FLOOD ASSESSMENT REPORT

RESIDENTIAL SUBDIVISION

WEST CULBURRA

CLIENT: REALTY REALIZATIONS

allen, price & associates
land and development consultants

Ref: 25405
February 2013
Rev: P0

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Rev	Date	Details
P0	February 2013	Issued for client review

Report Prepared by:

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BEnvSc, DipCivil Eng

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1. INTRODUCTION

Realty Realizations are proposing a residential subdivision over lot 5 DP1065111, lot 6 DP1065111 & Por 61 61 DP755971 off Culburra Rd, West Culburra. The expected lot yield of the proposal is approximately 784 residential allotments, 27 industrial allotments, 13 higher density allotments and 3 tourist sits, plus associated public reserves, sporting fields, electrical zone substation and residues.

The site is located within the coastal zone (under SEPP71) and is therefore defined as a Major Project under Part 3A of the Environmental Planning and Assessment Act, 1979. (EPA Act)

The Minister for Planning has formed an opinion that the proposal is a Major Project and the Director General of the Department of Planning has issued Environmental Assessment Requirements (EAR) under s75F of the EPA Act.

As the site is affected by floodwaters, the purpose of this report is to assess the proposed development against the regulatory framework surrounding the approval of development on flood prone land, and to draw conclusions on the suitability of the proposed development on the site.

2. THE SITE

The existing site comprises land which is identified

- Lot 61 DP755971 (Portion 61);
- Lot 6 DP1065111
- Lot 5 DP1065111

The site is primarily located on the northern side of Culburra Road and is generally within the Crookhaven River catchment and comprises approximately 127Ha of land. A small section of the site is located on the southern side of Culburra Rd. The site is located adjacent to and west of Culburra Beach CBD, extending approximately 3km along Culburra Road (see figure 1).

The site is bounded by Culburra Road to the south, Crookhaven River to the north, private property to the west and Canal St to the east.

The site is accessed from a number of tracks from Culburra Rd and surrounding streets.

Figure 1: Site Plan

The site predominantly is comprised of gently sloping land falling to the Crookhaven River to the north.

The site is generally vegetated land that has been zoned for residential development since 1992. There are some patches of clearing which have been used for agriculture.

3. PROPOSED DEVELOPMENT

It is proposed to construct all infrastructure for a subdivision comprising 784 residential allotments, 27 industrial allotments, 13 higher density allotments and 3 tourist sits, plus associated public reserves, sporting fields, electrical zone substation and residues.

4. FLOODING INFORMATION

4.1. Shoalhaven City Council Flood Certificate

A Flood Certificate has been obtained for the site from Shoalhaven City Council. A copy of the certificate is attached in Appendix A.

The flood certificate details the following information:

1% AEP level (existing):	RL3.2m AHD
1% AEP level (2050):	RL3.4m AHD
1% AEP level (2100):	RL3.6m AHD
Flood Planning Level (existing):	RL3.7m AHD
Flood Planning Level (2050):	RL3.9m AHD
Flood Planning Level (2100):	RL4.1m AHD
Hydraulic Category:	Flood Storage - provisional
Hazard Category:	High - provisional

4.2. Lower Shoalhaven River Flood Study and Floodplain Risk Management Plan

Portions of the site are liable to inundation from flood waters due to the location and level of the site in relation to nearby Curleys Bay. All of the proposed development areas of the site are above the 1% AEP flood level projected to 2050 being an of RL3.4m, only parts of the proposed reserves with some of the associated infrastructure and embellishments will be subject to inundation in this event.

The Lower Shoalhaven River Flood Study was prepared by Public Works Department and was completed in April 1990. This document is not a Council policy or any other type of document that may carry any sort of statutory weight but rather, a detailed technical report on the flooding mechanism of the subject waterways and surrounding land.

The Lower Shoalhaven River Floodplain Risk Management Study and Plan was prepared by Webb, McKeown and Associates and were completed in May 2008. These reports have been formally adopted by Council.

