TWEED SHIRE COUNCIL

FLOOD RISK MANAGEMENT POLICY

1954 Flood, Regent Cinema, Murwillumbah

DRAFT Version 1.0, ~~October~~ December 2007

FOR ~~EXHIBITION~~ADOPTION

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Tweed Shire Council Policy Document

Flood Risk Management

Version: DRAFT 1.0
Date: 12 September 2007

1.0 FOREWORD

Flooding within the Shire occurs when rainfall exceeds the capacity of creeks and rivers to convey the runoff water to the ocean. Flooding can generate rapid rises in water levels and warning times are often very short, particularly in the upper tributaries of the Tweed River. The coastal creeks and the lower reaches of the Tweed River can also be flooded from the affects of a cyclone or its remnant rain depression that creates extraordinarily high tide or ocean levels combined with heavy local rain. Flooding of this type will generally occur with little warning except for weather forecasts predicting cyclones and rain depressions.

Since installation of the Murwillumbah Flood Gauge in 1928, eighteen (18) major floods have been recorded, the largest occurring in 1931, 1954, 1956, 1974, and 1989. The flood of record for the Tweed River is the 1954 event, with a gauge reading of 6.04m AHD at Murwillumbah. 1954 flood levels varied in Tweed Heads from 2.51m AHD near the river mouth to 2.05m AHD in the town centre. Anecdotal evidence suggests, however, that earlier floods in 1887 and 1893 were higher than the 1954 flood.

Considerable time can pass between major floods, with the potential for major growth in population and floodplain usage in the intervening years. In the period since the 1989 flood, Tweed Shire has experienced one of the highest population growth rates in New South Wales, with approximately 1800 new residents per year. This had led to the creation of entire new communities via widescale residential subdivision, many of which have occurred on the floodplain.

In rural floodplains, minor flooding is controlled by levees and floodgated drainage outlets, where the agricultural use and potential flood damage has justified the expenditure. Council is responsible for the management of approximately 250 floodgates across the Shire.

In urban areas of Murwillumbah (CBD, East Murwillumbah, Dorothy / William Streets and South Murwillumbah) and Tweed Heads South, levees provide structural protection against flood inundation to varying degrees. In the event of a flood exceeding the levee height, the protected areas will flood quickly with little warning time and very rapid rises in water levels. In other areas, planning controls are used to contain future flood damage and address emergency response issues to minimise risk to life.

Residents in flood prone areas should be ~~e~~very conscious of their situation, be alert during any periods of predicted high rainfall, be prepared to relocate possessions from areas liable to inundation, and respond to emergency services directions.

Council's flood mitigation strategy is to maximise community safety and minimise future potential damage due to flooding, both by structural protection and by planning controls to ensure that only appropriate compatible development occurs on floodplains in the future.

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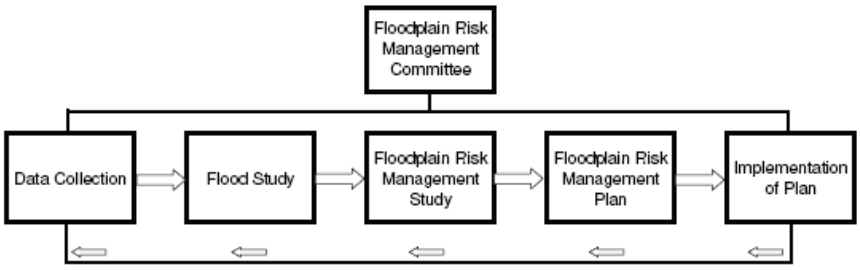
1.1 AIMS AND OBJECTIVES OF THE POLICY

- to alert the community to the extent of flood prone land and the severity of flood risk;
- to inform the community of Council policy in relation to the development and use of flood prone land, with reference to the Local Environment Plan, Development Control Plan and Floodplain Risk Management Studies and Plans;
- to reduce flood risk and damage to existing areas of development;
- to ensure that future land use and development is compatible with flood risk;
- to reduce flood risk to future development to an acceptable level through appropriate land use controls, including flood planning levels;
- to complement flood warning procedures and local flood plans for the protection of and/or evacuation of flood prone areas, the relief of evacuees and the recovery of flooded areas;
- to ensure that buildings and services required for evacuation and emergency needs are sited appropriately for the flood risk;
- to put in place emergency response measures to protect essential infrastructure and services during a flood, and to ensure rapid restoration of services following flood events;
- to progressively implement the NSW Government's Flood Prone Land Policy, in accordance with the Floodplain Development Manual;
- to progressively implement the recommendations of the Tweed Valley Floodplain Risk Management Study.

