FIGURE 9C

SEWERAGE AREAS
LAKES MUNMORAH & BUDGEWOI

1% AEP Flood Level

1% AEP Flood Level +0.9m

Sewerage Areas

Sewerage Pump Stations

N

0 0.5 1 1.5 2 2.5 km

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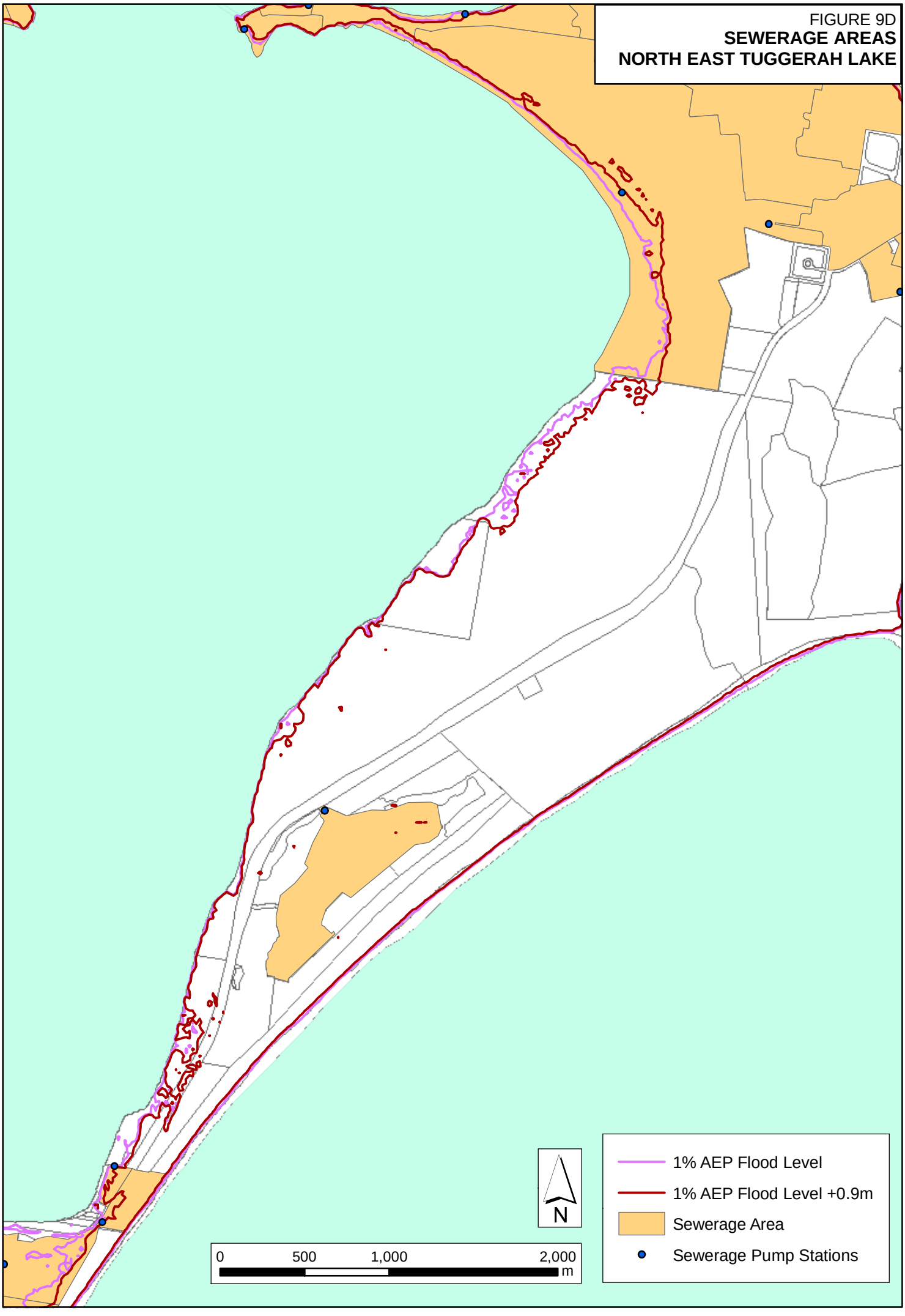
FIGURE 9D
SEWERAGE AREAS
NORTH EAST TUGGERAH LAKE
1% AEP Flood Level
1% AEP Flood Level +0.9m
Sewerage Area
Sewerage Pump Stations
N
0
500
1,000
2,000
m
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FIGURE 10A

FLOOD LIABLE BUILDINGS
EXISTING
SOUTH AND EAST OF TUGGERAH LAKE

This plan indicates the frequency of flood which first inundates the floor level of the building on the property. This information has been obtained by comparing the building floor level (obtained through Council survey) and the design flood levels for Tuggerah Lakes.

Flood Liable Buildings

- 50% AEP
- 20% AEP
- 10% AEP
- 5% AEP
- 2% AEP
- 1% AEP
- 0.5% AEP
- 0.2% AEP
- PMF
- 1% AEP Flood Level

N

0 0.5 1 1.5 2 km

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FIGURE 10B

FLOOD LIABLE BUILDINGS
EXISTING
WYONG

Flood Liable Buildings

- 50% AEP
- 20% AEP
- 10% AEP
- 5% AEP
- 2% AEP
- 1% AEP
- 0.5% AEP
- 0.2% AEP
- PMF
- 1% AEP Flood Level

N

0 0.5 1 1.5 2 km

This plan indicates the frequency of flood which first inundates the floor level of the building on the property. This information has been obtained by comparing the building floor level (obtained through Council survey) and the design flood levels for Tuggerah Lakes.

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FIGURE 10C

FLOOD LIABLE BUILDINGS
EXISTING
LAKES MUNMORAH & BUDGEWOI

Flood Liable Buildings

- 50% AEP
- 20% AEP
- 10% AEP
- 5% AEP
- 2% AEP
- 1% AEP
- 0.5% AEP
- 0.2% AEP
- PMF
- 1% AEP Flood Level

N

0 0.5 1 1.5 2 2.5 km

This plan indicates the frequency of flood which first inundates the floor level of the building on the property. This information has been obtained by comparing the building floor level (obtained through Council survey) and the design flood levels for Tuggerah Lakes.

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FIGURE 10D
FLOOD LIABLE BUILDINGS
EXISTING
NORTH EAST TUGGERAH LAKE

This plan indicates the frequency of flood which first inundates the floor level of the building on the property. This information has been obtained by comparing the building floor level (obtained through Council survey) and the design flood levels for Tuggerah Lakes.

