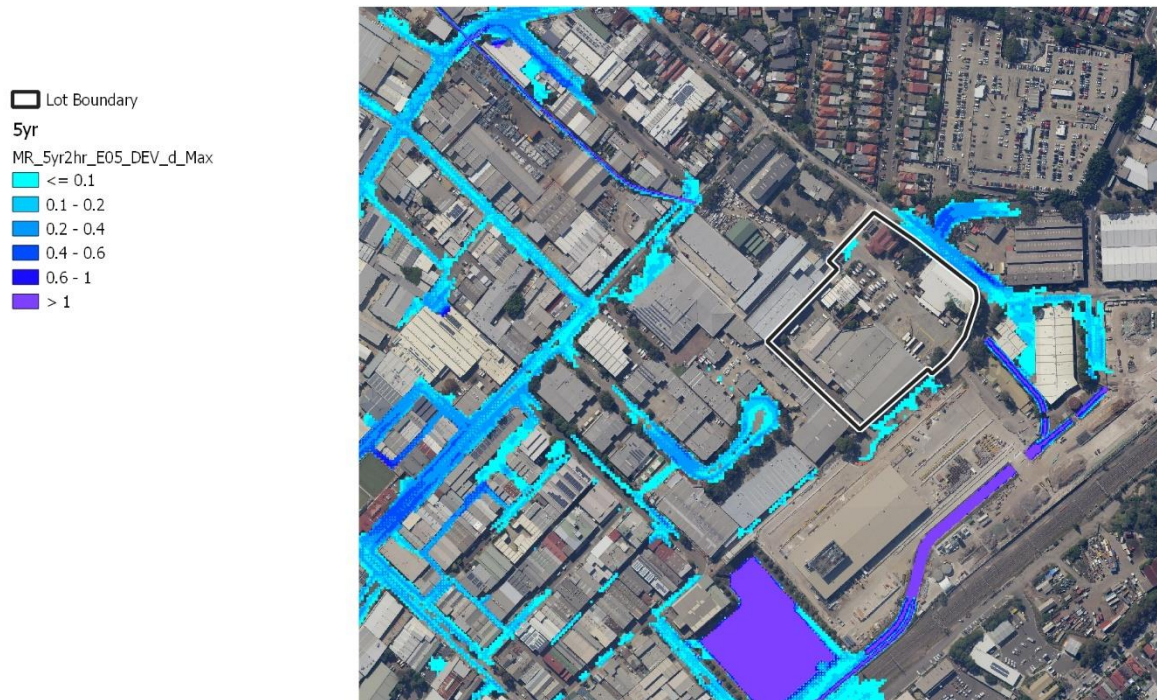


Figure 26 Post Development 20% AEP Flood Depth (m)