1.2 INTRODUCTION

This policy applies to all flood liable land in Tweed Shire.

This policy establishes Council's framework for management of the existing, future and continuing flood risk for property affected by flooding within the Tweed Shire. The policy recognises the need for a balanced approach to floodplain management, including works and planning controls, as recommended by the NSW Floodplain Development Manual and its Floodplain Risk Management Process (see below).



Floodplain Risk Management Process
(NSW Floodplain Development Manual 2005)

This policy has been developed in accordance with Clause C9.3 and Clause I6 of the NSW Floodplain Development Manual.

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This policy supersedes the following Council Policies:

- "Flood Liable Land" (Version 1.0, December 2004)
- "Flood and Floor Levels for Residential Buildings - Flood Prone Areas" (Version 1.0, December 2004)
- "Building Extensions in Flood Prone Areas" (Version 1.0, December 2004)
- "Unregistrable Moveable Dwellings and Annexes" (Version 1.0, December 2004)

This Policy should be read in conjunction with the LEP, DCP, Parts 1, 2 and 3 of the Tweed Valley Floodplain Risk Management Study, and Parts 1 and 2 of the Tweed Valley Floodplain Risk Management Plan.

Where an inconsistency arises with the Policy and an environmental planning instrument (SEPPs, REPs or LEPs), the EPI provisions prevail. Where inconsistencies with the DCP or other policy documents arise, then the higher standard/requirement shall prevail.

Tweed Shire Council is committed to the floodplain risk management process for the management of flood liable land as prescribed by the NSW Floodplain Development Manual, the NSW Flood Prone Land Policy and the relevant sections of the Local Government Act 1993.

Council will therefore review and update this policy from time to time as improved knowledge and higher learning evolves from further development and review of Floodplain Risk Management Studies and Plans in accordance with the requirements of the NSW Floodplain Development Manual.

1.3 FLOOD EXTENTS AND FLOOD PLANNING LEVELS

Flood Planning Levels (FPL's) are prescribed by DCP Section A3 - Development of Flood Liable Land. Refer also to Tweed Valley Floodplain Risk Management Study Part 1 - Establish Appropriate Flood Planning Levels for Residential Development (December 2005).

Council has acquired information on predicted flood extents, levels and velocities over many localities from a variety of flood studies. Flooding information may be obtained from the Engineering and Operations Division by enquiry. Fees and charges may apply.

Flood planning levels may change from time to time, as new flood predictions or observations of real events come to hand. While older developments may have met Council's flooding standards at the time of approval (such as minimum fill or floor levels), changes to flood planning levels may render these developments non-compliant in terms of current policy and development controls. This may affect the ability of owners to obtain flood insurance or further develop the property.

Proponents are advised to obtain a Section 149 Certificate to determine the flood planning levels applicable to specific parcels of land.

1.3.1 Variations to Habitable Floor Levels

For dwellings with existing floor levels below the adopted minimum floor level, "minor extensions" for habitable uses are permissible, with the concurrence of the Director Planning & Regulation.

Larger additions will only be considered for recreational rooms constructed of flood compatible materials, and provided furnishings therein are readily removable and can be relocated to an on-site storage area above the minimum habitable floor level. Concurrence of the Development Assessment Panel is required.

1.3.2 Section 149 Certification

Amongst other things, Clause 279 and Schedule 4(7) of the Regulations to the Environmental Planning and Assessment Act 1979 state that a Section 149(2) Certificate must contain information relating to:
"*Whether or not the land is affected by a policy … that restricts the development of the land because of the likelihood of land slip, bushfire, flooding, tidal inundation, subsidence, acid sulphate soils or any other risk."*

The primary function of the Section 149 Certificate Notation is as a planning tool for notification that the land is affected by a policy that restricts development due to the likelihood of a risk, in this instance, flooding. The Section 149 Certificate can play a role in community awareness but should not be relied on to provide detailed flood information.

Part of Council's statutory responsibility is to update Section 149 Certificates as new information, that poses a risk to the community, becomes available.

For the purpose of flood risk, Section 149(2) and Section 149(5) Certificates are used to inform property owners, prospective property buyers and property developers of the flood risk associated with any particular property and that development may be restricted.

