FLOOD RISK MANAGEMENT

POLICY 3.19

FLOOD RISK MANAGEMENT

DIVISION: DEVELOPMENT & HEALTH

PILLAR: MANAGING URBAN GROWTH

FILE / BINDER: Policy Manual

OBJECTIVE:

To establish flood risk management planning and development procedures for all flood prone land within the Camden Local Government Area (LGA).

BACKGROUND:

Refer Council Report 10 April, 2006 – ORD 88/06.

POLICY STATEMENT:

See over page.

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RELEVANT LEGISLATION:	**EP&A Act**
RELATED POLICIES:	**NSW Government Floodplain Development Manual April 2005**
DELEGATIONS:	**No**
SUSTAINABILITY ELEMENT:	**Yes**
STAFF TRAINING REQUIRED?	**No**

NEXT REVIEW DATE: **31 March 2013**

PREVIOUS POLICY
ADOPTED:
MINUTE:

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1. INTRODUCTION

1.1 Preamble

The Flood Risk Management Policy establishes flood risk management planning and development procedures for all flood prone land within the Camden Local Government Area (LGA). Flood prone land is land susceptible to flooding by the Probable Maximum Flood (PMF) event.

The Policy has regard to the requirements of the New South Wales Government Floodplain Development Manual – April 2005

The primary method of Flood Risk Management in the Camden LGA is through the application of development controls on flood prone lands as set out in this policy.

1.2 Title

This Policy is called Camden Council Flood Risk Management Policy.

1.3 Commencement

This Policy commences on a date to be notified by the Council.

Note: The policy was approved by the Council on 10 April, 2006 and commenced on 10 April, 2006 (see Minute No. ORD88/06)

1.4 Land to which the Policy Applies

This Policy applies to all flood prone land within the Camden LGA.

The Policy also applies to properties affected by major drainage and local overland flow catchments including any that are not currently identified on Council's Flood Information Maps and Flood Studies.

1.5 Purpose of Policy

Camden Council has a duty of care to ensure that development of flood affected properties is carried out in a reasonable and responsible manner, and encourage the use of land which is compatible with the indicated flood hazard.

The development of individual property needs to be balanced against the broader community expectations and physical constraints of the land. Council, through the development control process, seeks to manage development on flood prone property that minimises financial and personal risk to the community.

1.6 Aims and Objectives

The aims and objectives of this Policy are to:

- inform applicants of Council's Development Controls in flood risk areas;
- adopt a Flood Planning Level (FPL)
- alert the community to the extent and hazard of flooding in the Camden LGA;
- reduce the impact of flooding on individual properties;
- limit private and public liability resulting from flooding;
- limit the potential risk to life and property resulting from flooding;
- prevent non-compatible development in flood prone areas;
- ensure development in flood prone areas is sympathetic with the character of the surrounding land uses and character;
- ensure, where practical, that buildings and services required for evacuation and emergency needs are located above the Probable Maximum Flood (PMF);
- assess all proposed developments on flood prone properties on a 'merits based' approach taking account of social, economic, environmental and flooding considerations;

The aims and objectives of the Policy will be achieved by providing guidelines for development on flood prone land, together with specific Council requirements applying to the proposed land use.

2. CAMDEN FLOODING CRITERIA & CONSIDERATIONS

2.1 Flood Planning Level

The Flood Planning Level (FPL) used for general planning control purposes is derived from a combination of the 1% Annual Exceedance Probability (AEP) flood event plus a freeboard of 600mm. Throughout this policy, this is known as the Flood Planning Level. (FPL)

Notwithstanding the general FPL, Council may approve additions to existing flood liable industrial/commercial buildings, allowing for floor levels at the 1% AEP flood level (in accordance with Section 4.6 of this Policy). Each application where such an approach is proposed will be considered on its individual merits

Some areas of Camden have been identified as potential mine subsidence areas. This matter is detailed in Section 2.4. In such identified areas, an allowance will need to be made by the Mine Subsidence Board to the 1% AEP flood level and the FPL.

2.2 Local Overland Flooding

In accordance with the NSW Floodplain Management Manual, this Policy recognises the significant effects to land uses that may occur due to local overland flooding as a separate issue to mainstream flooding.

Local overland flows can be generated from a variety of sources. At the lower end of the scale these would typically include direct surface runoff, surcharges and overflows from low points in kerbs, or overflows from smaller pipes. These are categorised as local drainage. At the upper end of the scale, overland flows involve the floodplains of original watercourses whether still natural or altered (piped, channelised, diverted or restricted due to or by urban development). These are categorised as major drainage.

Properties affected by local overland flow or major drainage currently not identified on Council's Flood Maps and Flood Studies are subject to the same Flood Risk Management development controls and guidelines detailed in this Policy. These site constraints and how they are to be accommodated with the proposed development need to be ascertained by the Applicant and form part of the development application submission.

2.3 Reliable Safe Flood Access

Development on land below the 1% AEP flood level may be permitted, but only where effective warning time and reliable safe flood access is available for the evacuation of flood prone land.

Every development application on flood prone land, must demonstrate that effective warning time and reliable safe flood access for the evacuation of people to a communal refuge is available in the event of a flood event. Further, it should be demonstrated that the displacement of these people during times of flood will not significantly add to the overall cost and community disruption caused by the flood.

For the purpose of this Policy, reliable safe flood access is considered satisfactory when the depth of floodwater over vehicular access routes (roads and legal right of ways) allows the safe and stable movement of vehicles and the safe and stable movement of people in floods up to and including the PMF event. This must be demonstrated and certified by a qualified engineer with suitable specialist experience in hydraulic engineering and flood risk management. The stability of vehicles must be demonstrated using velocity and depth relationships of floodwaters as discussed in Figure G1 of the NSW Government's Floodplain Management Manual. The access route is to be legal and permanent, fail safe and maintenance free.

"Australian Rainfall & Runoff – A Guide to Flood Estimation" (AR&R) addresses the issue of safety associated with urban drainage systems. AR&R recommends that to prevent pedestrians being swept along streets and other drainage paths during major storm events, the product of velocities and depths in streets and major flow paths generally should not exceed 0.4 m^2/s. Where vehicles alone are affected, a higher depth-velocity product, 0.6 or 0.7 m^2/s depending on vehicle size is appropriate.

2.4 Mine Subsidence

Beneath the urban area of Camden and localities nearby lie significant resources of coal. Should the extraction of this coal be undertaken by underground mining there is the potential for subsidence to occur. If subsidence occurred in flood prone areas the effects of flooding could be aggravated.

Applicants for all proposed developments should be aware of the potential for mine subsidence in some areas of the Camden LGA.

In areas where Council has been advised by the Mine Subsidence Board of possible mine subsidence areas, this information has been included on Council's Section 149 certificates. Section 149 certificates can be obtained from the Development Branch of Council's Development & Environment Division.

Levels of anticipated subsidence can be obtained from the Mine Subsidence Board and must be included in the determination of the Flood Planning Level.

2.5 Land forming and Fill Operations

Fill operations will not be permitted below the 1% AEP flood level in floodways and flood storage areas.

All applications on land below the 1% AEP flood level in flood fringe areas that propose to undertake land forming operations must be accompanied by a detailed submission, including a hydraulic report, prepared by a qualified engineer with suitable specialist experience in hydraulic engineering and flood risk management. The report must certify that no adverse impacts to mainstream or local drainage will occur as a result of the proposed land forming operations. The report must examine hydraulic characteristics, such as peak flow, flows and depth of flows for all flood and storm events, and potential impacts on any other land. The report must also address the cumulative effect from the land forming operation if similar land forming operations are undertaken on other properties in the vicinity.

Any proposed filling on flood prone land will be given consideration on a merits based approach.

Applicants for all proposed developments that may involve land forming operations should be aware of Council's Development Control Plan No 106 – Land forming Operations.

3. FLOOD AWARENESS

3.1 Hydraulic Categories

- **Floodways** are those areas where a significant volume of water flows during floods and are often aligned with obvious natural channels. They are areas that, even if only partially blocked, would cause a significant increase in flood levels and/or a significant redistribution of flood flow, which may in turn adversely affect other areas. They are often, but not necessarily, the areas with deeper flow or the areas where the higher velocities occur.
- **Flood Storages** are those parts of the floodplain that are important for the temporary storage of floodwaters during the passage of a flood. If the capacity of flood storage is substantially reduced, flood levels in nearby areas may rise and the peak discharge downstream may be increased. Substantial reduction of the capacity of a flood storage area can also cause a significant redistribution of flood flows.
- **Flood Fringe** is the remaining area of land affected by flooding, after floodway and flood storage areas have been defined.

In determining appropriate hydraulic categories, it is important that the cumulative impact of progressive development be evaluated particularly with respect to floodway and flood storage areas. Whilst the impact of individual developments may be small, the cumulative effect of the ultimate development of the area can be significant and may result in unacceptable increases in flood levels and velocities elsewhere in the floodplain.

3.2 Hazard Categories

Flood hazard is a measure of the overall adverse effects of flooding which takes into consideration depth and velocity of floodwaters, effective evacuation time and evacuation difficulties. Hazard categories are broken down into high and low hazard for each hydraulic category.

Taking all issues into account, particularly the limited warning time and generally rapid rise of water levels in the catchments within the Camden LGA, all areas in the floodplain are considered to be **High Hazard**.

This hazard rating is not intended to sterilise the land for any use. Rather, it is a signal that any development that occurs in the floodplain should be planned with due attention to the flood related issues and that strict implementation of flood related development controls is essential for the reduction of flood damages.

3.3 Flood Mapping & Information

Council holds flood information and mapping for the major floodplains in the LGA, namely the Nepean River and its tributaries, and South Creek and its tributaries.

Plans have been prepared on behalf of Council that show the extent of inundation for various flood frequencies. These plans are available for inspection upon prior arrangements being made with Council's Works & Services Division. Council's flood mapping is only to be used to give a likely indication of the extent of flooding. The flood maps are to be used for indicative purposes and confirmation by ground survey is required.

Other areas subject to flooding where Council does not hold flood information and mapping, which are generally affected by either natural watercourses, local overland flooding or major drainage, are subject to the same Flood Risk Management development controls and guidelines detailed in this Policy. This matter has been detailed in Section 2.2.

In areas where Council does not hold flood information and mapping, potential developers will be required to provide 5 % AEP, 1% AEP and PMF flood levels.

3.4 149 Certificates

All Councils have statutory responsibility for land use planning and management under the EP&A Act for their local government area. Property information provided on certificates issued by Councils under Section 149 of the EP&A Act facilitate awareness of constraints and restrictions on the land.

In areas where Council holds flood related information, the Section 149 certificate shall indicate that the land is affected by flooding with additional information provided where appropriate. Section 149 certificates can be obtained from the Development Branch of Council's Development & Environment Division.

4. PROPERTY MODIFICATION STRATEGIES

4.1 Floodplain Risk Management Measures

There are basically three ways of managing flood risk to reduce losses:

- Flood Modification – by modifying the behaviour of the flood itself (for example construction of a levee to exclude floodwaters from an area).
- Property Modification – by modifying existing properties (for example house raising) and/or imposing controls on property and infrastructure development.
- Response Modification – by modifying the response of the population at risk to better cope with a flood event (for example improving community flood readiness).

As part of its floodplain risk management process Council has had a Floodplain Management Study & Plan (FMS&P) prepared for the Upper Nepean River and its tributaries. The Upper Nepean River Floodplain Management Study & Plan was prepared by Council in consultation with the Floodplain Management Committee. The FMS&P was received by Council at its meeting of 9 April 2001 to allow its use as a resource and information tool for Council to use in its future floodplain management planning.

As part of the FMS&P, flood modification measures to address the existing flood hazard from the Nepean River and its tributaries in the Camden LGA were considered. The measures considered included levees, flood control dams, retarding basins, by-pass floodways and channel improvements. The Camden Floodplain Management Committee considered these options on the basis of their economic, environmental and social impact on Camden, or their suitability to address the flooding situation. It was decided not to pursue flood modification options.

The FMS&P concluded that the modifying of existing high hazard properties by way of voluntary purchase, house raising and flood proofing, was an appropriate way of managing flood risk to reduce flood losses in the Camden LGA.

In implementing such a property modification scheme Council's priority will be to approach owners of the most severely flood effected dwellings with the view of purchasing these properties. After exhausting options for the voluntary purchase of such properties the owners of dwellings considered suitable for house raising would then be approached.

4.2 Voluntary Purchase

In certain urban areas where the hazard in the floodplain is high and it is impractical or uneconomic to mitigate the flood hazard, it may be appropriate to cease occupation of the land to minimise the physical and economic risk to the residents, potential rescuers and the community. In such situations, should funds be available, Council may instigate a voluntary purchase scheme of affected properties in consultation with the Department of Infrastructure, Planning and Natural Resources (DIPNR) (formerly the Department of Land & Water Conservation) and the affected residents, and in consideration of other relevant matters outlined in the New South Wales Government's Floodplain Management Manual.

The primary funding mechanism for any floodplain management measure is through the Government's Floodplain Management Program. This is undertaken by application under the Floodplain Management Authorities funding assessment. Funding is provided on a priority basis, with Council required to fund a share of the costs involved. Funding preference is given to dwellings where there is a risk to lives and properties. As such, vacant land is unlikely to gain Government funding and therefore is not considered suitable to include in Council's voluntary purchase scheme.

Should Council be successful in acquiring government funding for a voluntary purchase scheme and have sufficient funds available for its share of the costs involved, then the affected residents will be approached based on the priority list provided in Section 7.3 of this Policy. It should be noted there is no certainty that funding will become available for voluntary purchase in the Camden LGA.

Should Council be successful in implementing a voluntary purchase scheme, once a flood affected property is purchased, that land will be rezoned to a flood compatible use such as Open Space.

4.3 House Raising

House raising has long been a traditional response to flooding in New South Wales. Avoidance of flood damage by house raising achieves the flood risk management objectives of a reduction in personal loss; a reduction in danger to personal safety; and a reduction in stress and post flood trauma.

Where house raising is identified in a flood risk management plan as a means of protecting a significant number of houses at serious risk of flooding, it becomes a formal management measure, and, as such, is eligible for Government financial assistance. Council may instigate a house raising scheme of affected properties in consultation with DIPNR and the affected residents, and in consideration of other relevant matters outlined in the New South Wales Government's Floodplain Management Manual.

Should Council be successful in acquiring government funding for a house raising scheme, and have sufficient funds available for its share of the costs involved, then the affected residents will be approached based on the priority list provided in Section 7.4 of this Policy. Funding is provided on a priority basis, with Council required to fund a share of the costs involved. As house raising will add value to the affected property, it will be necessary for Council to negotiate with the benefiting landowner to provide a fair and reasonable proportion of Council's share of the funding. It should be noted there is no certainty that funding will become available for house raising in the Camden LGA.

If house raising is the only means of damage reduction available to individual properties, house raising can be undertaken by the individual owner. The owner of any house that is in the floodplain may apply to Council for consent to undertake flood proofing of their dwelling (generally house raising). A pre-application meeting with Council Officers is recommended. Each application will be treated on its merits. It is expected that the proposed works will not increase the number of people residing in the high hazard areas of the floodplain.

Any proposed house raising should be designed to have regard to the streetscape, minimising both the visual impact on the street and the visual impact on the community, as well as views, privacy and overshadowing of surrounding dwellings. Any impact on items of environmental heritage should also be addressed. Details such as architectural and landscaping enhancements should ensure that the resultant structure will not have significant adverse impacts upon the amenity and character of the area.

As part of any potential house raising, the affected residents should be educated on what emergency actions to take in case of a flood and preparations that can be taken to minimise flood impact. Where house raising is undertaken in flood prone areas, consideration must be given to the potential impacts of a higher than design flood; isolation if flood waters restrict access to the house; and capacity of the dwelling for self sufficiency during the flood event.

4.4 Rebuilding in the Floodplain

In the event of a building on land lying below the 1% AEP flood level being destroyed, Council will consider an application for rebuilding on the site. Any such application will be considered on its merits, having regard to flooding, evacuation, environmental, streetscape and heritage factors.

Any replacement building approved by Council must be constructed in accordance with the flood proofing guidelines as specified in Sections 4.7 and 7.5 of this Policy (as appropriate) and such that all habitable floor levels are at or above the Flood Planning Level.

It is expected that such rebuilding on flood prone land will not increase the number of people at risk residing in high hazard areas.

There is no certainty that rebuilding on land lying below the 1% AEP flood level will be permitted.