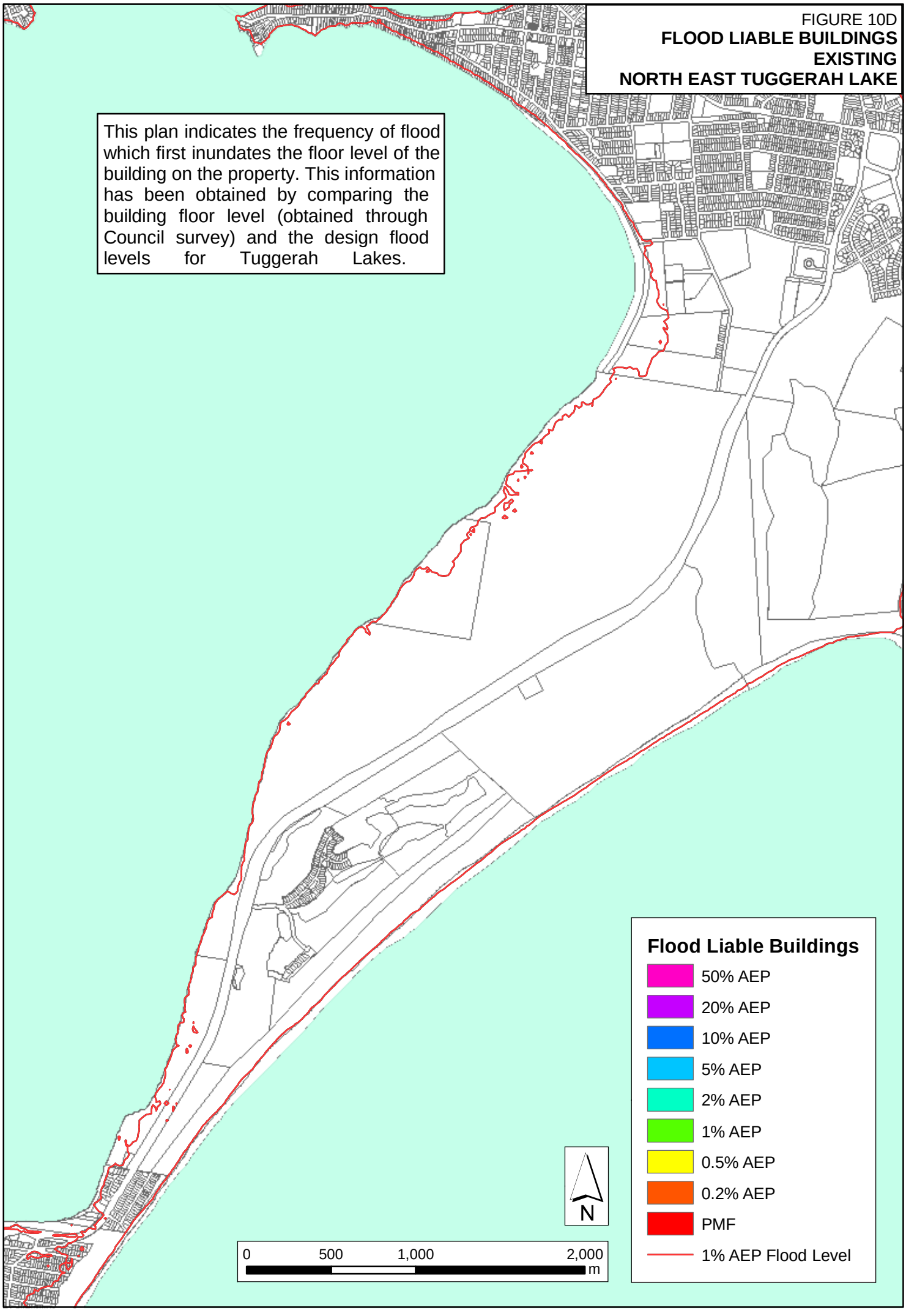

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FIGURE 11A

FLOOD LIABLE BUILDINGS
SEA LEVEL RISE 0.9M
SOUTH AND EAST OF TUGGERAH LAKE

Flood Liable Buildings

- 50% AEP
- 20% AEP
- 10% AEP
- 5% AEP
- 2% AEP
- 1% AEP
- 0.5% AEP
- 0.2% AEP
- PMF
- 1% AEP Flood Level + 0.9m

N

0 0.5 1 1.5 2 km

This plan indicates the frequency of flood which first inundates the floor level of the building on the property. This information has been obtained by comparing the building floor level (obtained through Council survey) and the design flood levels for Tuggerah Lakes.

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FIGURE 11B

FLOOD LIABLE BUILDINGS
SEA LEVEL RISE 0.9M
WYONG

Flood Liable Buildings

- 50% AEP
- 20% AEP
- 10% AEP
- 5% AEP
- 2% AEP
- 1% AEP
- 0.5% AEP
- 0.2% AEP
- PMF
- 1% AEP Flood Level + 0.9m

N

0 0.5 1 1.5 2 km

This plan indicates the frequency of flood which first inundates the floor level of the building on the property. This information has been obtained by comparing the building floor level (obtained through Council survey) and the design flood levels for Tuggerah Lakes.

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FIGURE 11C

FLOOD LIABLE BUILDINGS
SEA LEVEL RISE 0.9M
LAKES MUNMORAH & BUDGEWOI

Flood Liable Buildings

- 50% AEP
- 20% AEP
- 10% AEP
- 5% AEP
- 2% AEP
- 1% AEP
- 0.5% AEP
- 0.2% AEP
- PMF
- 1% AEP Flood Level + 0.9m

N

0 0.5 1 1.5 2 2.5 km

This plan indicates the frequency of flood which first inundates the floor level of the building on the property. This information has been obtained by comparing the building floor level (obtained through Council survey) and the design flood levels for Tuggerah Lakes.

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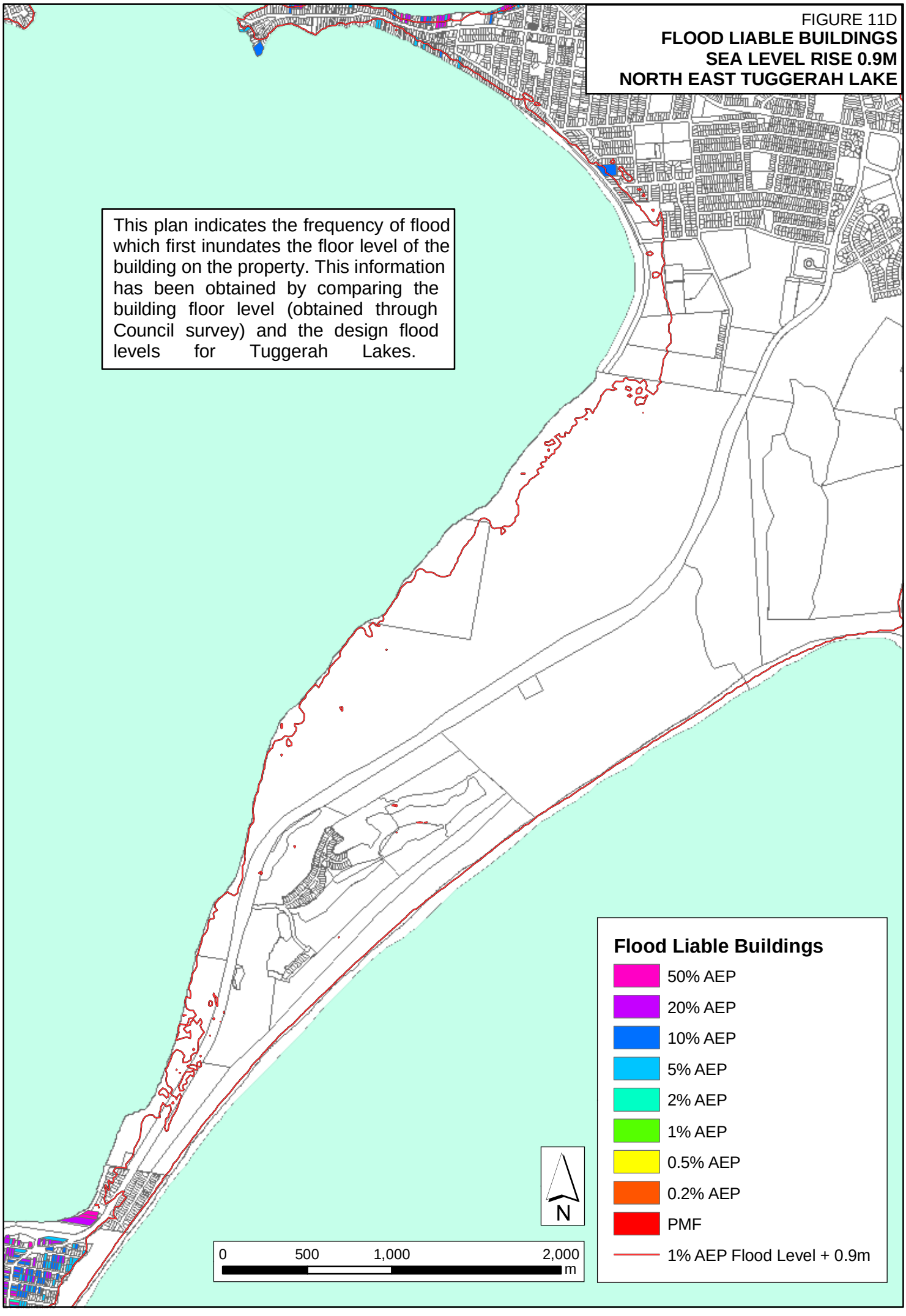
FIGURE 11D
FLOOD LIABLE BUILDINGS
SEA LEVEL RISE 0.9M
NORTH EAST TUGGERAH LAKE
This plan indicates the frequency of flood which first inundates the floor level of the building on the property. This information has been obtained by comparing the building floor level (obtained through Council survey) and the design flood levels for Tuggerah Lakes.
Flood Liable Buildings
50% AEP
20% AEP
10% AEP
5% AEP
2% AEP
1% AEP
0.5% AEP
0.2% AEP
PMF
1% AEP Flood Level + 0.9m
N
0
500
1,000
2,000
m
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FIGURE 12A

PMF CONTOURS
SOUTH AND EAST OF TUGGERAH LAKE

N

PMF = 2.7mAHD

PMF + 0.4m sea level rise = 3.1mAHD

PMF + 0.9m sea level rise = 3.6mAHD

0 0.5 1 1.5 2 km

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FIGURE 12B

PMF CONTOURS
WYONG

N

PMF = 2.7m

PMF + 0.4m sea level rise = 3.1mAHD

PMF + 0.9m sea level rise = 3.6mAHD

0 0.5 1 1.5 2 km

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FIGURE 12C

PMF CONTOURS
LAKES MUNMORAH & BUDGEWOI

N

PMF = 2.7mAHD

PMF + 0.4m sea level rise = 3.1mAHD

PMF + 0.9m sea level rise = 3.6mAHD

0 0.5 1 1.5 2 km

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FIGURE 12D
PMF CONTOURS
NORTH EAST TUGGERAH LAKE
N
0
500
1,000
2,000
m
PMF + 0.9m sea level rise = 3.6mAHD
PMF + 0.4m sea level rise = 3.1mAHD
PMF = 2.7mAHD
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FIGURE 13

