

**POLICY:** FLOODPLAIN MANAGEMENT

**DATE ADOPTED:** Director Engineering Services Report #5, #6  
Council 20 August 2008  
Minute Book No. 10474

**ORIGINAL ADOPTION:** Director Environmental, Planning & Building Services’  
Report #10, Council 30 March 2005  
Minute Book No. 9495

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Policy 1 December 2004, Council 8 December 2004  
Minute Book No. 9416  
(former BCC Policy)

**FILE REFERENCE:** 31.00002

**OBJECTIVE:** Implement and maintain a Floodplain Management Strategy which is, the highest standard and condition that Council can reasonably afford in all of its circumstances and having regard to financial, economic, environmental, aesthetic, social or political factors or constraints and levee bank construction.

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PART 1

SECTION 1

**General Provisions Applying to all Parts and Sections**

1. a) All matters and activities set out in all Parts and Sections of this Policy and any determination made pursuant thereto by a responsible person **SHALL ALWAYS** be subject to and limited by the funds and resources (“resource availability”) voted and resolved by council.
- b) Subject to the provisions of Section 731 of the Local Government Act, 1993, a decision made by a responsible person in carrying out the functions of the Policy shall be a decision of the Council **PROVIDED ALWAYS** that a responsible person has acted in good faith for the purpose of executing this Policy.
- c) Expressions of words used in this Policy (or a particular provision of this Policy) which are defined in the dictionary at the end of this Policy have the meanings set out in the dictionary.

- d) A determination made by a responsible person in carrying out the functions of this Policy shall be recorded and maintained in such fashion as is determined by a responsible person. The manner and form of records as set out in Council's standard Risk Management procedure.
- e) Subject to a responsible person determining otherwise, "**Codes of Best Practice**", incorporating standard(s), method(s) and frequencies, shall be determined and implemented for all activities set out in this Policy and shall be reviewed on a continuing basis.
- f) "**Responsible person(s)**" shall be determined by the General Manager or his/her delegate.
- g) The determination of responsible persons as set out in Council's standard Risk Management procedures.

## SECTION 2

### Dictionary

#### 2. "**as determined by a responsible person**" means:

- \* a decision by a responsible person and
- \* a decision made pursuant with the execution of this Policy and the functions, powers and duties set out therein.

"**function**" includes a power, authority and duty.

"**month**" means a calendar month.

"**reasonably safe condition**" means that in the ABSOLUTE OPINION of a responsible person:

- \* Safety measures were not required; or
- \* That safety measures taken were adequate and sufficient for a particular circumstance.
- \* Works carried out were in accordance with any Code of Best Practice or Standard determined pursuant with Section 1.e;

"**responsible person**" means the Council or an employee and/or a particular position as provided for in Council's standard Risk Management procedure.

"**week**" means the period Monday to Friday inclusive.

"**working day**" or "**day**" means Monday to Friday inclusive subject to the ordinary working hours" of Council.

“**work site**” means and includes any specific place or places at which construction or maintenance works are being carried out on by or under the actual direction and control of Council.

“**year**” means a calendar year.

### **SECTION 3**

#### **Instrument of Delegation**

3. That subject to compliance with the requirements of the Local Government Act, 1993, and Ordinances thereunder and any express Policy or direction of Council, the Council pursuant to the provision of Section 377 of the Local Government Act, 1993, hereby delegates to the General Manager, authority to exercise and perform on behalf of Council, all functions, powers, authorities, duties and matters contained in this Policy.

### **SECTION 4**

#### **Implementation**

4. That all recommendations in this Policy take operational effect from the date of Council Approval.

Having adopted a Floodplain Management Plan, Council’s Plan Policy shall operate in conjunction with such.

#### 1. INTRODUCTION:

The areas within the City of Bathurst which are affected by flooding, are those identified as inundated by 1% AEP flooding, as determined by the Bathurst Computer Based Floodplain Model, and such maps which may be updated from time to time, and are those identified as:

- \* Land which adjoins either the Macquarie River or the Queen Charlotte's Vale Creek;
- \* Have been identified as flood affected by the 1964, 1986 and/or 1990 floods;
- \* Are likely to be affected by inundation from a natural watercourse, or drainage channel; or
- \* All lands outside the designated flood line but contiguous to it, less than 0.5 metres above the designated flood level.

All land affected by flooding will be subject to this interim policy.