A flood certificate has provided information relating to the land subject of this report. In summary the following information has been obtained from the flood certificate and generally agrees with the flood study and risk management plans:

- The 5% AEP flood level and velocity is 2.3m AHD and 0.5m/s respectively;
- The 2% AEP flood level and velocity is 2.8m AHD and 0.5m/s respectively;
- The 1% AEP flood level and velocity is 3.2m AHD and 0.5m/s respectively;
- The PMF and velocity is 4.9m AHD and 0.5m/s respectively
- For the 1% AEP flood event, the site has been given a provisional Hydraulic Categorisation of High Hazard Flood Storage;

- Based on the above figures, site topography and the proposed development:
  - the 5% flood will inundate proposed reserves only. No dwelling will be inundated during this event;
  - the 5% flood will not inundate the road along the water front, however some infrastructure such as water quality basins, cycle ways and other embellishments of the reserves will be inundated once every 20 years on average;
  - the 2% flood will inundate proposed reserves only. No dwelling will be inundated during this event;
  - the 2% flood will not inundate the road along the water front, however some infrastructure such as water quality basins, cycle ways and other embellishments of the reserves will be inundated once every 50 years on average;
  - the 1% flood will inundate proposed reserves only. No dwelling will be inundated during this event;
  - the 1% flood will not inundate the road along the water front, however some infrastructure such as water quality basins, cycle ways and other embellishments of the reserves will be inundated once every 100 years on average;
  - The PMF will inundate the proposed reserves, some of the roads along the water front to a maximum depth of 200mm and some of the future development site with a velocity of 0.5m/s, the flood hazard (in accordance with Figures L1 and L2 of the Floodplain Development Manual is generally "low" unless water depth exceeds 800mm, where it is "medium" hazard (ie in the proposed reserves). Ingress and egress is "safe" for pedestrians and vehicles until flood waters reach 800mm depth, however this would only occur in the proposed reserve areas and in all cases alternate ingress and egress is available flood free;
  - The PMF will inundate a portion of the future development zone near Canal Street East only, however as this will be subject to further Development Approval this is not relevant for this application.

A copy of the figure 3D from the flood study and floodplain management plan for the subject site is attached in Appendix B.

5. SEA LEVEL RISE IMPACTS

5.1. NSW Government Policy on Sea Level Rise

The NSW Department of Planning has issued a policy statement entitled "NSW Sea Level Rise Policy Statement" October 2009 which outlines the NSW Government's attitude towards the impacts of sea level rise on regional planning and new development.

The policy states the following:

The NSW sea level rise planning benchmarks are an increase above 1990 mean sea levels of 40 cm by 2050 and 90 cm by 2100, with the two benchmarks allowing for consideration of sea level rise over different timeframes. The benchmarks were established by considering the most credible national and international projections of sea level rise2 and take into consideration the uncertainty associated with sea level rise projections. The Government will continue to monitor sea level rise observations and projections and will periodically review these planning benchmarks, with the next review likely to coincide with the release of the fifth IPCC report, due in 2014.

and

The sea level rise planning benchmarks will support consistent consideration of the influence of sea level rise on any coastal hazards and flooding risks that may influence a development or redevelopment site. The benchmarks are not intended to be used to preclude development of land that is projected to be affected by sea level rise. The goal is to ensure that such development recognises and can appropriately accommodate the projected impacts of sea level rise on coastal hazards and flooding over time, through appropriate site planning, design and development control.

5.2. NSW Coastal Planning Guideline: Adapting to Sea Level Rise (August 2010)

The NSW Department of Planning has issued a guideline document entitled "NSW Coastal Planning Guideline: Adapting to Sea Level Rise", August 2010.

The guideline adopts the planning benchmarks of the *NSW Government Policy on Sea level Rise* and identifies coastal areas that may be at risk from sea level rise and should be further investigated.

One of these "investigation areas" is areas affected by flooding.

Flood Risk Management Guide: Incorporating Sea Level Rise Benchmarks in Flood Risk Assessments

The NSW Department of Environment, Climate Change and Water has issued a draft report entitled "*Flood Risk Management Guide: Incorporating Sea Level Rise Benchmarks in Flood Risk Assessments*", August 2010.

The Guide adopts the planning benchmarks of the *NSW Government Policy on Sea level Rise* and provides guidance as to how to apply sea level rise benchmarks to flood affected areas.