Development consent to rebuild in the floodplain will be contingent upon the rebuilding proposal not including additional bedrooms or studies that could later be used for bedrooms.

4.5 Alterations and Additions to Dwellings in the Floodplain

Council will consider an application for additions and/or alterations to dwellings on land lying below the 1% AEP flood level provided that the work will not increase the number of people at risk residing in high hazard areas. This will be assured by way of refusing applications for additions where those additions include the creation of new bedrooms or studies that could be later used as a bedroom. Any such application will be considered on its merits, having regard to flooding, evacuation, environmental, streetscape and heritage factors.

Council may permit a once only minor addition of up to 30m² habitable floor area to an existing lawfully constructed dwelling on land lying below the 1% AEP flood level allowing floor levels the same as the existing ground floor level of the dwelling. The criteria for assessment is set out in Section 6.3 (Development Guidelines Matrix) of this Policy.

Council may permit major additions of greater than 30m² habitable floor area to an existing lawfully constructed dwelling on land lying below the 1% AEP flood level. Any such major addition approved by Council must be constructed in accordance with the following:

- the site must have reliable safe access for pedestrians and vehicles during the PMF event
- all habitable floor levels of the new building work must be constructed at or above the FPL
- the existing dwelling must either be raised so that the habitable floors are at the FPL at the time of the work or be capable of being raised at some later date
- the area of the building work below the FPL must be closed and assumed to impede the flow of floodwaters. The affect of the building on flood levels and the effect of the flood on the building must be determined
- such work must not increase the number of bedrooms within the dwelling

- any work associated with such additions and alterations must be constructed in accordance with the flood proofing guidelines as specified in Sections 4.7 and 7.5 of this Policy.

In addition to these issues, usual consideration and compliance with Development Control Plan No 58: Residential Code or any other applicable Development Control plan is necessary.

There is no certainty that alterations and additions to existing dwellings on land lying below the 1% AEP flood level will be permitted.

4.6 Redevelopment of Commercial Areas of the Floodplain

Council will consider an application for the redevelopment of sites on land below the 1% AEP flood level within areas zoned commercial. Any such application will be considered on its merits having regard to flooding, evacuation, environmental, streetscape and heritage factors.

Any redevelopment of a site approved by Council must be constructed in accordance with the flood proofing guidelines as specified in Sections 4.7, 5.1, 5.2 and 7.5 of this Policy (as appropriate) and such that all habitable floor levels are at or above the Flood Planning Level and all floor levels are at or above the 1% AEP flood level.

It is expected that such redevelopment on flood prone land will not increase the number of people at risk residing in high hazard areas.

There is no certainty that redevelopment on land below the 1% AEP flood level will be permitted.

4.7 Flood Proofing Buildings

Flood proofing buildings refers to the design and construction of buildings with appropriate water resistant materials such that flood damage to the building itself, and possibly its contents, is minimised should the building be inundated.

To prevent or minimise structural damage from flooding, developments should be designed to withstand inundation, debris and buoyancy forces. Particular methods of construction and certain types of materials are better able to withstand inundation better than others. Suggested flood proofing materials and management practices are provided in Section 7.5 of this Policy.

The owner of any house that is on flood prone land may apply to Council for consent to undertake flood proofing of their dwelling. A pre-application meeting with Council Officers is recommended. Each application will be treated on its

merits. It is expected that the proposed works will not increase the number of people residing in the high hazard areas of the floodplain.

4.8 Electrical Installations

Special consideration should be given to the design and siting of electrical installations in all cases of development on flood prone land. All electrical installations must comply with the requirements of Integral Energy. Further guidelines are provided in Section 7.5 of this Policy. All electrical equipment is required to be at or above the FPL

4.9 Fencing

All fencing on land below the 1% AEP flood level must be of a form that:

- does not result in the undesirable obstruction of the free flow of floodwaters; and
- does not become unsafe during floods and potentially become moving debris which threatens the integrity of structures or the safety of people.

No fencing will be allowed across, over or through watercourses, drainage easements and overland flowpaths.

4.10 Basement Parking

All car parking areas must drain by gravity flow.

Basement car parking generally results in multiple garaging facilities with the collective value of motor vehicles and stored items in the hundreds of thousands of dollars. Being underground there is the added risk to people should they be trapped by the sudden influx of floodwaters. Basement parking in flood affected areas is only permitted if the basement is fully flood protected without the reliance on mechanical devices or human intervention, including the crest level of all accesses to the basement being fully contained above the PMF. There is also to be a flood free evacuation route from the basement to an area of the development that is not flood affected.

4.11 On-site Sewage Management

On sites where required, on-site sewage management systems must be installed and operated to comply with Council's Sewage Management Strategy. A copy of the Sewage Management Strategy can be obtained from Council's Customer Service Counter.

Council has prescribed performance standards when determining applications for approval to install, construct, alter or operate sewage management systems. The Local Government (Approvals) Regulation 1999 specifies the minimum standards.

No portion of the sewage management system (ie treatment tanks, electrical pumps etc.) is permitted to be below the 1% AEP flood level. No portion of the irrigation area, absorption or evapo-transpiration area is permitted to be located below the 5% AEP flood level or within 40 metres of the top of the bank of a watercourse, creek or river.

4.12 On-Site Detention

For all development sites, the total flow rate and concentration of stormwater runoff in the post-developed state is to be no more that that which exists in the pre-developed state. For all developments other than subdivisions, this condition is to be met with the use of on-site detention storage. The triangular hydrograph method may be used to determine the site storage and runoff requirements.

On-Site Detention Basins must be designed to mitigate flows up to and including the 1% AEP Storm Event.

For subdivision developments, one or more single detention basins may be used to achieve this condition. The number of detention basins to be utilised in subdivisions is to be kept to a minimum.

5. COMMUNITY SAFETY & BUILDING MANAGEMENT

5.1 Emergency Response Management

Floodwater in the Camden LGA can rise rapidly with limited warning time, certain areas are at the risk of severe depths of inundation and high velocity flows.

The lack of suitable time for flood emergency response means that individual property owners need to be prepared in their own right. Residents and business proprietors occupying land that can be affected by flood events should ensure that they have in place an appropriate evacuation plan known by all occupants of the building/site. The plan should ensure that any chosen evacuation route will be available in such an event. The evacuation plan should also take into consideration the safety of family pets.

It is desirable that the occupants of flood affected land have established their property in order that suitable arrangements can be undertaken to minimise damage and loss of property by elevating goods and chattels above the flood planning level.

The flood awareness and preparedness of the community will not only minimise the risk of life (to both occupants and potential rescuers), but also minimise actual and potential flood damages by appropriate preparatory and evacuation measures.

5.2 Flood Management Plans

All applications on flood prone land must be accompanied by an evacuation strategy.

For commercial developments where it may be difficult to achieve FPL floor levels and still provide reasonable access to the existing public footway areas, Council may, on a merits basis, consider a reduced habitable floor level to a minimum of the 1% AEP storm event flood level, provided satisfactory flood compatibility and protection is provided up to the FPL. Such applications must be accompanied by a site specific assessment of the flood hazard associated with the proposed use, and demonstrate that adequate storage areas are available for hazardous materials and valuable goods and equipment above the FPL. Floor plans are to be designed to facilitate the flow of water using flood compatible materials. The report of the analysis is to be prepared by a qualified engineer with suitable specialist experience in hydraulic engineering and flood risk management.

In commercial developments effective and permanent signage is to be erected to clearly indicate the procedures to make the building flood compatible and contain appropriate evacuation procedures.

6. DEVELOPMENT GUIDELINES

6.1 Methodology

This plan establishes a methodology that can be applied to all flood prone land where development is proposed. This methodology will determine if development is suitable on flood prone land and will define standards that need to be implemented in relation to the proposed development.

The impact of flooding is dependent upon a number of variables, including the hydraulic and hazard categories applicable to a particular property and the land use category applicable to the proposed development.

The flood hazard categories and hydraulic categories are determined using the methods and definitions specified in the NSW Government Floodplain Management Manual. Such categories should be determined at the location of the proposed development by a qualified engineer with suitable specialist experience in hydraulic engineering and flood risk management engaged by the applicant (at their expense), prior to Council's assessment of the development proposal. Council may be able to assist in this regard by providing details of available flood information pertaining to a particular property.

Descriptions of Hydraulic Categories are given in Section 3.1 of this Policy. In regard to Hazard Categories, as detailed in Section 3.2 of this Policy, all areas within the floodplain in the Camden LGA are considered to be High Hazard.

6.2 Land Use Categories

Council will evaluate each development proposal to determine its classification based upon the following land use categories. It should be noted that the following land use categories are applicable only to this Policy in assessing flood compatibility. Such land use categories should not be used to determine the permissibility of a particular land use in accordance with the relevant Environmental Planning Instruments.

The following land use categories are used in the matrix of planning controls used in these development guidelines.

- **Subdivision**

  Includes the subdivision of land for residential purposes. This definition also pertains to the subdivision of land for rural residential purposes. Caravan parks are also included within this category only for the purpose of this policy.

- **Residential**

Refers to the construction of dwellings, two dwelling developments and multi unit housing development.

- **Minor Residential Additions**

  Includes habitable and non habitable dwelling additions (up to 30m^2), garages or any other structure deemed appropriate by the Manager Development.

- **Commercial**

  Refers to all commercial development, commercial additions and subdivision of land for commercial purposes. Motels also fall within this category and will be given special consideration by Council given the potential risk.

- **Industrial**

  Refers to all industrial and warehouse developments, industrial additions and subdivision of land for industrial purposes.

- **Rural (Non Urban)**

  Refers to the use of land for agricultural or associated pursuits and includes the construction of farm sheds and non-habitable outbuildings. This definition also pertains to the subdivision of land for rural purposes.

- **Open Space/Recreation**

  Generally refers to development of open space land for recreational purposes and includes, but is not limited to, development such as amenity blocks or clubhouses for sporting fields, and the like.

- **Critical Utilities & Public Facilities**

  Includes hospitals; sewage treatment facilities; utility installations; telecommunications infrastructure; SES offices; police, ambulance and fire stations; evacuation centres; and the like.

6.3 Development Guidelines Matrix

Council has prepared a development guidelines matrix that applies to a particular type of development based on the land use and hydraulic categories. Prior to identifying the development guideline standards, the flood categories should be determined at the location of the proposed development by a qualified engineer with suitable specialist experience in hydraulic engineering and flood risk management (engaged by the applicant). The flood category must be determined in accordance with the methods and definitions specified in the NSW Government Floodplain Management Manual.

Notwithstanding the following requirements, Council will adopt a “merits based” approach to the assessment of development of flood prone land.

GROUND LEVEL OF FLOOD PRONE LAND

OUTER FLOODPLAIN (ABOVE 1% AEP FLOOD LEVEL TO PMF)

DEVELOPMENT CONTROL CONSIDERATION	SUBDIVISION	RESIDENTIAL	MINOR RESIDENTIAL ADDITIONS	COMMERCIAL OR INDUSTRIAL	RURAL (NON URBAN)	OPEN SPACE/RECREATION	CRITICAL UTILITIES & PUBLIC FACILITIES
FLOOR LEVEL		1	2	1,3	1		
GROUND LEVEL	1,2,3	3			2,3	3	
STRUCTURAL SOUNDNESS		1	1	1	1	1	
EVACUATION & ACCESS	2,3	1,2		1,2,3	1,2		
FLOOD AFFECTATION	2	2	2	2	2	2	
FLOOD AWARENESS	1,2	1,2	2,3	1,2	1,2	2	
BUILDING MANAGEMENT	4			4			

FLOOD FRINGE (UP TO THE 1%AEP FLOOD LEVEL)

DEVELOPMENT CONTROL CONSIDERATION	SUBDIVISION	RESIDENTIAL	MINOR RESIDENTIAL ADDITIONS	COMMERCIAL OR INDUSTRIAL	RURAL (NON URBAN)	OPEN SPACE/RECREATION	CRITICAL UTILITIES & PUBLIC FACILITIES
FLOOR LEVEL		1	1,2	1,3	1,2		
GROUND LEVEL	1,2,3	3			3	3	
STRUCTURAL SOUNDNESS		1	1	1	1	1	
EVACUATION & ACCESS	1,2,3	1,2		1,2,3	1,2	2	
FLOOD AFFECTATION	1,2,3	1,2	1,2	1,2	1,2	1,2	
FLOOD AWARENESS	1,2	1,2	2,3	1,2	1,2	2	
BUILDING MANAGEMENT	4	1,2,3		1,2,3,4	1,2,3	3,4	

FLOOD STORAGE (UP TO THE 1%AEP FLOOD LEVEL)

DEVELOPMENT CONTROL CONSIDERATION	SUBDIVISION	RESIDENTIAL	MINOR RESIDENTIAL ADDITIONS	COMMERCIAL OR INDUSTRIAL	RURAL (NON URBAN)	OPEN SPACE/RECREATION	CRITICAL UTILITIES & PUBLIC FACILITIES
FLOOR LEVEL		1	1,2	1,3	1,2		
GROUND LEVEL	1,2,3	3			3	3	
STRUCTURAL SOUNDNESS		1	1	1	1	1	
EVACUATION & ACCESS	1,2,3	1,2		1,2,3	1,2	2	
FLOOD AFFECTATION	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	
FLOOD AWARENESS	1,2	1,2	2,3	1,2	1,2	2	
BUILDING MANAGEMENT	4	1,2,3		1,2,3,4	1,2,3	3,4	

FLOODWAY (UP TO THE 1%AEP FLOOD LEVEL)

DEVELOPMENT CONTROL CONSIDERATION	SUBDIVISION	RESIDENTIAL	MINOR RESIDENTIAL ADDITIONS	COMMERCIAL OR INDUSTRIAL	RURAL (NON URBAN)	OPEN SPACE/RECREATION	CRITICAL UTILITIES & PUBLIC FACILITIES
FLOOR LEVEL			1,2		1,2		
GROUND LEVEL					3	3	
STRUCTURAL SOUNDNESS			1		1	1	
EVACUATION & ACCESS					1,2	2	
FLOOD AFFECTATION			1,2,3		1,2,3	1,2,3	
FLOOD AWARENESS	1,2	1,2	2,3	1,2	1,2	2	
BUILDING MANAGEMENT					1,2,3	3,4	

NOT RELEVANT (grey shading) UNSUITABLE LAND USE (black shading)

FLOOR LEVEL

1	Habitable floor levels are to be equal to or greater than the FPL. The FPL is the 1% AEP flood event level plus a freeboard of 600mm. See glossary for definitions of habitable rooms for residential/industrial/commercial situations
2	Notwithstanding the provisions of (1), Council may permit a once only minor addition of habitable floor area of up to 30m² of habitable floor area to an existing dwelling that has been lawfully constructed providing the work must not increase the number of bedrooms within the dwelling. A minor addition shall be allowed at the same level as the existing ground floor level of the dwelling. Council may consider applications for major additions of greater than 30m² providing the work must not increase the number of bedrooms within the dwelling. For a major addition the requirements of RESIDENTIAL apply, as well as Section 4.5 of this Policy.
3	Notwithstanding the provisions of (1), Council may approve additions to existing flood liable industrial/commercial buildings, allowing habitable floor levels below the FPL. The applicant must demonstrate that all practical measures will be taken to minimise the impact of flooding. In determining such an application, Council will assess the application on a merits based approach with consideration to nature of business, frequency and depth of flooding and whether the raising of floor levels will be out of character with adjacent land uses or streetscapes.

GROUND LEVEL

1	All allotments in future subdivisions are to be a minimum of 300mm above the 1% AEP flood level.
2	For rural residential subdivisions, all proposals must nominate a building envelope which is a minimum of 300mm above the 1% AEP flood level. The building envelope must have a minimum area of 500m² and a minimum one way dimension of 15m, suitable for the erection of a dwelling. The building envelope, and access from the road, must be free of any site constraints such as mainstream flood affectation, local overland flow paths, required sewage and stormwater disposal areas, setbacks and significant trees/vegetation.
3	Where on-site sewerage management systems are to be installed and operated, no portion of the sewerage management system (ie treatment tanks, pumps, etc) is permitted below the 1% AEP flood level. No portion of the irrigation area, absorption or evapo-transpiration area is permitted to be located below the 5% AEP flood level or within 40m of the top of bank of a watercourse.

STRUCTURAL SOUNDNESS

1	Engineers report required to prove that any portion of a structure can withstand the force of flood water, debris and buoyancy, up to and including the PMF flood event.