1% AEP HYDRAULIC HAZARD WITH 0.4M SEA LEVEL RISE AND SEWERAGE SYSTEM IMPACT

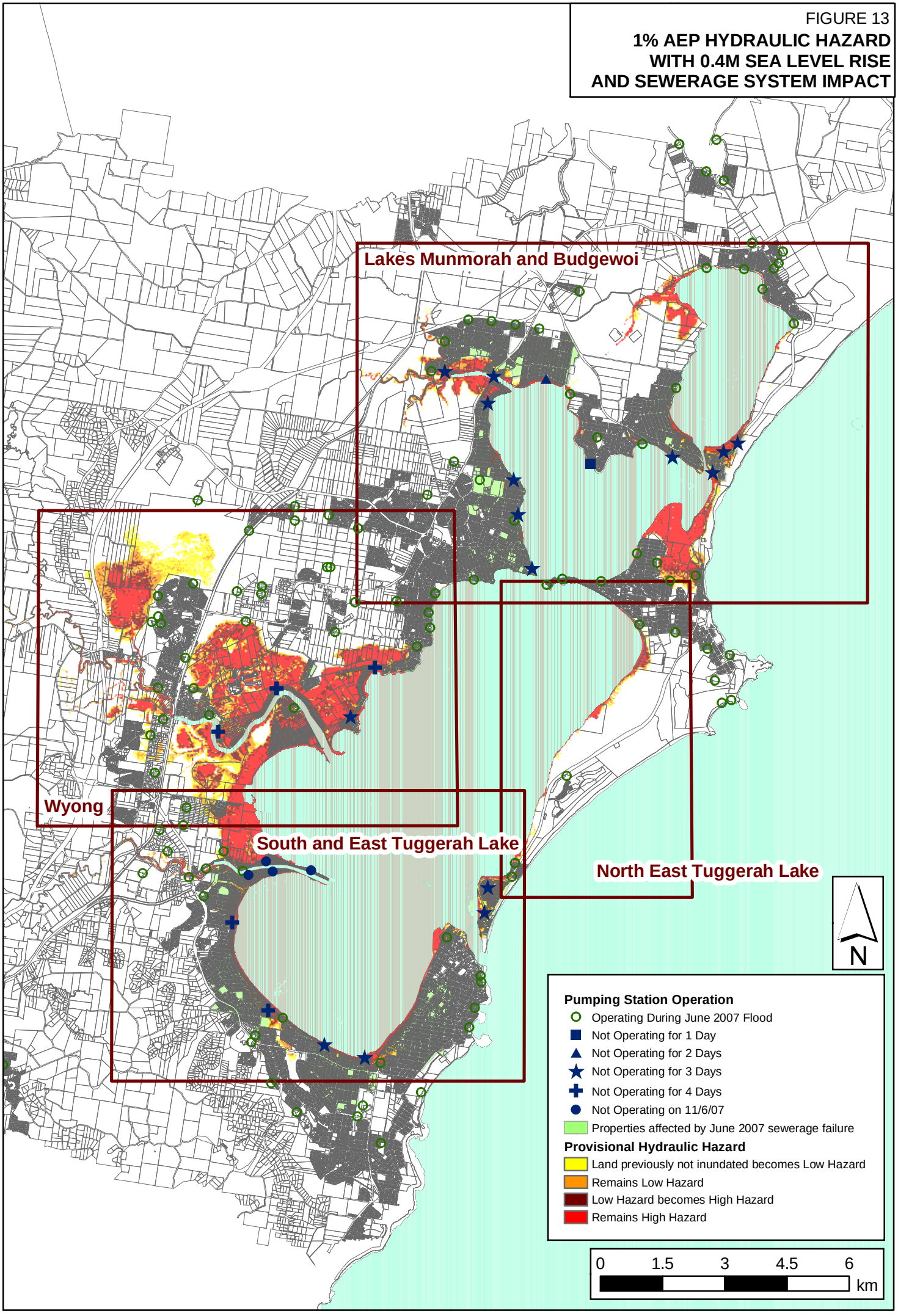

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FIGURE 13A

1% AEP HYDRAULIC HAZARD WITH 0.4M SEA LEVEL RISE AND SEWERAGE SYSTEM IMPACT SOUTH AND EAST OF TUGGERAH LAKE

N

Pumping Station Operation

- Operating During June 2007 Flood
- Not Operating for 1 Day
- Not Operating for 2 Days
- Not Operating for 3 Days
- Not Operating for 4 Days
- Not Operating on 11/6/07
- Properties affected by June 2007 sewerage failure

Provisional Hydraulic Hazard

- Land previously not inundated becomes Low Hazard
- Remains Low Hazard
- Low Hazard becomes High Hazard
- Remains High Hazard

0 0.5 1 1.5 2 2.5 3 km

J:\Jobs\29001\Arcview\Arcmaps\Figure13A_ClimChanHydHaz_SE-Tuggerah_0.4m.mxd

FIGURE 13B

1% AEP HYDRAULIC HAZARD WITH 0.4M SEA LEVEL RISE AND SEWERAGE SYSTEM IMPACT WYONG

N

Pumping Station Operation

- Operating During June 2007 Flood
- Not Operating for 1 Day
- Not Operating for 2 Days
- Not Operating for 3 Days
- Not Operating for 4 Days
- Not Operating on 11/6/07
- Properties affected by June 2007 sewerage failure

Provisional Hydraulic Hazard

- Land previously not inundated becomes Low Hazard
- Remains Low Hazard
- Low Hazard becomes High Hazard
- Remains High Hazard

0 0.5 1 1.5 2 2.5 3 km

J:\Jobs\29001\Arcview\Arcmaps\Figure13B_ClimChanHydHaz_Wyong_0.4m.mxd

FIGURE 13C

1% AEP HYDRAULIC HAZARD WITH 0.4M SEA LEVEL RISE AND SEWERAGE SYSTEM IMPACT LAKES MUNMORAH & BUDGEWOI

N

Pumping Station Operation

- Operating During June 2007 Flood
- Not Operating for 1 Day
- Not Operating for 2 Days
- Not Operating for 3 Days
- Not Operating for 4 Days
- Not Operating on 11/6/07
- Properties affected by June 2007 sewerage failure

Provisional Hydraulic Hazard

- Land previously not inundated becomes Low Hazard
- Remains Low Hazard
- Low Hazard becomes High Hazard
- Remains High Hazard