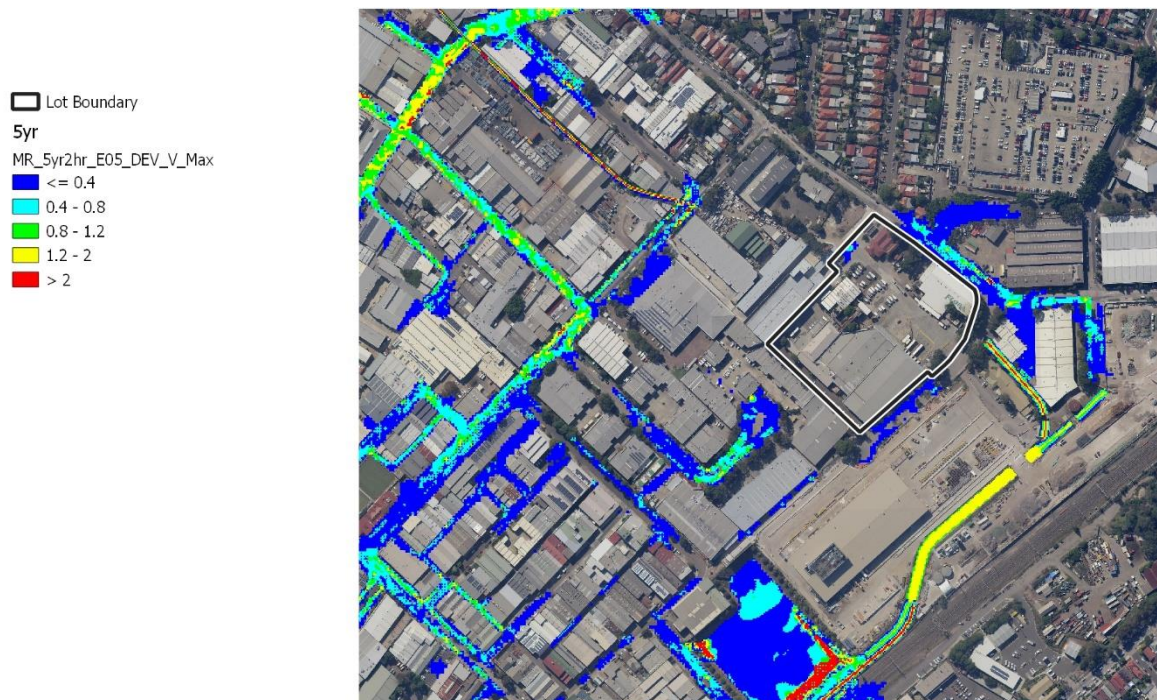


Figure 27 Post Development 20% AEP Flood Velocity (m/s)

Lot Boundary
 5yr
 MR_5yr2hr_E05_DEV_Z1_Max
 Low hazard
 Intermediate Hazard
 High Hazard

