



PROPOSED MIXED USE DEVELOPMENT 181 JAMES RUSE DRIVE, CAMELLIA FLOOD IMPACT STUDY

SEPTEMBER 2014

TABLE OF CONTENTS

1.	Introduction	3
2.	Site Description	3
3.	Proposed Development	3
4.	Flood Characteristics	4
5.	Flood Impacts	4
6.	Council's Floodplain Risk Management Policy	4
6.1	Policy Intent	4
6.2	Development Potential	5
6.3	Allowable Development	5
6.3.1	Flood Level	5
6.3.2	Building Components	6
6.3.3	Structural Soundness	6
6.3.4	Flood Affection	6
6.3.5	Car Parking and Driveway Access	6
6.3.6	Evacuation	7
6.3.7	Management and Design	7
7.	Section 117 Directions	7
7.1	Objectives	7
7.2	Planning Proposal Provisions (4)	8
7.3	Rezoning Land (5)	8
7.4	Provisions Not Allowed (6)	8
7.5	Flood Related Development Controls Above Flood Planning Level (7)	8
7.6	Flood Planning Level (8)	8
7.7	Consistency (9)	9
7.8	Summary	9
8	Conclusions	9

FIGURES

Figure 1	Locality Plan
Figure 2	Development Layout
Figure 3	Development cross section showing flood flow under building
Figure 4	100yr Flood Extent on Site
Figure 5	100yr Flood Level Impacts

Appendix A	Council's Floodplain Planning Matrix
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1. INTRODUCTION

A former industrial site fronting the Parramatta River at 181 James Ruse Drive Camellia is proposed for redevelopment for a high rise mixed use development.

A planning proposal submitted in a gateway process with the Department of Planning and Environment has been approved subject to the provision of additional information.

One aspect of additional information requested was “A flood impact assessment including external flood impacts and consideration of the Parramatta City Council Floodplain Risk Management Policy”. There is also a need to verify that the proposal conforms to the 117 Directions Section 4.3 Flood Prone Land.

This report details this flood impact assessment.

2. SITE DESCRIPTION

The site has an area of approximately 6.8ha and is bounded on the northern side by Parramatta River, on the western side by James Ruse Drive, on the eastern side by the Carlingford rail line and on the southern side by Tasman Street (see Figure 1). It also has a long handle heading south along the rail line to provide access to the Camellia rail station.

The site ground levels vary from around RL 3.6m AHD at the river foreshore and up to RL 5.8m at the southern boundary.

The subject site is part of the Camellia: 21st Century Business, Industry and Entertainment Precinct which the Department of Planning and Environment and Parramatta Council consider to be one of the most important employment precincts ...with great strategic value....and opportunities for future development.

3. PROPOSED DEVELOPMENT

The proposed high rise development consists of basement carpark, 13,180m² GFA retail floor space on a podium level at RL 6.5m AHD and approximately 2845 apartments above (see Figure 2). The minimum residential (habitable) floor level would be RL 8.0m AHD. The internal road system would be located above the basement at a level of RL 6.5m AHD. The basement would be common to all the apartment buildings and would have a vehicle entry ramp crest at or above the 100yr ARI flood level plus 0.5m freeboard.

The proposed development over the northern portion of the development has been formulated to allow the 100yr flood flows to pass under the building and ensuring that there was no loss of flood storage over the site. The lowest flood level in this area would be RL 6.5m AHD which is approximately 1.75m above the predicted 100yr floor level (refer to Figure 3). The basement extent would be setback southwards to permit unobstructed flood conveyance.

The existing ground surface would be lowered in this area to ensure no loss of flood storage. The Mott Macdonald flood impact assessment (refer Section 4) indicated that in fact approximately 2,000m³ of additional flood storage would be created on the site.

4. FLOOD CHARACTERISTICS

Flood modelling has been undertaken for the proposed development by Mott Macdonald (August 2012). This modelling adopted the Council's flood model flows in the river, Vineyard Creek and Clay Cliff Creek immediately upstream from the James Ruse Road bridge across the river.