EVACUATION & ACCESS

1	Reliable safe access for pedestrians and vehicles required during the PMF flood event.
2	Consideration required regarding an appropriate flood evacuation strategy and pedestrian/vehicular access route during a flood event up to the PMF. In the case of amenities building, which are not used for any storage or which will not have any valuable chattels permanently located in them, this consideration will not apply.
3	The evacuation route from land above the 1% AEP flood level in each proposed allotment in future subdivisions must be contiguous to land not lower than the PMF flood level so as to allow evacuation in extreme events.

FLOOD AFFECTATION

1	Engineers report required to prove that the proposed development will not adversely increase flood affectation elsewhere
2	The impact of the proposed development on flooding elsewhere is to be considered
3	No net reduction in flood storage below the 1% AEP flood level

FLOOD AWARENESS

1	Restrictions to be placed on title advising of flood planning levels (floor level) required relative to the 1% AEP flood level
2	S149 certificates to notify affectation by the PMF flood
3	Restrictions to be placed on title advising that a once only addition of habitable area has been undertaken and no further addition of habitable floor area will be permitted.

BUILDING MANAGEMENT

1	Flood management plans are required where floor levels are below the FPL.
2	Applicant to demonstrate that there are adequate storage areas are available for hazardous materials and valuable goods and equipment at or above the FPL.
3	No external storage of material below the 1%AEP flood level which may be hazardous during flood events
4	Applicant to demonstrate that potential development as a consequence of a subdivision proposal can be undertaken in accordance with this policy

7. APPENDICES

7.1 Glossary

It should be noted that the following definitions are only applicable to this Policy.

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, a 1% AEP flood has a 1% or 1 in 100 chance of happening each and every year.

Australian Height Datum (AHD)

A common national surface level datum approximately corresponding to mean sea level

communal refuge

A flood free area, on land above the Probable Maximum Flood (PMF) level, publicly accessible, capable of providing communal flood free facilities, shelter and emergency assistance for occupants of surrounding flood bound areas and capable of being practically provided with basic needs such as food and clothing from outside the flood affected area.

consent authority

The Council, Government agency or person having the function to determine a development application for land use under the Environmental Planning and Assessment Act (EP&A Act), 1979.

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 raise or remove valuable goods and equipment, and hazardous materials; and to evacuate people.

flood

Relatively high stream flow which overtops the natural or artificial banks in any part of a stream or river and/or local overland flooding associated with major drainage before entering a watercourse.

flood fringe areas

The remaining area of land affected by flooding, after floodway and flood storage areas have been defined.

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.

Flood Planning Levels (FPLs)

The combination of flood levels and freeboards selected for planning purposes.

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

Land susceptible to flooding by the Probable Maximum Flood (PMF) event. Flood prone land is synonymous with flood liable land. The term covers the whole of the floodplain.

flood storage areas

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

floodway areas

Those areas where a significant volume of water flows during floods and are often aligned with obvious natural channels.

freeboard

A factor of safety typically used in relation to the setting of floor levels, levee crest levels, etc. It is usually expressed as the difference between the adopted flood planning level and the flood used to determine the flood planning level. Freeboard provides a factor of safety to compensate for uncertainties in the estimation of flood levels across the floodplain, such as wave action, localised hydraulic behaviour and other effects such as greenhouse and climate change. 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 Policy the hazard is flooding which has the potential to cause damage to the community. The hazard category used in this Policy is described in Section 3.2.

land forming operations

Means the carrying out of any work or other activity that affects an area of land greater than 100m^2 and that:

(a) alters a drainage pattern or a flood level, or

(b) raises or lowers the surface of the land at any point so as to alter the natural ground level by more than one metre, or

(c) raises or lowers by more than one metre at any point any level of the land that has been created by previous excavation or filling.

local overland flooding

Inundation by local runoff rather than over bank discharge from a stream, creek or river.

mainstream flooding

Inundation of normally dry land occurring when water overflows the natural or artificial banks of a stream or river.

major drainage

Councils have discretion in determining whether urban drainage problems are associated with major or local drainage. For the purposes of this Policy 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 0.3m (in the major system design storm as defined in the current version of Australian Rainfall & 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 defined drainage reserves; and/or
- the potential to affect a number of buildings along the major flow path.

merit approach

The merit approach weighs social, economic, ecological and cultural impacts of land use options for different flood prone areas. It also considers potential flood damage, hazard and behaviour implications, as well as environmental protection and the well-being of the 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. At a specific level, it involves consideration of the best way of conditioning proposed development.

outer floodplain

That part of the floodplain between the 1%AEP flood level and the PMF flood level.

Probable Maximum Flood (PMF)

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.

Qualified Engineer

A person with an Engineering qualification in an appropriate discipline obtained from a University and recognised as such by the Institution of Engineers, Australia, by being eligible for certification as a practising engineer (CPEng).

risk

The chance of something happening that will have an impact. It is measured in terms of consequences and likelihood. In the context of this Policy it is the likelihood of consequences arising from the interaction of floods, communities and the environment.

reliable safe flood access

Reliable safe flood access is considered satisfactory when the depth of floodwater over vehicular access routes (roads and legal right of ways) allows the safe and stable movement of vehicles. The access route is to be legal and permanent, fail safe and maintenance free.

7.2 Requirements for Development Applications

Council seeks the submission of complete and well drawn plans, and detailed reports that will facilitate Council's assessment and decision making process.

It will, with a correctly completely application, facilitate prompt determination.

Inadequate plans and non submission of details required will inhibit Council's ability to assess development proposals, creating delays that can be costly to both Council and the applicant.

The following information is required to accompany all applications for development on flood prone land:

- **application forms**

  Either: - an 'Application for Development and/or Construction Certificate;

  or

  - a 'Complying Development Certificate Application'

- **statement of environmental effects (SEE)**

  A written statement of environmental effects must be submitted demonstrating

  - that the environmental impact of the development has been considered; and
  - sets out steps to be taken to protect the environment or to mitigate the harm.

- **site analysis**

  A full site analysis must be submitted as detailed in the 'DA Checklist'. A summary of information required follows:

  - location
  - adjacent development
  - streetscape
  - setbacks
  - boundary dimensions
  - orientation
  - natural site features
  - survey plan with a contour interval of 0.25m and spot levels (to AHD) of significant site features and flood levels
  - existing and proposed buildings and uses
  - location of utility services and easements, including legal rights of way

- location of proposed new buildings and works
- cut and fill (land forming) details
- fence locations, height and construction materials
- elevations prepared according to proposed levels with windows identifying room behind it
- views to and from the site
- heritage/archaeological impacts
- solar impacts on proposed development and adjoining development
- concept planning (subdivision)

The application must indicate the way in which the development takes into account the matters raised in regard to this Policy:

- the floor level (to AHD) of all existing buildings
- the design floor level (to AHD) of all proposed buildings
- the level of proposed accesses and evacuation routes
- details and location of power supply, effluent disposal system, fuel installations, and the like
- details and types of doors and other openings

Council may require the applicant to provide a report prepared by a qualified engineer with suitable specialist experience in hydraulic engineering and flood risk management demonstrating:

- the hydraulic category of the site (ie flood fringe, flood storage or floodway)
- that the development will not significantly increase flood levels
- that the development will not increase the flood hazard or flood damage to other properties or adversely affect flood behaviour
- that the structure can withstand the force of floodwaters, debris and buoyancy
- the suitability of materials of construction having regard to flood affectation. Where a structure is to be erected wholly on a parcel of land where the siting of a building is a minimum of 300mm above the 1% AEP flood level, Council may not require such certification.
- the extent of land forming operations, including existing and finished levels, compaction details, and means of protection of any batters against scouring and erosion.

Council may also require the preparation of a comprehensive flood study analysis to determine the affectation/impact of flooding relevant to all events up to and including the PMF.

7.3 Priority List for Voluntary Purchase

As part of it's floodplain risk management process Council has had a residential survey undertaken for the flood affected areas of Camden and Elderslie. The Upper Nepean River Floodplain Management Study & Plan (FMS&P) identified a number of properties as potential beneficiaries of a voluntary purchase program. The properties identified are located in high hazard areas due to depth of inundation, flow velocity impacts and difficulties in evacuation.

Of the 43 residential properties that were identified in the FMS&P, 34 were located in the Camden Town Centre, 8 in Chellaston Street and one in Barsden Street.

The identified properties in the Camden Town Centre have some capacity for flood compatible commercial redevelopment, the property in Barsden Street is zoned 3(f) Town Support.

The properties identified in Chellaston Street have extremely limited redevelopment opportunities. These properties adjoin either vacant land or Kings Bush Reserve.

A priority list has been prepared with preference given to facilitate the voluntary purchase of the most severely flood affected properties in Chellaston Street.

1. 39 Chellaston Street
2. 42 Chellaston Street
3. 37 Chellaston Street
4. 41 Chellaston Street
5. 38 Chellaston Street
6. 35 Chellaston Street
7. 36 Chellaston Street
8. 40 Chellaston Street

Should Council be successful in implementing a Voluntary Purchase Scheme for the identified properties in Chellaston Street and once a flood affected property is purchased, that land will be rezoned to Open Space.

7.4 Priority List for House Raising

As part of it's floodplain risk management process Council has had a residential survey undertaken for the flood affected areas of Camden and Elderslie. The Upper Nepean River Floodplain Management Study & Plan (FMS&P) identified a number of properties as potential beneficiaries of a house raising program. The properties identified are located in high hazard areas due to depth of inundation, flow velocity impacts and difficulties in evacuation.

62 residential properties were identified in the FMS&P as potential beneficiaries of house raising. Two of the identified properties are located in Barsden Street and are zoned 3(f) Town Support, and as they have some capacity for flood compatible commercial redevelopment, they have been excluded from the priority list.

A priority list has been prepared with preference given to facilitate the house raising of the most severely flood affected properties (after those identified in the voluntary purchase listing). There has been no detailed examinations of individual properties as part of the FMS&P, and as such individual circumstances will need to be established if house raising is practical and economically viable. Such an assessment shall include detailed internal, external and structural examination.

1. 34 Lerida Avenue
2. 36 Lerida Avenue
3. 36 Lerida Avenue
4. 1 Peter Avenue
5. 20 Lerida Avenue
6. 28 Lerida Avenue
7. 3 Peter Avenue
8. 22 Lerida Avenue
9. 20 Alpha Road
10. 3 Onslow Avenue
11. 14 Alpha Road
12. 40 Lerida Avenue
13. 16 Alpha Road
14. 1 Wilkinson Street
15. 18 Alpha Road
16. 30 Lerida Avenue
29. 31 Chellaston Street
30. 32 Chellaston Street
31. 12 Lerida Avenue
32. 46 Alpha Road
33. 1 Christopher Avenue
34. 53 Elizabeth Macarthur Avenue
35. 48 Alpha Road
36. 26 Alpha Road
37. 44 Alpha Road
38. 2 Kimbarra Avenue
39. 25 Lerida Avenue
40. 25 Macarthur Road
41. 15 Peter Avenue
42. 10 Lerida Avenue
43. 27 Macarthur Road
44. 30 Chellaston Street

17. 16 Lerida Avenue
18. 19 Lerida Avenue
19. 21 Lerida Avenue
20. 34 Chellaston Street
21. 3 Wilkinson Street
22. 33 Chellaston Street
23. 1 Onslow Avenue
24. 52 Camden Valley Way
25. 23 Lerida Avenue
26. 50 Camden Valley Way
27. 24 Alpha Road
28. 14 Lerida Avenue
45. 10 Engesta Avenue
46. 29 Chellaston Street
47. 42 Alpha Road
48. 28 Alpha Road
49. 10 Christopher Avenue
50. 14 Macarthur Road
51. 50 Engesta Avenue
52. 2A Lerida Avenue
53. 27 River Road
54. 28 Chellaston Street
55. 3 Michele Place
56. 14 Christopher Avenue

7.5 Flood Compatible Materials

Building Component	Flood Compatible Material	Building Component	Flood Compatible Material
Flooring and Sub-Floor Structure	▪ pier and beam construction ▪ suspended reinforced concrete slab	**Doors**	▪ solid panel with water proof adhesives ▪ flush door with marine ply filled with closed cell foam ▪ painted metal construction ▪ aluminium or galvanised steel frame
Floor Covering	▪ clay tiles ▪ concrete, precast or in-situ ▪ concrete tiles ▪ epoxy, formed in place ▪ mastic flooring, formed in place ▪ silicone floors formed in place ▪ vinyl sheets or tiles with chemical set adhesives ▪ ceramic tiles, fixed with mortar or chemical set	**Wall and Ceiling Linings**	▪ brick, face or glazed ▪ clay tile glazed in waterproof mortar ▪ concrete ▪ concrete block ▪ steel with waterproof applications ▪ stone, natural solid or veneer, waterproof grout ▪ glass blocks ▪ glass ▪ plastic sheeting or wall with

	adhesive ▪ asphalt tiles, fixed with water resistant adhesive ▪ removable rubber backed carpet		waterproof adhesive
Wall Structure	▪ solid brickwork, blockwork, reinforced concrete or mass concrete	**Insulation**	▪ foam, closed cell types
Windows	▪ aluminium frame with stainless steel rollers or similar corrosion and water resistant material	**Nails, Bolts, Hinges and Fittings**	▪ galvanised, stainless steel, brass, nylon ▪ removable pin hinges

Electrical and Mechanical Equipment For dwellings constructed on land to which this Policy applies, the electrical and mechanical materials, equipment and installation should conform to the following requirements.	**Heating & Air Conditioning System** Heating and air conditioning systems should, to the maximum extent possible, be installed in areas and spaces above the flood planning level. When this is not feasible every precaution should be taken to minimise the damage caused by submersion according to the following guidelines.
Main Power Supply Subject to the approval of the relevant authority, incoming electricity mains, service equipment and meters must be located at the flood planning level. Means must be available to easily disconnect the building from the main power supply.	**Fuel** Heating systems using gas or oil as a fuel should have a manually operated valve located in the fuel supply line to enable fuel cut-off.
Wiring All wiring, power outlets, switches, etc, should, to the maximum extent possible, be located 1m above the flood planning level. All electrical wiring installed below the flood planning level should be suitable for continuous submergence in water and should contain no fibrous components. Only submersible type splices should be used below the flood planning level. All conduits located below the relevant flood planning level should be installed so that they will be self draining if subject to flooding.	**Installation** The heating equipment and fuel storage tanks should be mounted on and securely anchored to a foundation pad of sufficient mass to overcome buoyancy and prevent movement that could damage the fuel supply line. All storage tanks should be vented to an elevation above the flood planning level.
Equipment All equipment installed below or partially below the flood planning level should be capable of disconnection by a single plug and socket assembly.	**Ducting** All ducting located below the flood planning level should be provided with openings for drainage and cleaning. Self draining may be achieved by constructing the ducting on a suitable grade. Where ducting must pass through a watertight wall or floor below the flood planning level, the ducting should be protected by a closure assembly operated from above the flood planning level.
Reconnection Should any electrical device and/or part of the wiring be flooded it should be thoroughly cleaned or replaced and checked by an approved electrical contractor before reconnection.	**Services** The provision of and connection to all public utility services must comply with the requirements of the relevant service authority.

7.6 Supporting Information

The following documents have been referred to in this policy document.

Floodplain Management Manual: the management of flood liable land, NSW Government, January 2001.