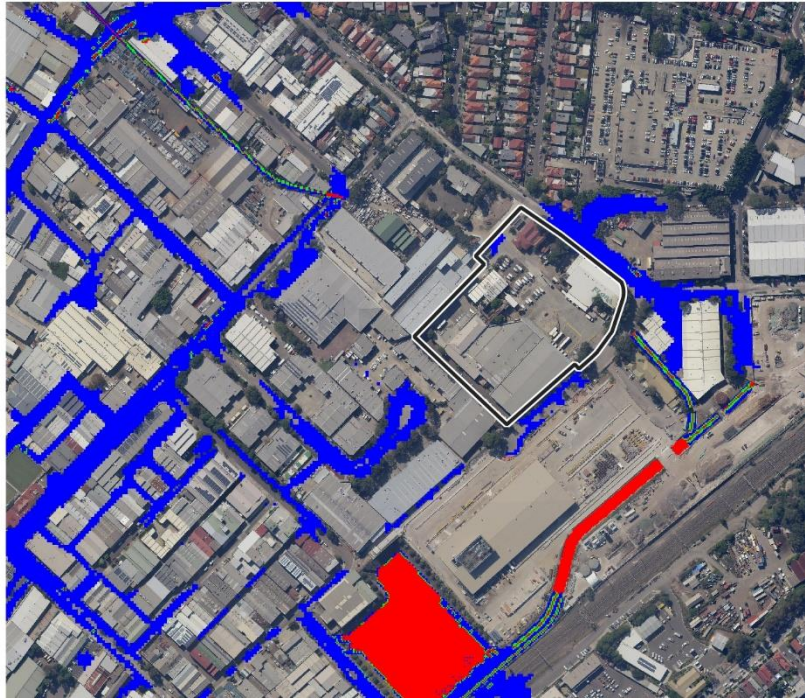


Figure 28 Post Development 20% AEP Flood Hazard Category

APPENDIX B.3 POST DEVELOPMENT 10% AEP FLOOD

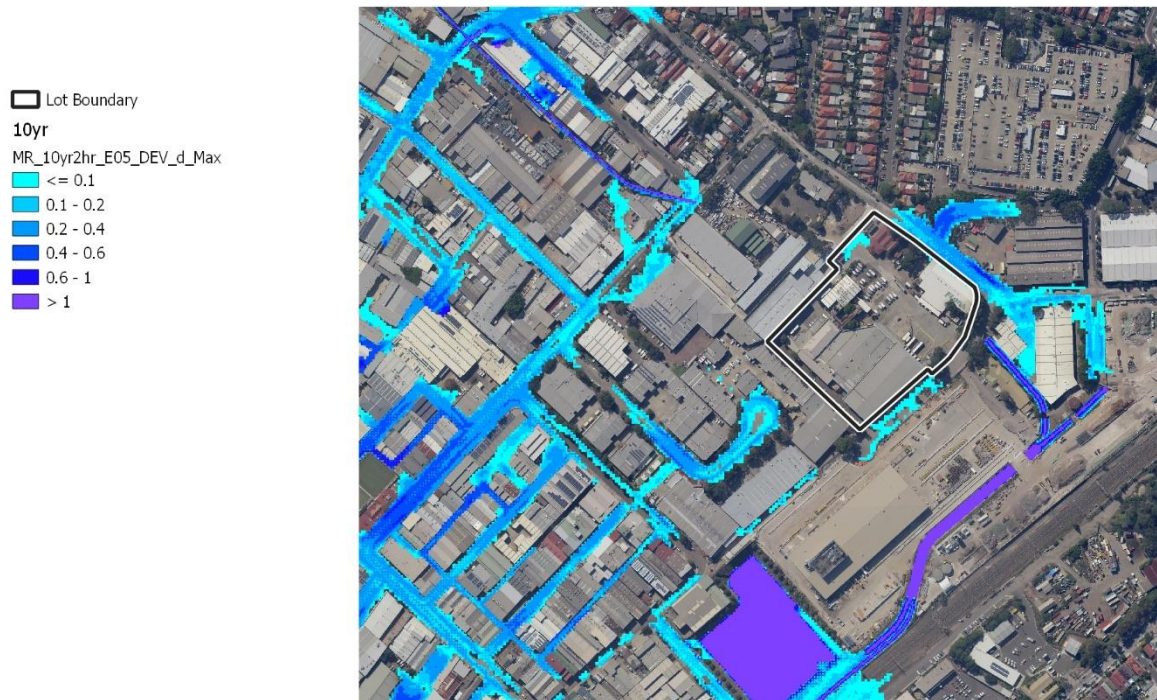


Figure 29 Post Development 10% AEP Flood Depth (m)

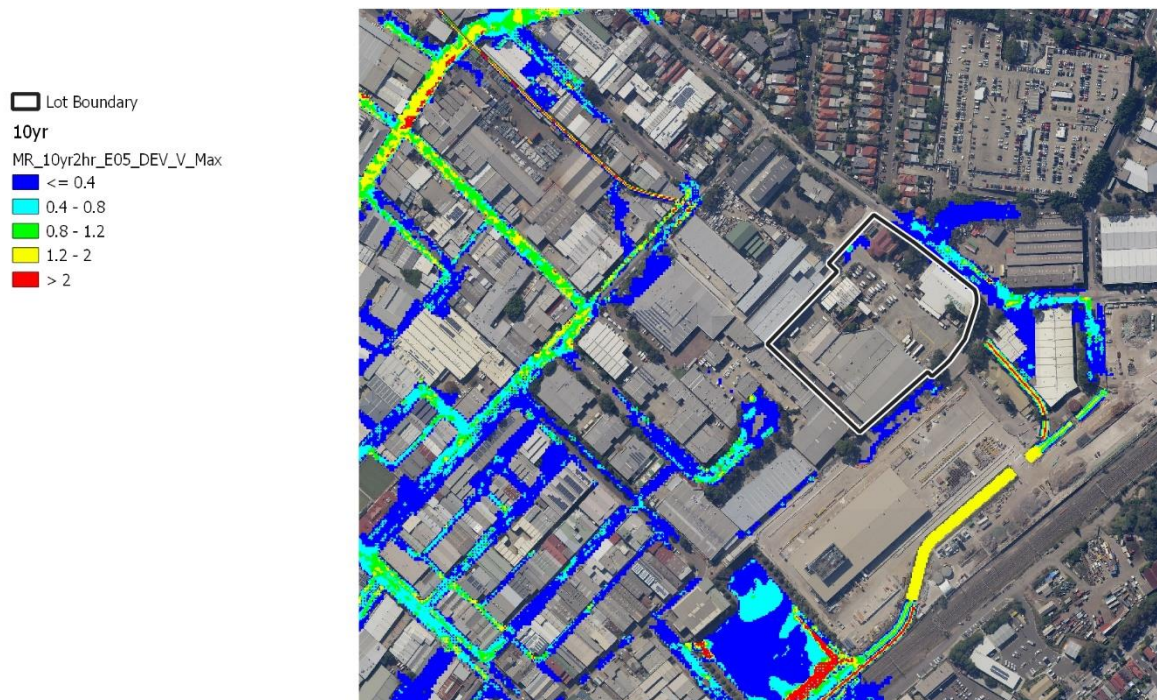


Figure 30 Post Development 10% AEP Flood Velocity (m/s)

Lot Boundary
 10yr
 MR_10yr2hr_E05_DEV_Z1_Max
 Low hazard
 Intermediate Hazard
 High Hazard