The Guide states the following:

This guide applies to areas where the sea level rise planning benchmarks are likely to have an impact on predicted flood levels. This includes areas in the vicinity of tidal waterways, including ICOLLs. In particular, this is likely to apply if the land is:

- *likely to be inundated if water levels are 1 metre above the upper limit of the current tidal range, which is usually defined by annual exceedance from local tidal records*
- *likely to be inundated if water levels are 1 metre above the current flood planning level in tidal affected waterways*
- *within 1.5 m of the maximum historic height of the entrance berm or the upper limit for management intervention identified in entrance management plans for any ocean entrance to the waterway which controls flooding (this commonly applies to ICOLLs)*
- *below 4 metres Australian Height Datum.*

The subject site is captured by these controls.

The Guide also states:

Where flood modeling has been undertaken, it can be updated to include the sea level rise planning benchmarks or a conservative assumption can be made about sea level rise impacts. Where the site is below 4 m AHD, an appropriate conservative assumption to estimate the 1% AEP flood level is to add the sea level rise planning benchmarks to the 1% AEP flood level relevant to the site.

Allowance for Sea Level Rise has been included in the flood certificate provided by Shoalhaven City Council and equates to the following 1% AEP flood levels:

- By 2050: RL3.4m AHD
- By 2100: RL3.6m AHD

The proposed development is expected to have a development life of about 40 years which equates to the 2050 sea level rise scenario and this figure is adopted when referring to works relating to infrastructure.

The proposed flood planning level is the projected 2050 1% AEP plus 500mm freeboard which equates to a level of RL3.4m + 0.5 = RL3.9m AHD. This figure is adopted when referring to future buildings and dwellings that are subject to further development approval upon the allotments created as a result of the subdivision.

6. POLICY FRAMEWORK

There are a number of policy and statutory documents that need to be considered when developing any land affected by flooding in the Shoalhaven. Each of these will now be discussed and dealt with in turn.

6.1. Shoalhaven Local Environmental Plan Clause 21 – Development of Flood Liable Land

With regard to flooding, Council can lawfully consent to the development of this land despite it being flood liable as it is within an urban zone, as prescribed in Clause 21(2)

When considering development applications affected by flooding, Clause 21 (3) requires Council to make an assessment of;

a. *the likely levels, velocity, sedimentation and debris carrying effects of flooding,*

b. *the structural sufficiency of any building the subject of the application and its ability to withstand flooding,*

c. *the effect which the development, if carried out, will or is likely to have on the flow characteristics of floodwaters,*

d. *whether or not access to the site will be possible during a flood, and*

e. *the likely increased demand for assistance from emergency services during a flood.*

In support of the proposal and with respect to the above provisions, the following information is provided;

The likely levels, velocity, sedimentation and debris carrying effects of flooding

- The projected 2050 1% AEP flood level is RL3.4m AHD which will inundate small portions of the site. Inundation will take place upon public land only;

- The velocity of the flood waters that will inundate the site are very slow (approx. 0.5m/s);

- Due to the very slow velocities of flood waters experienced at the site in a 1% AEP event, the sedimentation and debris carrying effects of the flood waters are expected to be very minor and exclusively upon public areas (proposed reserves).

The structural sufficiency of any building the subject of the application and its ability to withstand flooding

- No future dwelling areas will be inundated;

The effect which the development, if carried out, will or is likely to have on the flow characteristics of floodwaters

- Minimal earth works are proposed on the site to allow the infrastructure to be constructed, the majority of works are proposed to be undertaken above the projected 2050 1% AEP level;
- The proposed subdivision works below the projected 2050 1% AEP comprise embellishment of the proposed Public Reserves and Water Quality Basins and will have negligible impact on flood behaviour and will have a negligible reduction in flood storage which will be much less than 1% of the flood storage in the catchment;
- In light of the above impacts and the low velocities and depths of flood waters over the site in the projected 2050 1% AEP flood event, it is anticipated that the proposed development will have a negligible effect on the flow characteristics of floodwaters;
- The proposed development is therefore not likely to increase the flood hazard, or cause flood damage to adjoining properties, or adversely affect flood behaviour.