#### 2. DESIGNATED FLOOD:

The designated flood or flood standard shall be defined by the following designated floods:

- (a) 1% AEP Flood as determined by the Bathurst Computer Based Flood Model, as amended for the Macquarie River and the Queen Charlotte's Vale Creek, as detailed therein;
- (b) For areas beyond the flood model, including natural creeks and drainage channels, the 1% AEP flood, as calculated by accepted engineering methods.
- (c) 1% AEP Flood extents as determined by the Georges Plains Floodplain Risk Management Plan.
- (d) 1% AEP Flood extents as determined by the Sofala Floodplain Risk Management Plan.

All land subject to inundation/flooding by the designated flood shall be defined as within the designated flood area.

### 3. DEVELOPMENT WITHIN THE DESIGNATED FLOOD AREA:

All developments within the designated flood area shall be generally assessed in accordance with the latest edition of the Floodplain Development Manual as issued by the NSW Government.

Development will not be permitted unless Council is satisfied that the proposed development will not increase the flood hazard rating or likely flood damage to any other property.

All development within the designated flood area requires the consent of Council.

#### A. Development within High Hazard Flood areas:

- (i) No alteration in ground levels will be permitted, whether excavation or filling, without the submission of a hydraulic study and prior development consent;
- (ii) The carrying out of any work or the erection of any structure, including fences, on land within the High Hazard Designated Flood Area will only be permitted if the land is outside the floodway, subject to low velocities, and is supported by a Flood Impact Assessment (FIA) showing that the works will have no adverse flooding affect on any other property.

#### B. Development within Low Hazard flood Areas:

##### (i) Low Hazard - Floodway

No alteration in ground levels, whether by excavation or filling will be permitted without the submission of a hydraulic study and prior

development consent. Neither the carrying out of any work, nor the erection of any structure, including fences, will be permitted in Low Hazard Floodway areas.

(ii) Low Hazard - Flood Storage and Flood Fringe

Development consent is required to be obtained prior to any activity, work or building being carried out within the designated flood area. A hydraulic study may be required to be submitted with any Development Application.

(a) New Development - not protected by Levee Bank

The floor level of any structure is to be 500 mm above the designated flood Level, supplied by Council upon separate request.

(b) Existing Development - Non Residential

Extensions to existing non-residential buildings may be constructed at the same floor level as the existing building. The complete building is to be flood proofed to 500 mm above the designated flood level.

(c) Existing Development - Residential

Extensions to existing residential buildings will be determined by Council on the application's merits, having regard to the following matters.

Where the area of the extension is less than 50% of the existing floor area and the floor level of the existing house is above the designated flood level, the floor level of the extension may be constructed to the same level. The extension is to be flood proofed to 500 mm above the designated flood level.

Where the floor area of the extension is greater than 50% of the existing floor area, the extension is to be constructed with a floor level 500 mm above the designated flood level.

(d) Carports and Open Sheds

Carports and open sheds must be constructed from flood compatible materials, and may be constructed at existing floor levels.

(e) All lands contiguous to the designated flood area less than 0.5 metres above the designated flood level

These areas are only affected by this policy in so far as new floor levels are concerned. See (d) above.

Garages and other sheds must comply with the requirements for new developments.

C. Development within areas protected by levees:

Development within areas identified within the Floodplain Management Plan, benefiting from future levee protection, may be permissible provided that as a result of the development there is:

- (a) no encroachment on the possible alignment of the levees;
- (b) no increased potential flood damage, prior to levee protection;
- (c) no adverse effects on other properties.

For the purpose of this Clause, the areas applying are:

- \* Gilmour Street area
- \* Havannah Street area
- \* Morrissett Street area
- \* Upfold Street areas (upstream of railway line)
- \* Perthville

as described in the Floodplain Management Plan.

Prior to levee protection, floor levels of any new development shall be 500 mm minimum above the 1% AEP flood level as for Clause 3B(ii)(a) of this policy.

D. Development of flood protected land:

Flood protected land is that land within the area as listed below, being land that is protected from a 1% AEP flood by levees.

(i) Kelso Industrial Estate

For development purposes, new building lots protected by a levee shall have a finished ground level not less than either the 1% AEP Flood Level, as identified by the 1987 Flood Study Report, or the 2% AEP Flood Level, as determined by the Bathurst Computer Based Floodplain Model, whichever is the greater. The floor level of any building on land described in this Clause shall be above the ground level specified in this Clause.