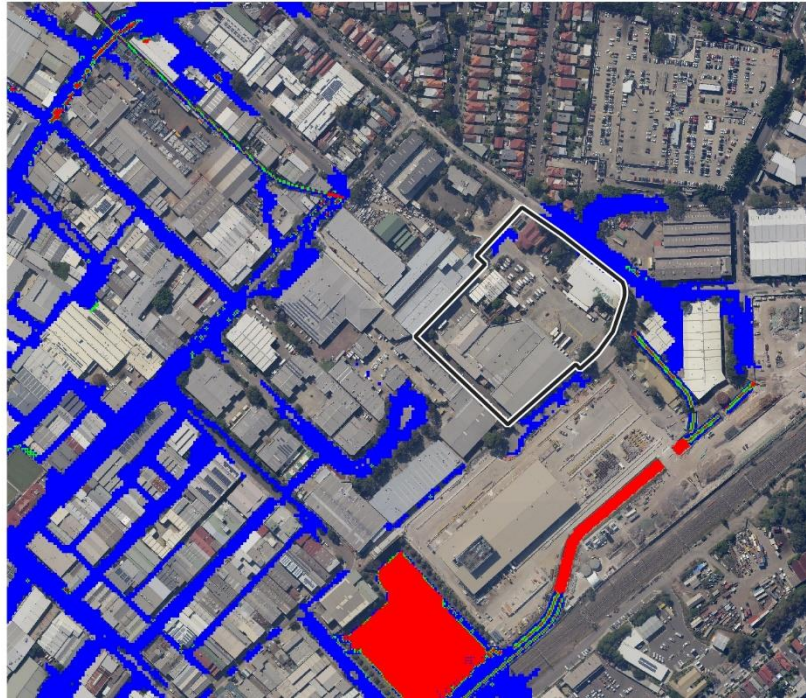


Figure 31 Post Development 10% AEP Flood Hazard Category

APPENDIX B.4 POST DEVELOPMENT 1% AEP FLOOD

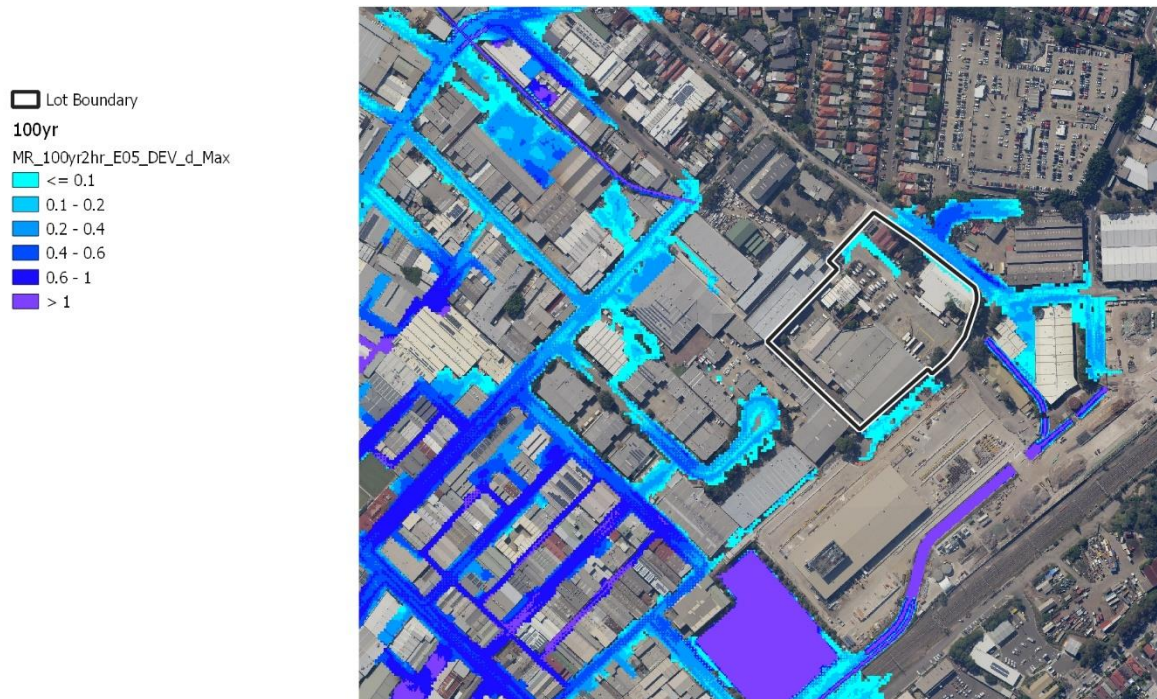


Figure 32 Post Development 1% AEP Flood Depth (m)



Figure 33 Post Development 1% AEP Flood Depth – Site outlet 100% blocked (m)

Lot Boundary
 100yr
 MR_100yr2hr_E05_DEV_V_Max
 ≤ 0.4
 0.4 - 0.8
 0.8 - 1.2
 1.2 - 2
 > 2