*Upper Nepean Floodplain Management Study & Plan***,** Camden Council et. al., April 2001

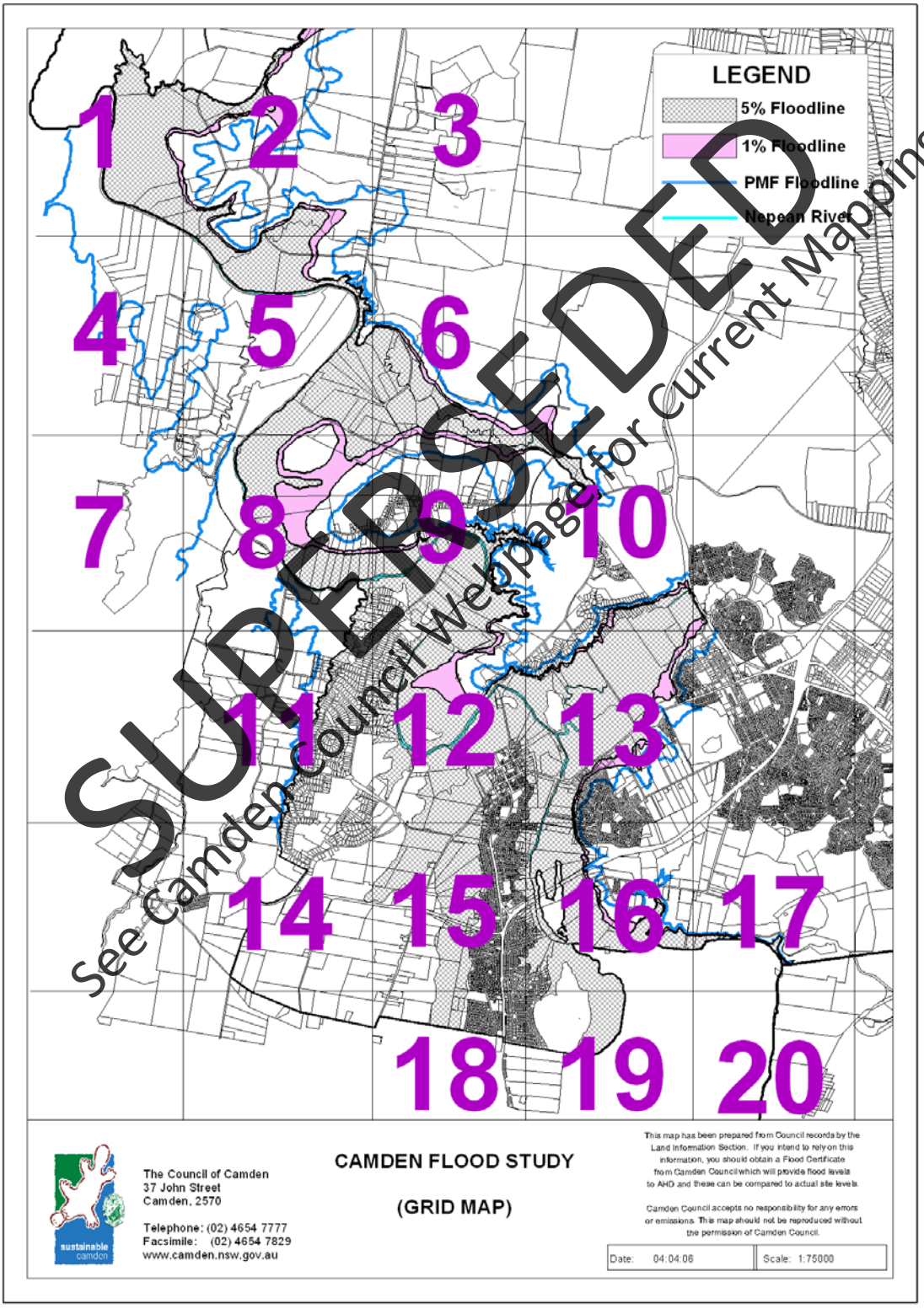
Development Control Plan No 58: Residential Code, Camden Council, 2003

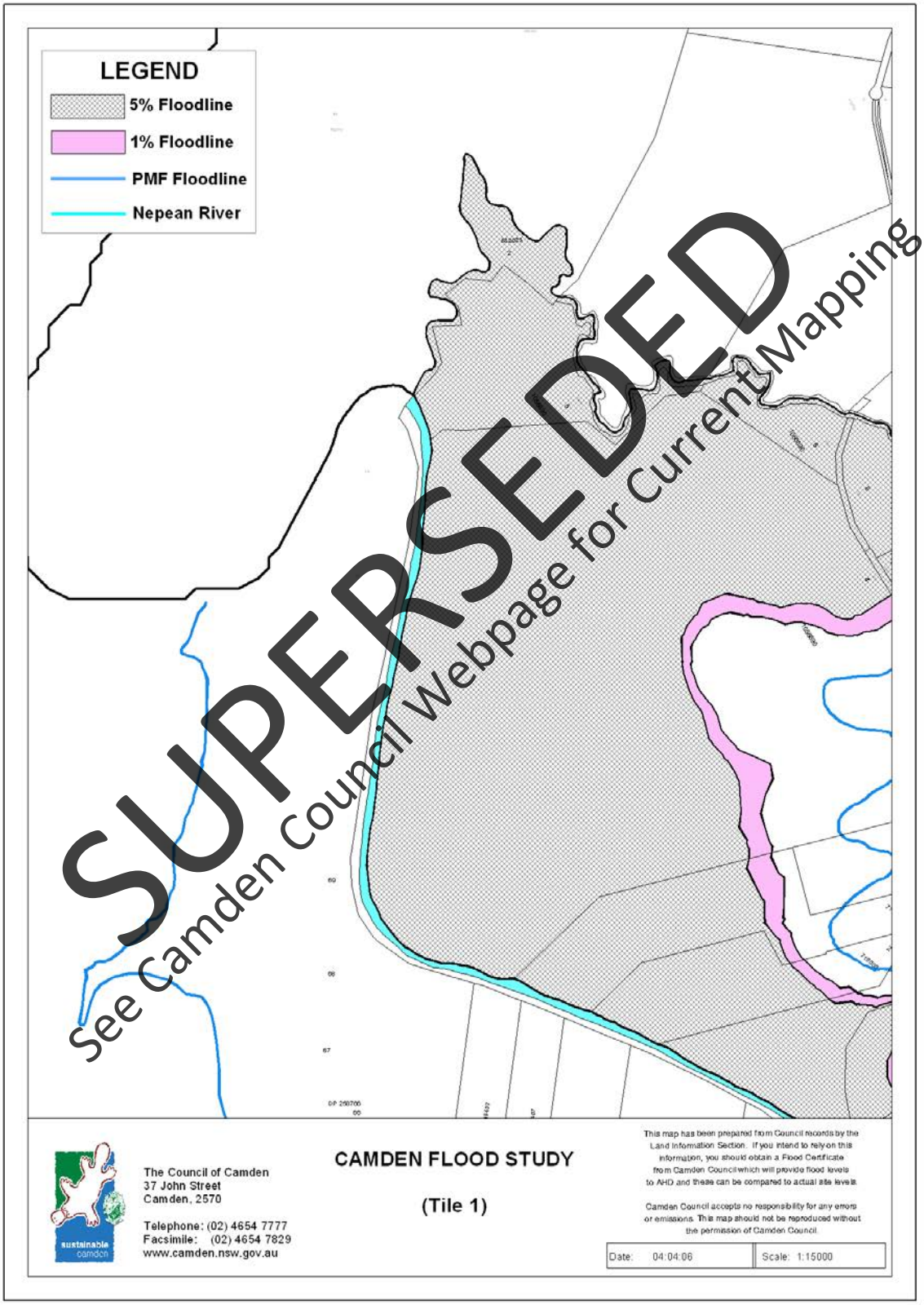
Development Control Plan No 106: Land forming Operations, Camden Council, (DCP in effect from 24 December 1998)

Sewage Management Strategy, The Institution of Engineers, Australia.

Australian Rainfall & Runoff – A Guide to Flood Estimation, Institution of Engineers, Australia et. al., 1987.

7.7 Camden Floodline




LEGEND
5% Floodline
1% Floodline
PMF Floodline
Nepean River
SUPERSEDED
See Camden Council Webpage for Current Mapping
CAMDEN FLOOD STUDY
(Tile 1)
The Council of Camden
37 John Street
Camden, 2570
Telephone: (02) 4654 7777
Facsimile: (02) 4654 7829
www.camden.nsw.gov.au
sustainable camden
This map has been prepared from Council records by the Land Information Section. If you intend to rely on this information, you should obtain a Flood Certificate from Camden Council which will provide flood levels to AHD and these can be compared to actual site levels.
Camden Council accepts no responsibility for any errors or omissions. This map should not be reproduced without the permission of Camden Council.
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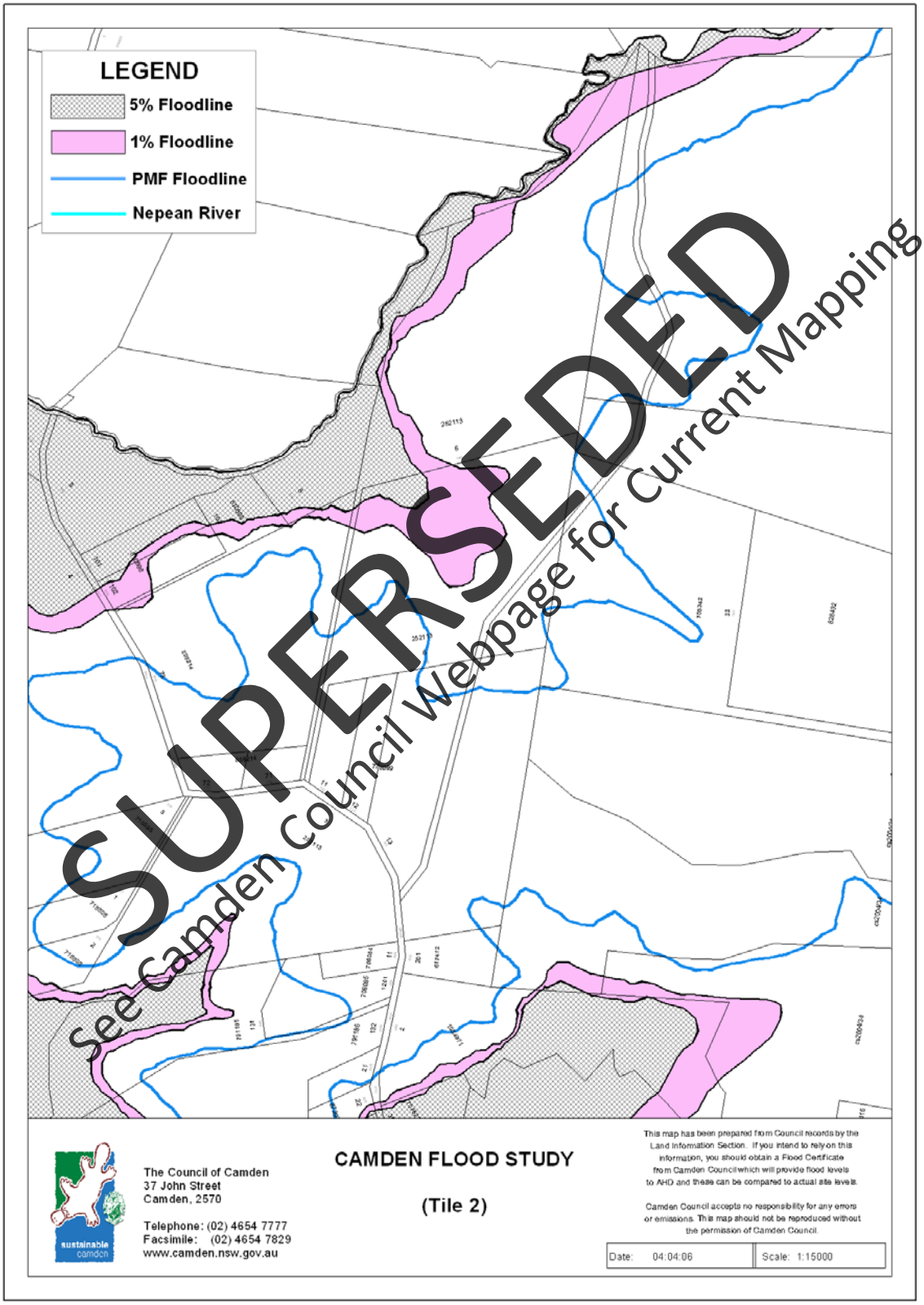
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sustainable camden
CAMDEN FLOOD STUDY
(Tile 2)
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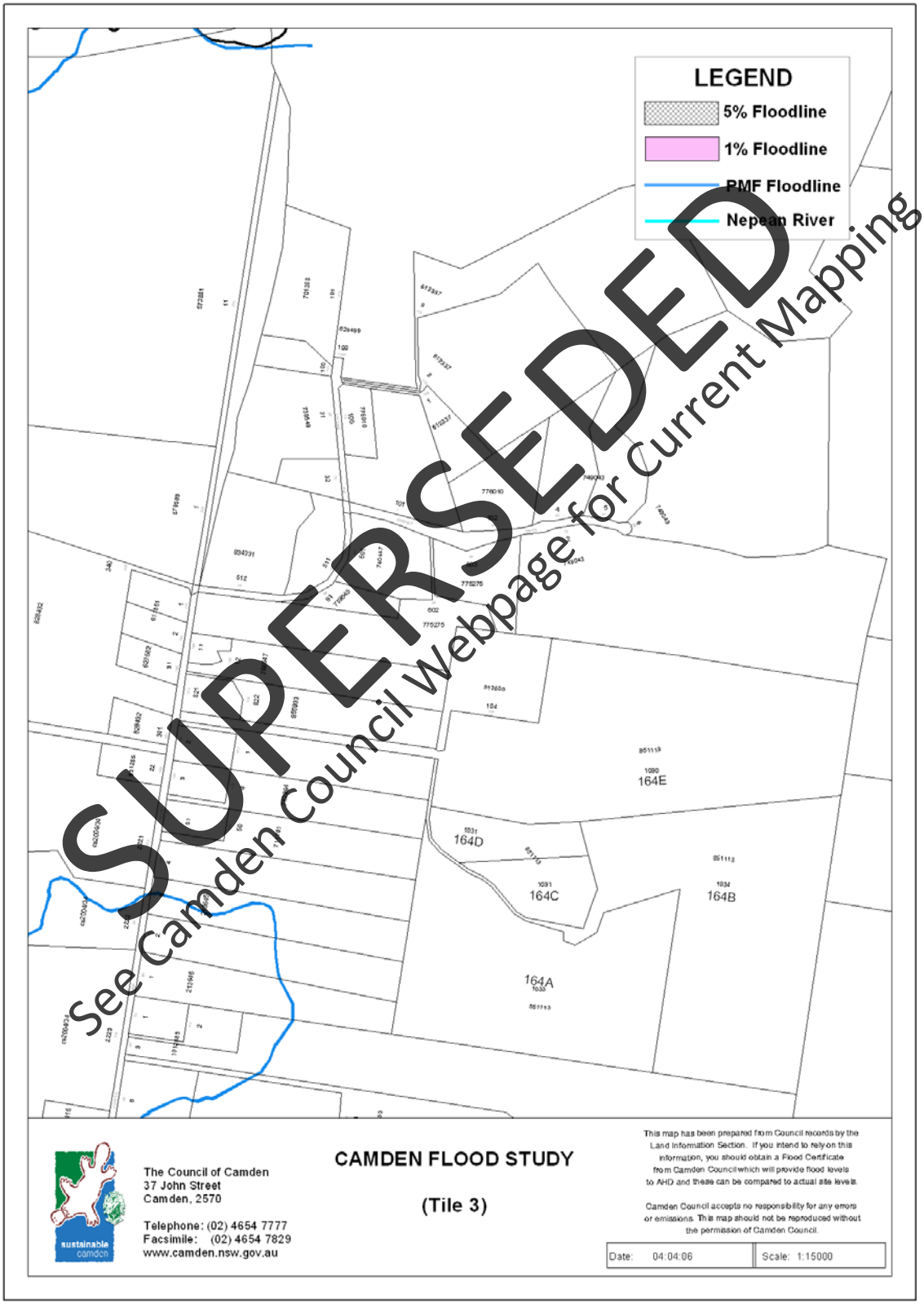
LEGEND
5% Floodline
1% Floodline
PMF Floodline
Nepean River
SUPERSEDED
See Camden Council Webpage for Current Mapping
164E
164D
164C
164B
164A
The Council of Camden
37 John Street
Camden, 2570
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www.camden.nsw.gov.au
sustainable camden
CAMDEN FLOOD STUDY
(Tile 3)
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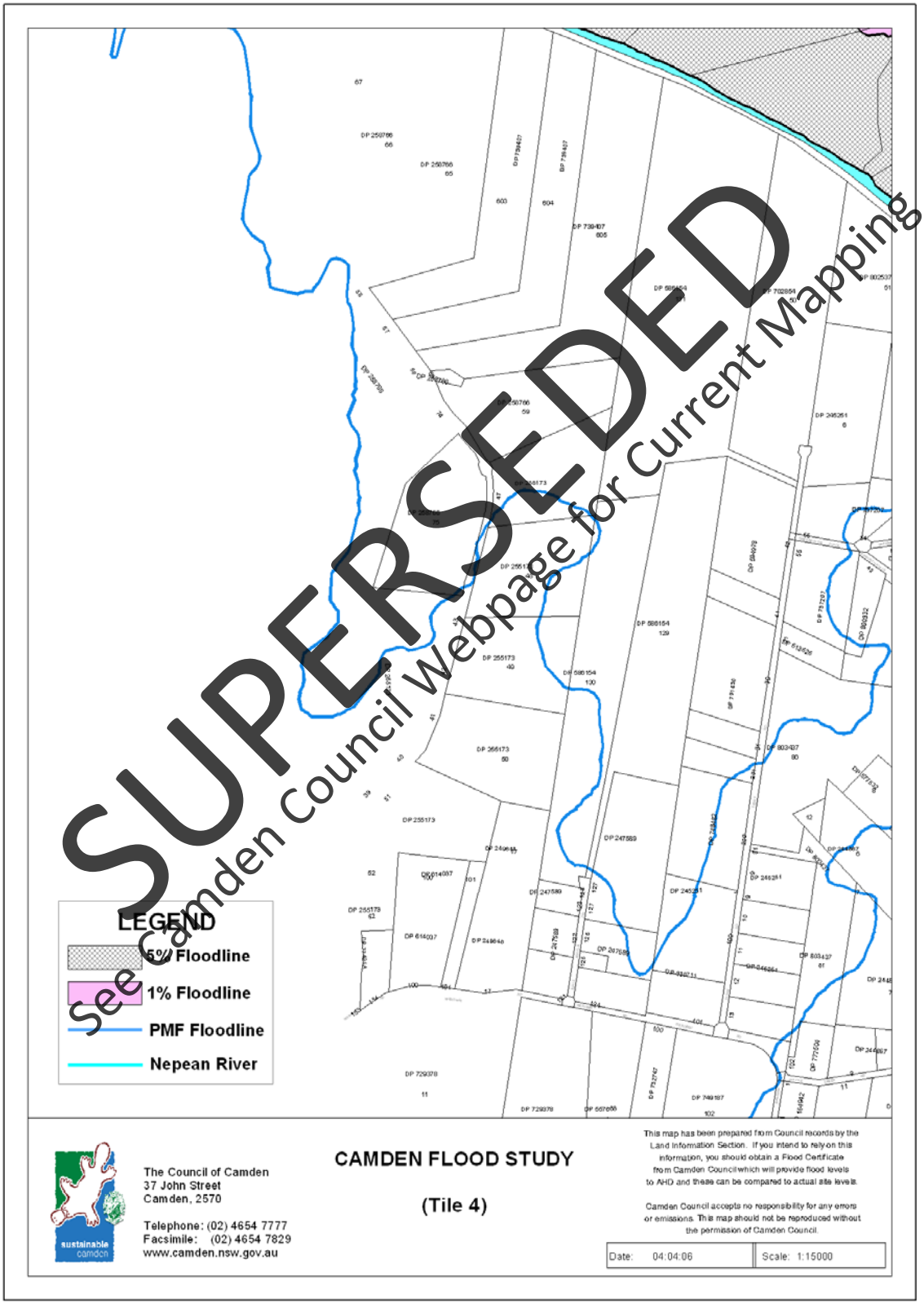
SUPERSEDED
See Camden Council Webpage for Current Mapping
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1% Floodline
PMF Floodline
Nepean River
The Council of Camden
37 John Street
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CAMDEN FLOOD STUDY
(Tile 4)
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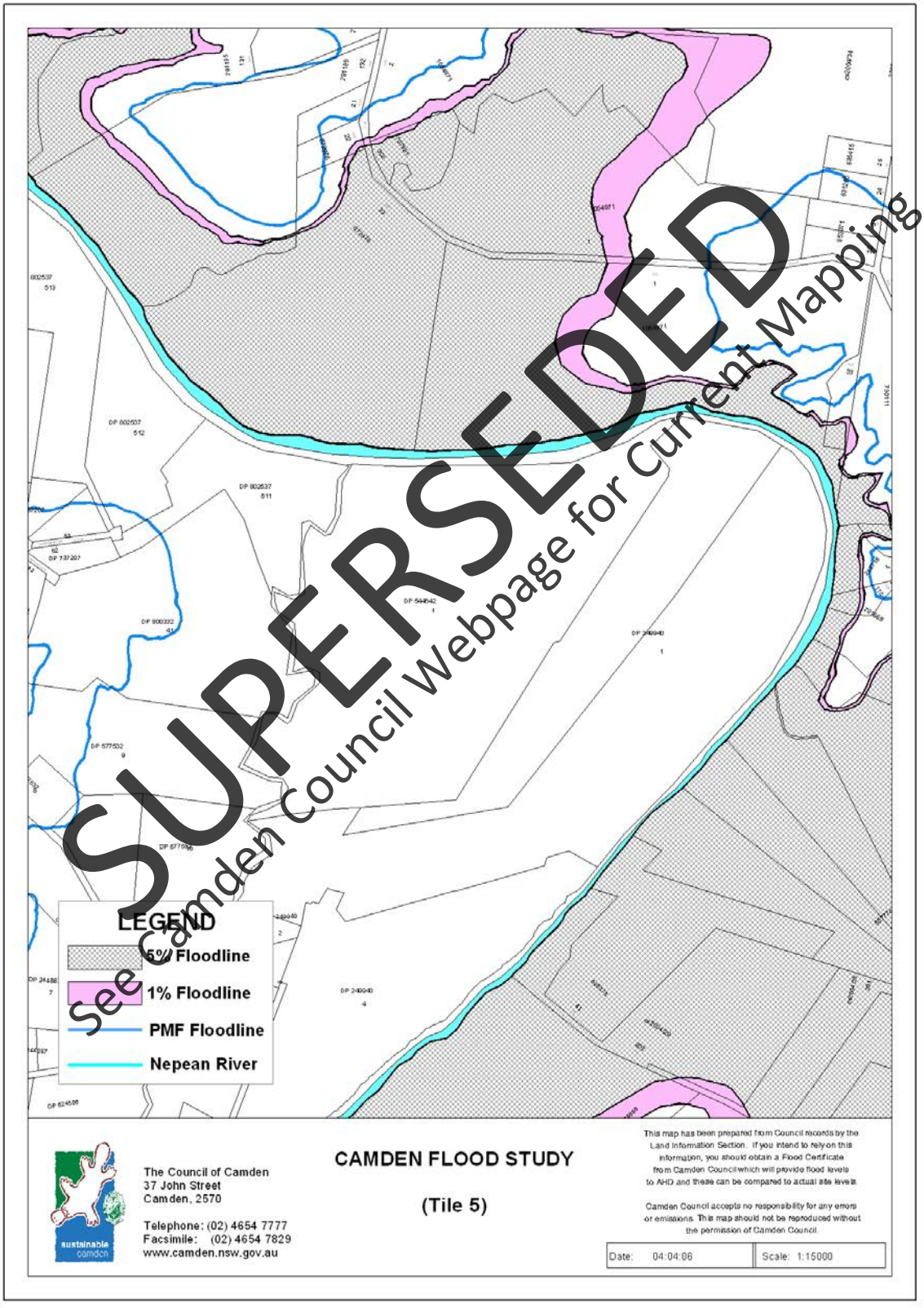
Date: 04:04:06
Scale: 1:15000