(ii) Havannah Street

Development within this area shall be considered in accordance with Bathurst Local environmental Plan 1997, as amended.

(iii) Morrissett Street

Development within this area shall be considered in accordance with Bathurst Local Environmental Plan 1997, as amended.

(iv) Stockland Drive/Lee Street

Development within this area shall be considered in accordance with Bathurst Local Environmental Plan 1997, as amended.

Maps illustrating those areas that are 'flood protected land' are shown at **attachment 1**.

#### 4. DEVELOPMENT OF LANDS AFFECTED BY A NATURAL WATERCOURSE

Development will not be permitted unless Council is satisfied that the proposed development will not increase the flood hazard rating or likely flood damage to any other property.

Development of land through which a significant natural watercourse passes, may be permitted, provided:

- (i) The development is not within the high hazard flood area or low hazard floodway;
- (ii) The habitable floor level is a minimum of 500 mm above the designated flood level;
- (iii) The development does not increase the rate of stormwater run-off into the watercourse.

**Note:** In the absence of flood inundation maps and official records, the designated flood shall be deemed as either:

- (a) 1% AEP flood level (1:100 year) as calculated by a Consulting Engineer, recognised in the hydrology/hydraulics fields; or
- (b) the highest known flood mark as stated on a Statutory Declaration by a resident of the immediate area for greater than 30 years.

#### 5. DEVELOPMENT APPLICATIONS

Any Development Application lodged for proposed development within the designated flood area is to comply with the requirements of the Environmental Planning and Assessment Act, 1979. Further, any Development Application is to be accompanied by:

- i) a report from an accredited Consulting Engineer, detailing any adverse effects of the proposed development on flood hazard rating

and potential flood damage to the subject property and any other property.

In the case of all land included in the Computer Based Flood Model Study area, such report shall be undertaken by Council at the cost of the developer;

- ii) an evacuation plan for the development, accompanied by evidence that the local division of the State Emergency Service has been consulted in the formulation of the plan;
- iii) existing ground levels of the subject site certified by a registered surveyor.

Approval of a Development Application is at Council's discretion and each application will be judged on its merits.

Failure to gain development approval in the correct manner prior to undertaking work within the designated flood area may lead to Council taking action under the provisions of the Environmental Planning and Assessment Act, 1979.

## 6. DEFINITION OF LOW HAZARD AND HIGH HAZARD FLOOD AREAS

The criteria outlined in Appendix B of the NSW Government Floodplain Development Manual shall be used for the assessment of flood hazard of those properties which are affected by flooding from the Macquarie River and Queen Charlotte's Vale Creek, and are included in the study area of the computer based flood model, utilising the depth and velocity calculations generated by the Model.

For watercourses not included in the Bathurst Computer Based Flood Model, Council has resolved that low hazard flood areas are those areas effected by 0.5 metre of flood water, or less.

## 7. FLOOD LEVELS

That all applications for flood levels be in writing and that a charge, as may be determined from time-to-time, apply for the supply of such information. (Formerly Policy No. 8).

## 8. RAGLAN CREEK

Council has adopted, as a matter of policy, for consistency of analysis, Council's calibrated RAFTS Model as the only method of assessing the hydrology of Raglan Creek. In this, all developments ultimately discharging into the Raglan Creek, will be subject to a Council charge, for the assessment of the effects of the development within the Raglan Creek Catchment, should such assessment be required.

## 9. VOLUNTARY PURCHASES



That Council agree to participate in the purchase of flood prone land, in conjunction with the New South Wales State Government and the Commonwealth Government on a voluntary basis in accordance with the following requirements, as stipulated by the Minister for Water Resources, namely:

1. That Council submit a proposal to the Department of Water Resources, giving details of the property to be purchased, including the purchase price and how this was arrived at;
2. Submit a detailed valuation of the property prepared and authenticated by the Valuer General's Department;
3. Submit a proposal for the future use of the land and that Council agree that it will:
  - (a) zone the land as open space, restricting all possible development, including the placement of fill or planting of trees;
  - (b) retain control of the land in perpetuity;
  - (c) ensure that appropriate steps are taken to record its open-space zoning. (Formerly policy No. 26) or such other requirements, and practice which may be applicable, from time to time.

This Clause applies to the Kelso floodplain, as identified in the Floodplain Management Plan.