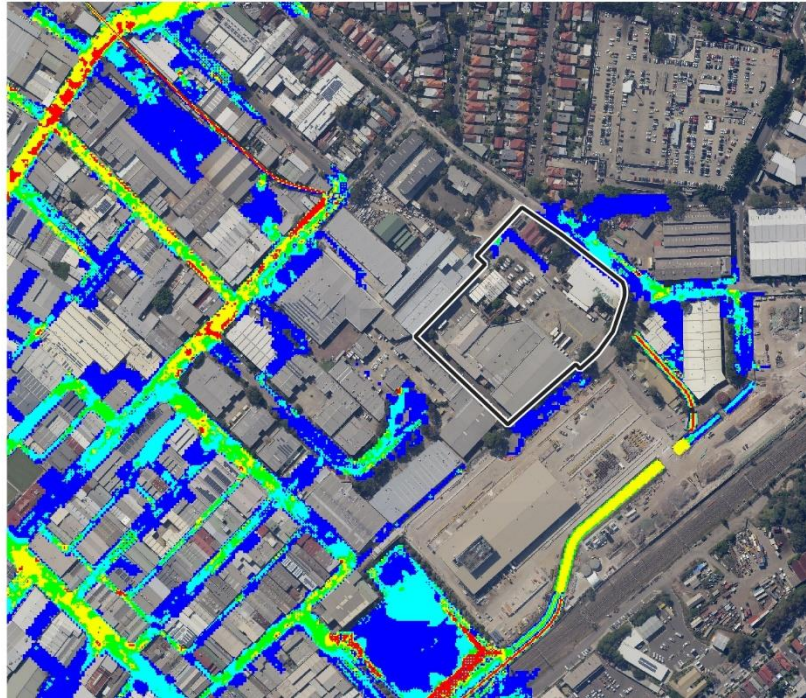


Figure 34 Post Development 1% AEP Flood Velocity (m/s)

Lot Boundary
 100yr
 MR_100yr2hr_E05_DEV_Z1_Max
 Low hazard
 Intermediate Hazard
 High Hazard



Figure 35 Post Development 1% AEP Flood Hazard Category

APPENDIX B.5 POST DEVELOPMENT PMF

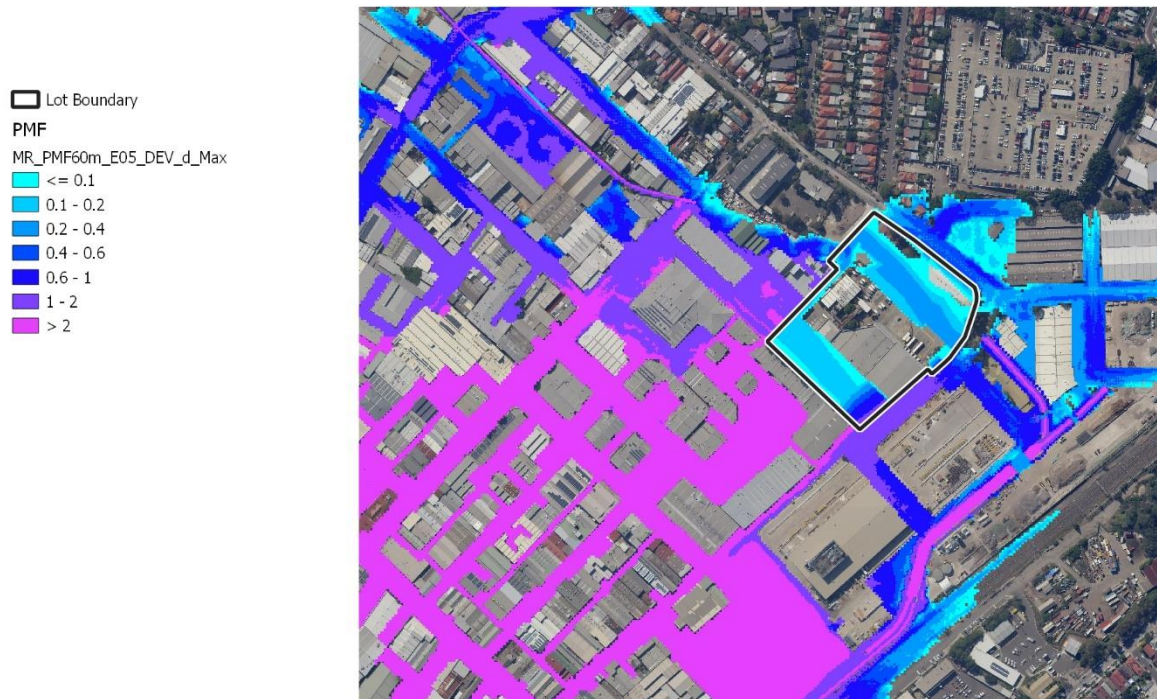


Figure 36 Post Development PMF Flood Depth (m)