A flood enquiry application derived the following flood levels for the site:

- 20yr RL 4.14m AHD
- 100yr RL 4.75m AHD
- PMF RL 8.99m AHD

The 100yr flood inundates part of the site up to RL 4.75m. This represents approximately 55% of the site as depicted on Figure 4. The southern portion of the site is not inundated by the 100yr flood.

Even though the whole site is not inundated in the 100yr flood, Council has identified the entire site as High Flood Risk in their Floodplain Risk Management Policy. This risk category does not apply to that part of the site not inundated in the 100yr flood which would be classified as Low Flood Risk. Also the landward component of the inundated area would be shallow/low velocity areas and categorised as flood fringe or flood storage which would have a Medium Flood Risk.

So, the site would contain all three categories of flood risk.

5. FLOOD IMPACTS

The Mott Macdonald flood assessment used the TUFLOW model to assess the impacts of the proposed development on flood levels upstream and downstream of the site.

The flood assessment concluded that there would not be significant increases in flood levels external to the site (refer to Figure 5).

The potential for cumulative impacts is negligible as well because the proposed development does not reduce the flood storage. In fact, it increases the flood storage available on the site.

6. COUNCIL'S FLOODPLAIN RISK MANAGEMENT POLICY

6.1 Policy Intent

This policy has been formulated based on the NSW Floodplain Development Manual. The Manual has two main objectives:-

- to ensure a merit based assessment; and
- to not unnecessarily sterilise land from development.

The Council has complied with the requirements of the Manual and prepared a Floodplain Risk Management Plan for Parramatta River. This Plan and the Policy rely upon a matrix involving flood risk, landuses and performance requirements.

6.2 Development Potential

The flood risks on the site consist of all three categories, namely high, medium and low. The most restrictive risk for development is high although the Policy adopts a merit based approach in this risk area. The Policy indicates that the high risk area has the potential for high flood damages, potential risk to life and evacuation problems. However, the Policy recognises that some developments can overcome these potential problems and if this is the case, then the land should not be sterilised from development.

The proposed development of reinforced concrete podiums and apartment buildings with a minimum floor level of RL 6.5m AHD (1.75m above the 100yr flood level) and capable of withstanding flood flow forces would ensure no significant flood damages. Hence, the development removes the flooding as a concern in the consideration of allowable development.

The proposed development will not pose a significant flood risk to people's lives because the:-

- podium level would be at RL 6.5m AHD which is 1.75m above the 100yr flood level;
- minimum habitable floor (residential) level at RL 8m AHD would be 3.25m above the 100yr flood level;
- vertical evacuation available to upper levels readily above the PMF flood level of RL 8.99m AHD; and;
- building would not incur any significant damage during a severe flood.

The proposed development would not impose significant evacuation difficulties because:-

- the minimum podium or concourse level for pedestrian access would be at RL 6.5m AHD (1.75m above the 100yr flood level);
- vehicular access to basements would have entry crests at the 100yr flood level plus 0.5m freeboard which conforms to Council requirements;
- evacuation will be available south along James Ruse Drive to the accommodation district near the top of the hill at Weston St (above the PMF level); and
- as a fallback, vertical evacuation will be available in the apartment towers.

Therefore, the proposed development would appropriately deal with the potential problems of flood damage, risk to peoples lives and evacuation.

6.3 Allowable Development

Due to the proposed form of the development (as described in Section 6.2), the flood related performance measures from the Floodplain Matrix in the Policy (refer Appendix A) are discussed in the following sections. In particular, the discussion is focused on how the proposed development complies with the performance measure or standard.

6.3.1 Flood Level

The performance measure requires a minimum habitable floor level of RL 5.25m AHD (100yr flood level plus 0.5m). The development readily complies with this (minimum habitable floor level is RL 8m AHD).

In accordance with the performance measure, a restriction would be placed on the title of the land, pursuant to S.88B of the Conveyancing Act confirming that the subfloor elevated above the flood level along the river frontage will not be enclosed.

6.3.2 Building Components

All structures below the level RL 5.2m AHD will have flood compatible materials/components. This will generally consist of reinforced concrete.