Whether or not access to the site will be possible during a flood

- Flood free pedestrian access (above the projected 2100 PMF) to the subject site is available from Culburra Road. Following the subdivision all proposed allotments will similarly have flood free pedestrian access provided along the roads to be constructed;
- Flood free vehicular access (above the projected 2100 PMF) to the subject site is available via Culburra Road <-> Coonamia Road <-> Forest Road <-> Princes Highway.
  Following the subdivision all proposed allotments will similarly have flood free vehicular access provided along the roads to be constructed;

The likely increased demand for assistance from emergency services during a flood

- In light of the above, and due to the relatively long warning times that exist for floods in the Shoalhaven catchment, there is not likely to be a noticeable increase in demand for assistance from emergency services during a flood;
- The site has adjacent developed areas with ground levels lower than that proposed resulting in emergency services being required to enter the area before the need arises for this development;
- All proposed lots have flood free access which would permit evacuation in an emergency;

Based on an assessment under Clause 21 of the SLEP, flooding is not an impediment to development on the site.

6.2. Shoalhaven City Council Development Control Plan 106 – Floodplain Management

Section 1.3 of DCP106 states that the development application will be assessed against one of the following documents:

- DCP106 – where Council has adopted a Floodplain Risk Management Plan; OR
- Council's Flood Policy – where Council has not adopted a Floodplain Risk Management Plan;

As Council has formally adopted a Floodplain Risk Management Plan for the Lower Shoalhaven River Floodplain, DCP106 applies to this Development Application.

Section 5.3 of DCP106 – Development on the Floodplain

Section 5.3 of DCP106 deals with Development on the Floodplain. The objective of the Condition is *"to ensure that development on the floodplain is consistent with the NSW Flood Policy (2005) and the NSW Development Manual (2005) and satisfies the objectives listed in Section 1.4 of this DCP."*

Section 5.3 of DCP106 contains seven performance criteria which need to be addressed for any development to proceed.

Three Acceptable Solutions are also provided, which are *"requirements that the Council considers sufficient to enable the objectives and performance criteria to be met"*. In other words, compliance with the Acceptable Solutions deems compliance with the performance criteria and objectives of the DCP.

The acceptable solutions are:

A1 *The development satisfies the requirements as shown in the Planning Matrix at Schedule 6;*

A2 *Buildings are constructed in accordance with the flood proofing guidelines (see Schedule 3);*

A3 *Buildings and structures are designed to withstand the forces of flood waters in accordance with best practice engineering standards*

Each of the Acceptable Solutions is addressed below:

A1 *The development satisfies the requirements as shown in the Planning Matrix in Schedule 6.*

The land use category is: Subdivision

The Hazard Category for the site based upon the flood certificate is High Hazard Flood Storage.

Therefore **the development is not permitted using the acceptable solutions** therefore the performance criteria are required to be met using alternative methods.

The following demonstrate that the development can meet the performance criteria:

P1. The development will not increase the risk to life or safety of persons during a flood event
All proposed lots and roads are above the projected 2050 1% AEP

P2. The development or work will not unduly restrict the flow behaviour of flood waters
The majority of works for the subdivision are above the projected 2050 1% AEP and therefore impact upon the flow behaviour will be negligible.

P3. The development or work will not unduly increase the level or flow of flood waters or stormwater runoff on land in the vicinity
All stormwater from the development will be directed into the proposed reserves and not overland therefore there will be negligible effect on the level or flow of flood waters or stormwater runoff on land in the vicinity.

P4. The development or works will not exacerbate the adverse consequences of floodwaters flowing on the land with regard to erosion, siltation and destruction of vegetation;

Detail design for the subdivision works will include sediment and erosion control measures being implemented both during construction and permanently that will mitigate the effect of the works upon the land during the design storm event.

P5. The structural characteristics of any building work that are the subject of the application are capable of withstanding flooding in accordance with the requirements of the Council;

Structures are proposed to be constructed outside the area affected by the flood planning level of RL3.9, therefore this performance criteria does not apply.

P6. Potential to damage due to inundation of proposed buildings and structures is minimised;

The flood planning level is calculated from the projected 2050 1% AEP Flood Level plus 0.5m freeboard, which is RL3.4m AHD + 0.5m, equivalent to RL3.9m AHD. All proposed allotments, bar one, are wholly above this level. The one lot with a small portion of the lot below RL3.9 has suitable area for development above RL3.9, sufficient to permit future buildings and structures to be built outside the areas below the flood planning, however as this site will be subject to a further development application there is the potential that they may utilise areas where the existing ground is below the flood planning level of RL3.9 if additional works are undertaken, such as filling or building construction with finished floor levels above RL3.9. These additional works are not proposed to be undertaken as part of the subdivision as only the lot adjacent to Canal Street is affected by this.