0 0.5 1 1.5 2 2.5 3 km

J:\Jobs\29001\Arcview\Arcmaps\Figure13C_ClimChanHydHaz_Lakes_Mun_Bud_0.4m.mxd

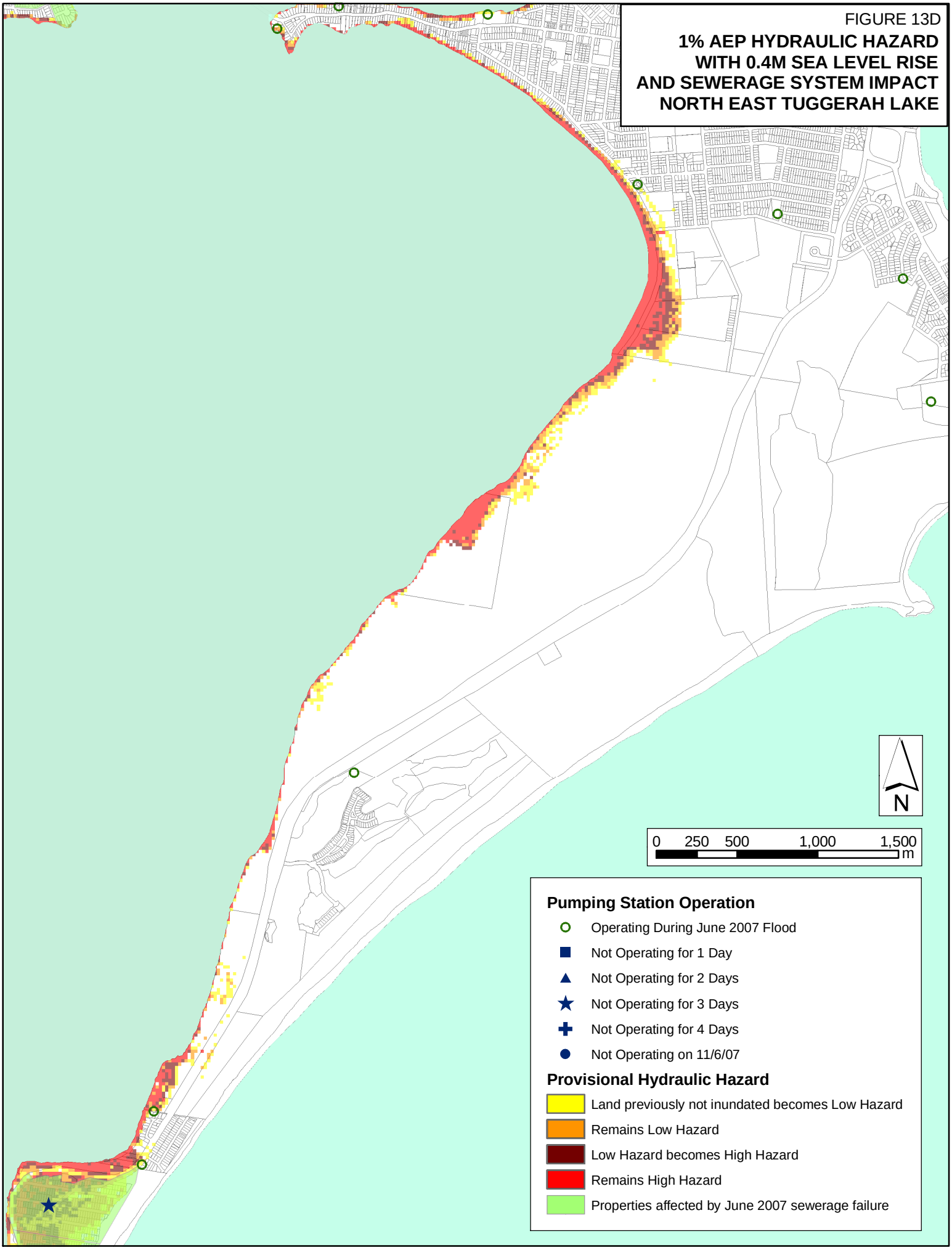

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FIGURE 14

1% AEP HYDRAULIC HAZARD WITH 0.9M SEA LEVEL RISE AND SEWERAGE SYSTEM IMPACT

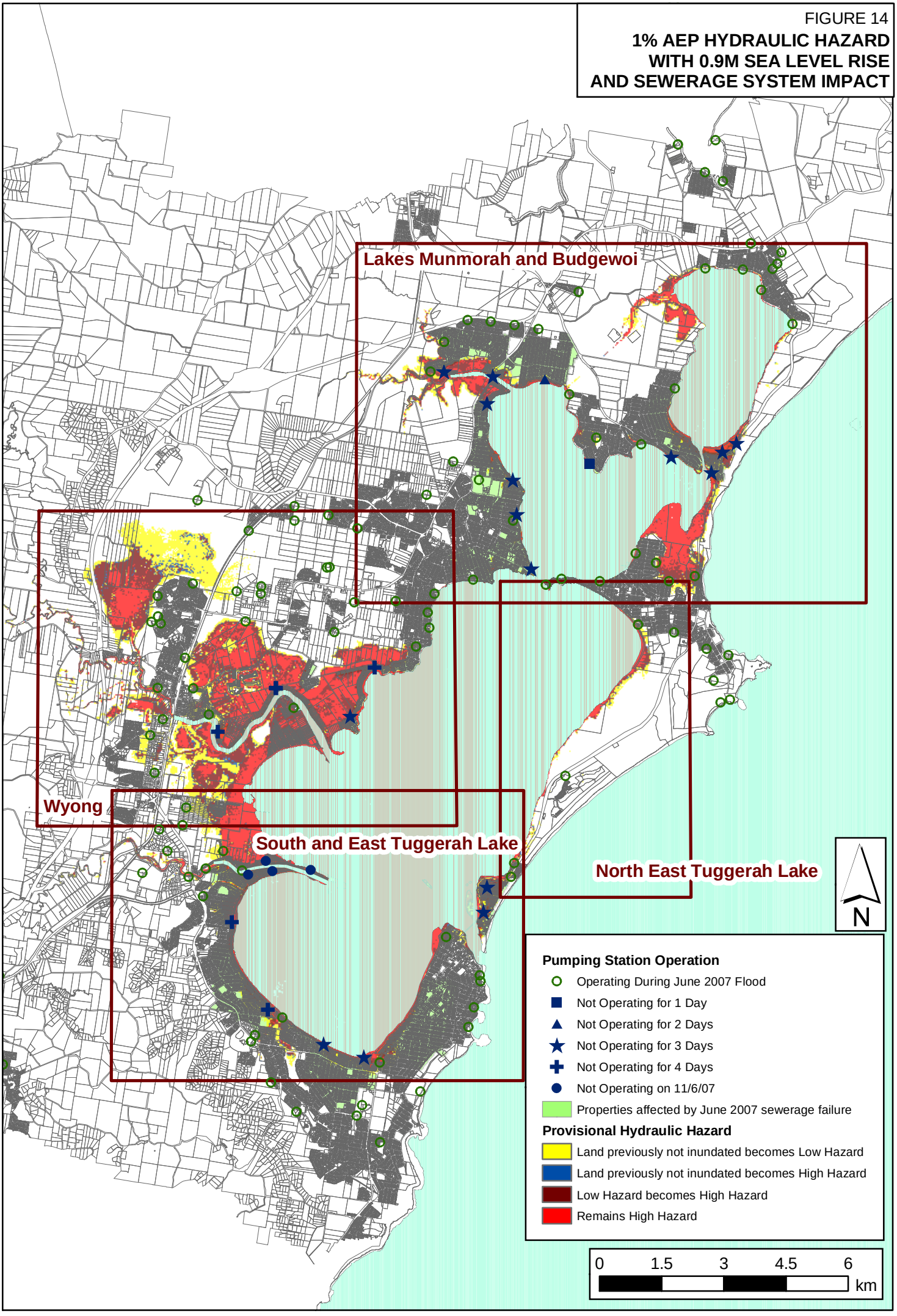

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FIGURE 14A

1% AEP HYDRAULIC HAZARD WITH 0.9M SEA LEVEL RISE AND SEWERAGE SYSTEM IMPACT SOUTH AND EAST OF TUGGERAH LAKE

Pumping Station Operation

- Operating During June 2007 Flood
- Not Operating for 1 Day
- Not Operating for 2 Days
- Not Operating for 3 Days
- Not Operating for 4 Days
- Not Operating on 11/6/07
- Properties affected by June 2007 sewerage failure

Provisional Hydraulic Hazard

- Land previously not inundated becomes Low Hazard
- Land previously not inundated becomes High Hazard
- Low Hazard becomes High Hazard
- Remains High Hazard

N

0 0.5 1 1.5 2 2.5 3 km

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FIGURE 14B
1% AEP HYDRAULIC HAZARD WITH 0.9M SEA LEVEL RISE AND SEWERAGE SYSTEM IMPACT WYONG

Pumping Station Operation

- Operating During June 2007 Flood
- Not Operating for 1 Day
- Not Operating for 2 Days
- Not Operating for 3 Days
- Not Operating for 4 Days
- Not Operating on 11/6/07
- Properties affected by June 2007 sewerage failure

Provisional Hydraulic Hazard

- Land previously not inundated becomes Low Hazard
- Land previously not inundated becomes High Hazard
- Low Hazard becomes High Hazard
- Remains High Hazard

