ABN 77 091 243 355 ACN 091 243 355 Address Level 5 79 Victoria Avenue Chatswood New South Wales 2067 *Telephone* +61 2 9417 8400

Facsimile +61 2 9417 8337

Email email@hhconsult.com.au

Web www.henryandhymas.com.au



27 March 2017

Our Ref: 16528-C3/af

Woolworths PO Box 8000 Baulkham Hills NSW 2153

Attention: Tony Pratt

Dear Tony,

RE: FLOOD ASSESSMENT REPORT 130-138 AND 140-142 PARRAWEENA ROAD, TAREN POINT, NSW

I refer to the Planning Proposal being prepared for a proposed retail development at the aforementioned property which is at the corner of Parraweena Road and Kareena Road, Taren Point. This Flood Assessment Report has been prepared to support the Planning Proposal in so far as it can be demonstrated that the development is able to satisfy the requirements of the Sutherland Shire Council Local Environmental Plan (LEP) 2015 Part 6, Clause 6.3 Flood Planning. This report also demonstrates how the development will comply with the Sutherland Shire Council Development Control Plan (DCP) 2015 in regards to floor levels and flood evacuation.

The following documents and resources were reviewed and are referenced as part of the flood assessment:

- Sutherland Shire Council DCP 2015 Chapter 39 Part c Flood Risk Management.
- Flood Information report by Sutherland Shire Council for 130-142 Parraweena Road dated 10 November 2016.
- Sutherland Shire Council LEP 2015 Part 6, Clause 6.3 Flood Planning.
- Flood maps from the Gwawley Bay Floodplain Management Study provided by Council in their Flood Information report.

Introduction

The site is within the upper reaches of the Gwawley Bay catchment (see Figure 1 below from Sutherland Shire Council Internet Mapping Site. Note that this information is used for reference to the site location but was not used for the extent of flooding). The high point of the site is in the north west corner at the intersection of Parraweena Road and Kareena Road. Parraweena Road falls in an easterly direction and Kareena Road falls in a southerly direction.

Based on flooding information available in Council's Flood Information report, it is understood that a large proportion of the eastern and southern parts of the site is within the area identified as flood prone land. In accordance with Chapter 39. Part c, Section 2 of Council's DCP 2015, flood prone land (floodplain) is defined as land





which is subject to inundation by the Probable Maximum Flood (PMF). A large proportion of the site (approximately 75%) is within the area identified as flood prone.

Compliance with the LEP

The following assessment seeks to demonstrate that the development proposed under the Planning Proposal is compatible with the requirements of Council's LEP 2015 Part 6, Clause 6.3 Flood Planning. Part 6, Clause 6.3 has been reproduced here in italics with our responses to the items following.

6.3 Flood planning

(1) The objectives of this clause are as follows:

(a) to minimise the flood risk to life and property associated with the use of land, - In order to ensure that the risk to life and property is minimised, the habitable portion of the site should be set at a level at or above the Flood Planning Level. Land below the 100 year ARI Flood level is deemed to be either medium or high flood risk, depending on the degree of hazard. According to the DCP (Chapter 39, Part c, Section 5.5), on land deemed a high flood risk, there is danger to personal safety, difficulty in evacuation by trucks and able bodied adults would have difficulty wading to safety. The depth of flood waters is a reliable indicator (although velocity is also an indicator) in determining the hazard posed by the floodwater. Given that the site is affected by the very upper reaches of the floodplain, and is not in a floodway, it is unlikely that the flood velocities would be high. Therefore the flood depth is the critical indicator. In low velocity floodwater, (According to Figure L1 - Velocity & Depth Relationships of the Floodplain Development Manual, 2005), regardless of velocity, flood depths of up to 0.3m are deemed safe for wading. Given that only a very small portion of the site along the southern and eastern boundaries have flood depths greater than 0.3m, the majority of the site would be deemed to be not within a high hazard area. The development will be designed to ensure that the any habitable areas of the site are located outside a high hazard flood area. This may be by means of slightly altering the landform to reduce the flood depths, making certain parts of the sites inaccessible or suspending the building and/or carpark above the high hazard potion of the site.