The priority of purchase is based on:

- (a) occupied by owner;
- (b) hazard rating for the 1% AEP flood;
- (c) whether over floor flooding has been experienced previously;
- (d) the level of adverse effects to the property as a result of other structural measures on the floodplain; notwithstanding that Council may purchase any property earmarked for voluntary purchase should it become available.

#### 10. FLOOD MITIGATION WORKS 27 April 1995

Flood mitigation works shall be exempt from the provisions of this policy, provided that:

- (a) the works are identified in the Bathurst Floodplain Management Plan;
- (b) the works have fulfilled all the criteria established in the Floodplain Management Plan;

- (c) the works comprise the adopted actions to implement the Floodplain Management Plan.
- (d) the works are identified in the Georges Plains floodplain risk Management Plan and comprise the adopted actions to be implemented as part of the Plan.
- (e) the works are identified in the Sofala Floodplain risk Management Plan and comprise the adopted actions to be implemented as part of the Plan.



**BATHURST REGIONAL COUNCIL**

**Flood Protected Land  
Havannah Street Levee**



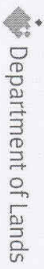
**'This plan relates to flood protected land only. Areas affected by the 1% AEP are not shown on this plan.'**

**Date 17/03/2005**

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Note: The colours on this Plan do not indicate zones under the Bathurst Local Environmental Plan 1997.





**BATHURST REGIONAL COUNCIL**

**Flood Protected Land  
Morrisset Street Levee**



**'This plan relates to flood protected land only. Areas affected by the 1% AEP are not shown on this plan.'**

**Date 17/03/2005**

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**1.2**



BATHURST REGIONAL  
COUNCIL

Flood Protected Land  
Kelso Industrial Area



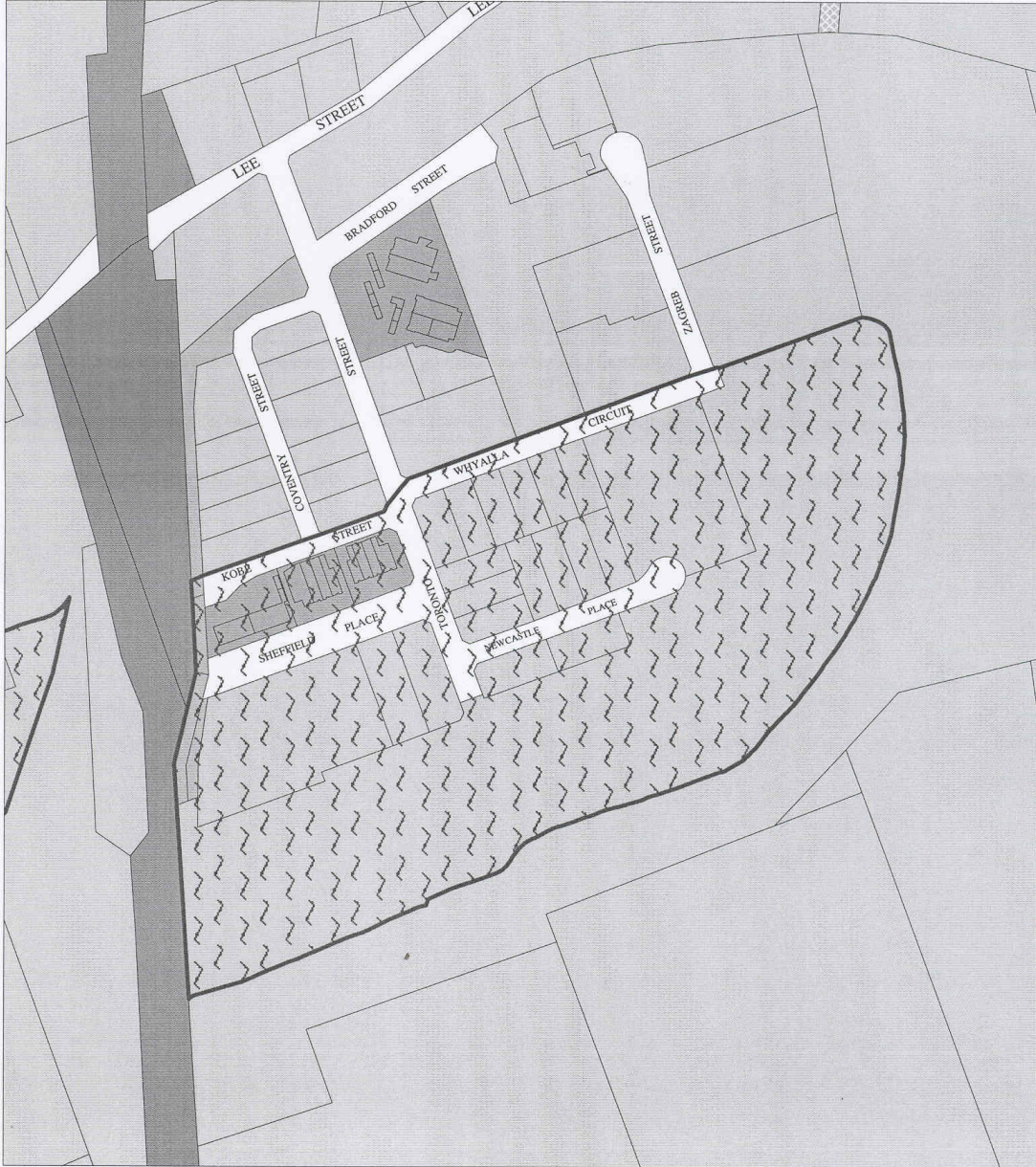
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**Date 17/03/2005**