N

0 0.5 1 1.5 2 2.5 3 km

J:\Jobs\29001\Arcview\Arcmaps\Figure14B_ClimChanHydHaz_Wyong_0.9m.mxd

FIGURE 14C

1% AEP HYDRAULIC HAZARD WITH 0.9M SEA LEVEL RISE AND SEWERAGE SYSTEM IMPACT LAKES MUNMORAH & BUDGEWOI

N

Pumping Station Operation

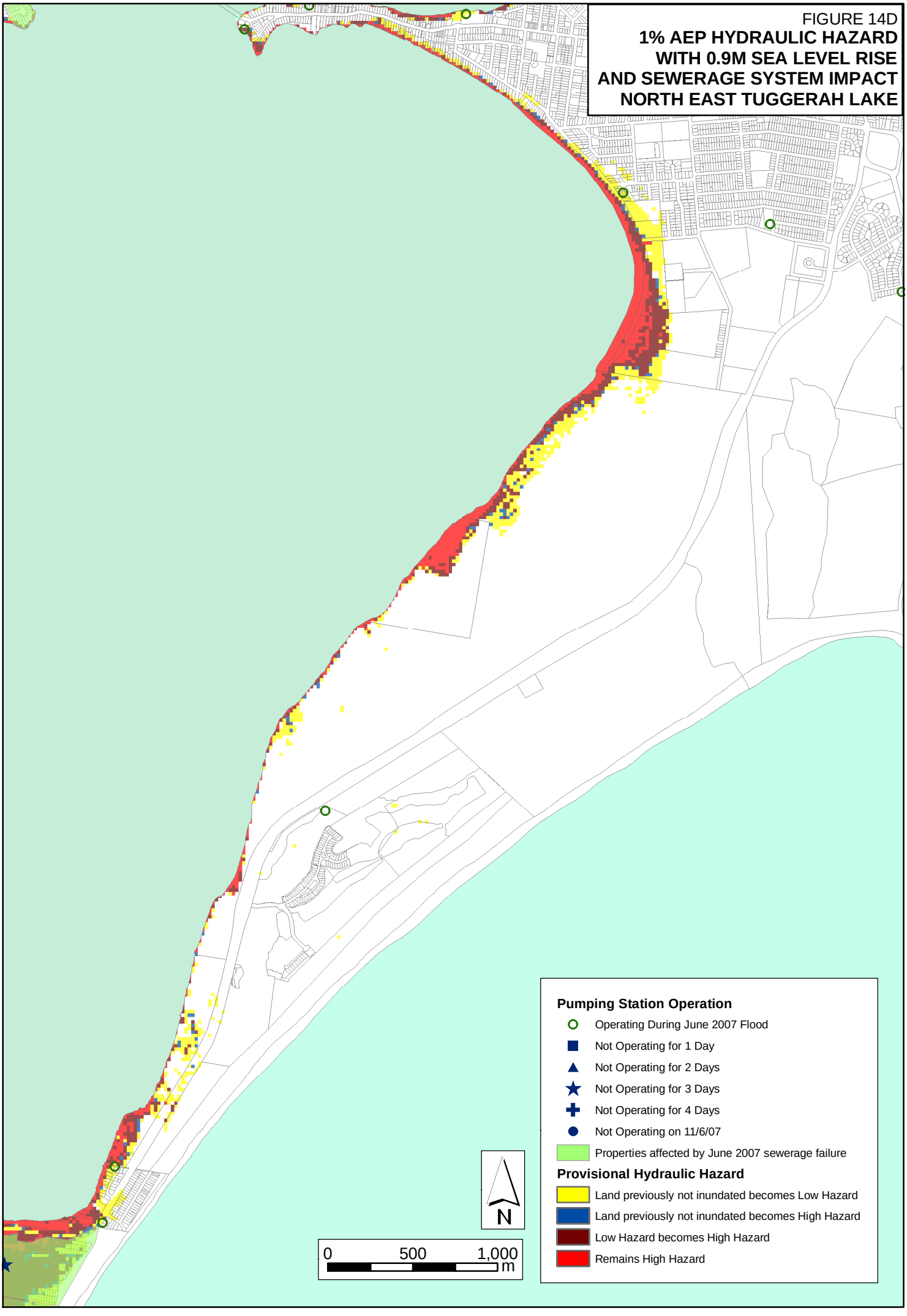
- Operating During June 2007 Flood
- Not Operating for 1 Day
- Not Operating for 2 Days
- Not Operating for 3 Days
- Not Operating for 4 Days
- Not Operating on 11/6/07

Provisional Hydraulic Hazard

- Land previously not inundated becomes Low Hazard
- Land previously not inundated becomes High Hazard
- Low Hazard becomes High Hazard
- Remains High Hazard
- Properties affected by June 2007 sewerage failure

0 0.5 1 1.5 2 2.5 3 km

J:\Jobs\29001\Arcview\Arcmaps\Figure14C_ClimChanHydHaz_Lakes_Mun_Bud_0.9m.mxd



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Appendix A

APPENDIX A: GLOSSARY

Taken from the Floodplain Development Manual (April 2005 edition)

acid sulfate soils	Are sediments which contain sulfidic mineral pyrite which may become extremely acid following disturbance or drainage as sulfur compounds react when exposed to oxygen to form sulfuric acid. More detailed explanation and definition can be found in the NSW Government Acid Sulfate Soil Manual published by Acid Sulfate Soil Management Advisory Committee.
Annual Exceedance Probability (AEP)	The chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage. For example, if a peak flood discharge of 500 m^3/s has an AEP of 5%, it means that there is a 5% chance (that is one-in-20 chance) of a 500 m^3/s or larger event occurring in any one year (see ARI).
Australian Height Datum (AHD)	A common national surface level datum approximately corresponding to mean sea level.
Average Annual Damage (AAD)	Depending on its size (or severity), each flood will cause a different amount of flood damage to a flood prone area. AAD is the average damage per year that would occur in a nominated development situation from flooding over a very long period of time.
Average Recurrence Interval (ARI)	The long term average number of years between the occurrence of a flood as big as, or larger than, the selected event. For example, floods with a discharge as great as, or greater than, the 20 year ARI flood event will occur on average once every 20 years. ARI is another way of expressing the likelihood of occurrence of a flood event.
caravan and moveable home parks	Caravans and moveable dwellings are being increasingly used for long-term and permanent accommodation purposes. Standards relating to their siting, design, construction and management can be found in the Regulations under the LG Act.
catchment	The land area draining through the main stream, as well as tributary streams, to a particular site. It always relates to an area above a specific location.
consent authority	The Council, government agency or person having the function to determine a development application for land use under the EP&A Act. The consent authority is most often the Council, however legislation or an EPI may specify a Minister or public authority (other than a Council), or the Director General of DIPNR, as having the function to determine an application.
development	Is defined in Part 4 of the Environmental Planning and Assessment Act (EP&A Act). infill development: refers to the development of vacant blocks of land that are generally surrounded by developed properties and is permissible under the current zoning of the land. Conditions such as minimum floor levels may be imposed on infill development. new development: refers to development of a completely different nature to that associated with the former land use. For example, the urban subdivision of an area previously used for rural purposes. New developments involve rezoning and typically require major extensions of existing urban services, such as roads, water supply, sewerage and electric power. redevelopment: refers to rebuilding in an area. For example, as urban areas age, it may become necessary to demolish and reconstruct buildings on a relatively large scale. Redevelopment generally does not require either rezoning or major

	extensions to urban services.
disaster plan (DISPLAN)	A step by step sequence of previously agreed roles, responsibilities, functions, actions and management arrangements for the conduct of a single or series of connected emergency operations, with the object of ensuring the coordinated response by all agencies having responsibilities and functions in emergencies.
discharge	The rate of flow of water measured in terms of volume per unit time, for example, cubic metres per second (m^3/s). Discharge is different from the speed or velocity of flow, which is a measure of how fast the water is moving for example, metres per second (m/s).
ecologically sustainable development (ESD)	Using, conserving and enhancing natural resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be maintained or increased. A more detailed definition is included in the Local Government Act 1993. The use of sustainability and sustainable in this manual relate to ESD.
effective warning time	The time available after receiving advice of an impending flood and before the floodwaters prevent appropriate flood response actions being undertaken. The effective warning time is typically used to move farm equipment, move stock, raise furniture, evacuate people and transport their possessions.
emergency management	A range of measures to manage risks to communities and the environment. In the flood context it may include measures to prevent, prepare for, respond to and recover from flooding.
flash flooding	Flooding which is sudden and unexpected. It is often caused by sudden local or nearby heavy rainfall. Often defined as flooding which peaks within six hours of the causative rain.
flood	Relatively high stream flow which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with major drainage before entering a watercourse, and/or coastal inundation resulting from super-elevated sea levels and/or waves overtopping coastline defences excluding tsunami.
flood awareness	Flood awareness is an appreciation of the likely effects of flooding and a knowledge of the relevant flood warning, response and evacuation procedures.
flood education	Flood education seeks to provide information to raise awareness of the flood problem so as to enable individuals to understand how to manage themselves an their property in response to flood warnings and in a flood event. It invokes a state of flood readiness.
flood fringe areas	The remaining area of flood prone land after floodway and flood storage areas have been defined.
flood liable land	Is synonymous with flood prone land (i.e. land susceptible to flooding by the probable maximum flood (PMF) event). Note that the term flood liable land covers the whole of the floodplain, not just that part below the flood planning level (see flood planning area).
flood mitigation standard	The average recurrence interval of the flood, selected as part of the floodplain risk management process that forms the basis for physical works to modify the impacts of flooding.
floodplain	Area of land which is subject to inundation by floods up to and including the