SUPERSEDED
See Camden Council Webpage for Current Mapping
LEGEND
5% Floodline
1% Floodline
PMF Floodline
Nepean River
The Council of Camden
37 John Street
Camden, 2570
Telephone: (02) 4654 7777
Facsimile: (02) 4654 7829
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CAMDEN FLOOD STUDY
(Tile 5)
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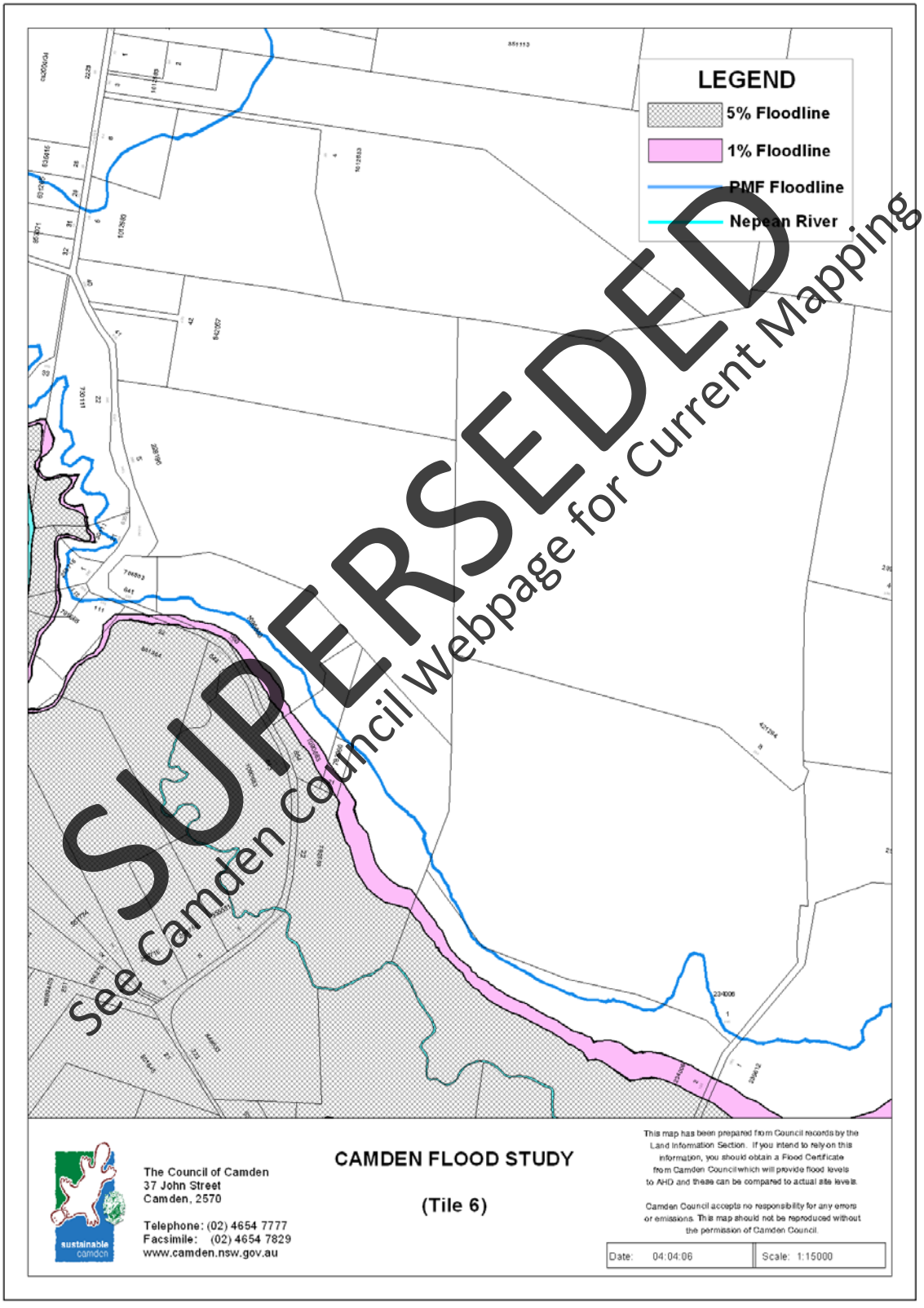
Date: 04:04:06
Scale: 1:15000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sustainable camden
CAMDEN FLOOD STUDY
(Tile 6)
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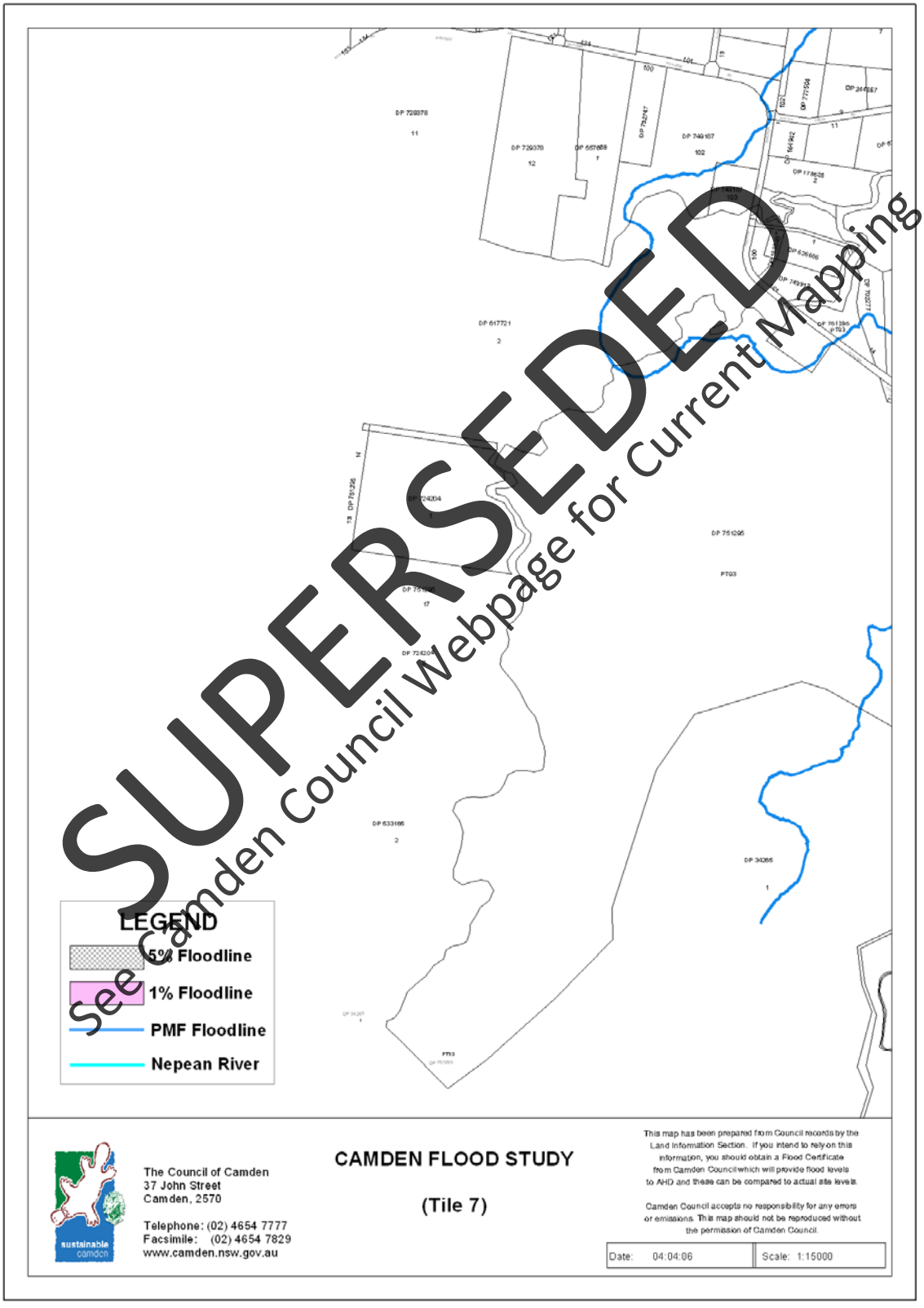