**Disclaimer**

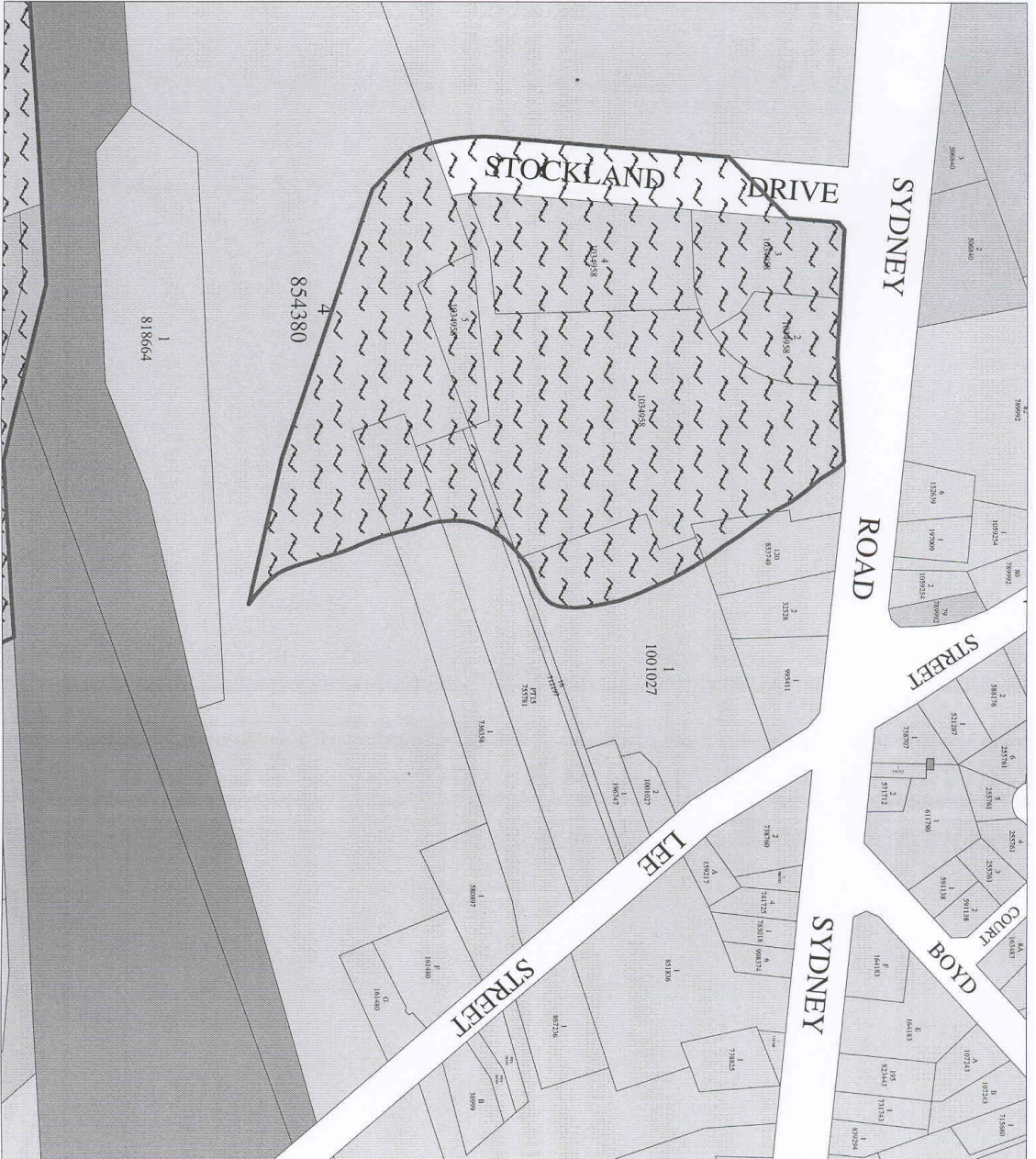
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Note: The colours on this Plan do not indicate  
any information under the Bathurst Local Environmental  
Plan 1997.