	probable maximum flood event, that is, flood prone land.
floodplain risk management options	The measures that might be feasible for the management of a particular area of the floodplain. Preparation of a floodplain risk management plan requires a detailed evaluation of floodplain risk management options.
floodplain risk management plan	A management plan developed in accordance with the principles and guidelines in this manual. Usually includes both written and diagrammetic information describing how particular areas of flood prone land are to be used and managed to achieve defined objectives.
flood plan (local)	A sub-plan of a disaster plan that deals specifically with flooding. They can exist at State, Division and local levels. Local flood plans are prepared under the leadership of the State Emergency Service.
flood planning area	The area of land below the flood planning level and thus subject to flood related development controls. The concept of flood planning area generally supersedes the flood liable land concept in the 1986 Manual.
Flood Planning Levels (FPLs)	FPLs are the combinations of flood levels (derived from significant historical flood events or floods of specific AEPs) and freeboards selected for floodplain risk management purposes, as determined in management studies and incorporated in management plans. FPLs supersede the standard flood event in the 1986 manual.
flood proofing	A combination of measures incorporated in the design, construction and alteration of individual buildings or structures subject to flooding, to reduce or eliminate flood damages.
flood prone land	Is land susceptible to flooding by the Probable Maximum Flood (PMF) event. Flood prone land is synonymous with flood liable land.
flood readiness	Flood readiness is an ability to react within the effective warning time.
flood risk	Potential danger to personal safety and potential damage to property resulting from flooding. The degree of risk varies with circumstances across the full range of floods. Flood risk in this manual is divided into 3 types, existing, future and continuing risks. They are described below. existing flood risk: the risk a community is exposed to as a result of its location on the floodplain. future flood risk: the risk a community may be exposed to as a result of new development on the floodplain. continuing flood risk: the risk a community is exposed to after floodplain risk management measures have been implemented. For a town protected by levees, the continuing flood risk is the consequences of the levees being overtopped. For an area without any floodplain risk management measures, the continuing flood risk is simply the existence of its flood exposure.
flood storage areas	Those parts of the floodplain that are important for the temporary storage of floodwaters during the passage of a flood. The extent and behaviour of flood storage areas may change with flood severity, and loss of flood storage can increase the severity of flood impacts by reducing natural flood attenuation. Hence, it is necessary to investigate a range of flood sizes before defining flood storage areas.
floodway areas	Those areas of the floodplain where a significant discharge of water occurs during floods. They are often aligned with naturally defined channels. Floodways are

	areas that, even if only partially blocked, would cause a significant redistribution of flood flows, or a significant increase in flood levels.
freeboard	Freeboard provides reasonable certainty that the risk exposure selected in deciding on a particular flood chosen as the basis for the FPL is actually provided. It is a factor of safety typically used in relation to the setting of floor levels, levee crest levels, etc. Freeboard is included in the flood planning level.
habitable room	in a residential situation: a living or working area, such as a lounge room, dining room, rumpus room, kitchen, bedroom or workroom. in an industrial or commercial situation: an area used for offices or to store valuable possessions susceptible to flood damage in the event of a flood.
hazard	A source of potential harm or a situation with a potential to cause loss. In relation to this manual the hazard is flooding which has the potential to cause damage to the community. Definitions of high and low hazard categories are provided in the Manual.
hydraulics	Term given to the study of water flow in waterways; in particular, the evaluation of flow parameters such as water level and velocity.
hydrograph	A graph which shows how the discharge or stage/flood level at any particular location varies with time during a flood.
hydrology	Term given to the study of the rainfall and runoff process; in particular, the evaluation of peak flows, flow volumes and the derivation of hydrographs for a range of floods.
local overland flooding	Inundation by local runoff rather than overbank discharge from a stream, river, estuary, lake or dam.
local drainage	Are smaller scale problems in urban areas. They are outside the definition of major drainage in this glossary.
mainstream flooding	Inundation of normally dry land occurring when water overflows the natural or artificial banks of a stream, river, estuary, lake or dam.
major drainage	Councils have discretion in determining whether urban drainage problems are associated with major or local drainage. For the purpose of this manual major drainage involves: • the floodplains of original watercourses (which may now be piped, channelised or diverted), or sloping areas where overland flows develop along alternative paths once system capacity is exceeded; and/or • water depths generally in excess of 0.3 m (in the major system design storm as defined in the current version of Australian Rainfall and Runoff). These conditions may result in danger to personal safety and property damage to both premises and vehicles; and/or • major overland flow paths through developed areas outside of defined drainage reserves; and/or • the potential to affect a number of buildings along the major flow path.
mathematical/computer models	The mathematical representation of the physical processes involved in runoff generation and stream flow. These models are often run on computers due to the complexity of the mathematical relationships between runoff, stream flow and the distribution of flows across the floodplain.
merit approach	The merit approach weighs social, economic, ecological and cultural impacts of land use options for different flood prone areas together with flood damage,

	hazard and behaviour implications, and environmental protection and well being of the States rivers and floodplains. The merit approach operates at two levels. At the strategic level it allows for the consideration of social, economic, ecological, cultural and flooding issues to determine strategies for the management of future flood risk which are formulated into Council plans, policy and EPIs. At a site specific level, it involves consideration of the best way of conditioning development allowable under the floodplain risk management plan, local floodplain risk management policy and EPIs.
minor, moderate and major flooding	Both the State Emergency Service and the Bureau of Meteorology use the following definitions in flood warnings to give a general indication of the types of problems expected with a flood: minor flooding: causes inconvenience such as closing of minor roads and the submergence of low level bridges. The lower limit of this class of flooding on the reference gauge is the initial flood level at which landholders and townspeople begin to be flooded. moderate flooding: low-lying areas are inundated requiring removal of stock and/or evacuation of some houses. Main traffic routes may be covered. major flooding: appreciable urban areas are flooded and/or extensive rural areas are flooded. Properties, villages and towns can be isolated.
modification measures	Measures that modify either the flood, the property or the response to flooding. Examples are indicated in Table 2.1 with further discussion in the Manual.
peak discharge	The maximum discharge occurring during a flood event.
Probable Maximum Flood (PMF)	The PMF is the largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation, and where applicable, snow melt, coupled with the worst flood producing catchment conditions. 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. The extent, nature and potential consequences of flooding associated with a range of events rarer than the flood used for designing mitigation works and controlling development, up to and including the PMF event should be addressed in a floodplain risk management study.
Probable Maximum Precipitation (PMP)	The PMP is the greatest depth of precipitation for a given duration meteorologically possible over a given size storm area at a particular location at a particular time of the year, with no allowance made for long-term climatic trends (World Meteorological Organisation, 1986). It is the primary input to PMF estimation.
probability	A statistical measure of the expected chance of flooding (see AEP).
risk	Chance of something happening that will have an impact. It is measured in terms of consequences and likelihood. In the context of the manual it is the likelihood of consequences arising from the interaction of floods, communities and the environment.
runoff	The amount of rainfall which actually ends up as streamflow, also known as rainfall excess.
stage	Equivalent to water level. Both are measured with reference to a specified datum.
stage hydrograph	A graph that shows how the water level at a particular location changes with time

	during a flood. It must be referenced to a particular datum.
survey plan	A plan prepared by a registered surveyor.
water surface profile	A graph showing the flood stage at any given location along a watercourse at a particular time.
wind fetch	The horizontal distance in the direction of wind over which wind waves are generated.

Appendix B

If you have any further comments that relate to the Tuggerah Lakes Floodplain Risk Management Study and Plan, please provide them in the space below (or attach additional pages if needed):

_____

_____

_____

Tuggerah Lakes and Surrounding Suburbs

For more information please contact:

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BE IN THE DRAW TO WIN A $50 GIFT VOUCHER

Does flooding in the Tuggerah Lakes area affect you?

Pacific Highway, Charmhaven | June 2007

Local Resident Survey

Tuggerah Lakes Floodplain Risk Management Study and Plan | 2010

Flooding is a natural event that can risk human lives, services, goods and properties. There have been large floods in Wyong Shire in 2007, 2004, 1990, 1964 and 1949. Having a good understanding of floods and planning for them can help reduce the risks.

In June 2007 flooding resulted in about:

- 2000 flooded homes
- 10 000 flooded properties
- 500 people needing rescue
- Three days of high flood waters in Wyong Shire.

Wyong Shire Council is preparing a Tuggerah Lakes Floodplain Risk Management Study and Plan. The aim of the plan is to help ensure that Council can plan for and manage the impacts of flooding, and minimise the risks to the community before, during and after flood events.

Do you live, work or play in the Tuggerah Lakes area? Your experience of floods can provide important information to Council. Your ideas of what Council can do to manage flood prone land will help us prepare the plan.

Council would like you to participate in this survey and ask that you fill in and return using the reply paid envelope provided by 31 March 2010.

For more information on flooding go to Wyong Shire Council's website at: http://www.wyong.nsw.gov.au/environment/flooding

All returned surveys will be put in a draw to win a $50 gift voucher.

Q1. Please provide us with the following details (optional):
We may wish to contact you to discuss some of the information you have provided us.

Name: _____

Address: _____

Daytime Phone: _____

Email: _____

Q2. Is your property:

Owner occupied	Occupied by a tenant	A business	School/Aged Care
☐	☐	☐	☐

Q3. How long have you lived, worked and/or owned your property?