6.3.3 Structural Soundness

An engineers report will be provided prior to the issue of the construction certificate certifying that the structure can withstand the forces of floodwater, debris, and buoyancy up to and including a 100yr flood plus 0.5m freeboard.

6.3.4 Flood Affection

An engineers report will be provided to certify that the development will not increase flood affection elsewhere having regard to:-

- i) Loss of flood storage;
- ii) Changes in flood levels, flows and velocities;
- iii) The cumulative impact of multiple potential developments in the vicinity.

6.3.5 Car Parking and Driveway Access

The proposed development would have vehicular entry crests to the basement car parks at or above RL 5.25m AHD which is the 100yr flood plus 0.5m freeboard.

The level of the road providing access to the carparking entry would be above the 100yr flood level and hence above the minimum level which is 0.2m below the 100yr flood level.

The basement carpark would have adequate flood warning systems, signage, exits and evacuation routes.

The podium level would be 1.75m above the 100yr flood and as such, there would be no need for restraints or barriers to prevent vehicles floating away in a 100yr flood.

6.3.6 Evacuation

Evacuation is available both on site (vertical) or offsite (south along James Ruse Drive) to areas above PMF levels.

The development is consistent with the flood evacuation strategy for the local area.

There would be adequate flood warning for the evacuation procedure. This procedure would be based on either relocation south along James Ruse Drive and if this is not available, then vertical evacuation in the buildings. The PMF flood would only influence the first level of apartments requiring only a small number of people to be evacuated.

6.3.7 Management and Design

The proposed development would not be inundated in useable areas in the 100yr flood. As such, a Site Emergency Response Flood Plan is not required.

No materials are to be stored below the 100yr flood level. Areas below this level are the basement carparks which are protected from the 100yr flood. As such, material storage in the basement carparks would be allowable.

7. SECTION 117 DIRECTIONS

Under Section 117(2) of the Environmental Planning and Assessment Act 1979, directions are issued to planning authorities. Section 4.3 of these directions relates to Flood Prone Land. The discussion below demonstrates how the Parramatta City Council and the proposed planning proposal for the subject site conforms to the Flood Prone Land Section 117 Directions.

7.1 Objectives

The objectives of this Direction are:-

- a) to ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005; and
- b) to ensure that the provision of an LEP on flood prone land is commensurate with flood hazard and includes consideration of the potential flood impacts both on and off the subject land.

Parramatta City Council has undertaken definition of flood behaviour, hazard and an appropriate planning response which conforms to the NSW government Flood Prone Land Policy and the Floodplain Development Manual 2005. Similarly, the Parramatta LEP, DCP and Flood Policy includes appropriate provisions to deal with flood hazard and potential impacts.

7.2 Planning Proposal Provisions (4)

The planning proposal has been formulated to be consistent with the Parramatta City Council flood prone land requirements which have been formulated to be consistent with the NSW Government Flood Prone Land Policy and the Floodplain Development Manual (2005).

7.3 Rezoning Land (5)

The proposed rezoning of the subject property is from B5 – Business Development to a Mixed Use zoning. This rezoning is allowed under the Direction.

7.4 Provisions Not Allowed (6)

- a) no development is permitted in a floodway.
The planning proposal does not propose development in a floodway. The definition of a floodway is that there would be significant obstruction and changes to flood flows and levels if a structure was placed in it. This is not the case as the proposed development will not have any significant adverse impact on flood behaviour.
- b) no significant flood impacts on other properties
The flood impact assessment demonstrates that the proposal would not have significant adverse impact on flooding of other properties.
- c) not permit significant increase in the development of that land
The proposal permits development on the land that would conform to the LEP/DCP requirements and in particular, conforms to the flood planning requirements.
- d) not substantially increase the requirement for government spending on flood mitigation measures, infrastructure or services
The proposal incorporates a structure which would withstand flood forces without any significant damage. Also, the proposal would incorporate an independent flood emergency response plan which would not rely on any government resources. The proposal therefore would not put any significant reliance on increased government spending on flood related resources.
- e) not permit development without consent
This proposal does not permit development without consent other than as exempted in these Directions.