1.4 APPLICATIONS FOR THE DEVELOPMENT OF FLOOD PRONE LAND

Exempt and complying development on flood prone land must satisfy Section A10 of the DCP.

Flood prone development requiring consent must satisfy the LEP, DCP Section A3, and the following policy considerations:

1.4.1 Essential Community Facilities & Critical Services

a) Flood Emergency Response

In accordance with Tweed Valley Floodplain Risk Management Study Part 3 - Habitable Land Use on the Floodplain, critical infrastructure and emergency response facilities shall comply with the following development controls:

Land Use Risk Class	Development Type	Development Controls	Notes
Critical Infrastructure and Emergency Response Facilities *As per Appendix K3.1 of the FPDM - Police and ambulance stations, hospitals, SES headquarters, evacuation centres and civil infrastructure such as major telephone exchanges and power sub-stations.*	New Development	~~Mandate a~~All new critical infrastructure and facilities to be located above PMF level, unless exceptional circumstances can be justified, such as servicing existing flood prone communities where no practical alternative exists. In such cases, adequate PMF refuge must be provided.~~.~~	Note 1
	Existing Development	~~Permit m~~Minor expansion of existing facilities permitted without consideration of PMF. Major expansion~~located~~ below PMF level subject to provision of adequate PMF refuge.	Note 1

Note 1 - PMF Refuge for Critical Development
The PMF refuge must meet the following minimum requirements:

- Refuge must be above the PMF level.
- Minimum floor level to be PMF level. No freeboard required.
- For extensions to new facilities, minimum floor area of refuge to be no less than 50% of the incremental increase in total floor area located below the PMF due to the extension, or an equivalent area that would comfortably accommodate and service the needs of occupants for a period of not less than one week.
- Refuge must comply with Building Code Australia requirements, with external components rated appropriately for storm, wind and moisture.
- Permanent internal access via permanent staircase, minimum 1.2m wide.
- External access to the refuge must also be provided. Access must remain unobstructed for emergency boat access during flooding (i.e. clear of trees, services).
- Refuge must have natural lighting and ventilation.
- Support structures below PMF level must be capable of withstanding flood forces (water flow, debris impact, and buoyancy) and continuous submergence for up to one week, requiring an engineering certification.
- Refuge must meet all planning and building controls applicable to the site.
- All services provided as part of normal operations are to be continued undiminished during all flood events. This includes food, water, shelter, power via back up generators, medical services and hygiene of residents and facilities. All excess sewage, food and medical waste is to be collected and stored until such time as normal disposal can be undertaken. Facility management must make provision for staff to be rostered on and accommodated for the flood period. All such measures must be detailed in the development's Flood Response Assessment Plan.

1.4.2 Habitable Development

a) Flood Emergency Response
In accordance with Tweed Valley Floodplain Risk Management Study Part 3 - Habitable Land Use on the Floodplain, new habitable development shall comply with the ~~following~~ development controls below.~~:~~

Savings
Applications submitted within six (6) months of the date of adoption of Version 1.0 of this Policy for single dwellings, medium and high density accommodation (as defined below) may be exempted from the development controls in 1.4.2(a).

Land Use Risk Class	Development Type	Development Controls	Notes
Sensitive Uses *Housing (including group homes) and residential care facilities for seniors and disabled persons.*	New Development	All new sensitive development to have permanent high level road evacuation route(s) to land above PMF level and/or adequate PMF refuge, subject to the recommendations of an acceptable Flood Response Assessment Plan.	Note 1