**1.3**





**BATHURST REGIONAL COUNCIL**

**Flood Protected Land  
Lee/Stockland Levee**



**BATHURST REGIONAL COUNCIL**

**"This plan relates to flood protected land only. Areas affected by the 1% AEP are not shown on this plan."**

**Date 22/03/2005**

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Department of Lands

# 1. FLOOD RISK MANAGEMENT IN NSW

## 1.1 Flood Prone Land Policy

The primary objective of the New South Wales Flood Prone Land Policy, as outlined below, recognises the following two important facts:

- flood prone land is a valuable resource that should not be sterilised by unnecessarily precluding its development; and
- if all development applications and proposals for rezoning of flood prone land are assessed according to rigid and prescriptive criteria, some appropriate proposals may be unreasonably disallowed or restricted, and equally, quite inappropriate proposals may be approved.

### 1.1.1 The Policy Statement

The primary objective of the policy is to reduce the impact of flooding and flood liability on individual owners and occupiers of flood prone property, and to reduce private and public losses resulting from floods, utilising ecologically positive methods wherever possible. That is:

- a merit approach shall be adopted for all development decisions in the floodplain to take into account social, economic and ecological factors, as well as flooding considerations;
- both mainstream and overland flooding shall be addressed, using the merit approach, in preparation and implementation by councils of strategically generated floodplain risk management plans;
- the impact of flooding and flood liability on existing developed areas identified in floodplain risk management plans shall be reduced by flood mitigation works and measures, including on-going emergency management measures, the raising of houses where appropriate and by development controls; and
- the potential for flood losses in all areas proposed for development or redevelopment shall be contained by the application of ecologically sensitive planning and development controls.

To achieve its primary objective, the policy provides for:

- financial assistance by the NSW Government for works to reduce potential flood damage and personal danger in existing developed areas;
- technical support from the State Government to local councils in ensuring that the management of flood prone land is consistent with flood risk and that such development does not cause undue future distress to individuals nor unduly increase potential flood liability to them or the community;
- emergency management and flood recovery programs and their linkage with the floodplain risk management process; and
- the protection of councils, government agencies, and their staff against claims for damages resulting from their issuing advice or granting approvals on floodplains, providing such action was taken in accordance with the principles and guidelines in this manual.

The policy shall be implemented in the following manner:

- The management of flood prone land is, primarily, the responsibility of councils. In addition, the Department of Infrastructure Planning and Natural Resources (DIPNR) has a lead role in the development of regional strategies and plans under the Environmental Planning and Assessment Act (EP&A Act). Therefore, councils need to be cognisant of regional strategies and plans, when determining standards and implementation arrangements for flood prone land in their service areas.
- The NSW Government, through DIPNR and the State Emergency Service (SES), shall provide specialist technical assistance on all flooding and land use planning matters. This manual is provided to assist councils in the preparation of floodplain risk management plans.

- The establishment of local floodplain risk management committees by councils, through which local community groups and individuals can effectively communicate their aspirations concerning the management of the flooding problem.
- The State Government continuing to subsidise flood risk management studies, works and measures.