7.5 Flood Related Development Controls Above Flood Planning Level (7)

The proposal would not need to impose flood related development controls above the flood planning level (100yr flood level plus 0.5m freeboard).

7.6 Flood Planning Level (8)

Parramatta City Council has determined a flood planning level which conforms with the Floodplain Development Manual (2005). This level is the 100yr flood level plus 0.5m freeboard.

7.7 Consistency (9)

The planning proposal can be inconsistent with this Direction if it is consistent with the Parramatta City Council floodplain risk management plan which has been prepared in accordance with the principles and guidelines of the Floodplain Development Manual 2005.

7.8 Summary

The planning proposal complies with the 117 Directions Section 4.3 Flood Prone Land.

8. CONCLUSIONS

The proposed development would not cause significant adverse impacts on 100yr flood levels and would be able to comply with the Council's Local Floodplain Risk Management Policy. The proposal conforms to the Section 117 Directions Section 4.3 Flood Prone Land requirements.

FIGURES

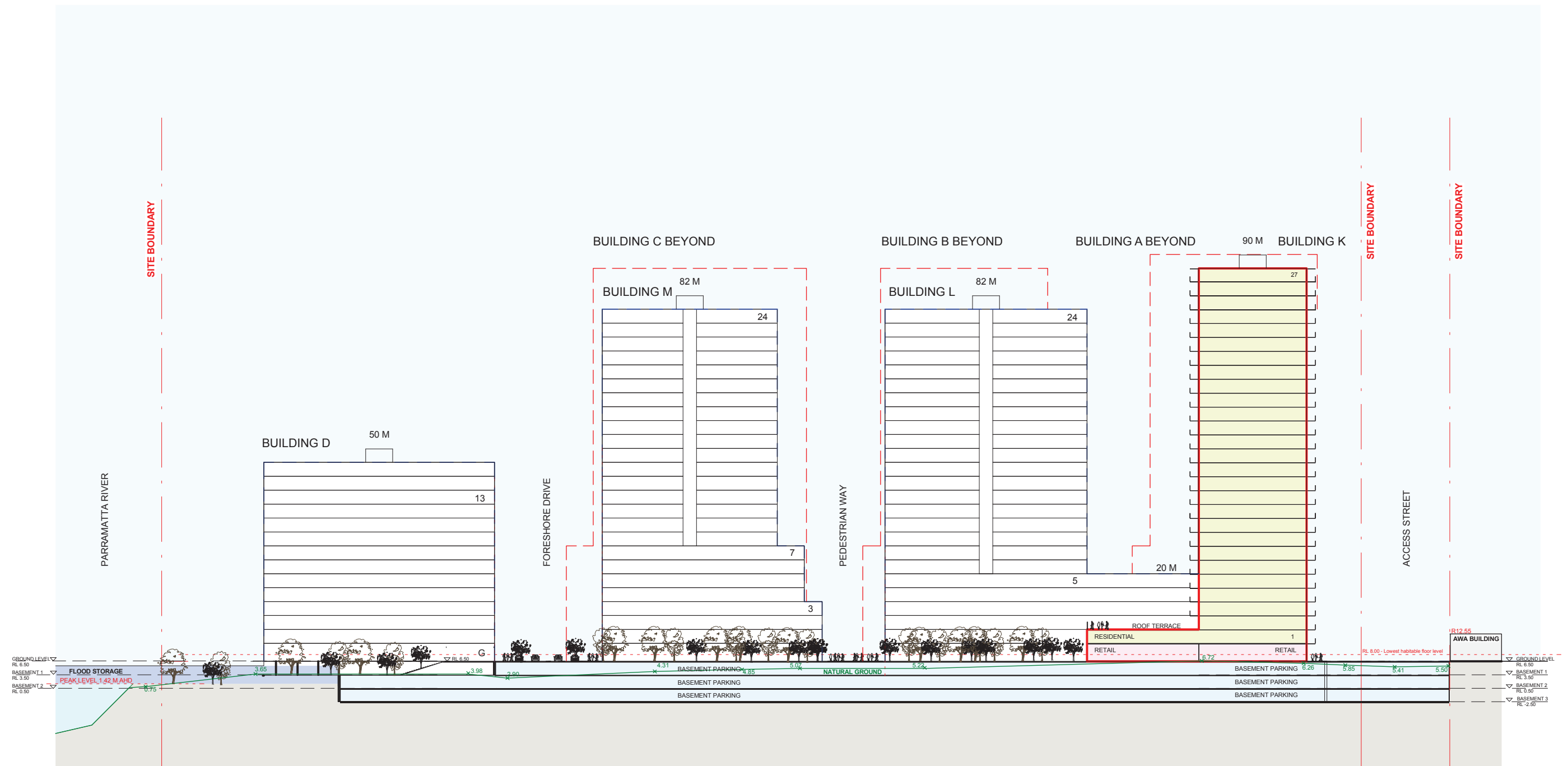
FIGURE 1



FIGURE 2



FIGURE 3



TYPICAL SECTION THROUGH THE DEVELOPMENT - NORTH TO SOUTH

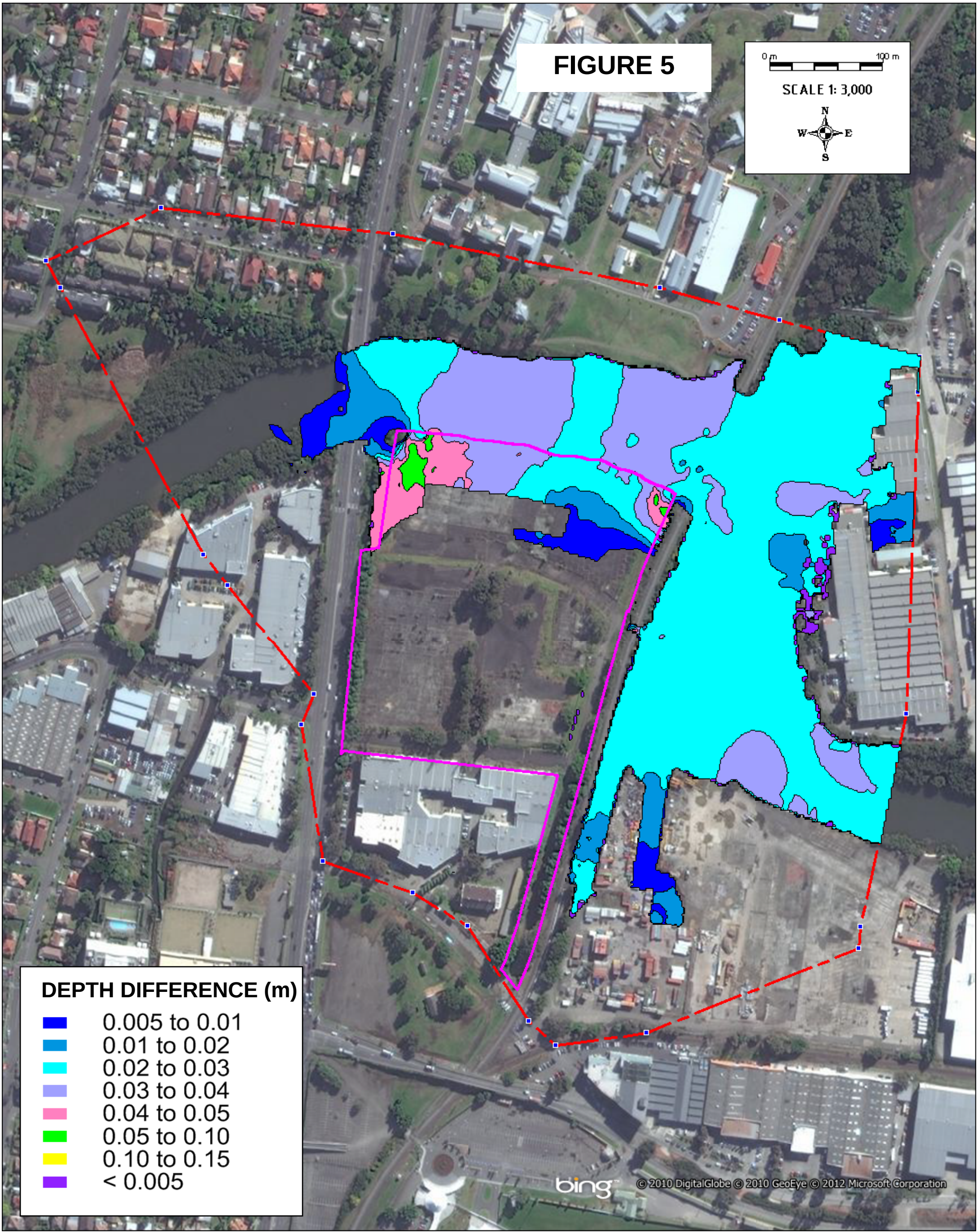


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308388-CIV-FL-SK-001
CAMELLIA WEST FLOOD MODELLING
PRE-DEVELOPMENT