_____Months _____Years

Q4. Have you ever experienced flooding since living / working / owning your property?

- ☐ Floodwaters entered my house / work / school / aged care building (date_____ / location_____)
- ☐ Floodwaters entered my backyard (date_____ / location_____)
- ☐ No, I haven't experienced a flood (go to Q.6)

Q5. If you have experienced a flood, how did the flooding affect you and your family / business?

- ☐ Parts of my house / work / school / aged care building were damaged
- ☐ The contents of my house / work / school / aged care were damaged
- ☐ My backyard was damaged
- ☐ My car was damaged
- ☐ Other property was damaged (please specify_____)
- ☐ I couldn't leave my house / work / school / aged care
- ☐ Family members couldn't return to the house / work
- ☐ My family had to evacuate the house / work
- ☐ The flood disrupted my daily routine
- ☐ The sewer stopped working (for how long?)_____)
- ☐ The flood affected me in other ways (please specify_____)
- ☐ No, the flood didn't affect me

Q6. Do you think your property could be flooded sometime in the future?

- ☐ No
- ☐ Yes, but only a small part of my yard
- ☐ Yes, most of my yard
- ☐ Yes, my house could flood over the floor

Q7. Where have you looked for information about flooding on your property?

- ☐ Council's customer service centre
- ☐ Other information from Council (please specify _____)
- ☐ Viewed a Property Planning (Section 149) Certificate
- ☐ Information from a real estate agent
- ☐ Information from relatives, friends, neighbours, or previous owner
- ☐ Other information (please specify _____)
- ☐ No information has been looked for
- ☐ I do not believe my property is affected by flooding

Q8. What do you think are the best ways for Council to get feedback from, and to talk about flooding with the local community?

- ☐ Council's website
- ☐ Emails from Council
- ☐ Council's Floodplain Management Committee
- ☐ Formal Council meetings
- ☐ Council's information page in the local paper
- ☐ Other articles in the local paper
- ☐ Information days in the local area
- ☐ Community meetings
- ☐ Mail outs to all residents / business owners in the study area

Q9. As a local resident, you may have your own ideas on how to reduce flood risks. Which of the following options would you prefer for Tuggerah Lakes? Please also provide comments as to the location where you think the option might be suitable. 1= least preferred 5= most preferred (please circle a number)

Option	Example	Preference	Other Comments?
Recognition of natural flow path	Council may leave a floodway as parkland instead of developing the area	1 2 3 4 5	
Vegetation control	Removing weeds & stabilisation of a river bank by planting trees	1 2 3 4 5	
Building development controls	Council may set a particular floor level height for new buildings and extensions which is above the flood level	1 2 3 4 5	
Education of community	Community learn how to prepare for flooding and what to do during a flood	1 2 3 4 5	
Flood forecasting, flood warning, evacuation planning and emergency response	Flood warnings on the Council website	1 2 3 4 5	
Floodgates or levee banks	A wall or gate built to keep water from overflowing from a river or lake etc.	1 2 3 4 5	
Opening or dredging The Entrance Channel	Council could perform major works to open the channel	1 2 3 4 5	
Voluntary house purchase	Council may offer to buy back flood affected properties from owners	1 2 3 4 5	
House raising	Some houses could be raised above flood planning level	1 2 3 4 5	
Other (please attach a page if needed)	Any other ideas you may have for Council to manage flooding	1 2 3 4 5	

Local Resident Survey – Results

Tuggerah Lakes Floodplain Risk Management Study and Plan | 2010

Q 1.	Please provide us with the following details (optional)? We may wish to contact you to discuss some of the information you have provided us.	Name: Address: Daytime Phone: Email:	
Q 2.	Is your property (please click in check boxes).	Owner occupied 92.8%	Occupied by a tenant 6.3% / A business 0.8% / School/Aged Care 0.4%
Q 3.	How long have you lived, worked and/or owned your property?	Months	Average 30.8 Years
Q 4.	Have you ever experienced flooding since living / working / owning your property?	☐ Floodwaters entered my house / work / school / aged care building (date / location) ☐ Floodwaters entered my backyard (date / location ☐ No, I haven't experienced a flood (go to Q.6)	18.4% 58.2% 33.3%
Q 5.	If you have experienced a flood, how did the flooding affect you and your family / business?	☐ Parts of my house / work / school / aged care building were damaged ☐ The contents of my house / work / school / aged care were damaged ☐ My backyard was damaged ☐ My car was damaged ☐ Other property was damaged (please specify) ☐ I couldn't leave my house / work / school / aged care ☐ Family members couldn't return to the house / work ☐ My family had to evacuate the house / work ☐ The flood disrupted my daily routine ☐ The sewer stopped working (for how long?) ☐ The flood affected me in other ways ☐ No, the flood didn't affect me	15.6% 14.5% 34.3% 7.7% 15.3% 22.8% 13.8% 10.8% 37.5% 24% 23.5% 12.4%
Q 6.	Do you think your property could be flooded sometime in the future?	☐ No ☐ Yes, but only a small part of my yard ☐ Yes, most of my yard ☐ Yes, my house could flood over the floor	11.5% 6% 7.2% 12.6%
Q 7.	Where have you looked for information about flooding on your property?	☐ Council's customer service centre ☐ Viewed a Property Planning (Section 149) Certificate ☐ Information from a real estate agent ☐ Information from relatives, friends, neighbours, or previous owner ☐ Other information (please specify) ☐ No information has been looked for ☐ I do not believe my property is affected by flooding	11.5% 6.% 7.2% 12.6% 29.1% 8.9% 36.4% 12.5%
Q 8.	What do you think are the best ways for Council to get feedback from, and to talk about flooding with the local community?	☐ Council's website ☐ Emails from Council ☐ Council's Floodplain Management Committee ☐ Formal Council meetings ☐ Council's information page in the local paper ☐ Other articles in the local paper ☐ Information days in the local area ☐ Community meetings ☐ Mail outs to all residents/business owners in the study area	18.5% 14.2% 10.6% 5.3% 47.5% 31.2% 24.4% 21.3% 65.6%

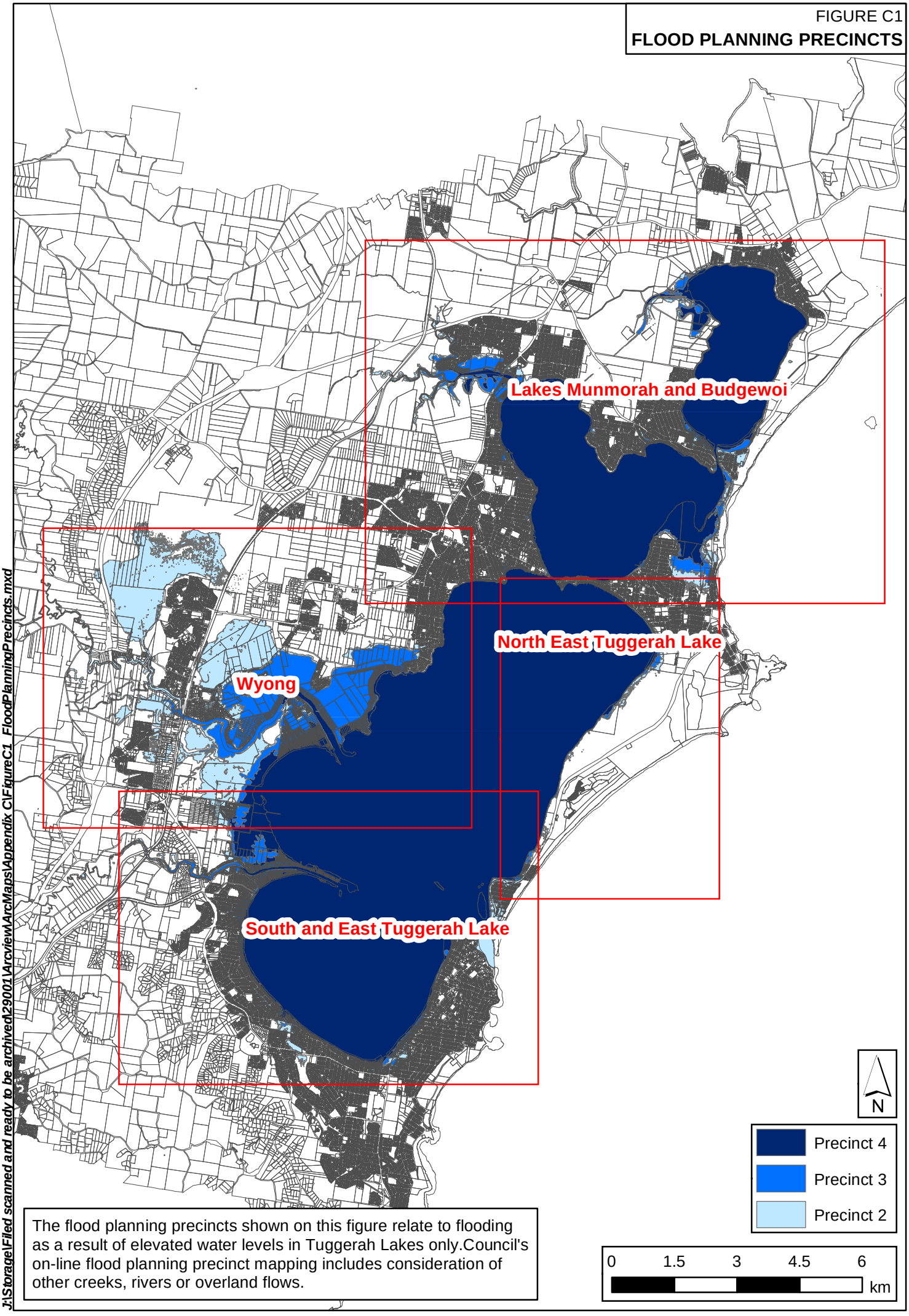
Q 9. As a local resident, you may have your own ideas on how to reduce flood risks. Which of the following options would you prefer for Tuggerah Lakes? Please also provide comments as to the location where you think the option might be suitable.
1= least preferred 5= most preferred (please choose a number from the drop down list)