P7. The development will not unduly increase dependency on emergency services;

All vehicular access to the site and development areas is above the flood planning level of RL3.9 and therefore the development will not unduly increase dependency on emergency services.

A2 Buildings are constructed in accordance with the flood proofing guidelines (see Schedule 3);

As outlined above, the proposed development will place all future building above the Flood Planning Level.

A3 Buildings and structures are designed to withstand the forces of flood waters in accordance with best practice engineering standards

As outlined above, the proposed development will place all future building above the Flood Planning Level.

6.3. Shoalhaven City Council DRAFT Development Control Plan 118 – Coastal Management

This DRAFT policy does not include the subject property in mapping in Appendix 1 in any way.

This draft DCP therefore does not apply to the site.

7. CONCLUSIONS

- The site is flood prone only in the areas proposed as reserves;
- The 1% AEP flood level assuming a 2050 planning benchmark for sea level rise is RL3.4m AHD;
- In the 1% AEP event, the site is defined as High Hazard Flood Storage (noted on the flood certificate).
- The proposed development is proposed to be constructed with all lots created as a result of the development being above the level of RL3.9m AHD, which is equivalent to 500mm above the 1% AEP flood level assuming a 2050 planning benchmark for sea level rise;
- The proposed development is proposed to be constructed with all infrastructure above the level of RL3.4m AHD, which is equivalent to the 1% AEP flood level assuming a 2050 planning benchmark for sea level rise;
- The proposed development will have a negligible effect, if any, on flood behaviour;
- Egress from the proposed development in a PMF flood event assuming a 2100 planning benchmark for sea level rise is safe for pedestrians;
- Egress from the proposed development in a PMF flood event assuming a 2100 planning benchmark for sea level rise is safe for vehicular access;
- There will be no increase in demand for emergency services as all allotments will be above flood waters in a 1% AEP flood level assuming a 2050 planning benchmark for sea level rise and safe access is available for the all flood events up to and including the PMF assuming a 2100 planning benchmark for sea level rise
- Flooding is not an impediment to the proposed development progressing.

8. REFERENCE

Lower Shoalhaven River Flood Study, April 1990 (Public Works Department)

Lower Shoalhaven River Floodplain Risk Management Study, May 2008 (Webb McKeown and Associates)

Lower Shoalhaven River Floodplain Management Plan, May 2008 (Webb McKeown and Associates)

Interim Flood Policy – Adopted 22 September 1987

DCP106 – Floodplain Management – Adopted 26 September 2006

NSW Flood Prone Land Policy

NSW Floodplain Development Manual, April 2005 - Gazetted 6 May 2005 to comply with Section 733 of the Local Government Act,1993

NSW Sea Level Rise Policy Statement - October 2009;

NSW Coastal Planning Guideline: Adapting to Sea Level Rise", August 2010.

Flood Risk Management Guide: Incorporating Sea Level Rise Benchmarks in Flood Risk Assessments – August 2010.

Appendices:
Appendix A:
Appendix B:

Appendix A

City Administrative Centre
Bridge Road, Nowra NSW Australia 2541
Phone: (02) 4429 3111 • Fax: (02) 4422 3168

Address all correspondence to
The General Manager, PO Box 42, Nowra NSW 2541 Australia

COUNCIL REFERENCE: 28112E (D11/238443)
CONTACT PERSON: Ailsa Schofield
DATE: 20 September 2011

Caroline Griffiths
PO Box 73
NOWRA NSW 2541

Thank you for your recent inquiry in relation to flood data held by Shoalhaven City Council.

Please find below the original details of your inquiry, some general information on flooding as well as the requested property specific Flood Certificate.