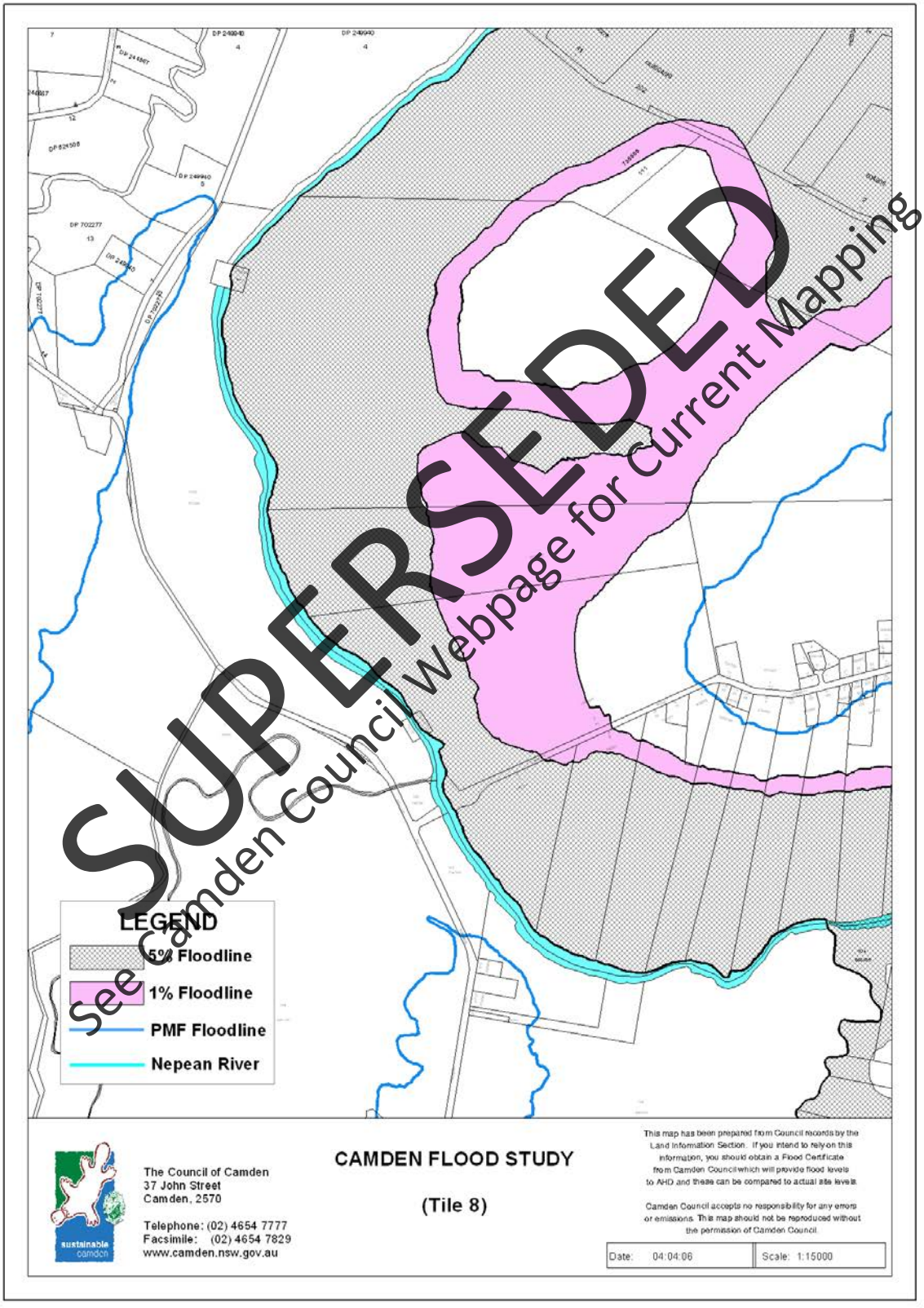
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5% Floodline
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PMF Floodline
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CAMDEN FLOOD STUDY
(Tile 8)
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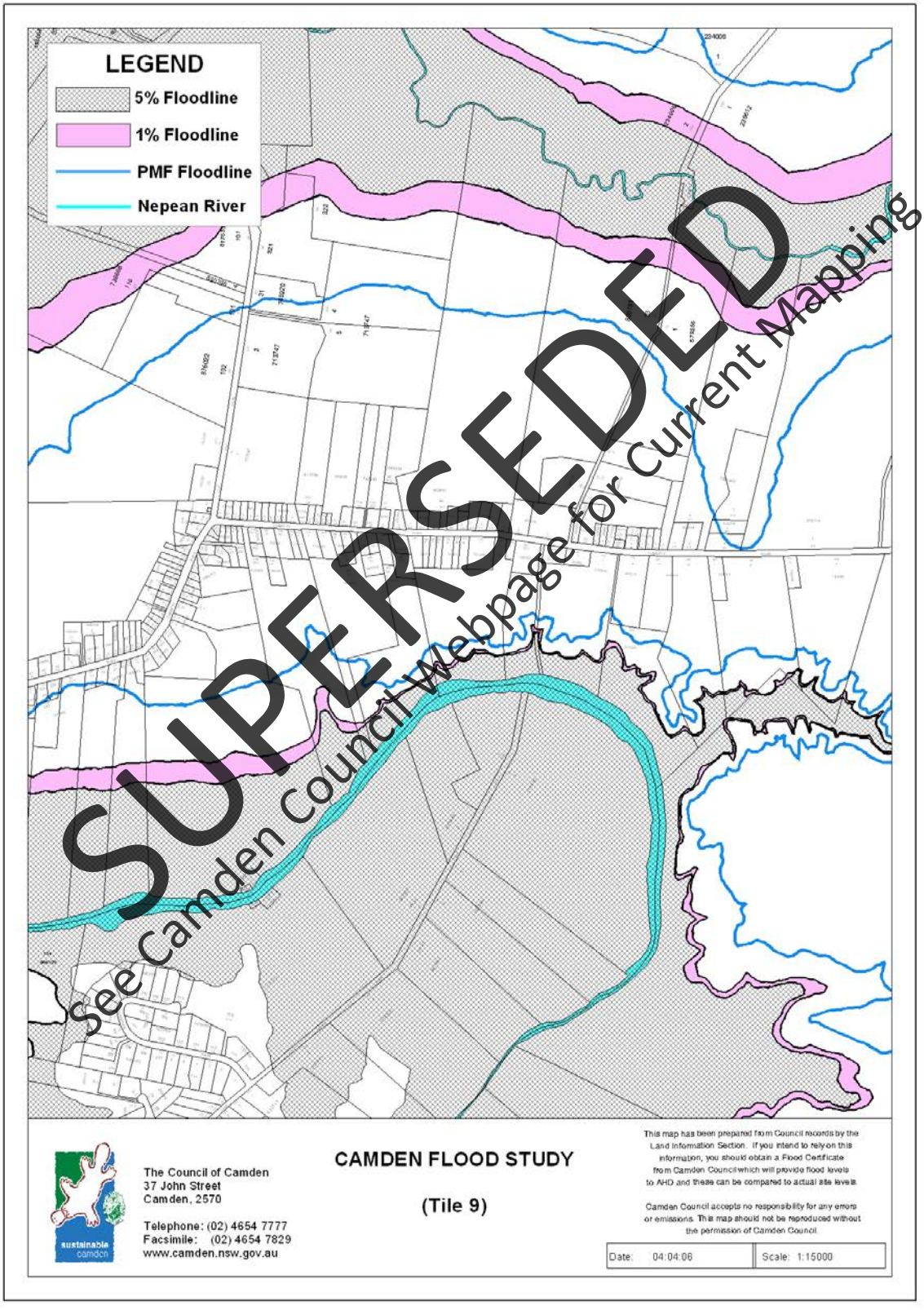
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CAMDEN FLOOD STUDY
(Tile 9)
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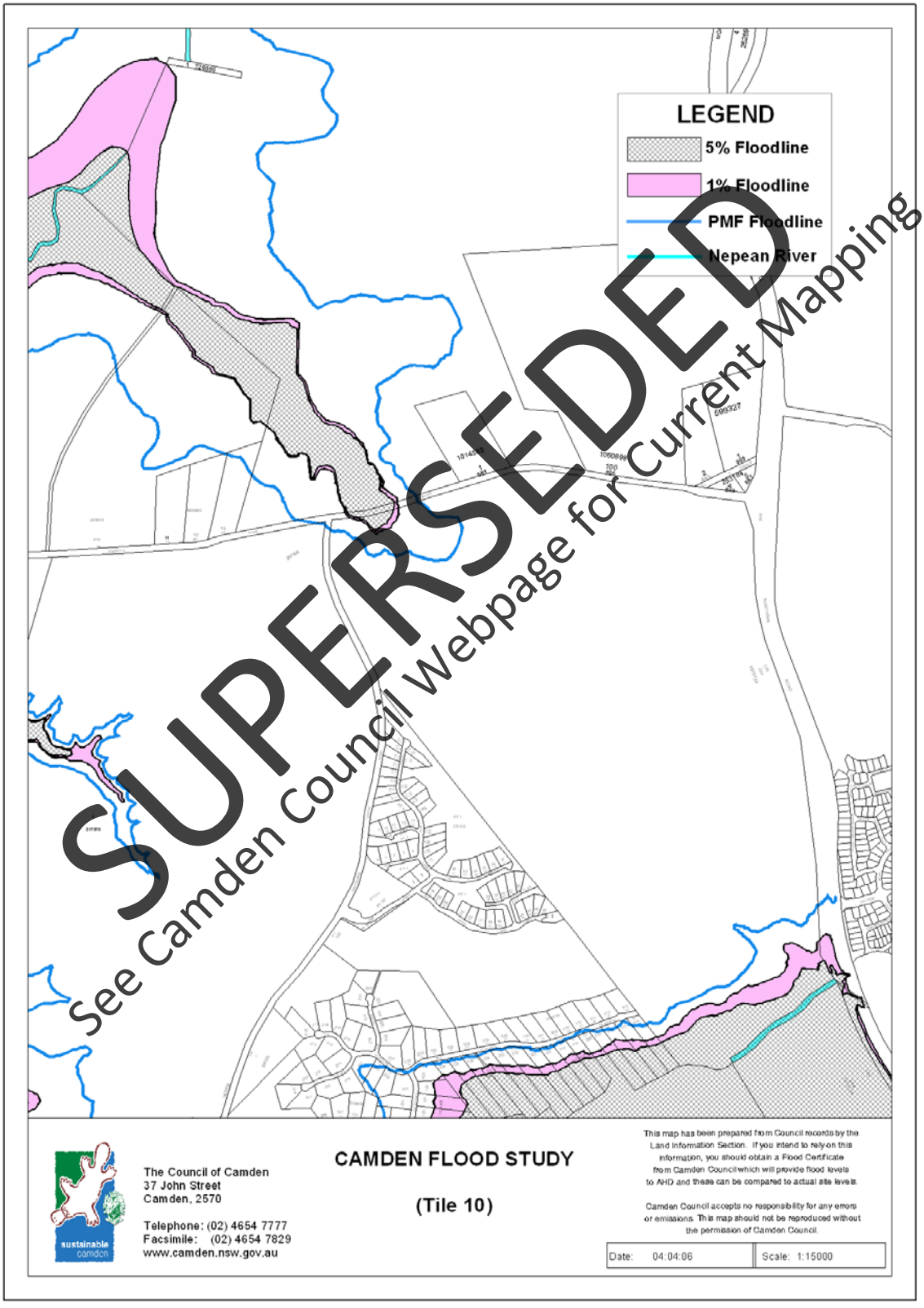
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Nepean River
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CAMDEN FLOOD STUDY
(Tile 10)
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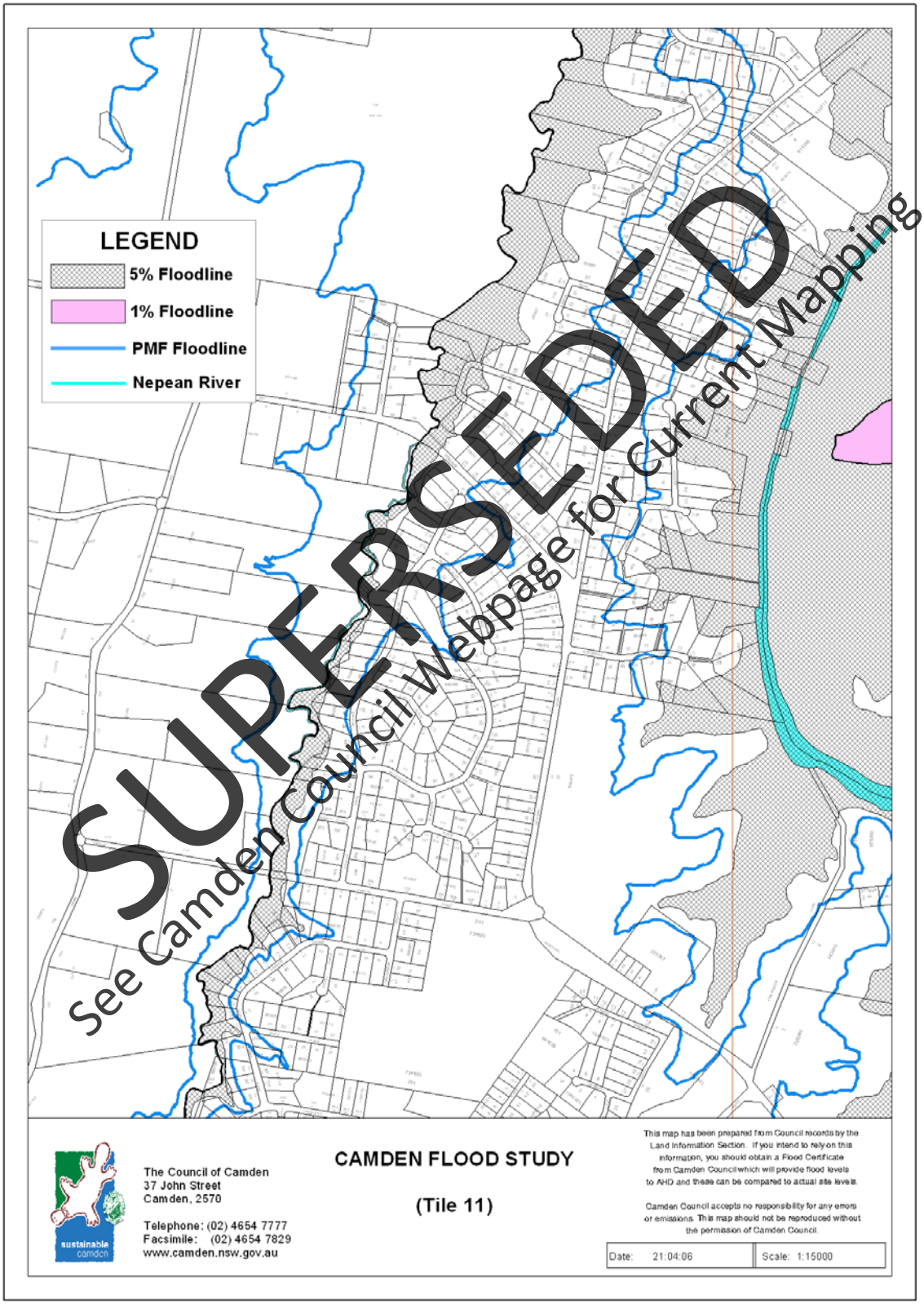
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Nepean River
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CAMDEN FLOOD STUDY
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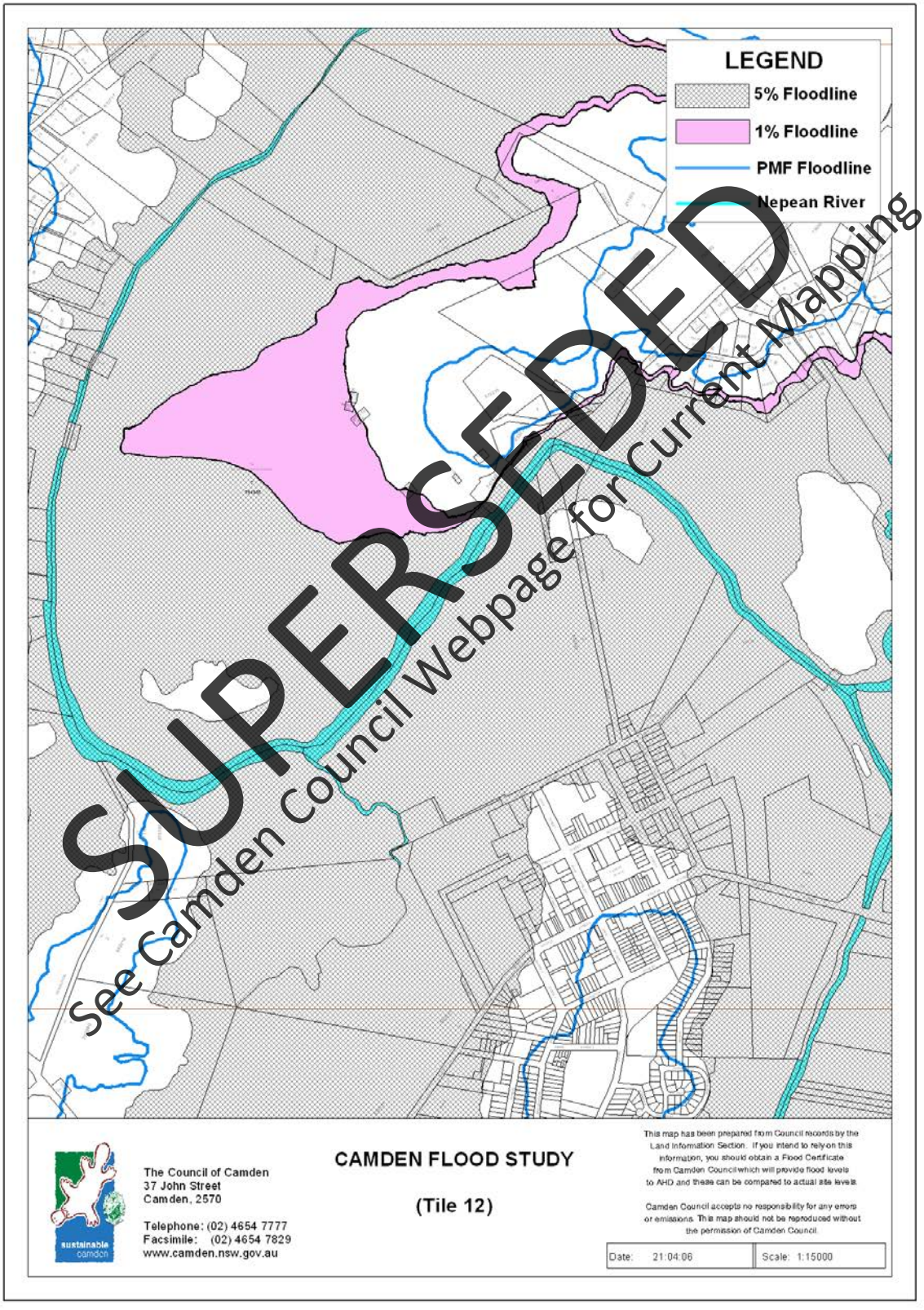
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CAMDEN FLOOD STUDY