### 1.1.2 Policy Provisions

The policy provides for:

- a flexible merit based approach to be followed by councils, when dealing with development or redevelopment of flood prone land;
- high government priority for flood risk mitigation programs;
- a merit based approach to selection of appropriate flood planning levels (FPLs). This recognises the need to consider the full range of flood sizes, up to and including the probable maximum flood (PMF) and the corresponding risks associated with each flood, whilst noting that with few exceptions, it is neither feasible nor socially or economically justifiable to adopt the PMF as the basis for FPLs. FPLs for typical residential development would generally be based around the 1% AEP flood event plus an appropriate freeboard (typically 0.5m);
- councils to be responsible for the determination of appropriate planning and development controls, including FPLs, to manage future flood risk to an acceptable level based on social, economic and ecological, as well as flooding considerations. These controls should be cognisant of the relevant regional planning and any associated controls;
- an emphasis on the importance of developing and implementing floodplain risk management plans based on an integrated mix of management measures that address existing, future and continuing risk;
- the provision of NSW government technical and financial support to councils in relation to flooding matters;
- floodway definition to be based on hydraulic, hazard and potential damage considerations related to the effect of loss of flow conveyance on flood conditions, with provision for restricted development depending on circumstances;
- explicit recognition that flood risk management needs to take into account the principles of ecologically sustainable development (ESD) through consideration of relevant government policies and legislation allowing for the sustainable use of the floodplain as a natural resource. Planning and assessment requirements laid down in these policies and legislation must be complied with by all agencies associated with the use, development and management of the floodplain;
- recognition of the need to consider ways of maintaining and enhancing riverine and floodplain ecology in the development of floodplain risk management plans;
- recognition of the importance of the continuing flood risk addressed in the State Emergency Service Act 1989 and State Flood Plan, and the close relationship between the emergency management and floodplain risk management processes;
- recognition of the potential implications of climate change on flooding behaviour;
- detailed implementation arrangements as outlined in this manual;
- protection of councils and other public authorities and their staff against claims for damages, providing they act in accordance with the government's policy at the time; and
- relief from land tax, council rates and water and sewerage rates where vacant land cannot be developed because of its flood prone nature.

### 1.1.3 Enquiries

Enquiries should be directed as follows:

- general enquiries on the policy, its currency, and implementation to DIPNR;
- enquiries on flood liability of individual properties and proposals for development should be directed to the relevant council; and



- enquiries on flood warning, evacuation and community education matters should be directed to the SES.

## 1.2 Purpose of the Manual

The manual supports the NSW Government's Flood Prone Land Policy in providing for the development of sustainable strategies for managing human occupation and use of the floodplain considering the risk management principles outlined in Appendix B. These are based upon a hierarchy of avoidance, minimisation (using planning controls) and mitigation works.

This manual provides councils with a framework for implementing the policy to achieve its primary objective. It considers the costs and benefits of floodplain occupation in full recognition that associated management decisions need to consider broader issues in an integrated approach.

This manual updates the 2001 Floodplain Management Manual to reflect the significant change in the roles of State Agencies and to clarify some planning issues which have led to inconsistent interpretations. It replaces the 1986 Floodplain Development Manual as the Government's manual relating to the management of flood liable land in accordance with Section 733 of the Local Government Act 1993. This provides councils and statutory authorities, and their staff, with indemnity for decisions made and information provided in good faith from the outcomes of the management process.

The manual also presents general principles and a process for floodplain risk management to enable councils and their floodplain risk management committees to understand flood behaviour and impacts. It provides for evaluation of strategies and formulation of plans that achieve effective floodplain risk management outcomes accounting for social, economic, ecological and cultural factors, together with community aspirations for the use of flood prone land. This provides for sustainable use and development of the floodplain in a wise and rational manner on a flexible merit basis.

## 1.3 Who is the Manual for?

The Manual is written principally for local government, including councillors, senior

managers, engineers, planners, environment officers, development assessors, reserve managers and others. However, the manual will also be of interest to other organisations and individuals involved in floodplain risk management such as government agencies, landholders, community groups and consultants.

## 1.4 Where does the Manual Apply?

The manual applies to floodplains across NSW, in both urban and rural areas. It is also used to manage major drainage issues in local overland flooding areas. As the 1986 manual was directed principally to mainstream flooding in urban areas Appendix C provides more details on the application of the manual to rural and local overland flooding.

## 1.5 How to Use the Manual

The manual is to be read and interpreted in a global sense with reference to the overall objectives of the policy, with particular reference to the primary objective.