Details of Inquiry:

Name of Inquirer	Caroline Griffiths	**Date Requested:** 2 Sep 2011
Reason for Enquiry	Other - Development	
Contact Details	Phone: 02 4421 6544 Email: cgriffiths@allenprice.com.au Postal: PO Box 73 Nowra	
Preferred Response	Email	
Survey Detail	Not Provided	
Flood Safety Tip	**Causeways can kill!** **Never drive through flood waters!** **Wait and be safe!**	
General Flood Information	Shoalhaven City Council in conjunction with SES has produced site specific flood brochures for Shoalhaven Heads, Nowra / Bomaderry / Terara, Greenwell Point/Orient Point and Sussex Inlet. General Flood Information booklets, such as "What to do before, during & after a flood" prepared by Emergency Management Australia are also available. You can pick up free copies of all brochures at the City Administration Building in Nowra.	

FLOOD CERTIFICATE

According to the *Lower Shoalhaven River Floodplain Risk Management Plan – Climate Change Review (2011)* and the *draft flood assessment report (footprint sustainable engineering, 2011, project number 0915)*, this property, Culburra Rd Culburra Beach, **is affected by the 1% AEP flood event.**

Property information:
Culburra Rd Culburra Beach, Lot: 6, DP: 1065111, UPN: 98008

BASIC FLOOD INFORMATION – Flooding from Shoalhaven River

	Existing	Projected 2050	Projected 2100
1% AEP Flood Level	3.2m AHD	3.4m AHD	3.6m AHD
Freeboard	0.5m	0.5m	0.5m
Flood Planning Level	3.7m AHD = 3.2 + 0.5	3.9m AHD = 3.4 + 0.5	4.1m AHD = 3.6 + 0.5
Hazard Category	High - Based on Floodplain Risk Management Plan & adopted by Council	High - provisional	High - provisional
Hydraulic Category	Flood Storage - Based on Floodplain Risk Management Plan & adopted by Council	Flood Storage - provisional	Flood Storage - provisional

DETAILED FLOOD INFORMATION – Flooding from Shoalhaven River

	Existing	Projected 2050	Projected 2100
Probable Maximum Flood Level	4.9m AHD	4.9m AHD	5.0m AHD
2% AEP Flood Level	2.8m AHD	2.9m AHD	3.3m AHD
5% AEP Flood Level	2.3m AHD	2.6m AHD	2.9m AHD
10% AEP Flood Level	2.0m AHD	2.2m AHD	2.7m AHD
Velocity (1% AEP event)	0.5m/s	Not Available	Not Available

BASIC FLOOD INFORMATION – Flooding from Lake Wollumboola*

*a Flood Study has not been prepared for the Lake Wollumboola area. Flood information has been provided using a DRAFT site specific flood assessment report for a property in the vicinity (footprint sustainable engineering, 2011, flood assessment report, project number 0915).

1% AEP Flood Level	3.4m AHD
Freeboard	0.5m
Flood Planning Level	3.9m AHD = 3.4 + 0.5

Hazard Category	Unknown
Hydraulic Category	Unknown

SITE SPECIFIC CONSIDERATIONS

1. Flooding from the Shoalhaven River affects the northern end of the property, whereas flooding from Lake Wollumboola affects the southern end of the property. No flood information is available for Down's Creek which runs through the property.
2. Not all of the property is categorised High Hazard Flood Storage. To determine the exact extent of flood inundation and associated hazards from the Shoalhaven River, Lake Wollumboola and Down's Creek, a detailed ground level survey would need to be conducted by a suitably qualified surveyor followed by a flood assessment by a suitably qualified engineer.
3. Due to current NSW Government legislation only sea level rise is required to be considered as part of this Flood Study. Other aspects of climate change such as varied rainfall intensity and berm heights may be considered in future. Should this occur it is expected that existing flood behaviour and levels will change. Information provided in this Flood Certificate will be superseded by the revised information once adopted.
   All applications for buildings, and the like, must take into account the projected 2050 flood information. All subdivision and other long-term planning must take into account the projected 2100 flood information.
4. The provided velocity is approximate only.

STANDARD CONSIDERATIONS

Properties below the Flood Planning Level:
Council considers the land in question to be below the flood planning level and therefore subject to flood related development controls. The conditions as set out below will reduce flood risk in flood events up to the Flood Planning Level, however the property may still be subject to flooding at higher levels during rare flood events.

Development controls apply to flood affected properties.