100 YEAR ARI FLOOD EXTENTS





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308388-CIV-FL-SK-006
CAMELLIA WEST FLOOD MODELLING
POST-DEVELOPMENT
100 YEAR ARI DEPTH DIFFERENCE



APPENDIX A

Council's Floodplain Planning Matrix

LOCAL FLOODPLAIN RISK MANAGEMENT POLICY

FLOODPLAIN MATRIX

Planning & Development Controls

Planning Consideration	Flood Risk Precincts (FRP's)																											
	Low Flood Risk								Medium Flood Risk								High Flood Risk											
	Sensitive Uses & Facilities	Critical Uses & Facilities	Subdivision	Filling	Residential *	Commercial & Industrial	Tourist Related Development	Open Space & Non-Urban	Concessional Development	Sensitive Uses & Facilities	Critical Uses & Facilities	Subdivision	Filling	Residential *	Commercial & Industrial	Tourist Related Development	Open Space & Non-Urban	Concessional Development	Sensitive Uses & Facilities	Critical Uses & Facilities	Subdivision	Filling	Residential *	Commercial & Industrial	Tourist Related Development	Open Space & Non-Urban	Concessional Development	
Floor Level		3			2, 5	2, 5	2, 5							2, 5	2, 5	2, 5	1, 5	4, 5									1, 5	4, 5
Building Components		2												1	1	1	1	1									1	1
Structural Soundness		2												1	1	1	1	1									1	1
Flood Affectation		2	2	1	2	2	2					1		1	1	1	2	1									1	1
Car Parking & Driveway Access		1, 3, 5, 6			1, 3, 5, 6	1, 3, 5, 6	1, 3, 5, 6	2, 4, 6, 7						1, 3, 5, 6, 7	1, 3, 5, 6, 7	1, 3, 5, 6, 7	2, 4, 6, 7	1, 5									2, 4, 6, 7	1, 5
Evacuation		2, 4, 6	5		3, 4	4	4					5, 3, 4		3, 4, 6	3, 4, 6	3, 4, 6	1, 4	3, 6									1, 4	3, 4, 6
Management & Design		2, 3, 4	1									1		2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4									2, 3, 4	2, 3, 4

Not Relevant

Unsuitable Land Use

* For redevelopment of an existing dwelling refer also to 'Concessional Development' provisions

Floor Level

- All floor levels to be equal to or greater than the 20 year ARI flood level plus freeboard.
- Habitable floor levels to be equal to or greater than the 100 year ARI flood level plus freeboard.
- All floor levels to be equal to or greater than the PMF level plus freeboard.
- Floor levels to be equal to or greater than the 100 year ARI flood level plus freeboard. Where this is not practical due to compatibility with the height of adjacent buildings, or compatibility with the floor level of existing buildings, or the need for access for persons with disabilities, a lower floor level may be considered. In these circumstances, the floor level is to be as high as practical, and, when undertaking alterations or additions, no lower than the existing floor level.
- A restriction is to be placed on the title of the land, pursuant to S.88B of the Conveyancing Act, where the lowest habitable floor area is elevated more than 1.5m above finished ground level, confirming that the subfloor space is not to be enclosed.