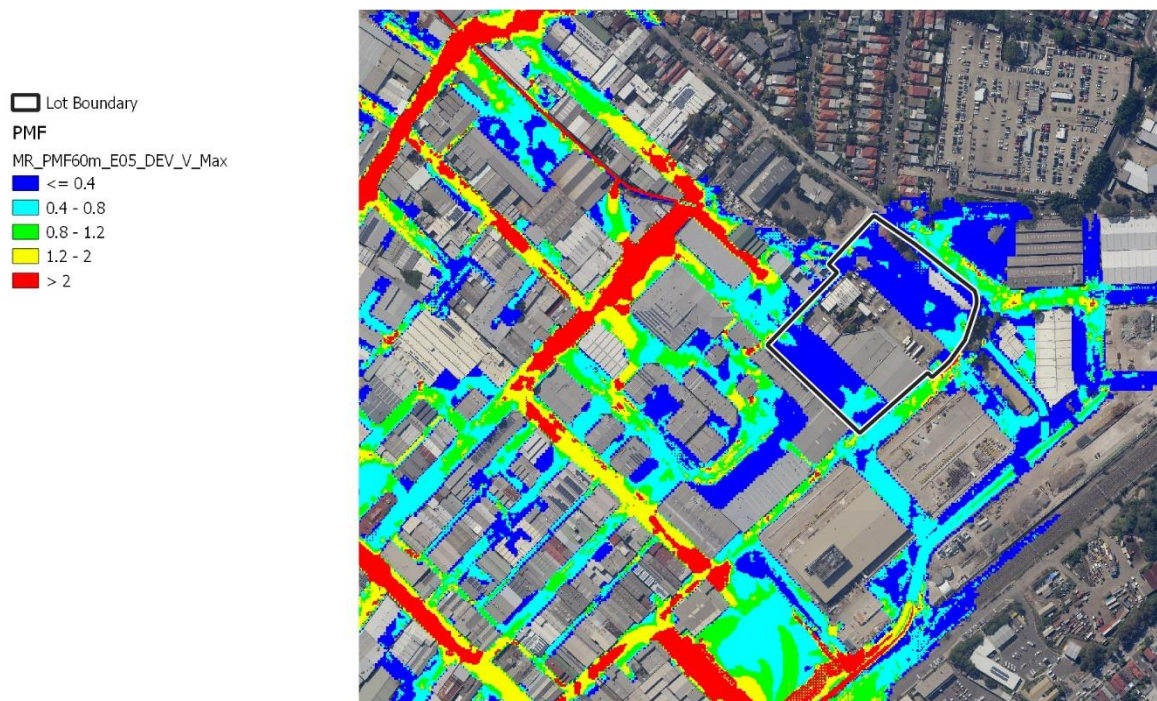


Figure 37 Post Development PMF Flood Velocity (m/s)

Lot Boundary
 PMF
 MR_PMF60m_E05_DEV_Z1_Max
 Low hazard
 Intermediate Hazard
 High Hazard

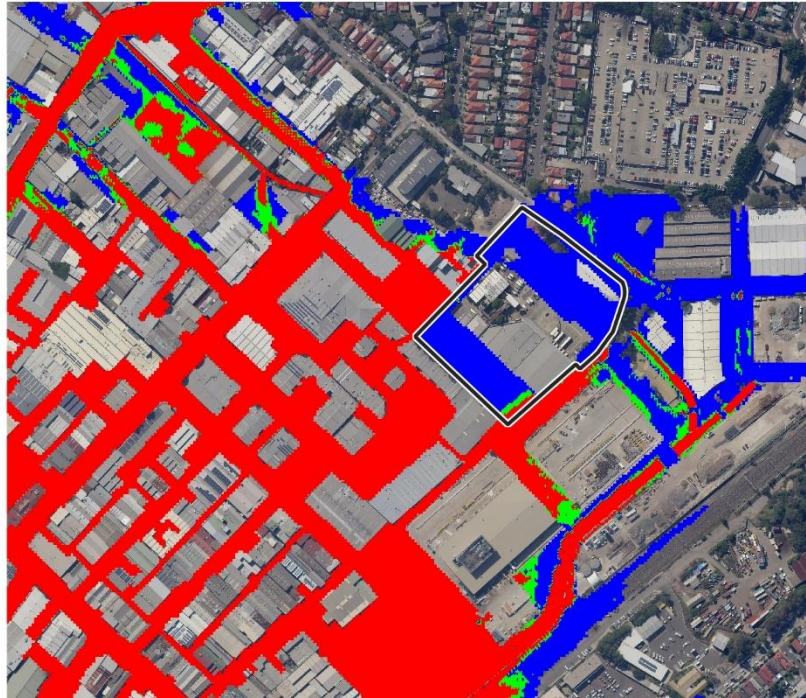


Figure 38 Post Development PMF Flood Hazard Category

APPENDIX C.
APPENDIX C.1

CHANGE IN FLOOD DEPTH
2YR ARI CHANGE IN FLOOD DEPTH

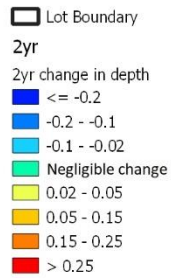


Figure 39 Post Development change in 2yr ARI flood depth (m)