Development conditions will vary depending on flood hazard, hydraulic category as well as the type of development that is proposed. Please refer to the following documents for information on Council's flood related development controls and the NSW State Government's Floodprone Land Policy.

- SCC Development Control Plan 106 – Floodplain Management: http://www3.shoalhaven.nsw.gov.au/applications/policyindexinternet/docs/1633527.pdf
- SCC Floodplain Management Policy for: Manufactured Home Estates, Caravan Parks, Camping Ground and Moveable Dwellings: http://shoalhaven.nsw.gov.au/council/pubdocs/index.htm
- NSW Floodplain Development Manual 2005: http://www.environment.nsw.gov.au/floodplains/manual.htm

DISCLAIMER:

Your enquiry relating to the likelihood of the land specified in the application being flooded has been referred to the Council's Floodplain Engineer.

In responding to your application the Council seeks to bring to your attention the fact that pursuant to s.733 of the Local Government Act a council does not incur liability in respect of the giving of any advice furnished in good faith by the Council relating to the likelihood of any land being flooded or the nature or extent of any such flooding.

The Council does not have a legal obligation to provide advice to you and to the extent that this reply is giving advice, the Council provides that advice in good faith with the intention of preserving, so far as is legally possible, the Council's immunity from liability pursuant to s.733 of the Local Government Act.

While all reasonable care has been taken to ensure the accuracy of the information given in this reply, its purpose is to provide a general indication of flood risk in the area. Flood lines shown on Council maps indicate the approximate extent of flooding only in relation to the abovementioned land.

The information provided may contain errors or omissions and the accuracy may not suit the purposes of all users. A site survey and further investigation are strongly recommended before commencement of any project based on this data.

The information given is the most current information at the time of the request. It is to be noted, however, that flood information is constantly reviewed and updated and as such, the information contained in this regard is current only on the day of issue.

Before acting upon the information provided in this reply, the Council urges you to obtain separate and independent advice as Council, in giving this information, does not intend it to be relied upon in such a fashion as to impose liability upon the Council.

Should you not be prepared to accept the information contained in this reply upon that basis then you should immediately notify Council.

GLOSSARY:

AEP (Annual Exceedance Probability) means the chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage – for example a 1% AEP flood event has a 1% chance of occurring in any one calendar year.

AHD (Australian Height Datum) is a common national surface level datum corresponding approximately to mean sea level.

Flood fringe is that part of the floodplain remaining after the floodway and flood storage areas have be defined.

Flood planning level means the combination of flood levels and freeboards selected for planning purposes, as determined in floodplain risk management studies and incorporated in floodplain risk management plans.

Floodplain risk management plan is a plan developed in accordance with the principles and guidelines contained in the NSW Government Floodplain Management Manual. Usually includes both written and diagrammatic information describing how particular areas of flood prone land are to be used and managed to achieve defined objectives.

Floodplain risk management study is a study that identifies and compares various risk management options. This includes an assessment of their social, economic, ecological and cultural impacts, together with opportunities to maintain and enhance river and floodplain environments.

Flood prone land means the land susceptible to flooding by the probable maximum flood event (that is, land within the floodplain) as indicated on the map marked "Flood Prone Land" deposited in the office of the Council as amended from time to time.

Floodway means those parts of the floodplain where a significant discharge of water occurs during floods. They are often aligned with natural defined channels. Floodway's are areas that, even if only partially blocked, would cause a significant redistribution of flood flow, or a significant increase in flood levels.

Flood storage areas are those parts of the floodplain that are important for the temporary storage of floodwaters during the passage of a flood.

Flood study is a technical investigation of flood behaviour. It defines the nature of flood risk by establishing the extent, level and velocity of floodwaters. The study also provides information on the distribution of flood flows across various sections of the flood plain for the full range of flood events up to and including the PMF.

Probable maximum flood (PMF) is the largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation. Generally, it is not physically or economically possible to provide complete protection against this event. The PMF defines the extent of flood prone land, that is, the floodplain.

Provisional flood planning level, hazard and hydraulic categories are provisional until the Floodplain Risk Management Plan has been completed and adopted by Council.