Building Components & Method

- All structures to have flood compatible building components below the 100 year ARI flood level plus freeboard.
- All structures to have flood compatible building components below the PMF.

Structural Soundness

- Engineers report to certify that the structure can withstand the forces of floodwater, debris and buoyancy up to and including a 100 year ARI flood plus freeboard.
- Engineers report to certify that the structure can withstand the forces of floodwater, debris and buoyancy up to and including a PMF level.

Flood Affectation

- Engineers report required to certify that the development will not increase flood affectation elsewhere, having regard to: (i) loss of flood storage; (ii) changes in flood levels, flows and velocities caused by alterations to flood flows; and (iii) the cumulative impact of multiple potential developments in the vicinity.
- The impact of the development on flooding elsewhere to be considered having regard to the three factors listed in consideration 1 above.

Car Parking and Driveway Access

- The minimum surface level of open spaces or carports shall be as high as practical, but no lower than 0.1m below the 100 year ARI flood level. In the case of garages, the minimum surface level shall be as high as practical, but no lower than the 100 year ARI flood level.
- The minimum surface level of open parking spaces or carports shall be as high as practical, but no lower than 0.3m above the 20 year ARI flood level.
- Garages capable of accommodating more than 3 motor vehicles on land zones for urban purposes, or enclosed car parking, must be protected from inundation by floods equal to or greater than the 100 year ARI flood. Ramp levels to be no lower than 0.5m above the 100 year ARI flood level.
- The driveway providing access between the road and parking spaces shall be as high as practical and generally rising in the egress direction.
- The level of the driveway providing access between the road and parking spaces shall be no lower than 0.2m below the 100 year ARI flood level.
- Enclosed car parking and car parking areas accommodating more than 3 vehicles, with a floor below the 100 year ARI flood level, shall have adequate warning systems, signage, exits and evacuation routes.
- Restraints or vehicle barriers to be provided to prevent floating vehicles leaving a site during a 100 year ARI flood.

Evacuation

- Reliable access for pedestrians required during a 20 year ARI peak flood.
- Reliable access for pedestrians and vehicles required to a publicly accessible location during the PMF peak flood.
- Reliable access for pedestrians and vehicles is required from the site to an area of refuge above the PMF level, either on site (eg. second storey) or off site.
- Applicant to demonstrate the development is consistent with any relevant flood evacuation strategy or similar plan.
- Applicant to demonstrate that evacuation in accordance with the requirements of this DCP is available for the potential development resulting from the subdivision.
- Adequate flood warning is available to allow safe and orderly evacuation without increased reliance upon SES or other authorised emergency services personnel.

Management and Design

- Applicant to demonstrate that potential development as a consequence of a subdivision proposal can be undertaken in accordance with this the relevant FRMS and FRMP
- Site Emergency Response Flood plan required where the site is affected by the 100 year ARI flood level, (except for single dwelling-houses).
- Applicant to demonstrate that area is available to store goods above the 100 year flood level plus freeboard.
- No storage of materials below the 100 year ARI flood level.

Notes

- Freeboard equals an additional height of 500mm.
- The relevant environmental planning instruments (generally the Local Environmental Plan) identify development permissible with consent in various zones in the LGA. Notwithstanding, constraints specific to individual sites may preclude Council granting consent for certain forms of development on all or part of a site. The above matrix identifies where flood risks are likely to determine where certain development types will be considered "unsuitable" due to flood related risks.
- Filling of the site, where acceptable to Council, may change the FRP considered to determine the controls applied in the circumstances of individual applications.
- Any fencing that forms part of a proposed development is subject to the relevant Flood Effects and Structural Soundness planning considerations of the applicable land use category.
- Development within the floodplain may be subject to the Foreshore Building Line objectives of the LEP and REP
- Terms in italics are defined in the glossary of this policy. Development types are specified in each land use category. These development types are generally as defined within Environmental Planning Instruments applying to the local government area.