The manual and policy are targeted at a strategic management level. To ensure that the underlying philosophies are applied in each case, without exception, individual portions or sections of the manual should not be interpreted outside:

- the overall philosophy of the manual and its application of strategic management; and
- the policy, as outlined in Section 1.1.

In the case of any inconsistency the main body of the manual takes precedence over the appendices.

The manual is broken down into sections as follows:

- Section 1 outlines the policy, the role of the manual in policy interpretation, and the principles and objectives of floodplain risk management;
- Section 2 describes the floodplain risk management process;
- Section 3 deals with the roles and responsibilities of participants in floodplain risk management; and
- Section 4 provides a glossary of terms used.

Appendices support the text in implementing the management process. Key appendices include:

- Appendix A discusses the history of policy development, improvements on previous manuals, and the cost of flooding in NSW;
- Appendix B provides a background on risk management;
- Appendix C outlines the floodplain risk management process, as shown in Figure 2.1, and references other relevant appendices;
- Appendix D discusses the need for, and role and make up of management committees;
- Appendix E outlines the necessary data and its collection;
- Appendix F outlines flood study preparation;
- Appendix G discusses issues addressed in, and preparation of, a floodplain risk management study;
- Appendix H discusses preparation and formalisation of a floodplain risk management plan;
- Appendix I discusses management plan implementation;
- Appendix J discusses floodplain risk management options;
- Appendix K discusses derivation of flood planning levels;
- Appendix L outlines hazard and hydraulic categorisation;
- Appendix M discussed flood damages; and
- Appendix N discusses emergency response planning for floods.



PLATE 1 - South Murwillumbah, 1954

## 1.6 Effective Floodplain Risk Management

Floodplain risk management specifically considers the consequences of flooding as they relate to human occupation of the floodplain. The policy and manual focus on this risk whilst recognising that natural resource management policies and legislation need consideration by all agencies managing floodplain development and use.

The policy and manual use a broad risk management hierarchy of avoidance, minimisation and mitigation, as discussed in Appendix B, to:

- reduce the social and financial costs from the risks associated with occupying the floodplain;
- increase the sustainable benefits of using the floodplain; and
- improve or maintain floodplain ecosystems dependent on flood inundation.

The most effective means of achieving sound flood risk management outcomes is to formulate and implement management plans through the floodplain risk management process, discussed in Section 2.

The process enables decisions to be made on a balanced consideration of economic, social and environmental issues from a flood risk management perspective so as to achieve effective robust outcomes in an informed and consultative manner.

Management plans need to be specific to individual floodplain and specific locations within the floodplain due to variation in flood hazard, exposure and vulnerability.

Balanced management plans must address each of the three types of flood risk, discussed below, in a comprehensive manner and evaluate all factors (including social, economic, ecological and cultural impacts and flood risk) that affect the use of flood prone land. The three types of flood risk are:

- **existing flood risk**, associated with current development on flood prone land. For example, this may be the risk to existing development areas that can be effectively managed by the construction of a levee;

- **future flood risk**, associated with any new development on flood prone land. For example, this may be the risk to future development areas that can be managed by adopting appropriate development limits, and minimum fill levels for lots and minimum floor levels for buildings; and
- **continuing flood risk**, is the risk remaining, in both existing and future development areas, after floodplain risk management measures, such as works and planning controls, are implemented. This is the risk from rarer floods which may result in levee overtopping or flooding of buildings with minimum floor levels. The consequences of these rarer floods may include danger to personal safety and damages to infrastructure, and both public and private property.
- consideration of future development scenarios for a reasonable timeframe (say 20 years). Considering only existing planning or development scenarios cannot generally account for this future growth;
- cumulative assessment of decisions relating to mitigation works and measures, future development and environmental consequences on a long term strategic basis; and
- accounting for future growth in the numbers of occupants in the floodplain. Such growth increases the pressure on response and recovery agencies should an emergency occur.

Incorporating future land use elements of management plans into Environmental Planning Instruments (EPIs) and development control plans and policies will facilitate effective management of the floodplain.

A balanced management plan therefore requires a range of different management measures. These measures (including both works and planning controls) and their cumulative impacts, need to be considered strategically. This involves:

Case-by-case decision making cannot account for the cumulative impacts on flood behaviour and risks, caused by individual developments or works. This form of ad hoc assessment contravenes the principles of the manual.



**PLATE 2 - Nyngan, 1990**

*(Continuing Flood Risk - Floodplain Risk Management Measures Overwhelmed)*