(b) to allow development on land that is compatible with the land's flood hazard, taking into account projected changes as a result of climate change, - Given that only a small portion of the site is within a high flood risk category, the majority of the site will be within the low and medium flood risk categories. On that basis, the development will comply with the controls specified in the DCP (refer below for details). On the basis of compliance with these controls, the land is compatible with the flood hazard of the land.

(c) to avoid significant adverse impacts on flood behaviour and the environment. – The development will be designed to ensure there is no loss of floodplain storage. This may be achieved by provision of compensatory flood storage, lowering certain parts of the site or providing suspended slabs above the flood. The development will also be designed such that there is no channelisation of flows. Details will be provided at Development Application Stage. Terrain modelling will be undertaken at Development Application stage to ensure that the proposed landform does not reduced floodplain storage compared to the existing topography.

(2) This clause applies to:

(a) land identified as "Flood planning area" on the Flood Planning Map, and - Since the site is within an area identified as flood prone land, the site would be considered to be a flood control lot.



(b) other land at or below the flood planning level. - Refer 2 (a) above

(3) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development:

(a) is compatible with the flood hazard of the land, and - Refer 1 (b) above.

(b) will not significantly adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties, and - Refer 1 (c) above.

(c) incorporates appropriate measures to manage risk to life from flood, and - Refer 1 (a) above.

(d) will not significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses, and - Given the site is located within an already urbanised catchment, in which there are no river banks or watercourses or riparian vegetation, the development will not adversely affect the environment in relation to erosion, siltation or destruction of watercourses.

(e) is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding. - Given that the floor level of the development will be set at or above the Flood Planning Level which will ensure that the risk to life is minimised, there will be no adverse social impact as result of the development. In addition, the development will be constructed with flood compatible materials and set at or above the Flood Planning Level, which means there will be no adverse economic impact as result of the development in terms of building or stock damage or loss of trade.

(4) A word or expression used in this clause has the same meaning as it has in the Floodplain Development Manual (ISBN 0 7347 5476 0) published by the NSW Government in April 2005, unless it is otherwise defined in this clause. - Noted and understood.

(5) In this clause:

flood planning level means the level of a 1:100 ARI (average recurrent interval) flood event plus 0.5 metre freeboard. - Noted and understood.

Compliance with the DCP

The Flood Planning Risk is a category identified in Council's DCP 2015 Chapter 39 Part c Flood Risk Management that will be applied to determine the suitability of a type of development on a parcel of land. For land that is affected by flooding, evacuation during a flooding event may be required. The availability of flood free evacuation routes to land that is above the PMF is one of the criteria used in determining the Flood Planning Risk.

On the basis that the majority of the site is located within land deemed to be low or medium flood risk, these will be the DCP controls which will apply to the development. Compliance with these controls will determine the suitability of the development.

Sections 5.3 (Low Flood Risk) and 5.4 (Medium Flood Risk) of Chapter 39 Part c are referenced below. For commercial and industrial developments, the DCP controls for these two risk categories are identical with the exception of the requirement for floor levels, in which an allowance for conveyance of water under the building is required in medium flood risk land. The various controls are listed below (identified in Section 5.6) with a corresponding response In regards to how these controls will be satisfied.