(Tile 12)
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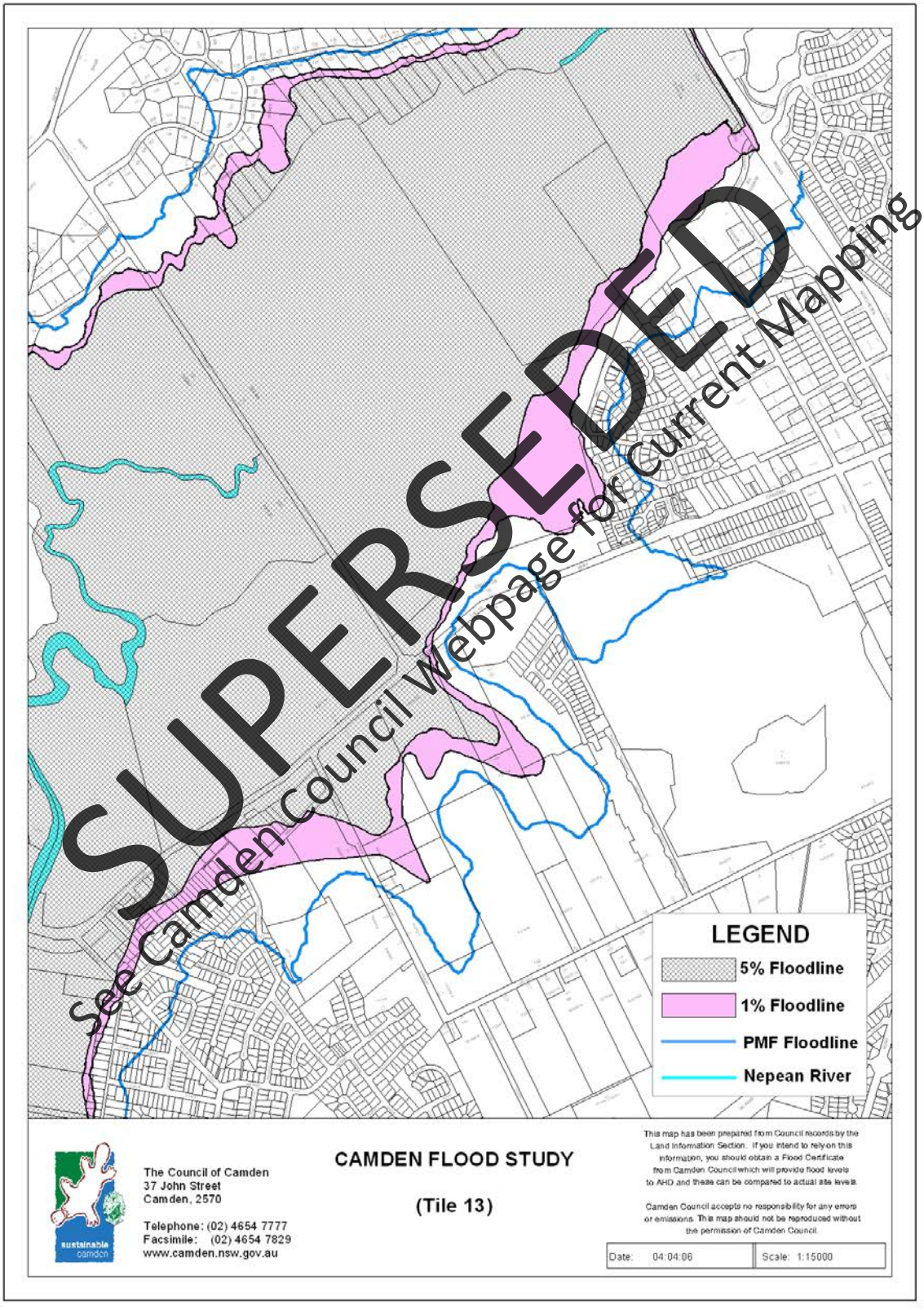
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CAMDEN FLOOD STUDY
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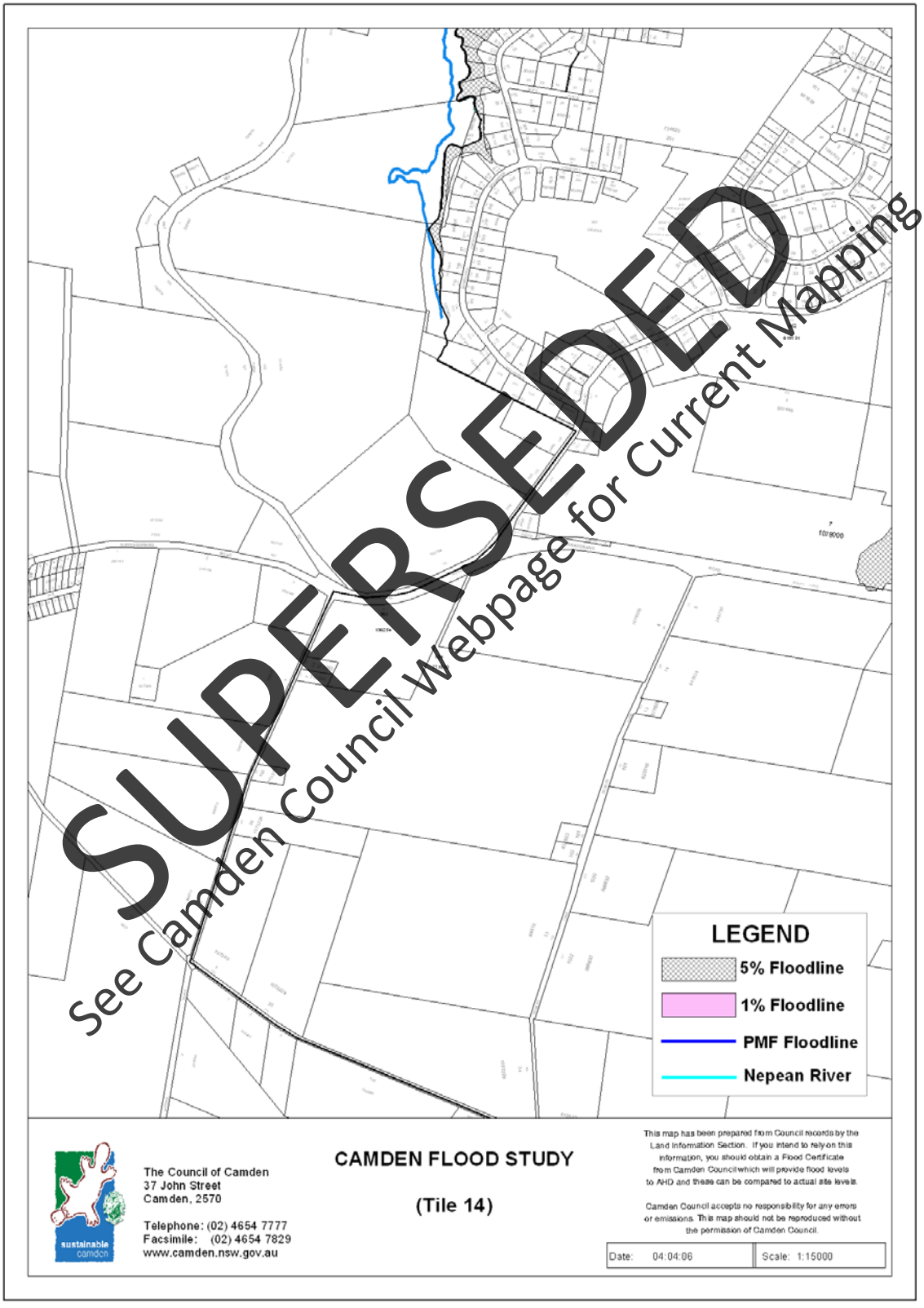
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(Tile 14)
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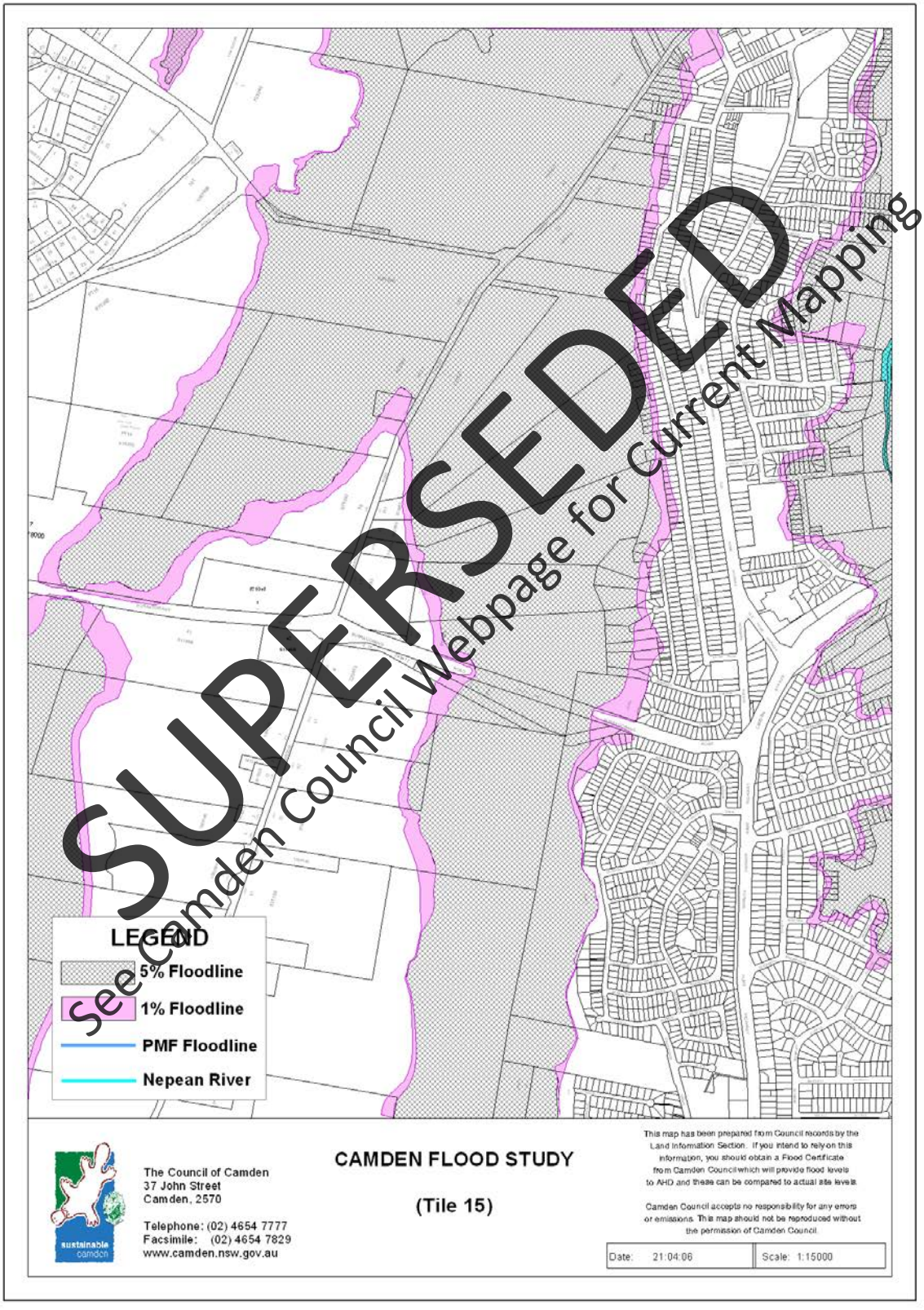
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CAMDEN FLOOD STUDY
(Tile 15)
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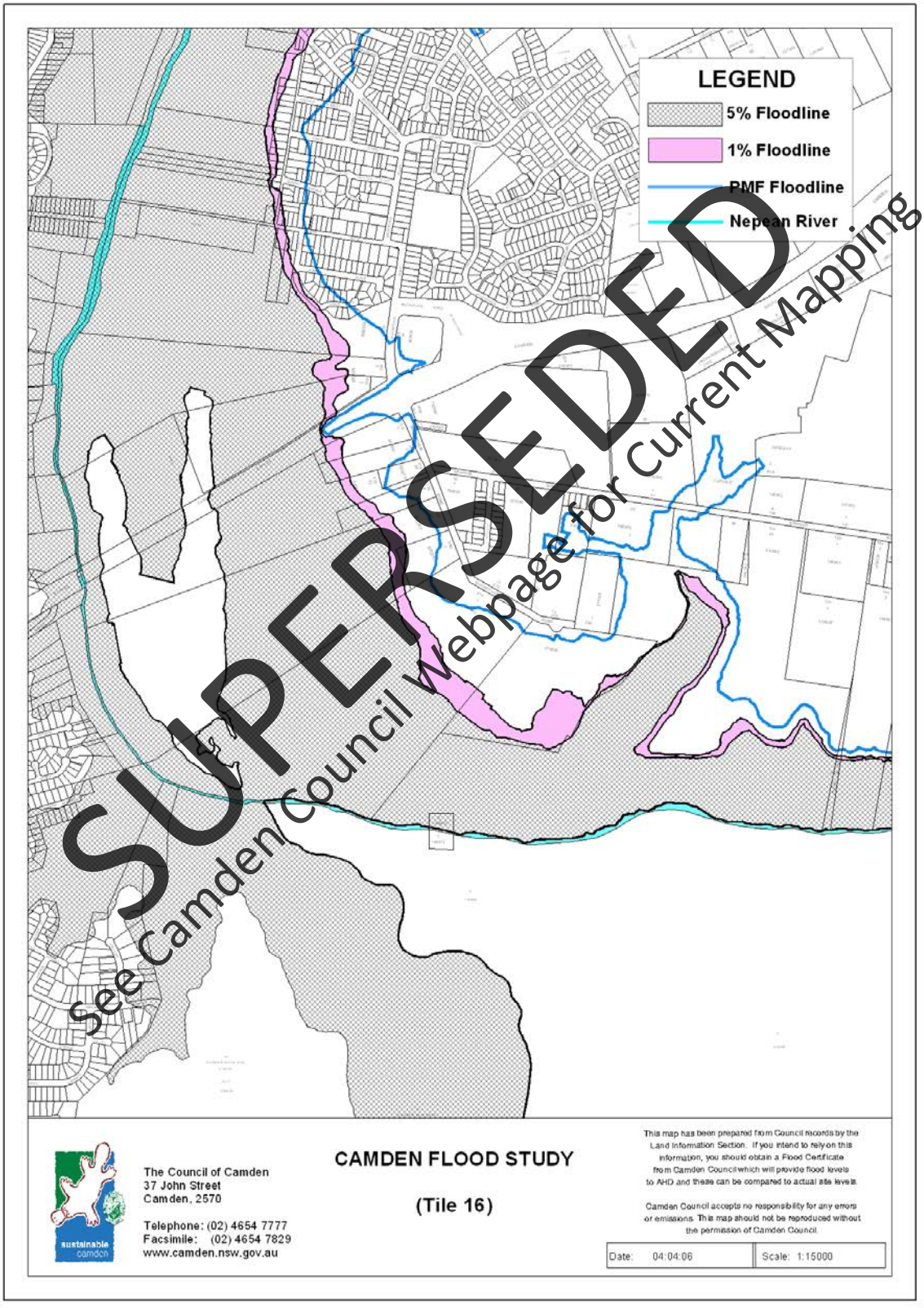
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CAMDEN FLOOD STUDY
(Tile 16)
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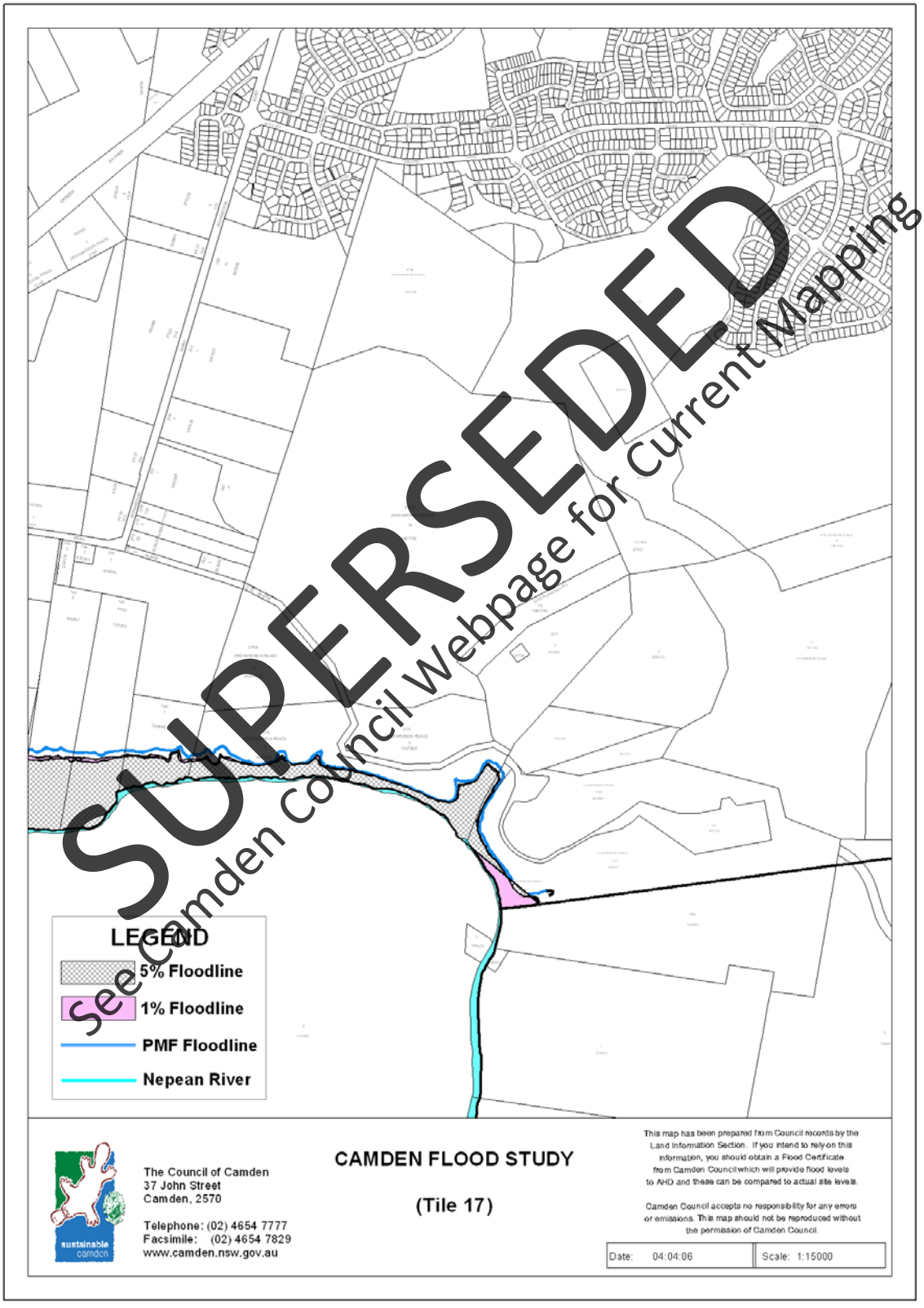
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CAMDEN FLOOD STUDY
(Tile 17)
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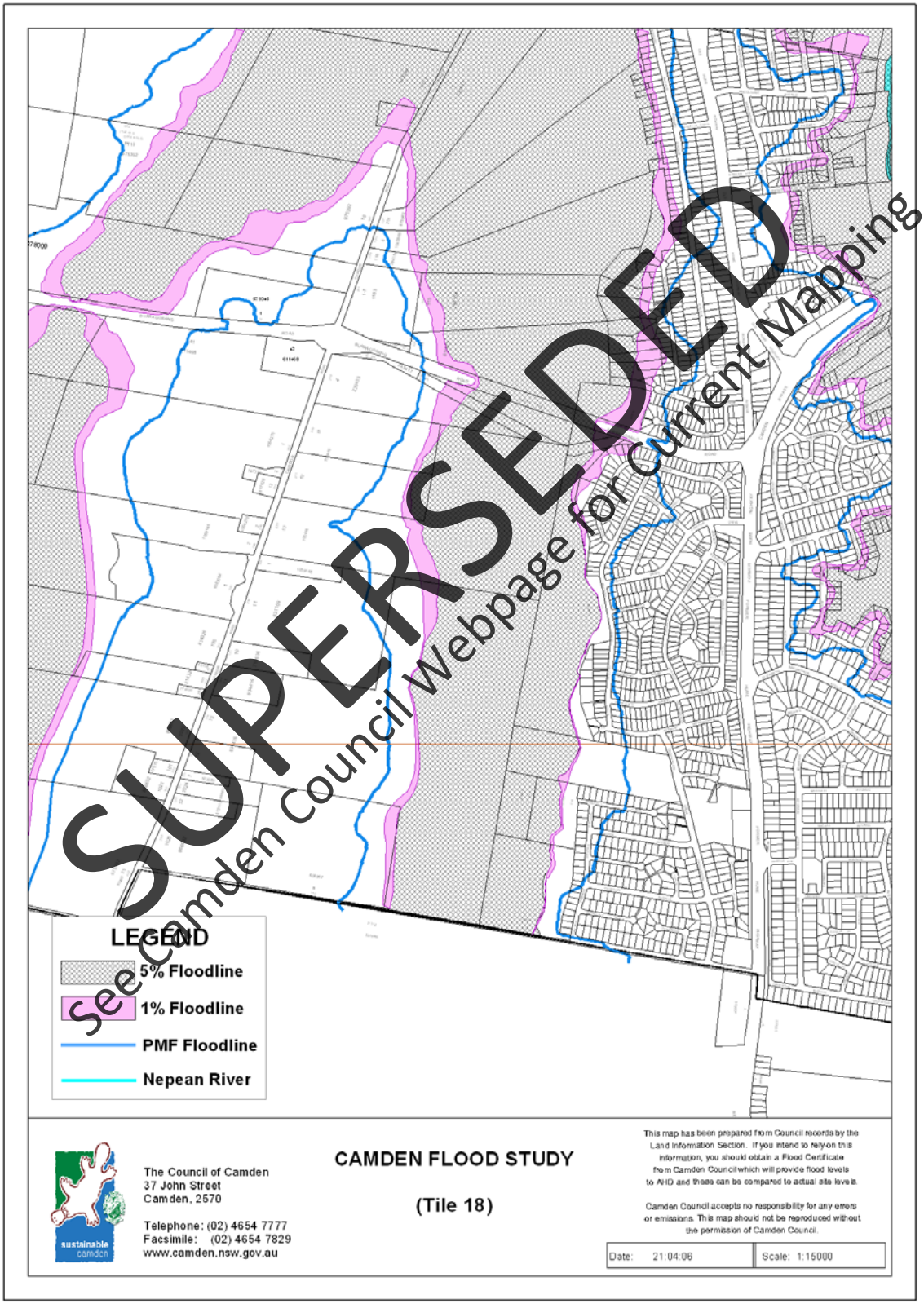
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CAMDEN FLOOD STUDY