Appendix B

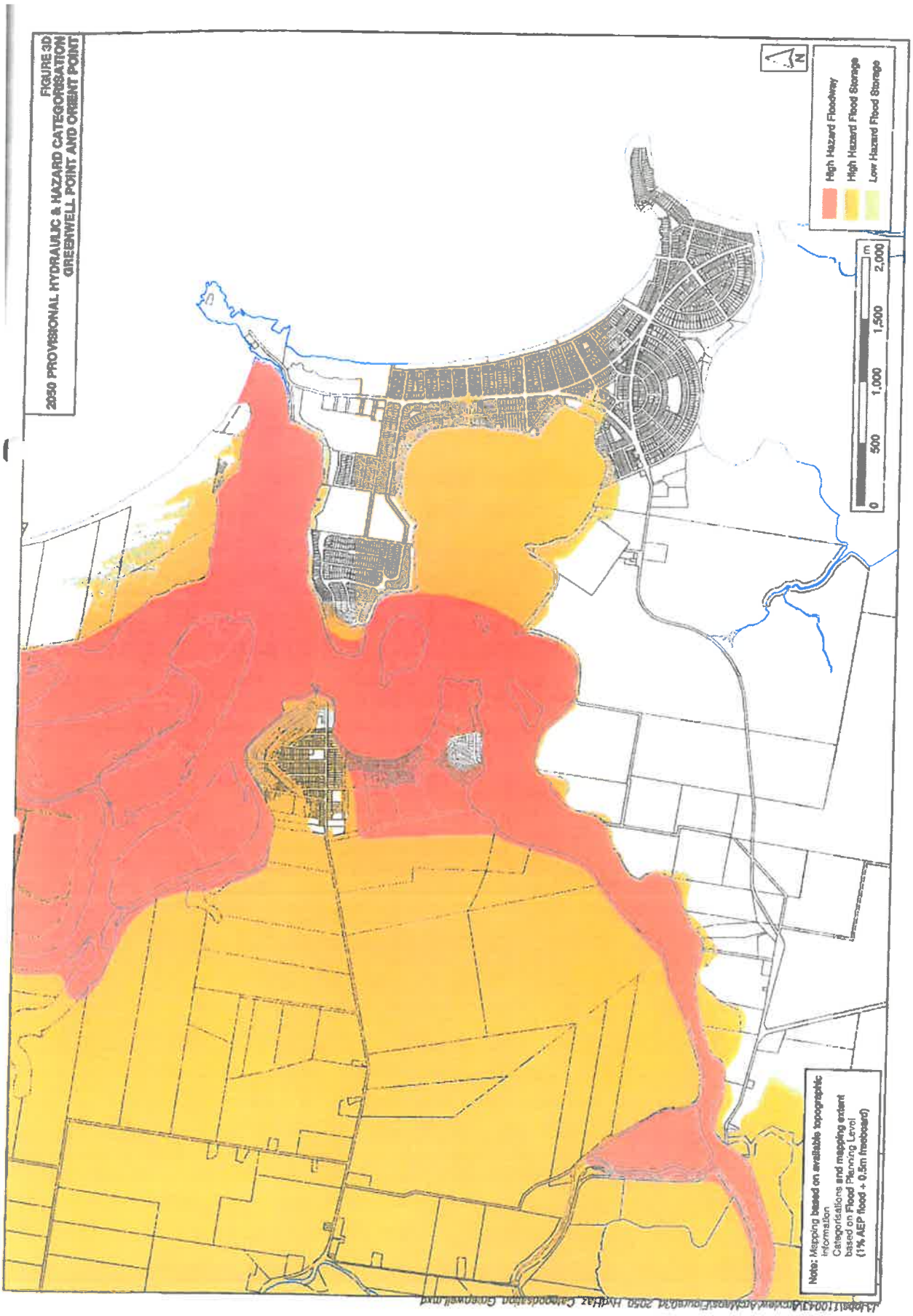
FIGURE 3D
2050 PROVISIONAL HYDRAULIC & HAZARD CATEGORISATION
GREENWELL POINT AND ORIENT POINT
N
High Hazard Floodway
High Hazard Flood Storage
Low Hazard Flood Storage
m
0
500
1,000
1,500
2,000
Note: Mapping based on available topographic information
Categorisations and mapping extent based on Flood Planning Level (1% AEP flood + 0.5m freeboard)