- Floor Level The floor level of the development will be set at the Flood Planning Level. Given the site topography and street frontage levels, there should be no impediment to satisfying this control.
- Building Components & Method Structures within the development will be constructed with flood compatible building material below the 1% AEP flood level plus 500mm freeboard. It is likely that this will be achieved by the use of concrete or masonry type materials.
- Structural Soundness To satisfy this control, an Engineer's report will be provided to certify that the structure can withstand the forces of floodwater, debris and buoyancy up to and including a 1% AEP flood level plus 500mm freeboard.
- Flood Effects To satisfy this control, an Engineer's report will be provided to certify that the development will not increase flood effects elsewhere having regards to:
 - Loss of flood storage achieved by ensuring ground levels are not increased and if they are, that adequate compensatory flood storage is provided.
 - Changes in flood levels, flows and velocities caused by alterations in the flood conveyance - flood modelling can be provided if required at Development Application stage to ensure that flood levels, flows and velocities are not affected.
 - The cumulative impact of multiple potential developments in the floodplain by satisfying the tow controls above, this control will be met.
- Car Parking and Driveway Access This control will be satisfied by providing the appropriate floor level and freeboard for the type of parking that is ultimately provided for the development.
- Evacuation This control will be satisfied as follows:
 - Reliable access for pedestrians or vehicles shall be provided during a 1% AEP flood
 given that the site is located at the intersection of Parraweena Road and Kareena Road, which are not flood affected, means that reliable access would be able to be provided.
 - Reliable access for pedestrians or vehicles shall be provided from the building commencing at a minimum level equal to the lowest habitable floor level to an area of refuge above the PMF level. - On the basis that the road surrounding the site are located above the PMF and the floor level for the development will be set at or above the Flood Planning Level, a continuous path of travel from the building to above the PMF will be possible.
 - Adequate flood warning systems, signage and exits shall be available to allow safe and orderly evacuation without increased reliance upon the SES or other authorised emergency services personnel. - These can be provided as part of the proposed development.
 - The development shall be consistent with any relevant flood strategy, Floodplain Risk Management Plan adopted by Council or similar plan. - Whilst we understand that no Floodplain Risk Management Plan applies to this site, we believe that if one



were to be adopted, there would be no issues complying with the controls of the DCP. Refer to Ste Assessment below for further commentary.

 Management and Design - Given that the floor level is to be set at or above the 1% AEP plus 500mm freeboard, there should be no issues providing storage of goods or potentially hazardous or pollution causing material at or above the same level.



Figure 1: Site Locality within Gwawley Bay Catchment

Site Assessment

An adjacent site to the south fronting Kumulla Road has been identified as a site in a Medium Flood Risk precinct, which is land identified as being flood affected but with no significant evacuation difficulties. Kumulla Road would be inundated during the PMF and as such, evacuation west along Kumulla Road would be potentially through flood waters.

Given that the site at the corner of Parraweena Road and Kareena Road would not require evacuation via flood affected roads, it would be expected that if a flood risk management plan were prepared for the site, it would be identified as land with lower or no greater flood risk than the parcel of land fronting Kumulla Road.

On the basis of the available evacuation routes and the majority of the site being above the 1% AEP or 100 year Average Recurrence Interval (ARI), it is expected that the site would be



classified in the Low Flood Risk precinct. Note that a portion of the site is above the PMF, therefore also above the 100 year ARI flood.

Given that the north western corner of the site is above the PMF, it is not expected that setting the floor level with sufficient freeboard above the 100 year ARI flood level will be an issue. It is also unlikely that the development will result in an increase in flood levels or loss of flood storage. Compensatory flood storage could be provided in the south eastern corner of the site if required to ensure that the existing flooding conditions are maintained. Finally, since the street frontage portion of the site is above the PMF, evacuation or refuge above the PMF will not be an issue.

It should be noted that the planning controls for Medium Flood Risk precincts are the same as for Low Flood Risk precincts in relation to setting floor levels, impact on existing flood levels, and evacuation. So even if the site was classified in a Medium Flood Risk precinct which is unlikely, the design approach in relation to flooding would remain the same.

Flood Evacuation

If evacuation is required during a flood event, vehicular and pedestrian evacuation could be made either north along Kareena Road and west along Parraweena Road, or south along Kareena Road towards Kingsway and Port Hacking Road where various hospitals and medical facilities are available. Both these evacuation routes are unaffected by flooding. Refer Figure 2 below which identifies flood evacuation routes from the site.



Figure 2: Site Locality and Available Evacuation Routes



Conclusion

Based on the available flooding information, there will be no issues setting an appropriate floor level for the proposed development. It is also likely that the existing flooding conditions will be unaffected, and that evacuation to above the PMF will be readily available. As such, any flooding issues relating to the site are minor and can be dealt with in more detail at the design stage.

I trust this information meets your requirements. If you have any further inquiries, please do not hesitate to give me a call.

Yours faithfully,

ANDREW FRANCIS For, and on behalf of, H & H Consulting Engineers Pty Ltd