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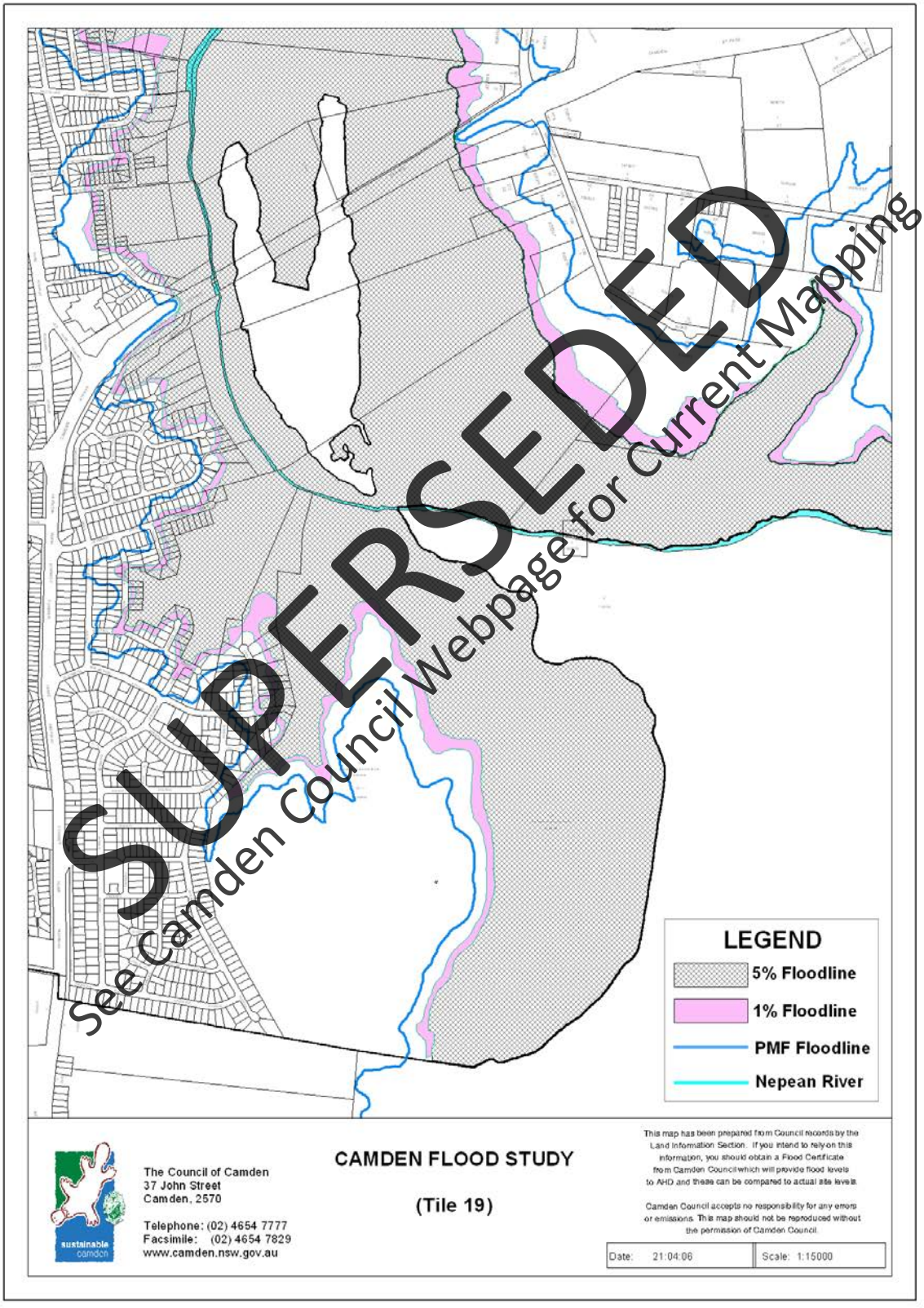
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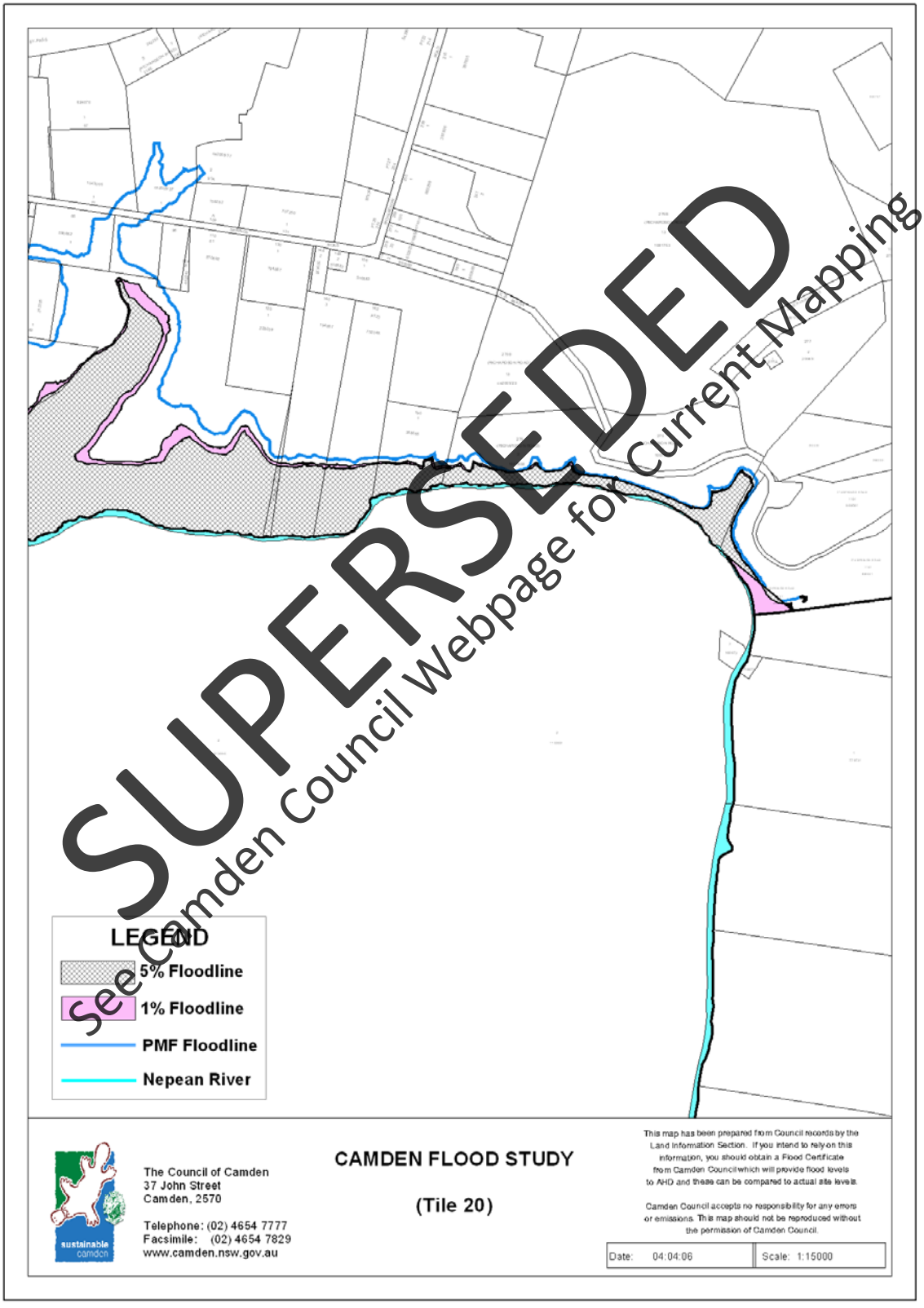
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CAMDEN FLOOD STUDY
(Tile 20)
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7.8 Flood Photos

Original Watson Property (refer Dick Nixon's plan) showing his father on horse, grandmother and great grandmother of Peter (N.W.) Watson. Circa 1900

Oxley Street looking at Mitchell Street, corner sign for building Camden Memorial Pool - Sunday June 1964, 12 hours after peak.

N.W. (Peter) Watsons' parent's home second from Mitchell Street in Oxley Street, Camden

Lerida Street 1964, looking to Macquarie Avenue
(No 5 arrowed is Watson home N.W. (Peter)

Argyle and Murray Streets intersection at entrance to Camden Showgrounds.
June 1964

Argyle Street looking toward the Dairy building and the Cowpasture Bridge under water

Mitchell Street at Elizabeth Street, looking to Edward Street. June 1964

Sunday, June 1964: 12 hours after peak rains of the Saturday evening