APPENDIX C.2

5% AEP CHANGE IN FLOOD DEPTH

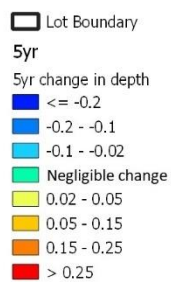


Figure 40 Post Development change in 5% AEP flood depth (m)

APPENDIX C.3 10% AEP CHANGE IN FLOOD DEPTH



Figure 41 Post Development change in 10% AEP flood depth (m)

APPENDIX C.4 1% AEP CHANGE IN FLOOD DEPTH



Figure 42 Post Development change in 1% AEP flood depth (m)

APPENDIX C.5 1% AEP CHANGE IN FLOOD DEPTH (100% BLOCKAGE)



Figure 43 Post Development change in 1% AEP flood depth – Site outlet 100% blocked (m)

APPENDIX C.6 PMF CHANGE IN FLOOD DEPTH

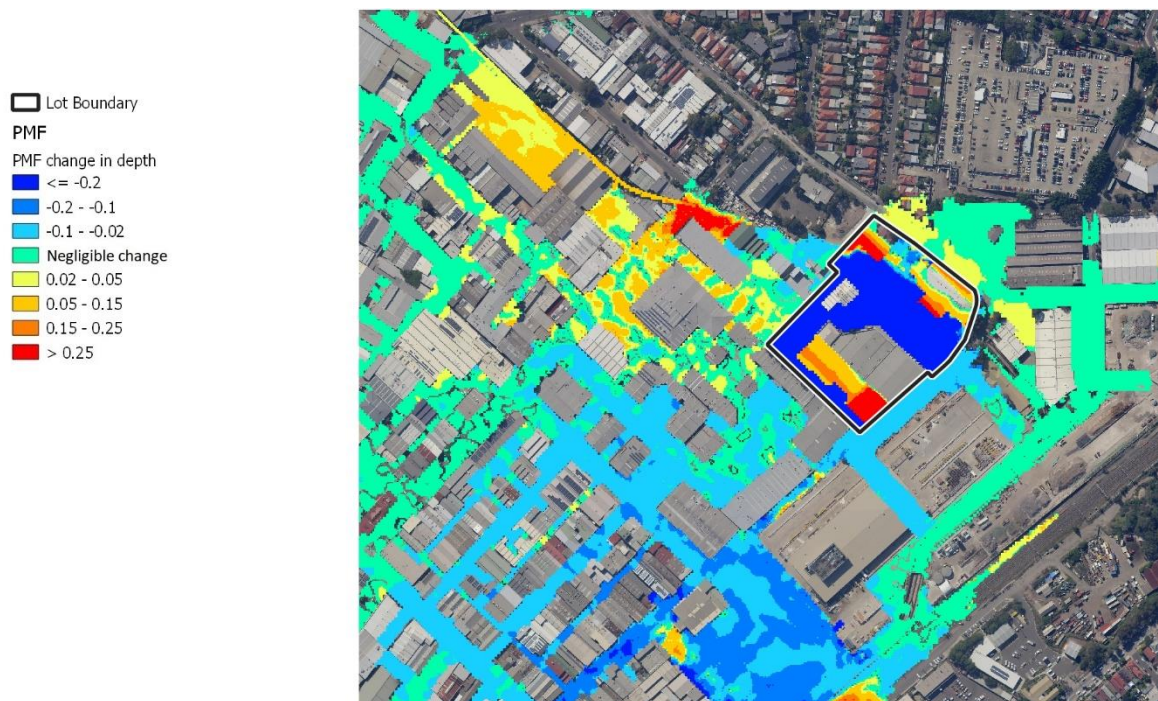


Figure 44 Post Development change in PMF flood depth (m)

APPENDIX C.7 PMF CHANGE IN FLOOD DEPTH (% OF EXISTING)