Option	Example	Preference	Percentage
Recognition of natural flow path	Council may leave a floodway as parkland instead of developing the area	1 2 3 4 5	7.0% 3.2% 6.6% 3.2% 59.2%
Vegetation control	Removing weeds & stabilisation of a river bank by planting trees	1 2 3 4 5	11% 4.5% 11.6% 4.5% 45.2%
Building development controls	Council may set a particular floor level height for new buildings and extensions which is above the flood level	1 2 3 4 5	10% 4.8% 16.3% 4.8% 42.1%
Education of community	Community learn how to prepare for flooding and what to do during a flood	1 2 3 4 5	7.7% 5.7% 16.7% 5.7% 41.8%
Flood forecasting, flood warning, evacuation planning and emergency response	Flood warnings on the Council website	1 2 3 4 5	13.1% 8.2% 16.9% 8.2% 33.9%
Floodgates or levee banks	A wall or gate built to keep water from overflowing from a river or lake etc.	1 2 3 4 5	21.7% 8.8% 13.4% 8.8% 28.3%
Opening or dredging The Entrance Channel	Council could perform major works to open the channel	1 2 3 4 5	8.5% 2.8% 6.6% 2.8% 67.8%
Voluntary house purchase	Council may offer to buy back flood affected properties from owners	1 2 3 4 5	23.5% 8.8% 19.6% 8.8% 21%
House raising	Some houses could be raised above the flood planning level	1 2 3 4 5	18.5% 10.9% 23.8% 10.9% 17.9%

Appendix C

FIGURE C1

FLOOD PLANNING PRECINCTS



The flood planning precincts shown on this figure relate to flooding as a result of elevated water levels in Tuggerah Lakes only.Council's on-line flood planning precinct mapping includes consideration of other creeks, rivers or overland flows.

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FIGURE C2

FLOOD PLANNING PRECINCTS

SOUTH AND EAST OF TUGGERAH LAKE

The flood planning precincts shown on this figure relate to flooding as a result of elevated water levels in Tuggerah Lakes only.Council's on-line flood planning precinct mapping includes consideration of other creeks, rivers or overland flows.

N

Precinct 4

Precinct 3

Precinct 2

0 0.5 1 1.5 2 km

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FIGURE C3

FLOOD PLANNING PRECINCTS

WYONG

Limit of Study Area

N

Precinct 4

Precinct 3

Precinct 2

0 0.5 1 1.5 2 km

The flood planning precincts shown on this figure relate to flooding as a result of elevated water levels in Tuggerah Lakes only.Council's on-line flood planning precinct mapping includes consideration of other creeks, rivers or overland flows.

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The flood planning precincts shown on this figure relate to flooding as a result of elevated water levels in Tuggerah Lakes only.Council's on-line flood planning precinct mapping includes consideration of other creeks, rivers or overland flows.

FIGURE C4
FLOOD PLANNING PRECINCTS
LAKES MUNMORAH & BUDGEWOI

N

Precinct 4
Precinct 3
Precinct 2

0 0.5 1 1.5 2 2.5
km

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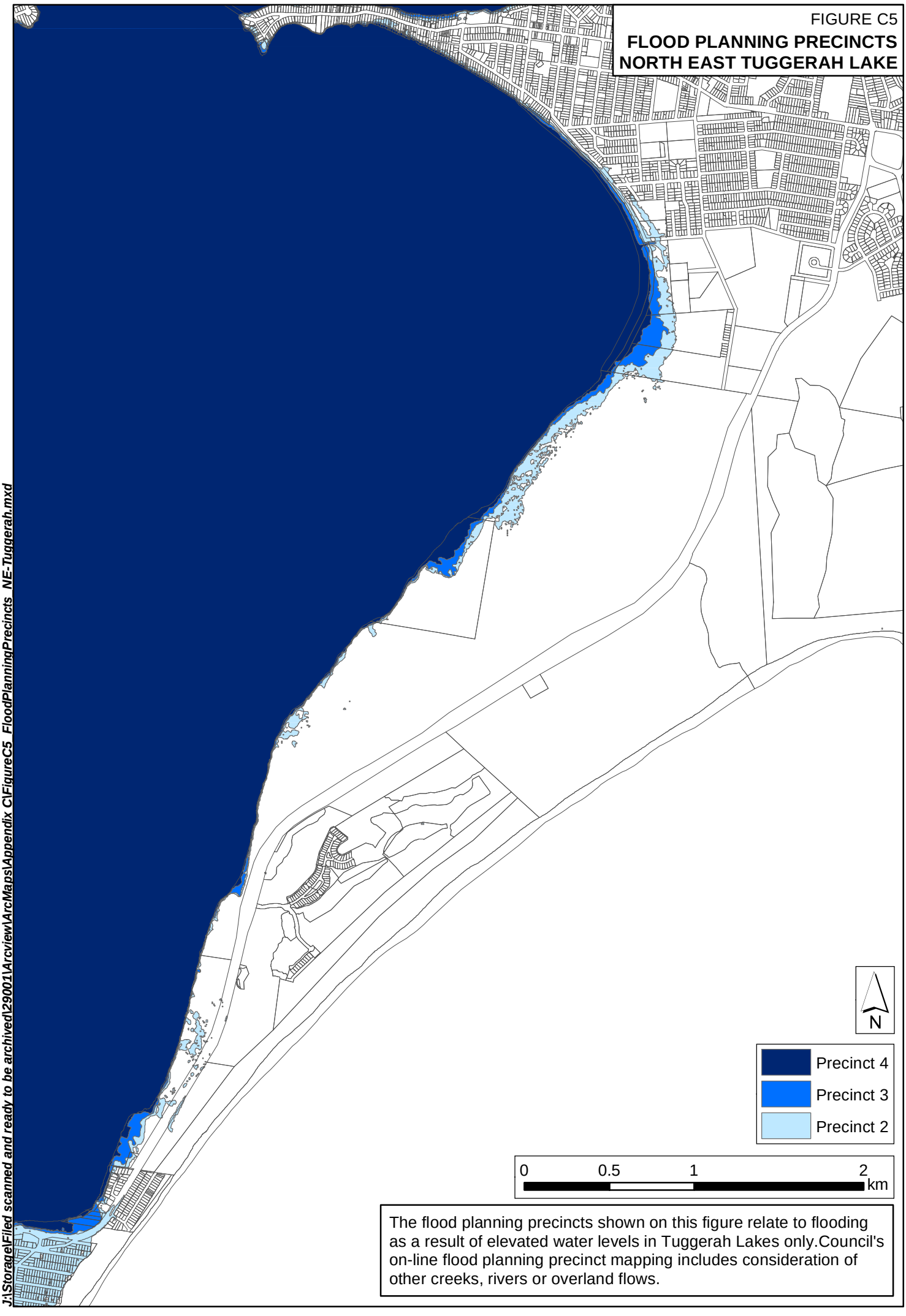
FIGURE C5

FLOOD PLANNING PRECINCTS
NORTH EAST TUGGERAH LAKE



The flood planning precincts shown on this figure relate to flooding as a result of elevated water levels in Tuggerah Lakes only.Council's on-line flood planning precinct mapping includes consideration of other creeks, rivers or overland flows.

J:\Storage\Filed scanned and ready to be archived\29001\Arcview\ArcMaps\Appendix C\FigureC5_FloodPlanningPrecincts_NE-Tuggerah.mxd