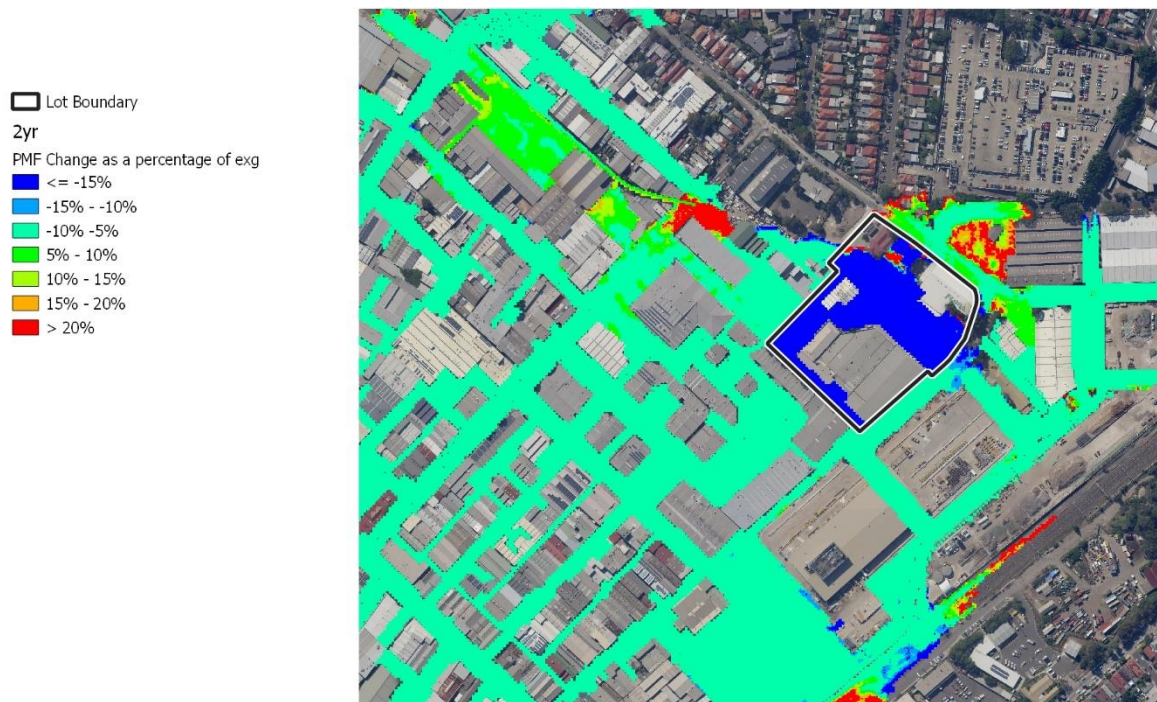


Figure 45 Post Development change in PMF flood depth as a percentage of existing (%)

APPENDIX C.8 PMF CHANGE IN HAZARD CATEGORIES



Figure 46 Post Development change in PMF hazard categories

APPENDIX D. STATE EMERGENCY SERVICE (SES) ADVICE



Our Ref: ID1273

Your Ref:

8th February 2021

Harshad Varsani
Richmond + Ross
Level 1, 38 Willoughby Road
Crows Nest NSW 2065

email: harshadv@richmondross.com.au

Dear Harshad,

Re: Flood Evacuation Procedure for 74 Edinburgh Rd, Marrickville

I refer to your correspondence dated 3rd February 2021 regarding Flood Evacuation Procedure for 74 Edinburgh Rd, Marrickville.

The NSW State Emergency Service (NSW SES) often receives requests for comment on private flood evacuation plans in instances where Council or the approving authority has, in granting development consent, imposed a condition requiring a private flood evacuation plan.

In accordance with sections 3.6, A-5, L-5, L-6.9.6 and N-7 of the NSW Floodplain Development Manual the NSW SES is opposed to the use of private flood evacuation plans as a condition of development consent. Furthermore the NSW SES does not have the statutory authority to endorse private flood evacuation plans.

Accordingly the NSW SES is unable to provide comment on your plan, however we will include the at risk community in developing the local flood plan and associated emergency management strategies for the area.

Further useful information can be found:

- [NSW SES website \(https://www.ses.nsw.gov.au/disaster-tabs-header/flood/\)](https://www.ses.nsw.gov.au/disaster-tabs-header/flood/)
- [Home Emergency Plan \(http://www.seshomeemergencyplan.com.au/\)](http://www.seshomeemergencyplan.com.au/)
- [Emergency Business Continuity Plan \(http://www.sesemergencyplan.com.au/business/\)](http://www.sesemergencyplan.com.au/business/)
- The [Office of Environment and Heritage website \(https://www.environment.nsw.gov.au/research-and-publications/publications-search/floodplain-development-manual\)](https://www.environment.nsw.gov.au/research-and-publications/publications-search/floodplain-development-manual)



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www.ses.nsw.gov.au
ABN: 88 712 649 015



Thank you for your referral and please do not hesitate to contact me should you have any further inquiries.

Yours Sincerely

A handwritten signature in black ink, appearing to read 'mK Frazer', is positioned below the 'Yours Sincerely' text.

Maria Frazer
Coordinator Planning

CC: Shelly Stingmore, Co-Ordinator Planning

www.ses.nsw.gov.au