Land Use Risk Class	Development Type	Development Controls	Notes
	Existing Development	Minor expansion of existing facilities ~~located below PMF level~~ permitted without consideration of PMF. Major expansion~~,~~ below PMF level subject to provision of adequate PMF refuge.	Note 2
Medium and High Density Accommodation *Multi dwelling housing, dual occupancy, residential accommodation, residential flat building, backpackers' accommodation, boarding house, hostel, hotel accommodation, moveable dwelling, caravan park, serviced apartment, tourist and visitor accommodation, and accommodation associated with an educational establishment*	New Development (except moveable dwellings, caravan parks)	All new high/medium density development to have permanent high level road evacuation route(s) to land above PMF level and/or adequate PMF refuge, subject to the recommendations of an acceptable Flood Response Assessment Plan.	Note 3
	Existing Development (except moveable dwellings, caravan parks)	Minor expansion of existing facilities ~~located below PMF level~~ permitted without consideration of PMF. Major expansion below PMF level~~,~~ subject to provision of adequate PMF refuge.	Note 4
	New Development (moveable dwellings, caravan parks)	All new caravan/moveable dwelling parks to have permanent high level road evacuation route(s) to land above PMF level.	
	Existing Development (moveable dwellings, caravan parks)	No expansion of existing facilities permitted, unless permanent high level road evacuation route to high land external to the site~~to land above PMF level~~ is available, or high land internal to the site can be accessed by the additional sites via road and/or pedestrian routes.~~,~~	
Residential Subdivision and Development *Urban Residential Subdivision (including small lot rural subdivision where the average lot size, excluding residual and non-residential lots is less than 5000m^2), Urban Residential Dwellings, Rural Subdivision, Rural Residential Dwellings*	New Subdivisions	All new subdivisions to have high level road evacuation route(s) to land above PMF level, accessible to all allotments via (as a minimum) pedestrian access at or above 100 year ARI flood level not exceeding 100m in length.	
	Infill Subdivisions (subdivision of land less than 5 hectares in area, surrounded by existing urban development and/or constrained by the urban land form from further expansion)	Infill subdivision permitted subject to the creation of covenants on land titles of all new allotments that cannot achieve suitable high level road/pedestrian evacuation route(s) to land above PMF level, requiring adequate PMF refuges in all future dwellings.	Note 4
	New Single Dwellings	Adequate PMF refuges required in all new dwellings on existing allotments that are located below PMF level and that are without suitable high level road/pedestrian evacuation route(s) to land above PMF level, unless that land is protected by a 1 in 100 year levee (Murwillumbah CBD, East Murwillumbah, Dorothy/William Street).	Note 4
	Existing Single Dwellings	Minor extensions to existing dwellings permitted without consideration of the PMF. Dwellings undergoing major extensions must meet new single dwelling criteria.	Note 4

Land Use Risk Class	Development Type	Development Controls	Notes
Other Habitable Development	All	Flood Response Assessment Plans are required to be submitted with Development Applications for all habitable land uses in the floodplain.	Note 5

Note 1 - Evacuation Versus Shelter in Place for Sensitive Development

Evacuation of occupants is the preferred risk management approach for sensitive developments proposed below PMF level. Adoption of evacuation as the risk management response for a development requires a Flood Response Assessment Plan that specifically addresses the following evacuation requirements:

- Typical demographics of evacuees (age, gender etc)
- Typical medical conditions and/or disabilities of evacuees (dialysis, dementia, paralysis etc)
- Mode of transportation (private bus, ambulance etc)
- Intended evacuation destination
- Level of service provided by evacuation centre (medical, security, accommodation etc)
- Required staffing for evacuation centre to cater for evacuees
- Special supply measures for evacuation centre to cater for evacuees (food, water, waste, medicines etc)

If the above requirements are not able to be satisfied for all future occupants of the development, a PMF refuge shall be provided in accordance with design criteria in Note 2.

Note 2 - PMF Refuge for Sensitive Development

The PMF refuge must meet the following minimum requirements:

- Refuge must be above the PMF level.
- Minimum floor level to be PMF level. No freeboard required.
- For new facilities, minimum floor area of refuge to be no less than 50% of the total floor area located below the PMF, or an equivalent area that would comfortably accommodate and service the needs of the occupants for a period not less than one week. For extensions to new facilities, minimum floor area of refuge to be no less than 50% of the incremental increase in total floor area located below the PMF due to the extension.
- Refuge must comply with Building Code Australia requirements, with external components rated appropriately for storm, wind and moisture.
- Permanent internal access via permanent staircase, minimum 1.2m wide.
- External access to the refuge must also be provided. Access must remain unobstructed for emergency boat access during flooding (i.e. clear of trees, services).
- Refuge must have natural lighting and ventilation.
- Support structures below PMF level must be capable of withstanding flood forces (water flow, debris impact, and buoyancy) and continuous submergence for up to one week, requiring an engineering certification.
- Refuge must meet all planning and building controls applicable to the site.
- All services provided as part of normal operations are to be continued undiminished during all flood events. This includes food, water, shelter, power via back up generators, medical services and hygiene of residents and facilities. All excess sewage, food and medical waste is to be collected and stored until such time as normal disposal can be undertaken. Facility management must make provision for staff to be rostered on and accommodated for the flood period. All

such measures must be detailed in the development's Flood Response Assessment Plan.

Note 3 - Evacuation Versus Shelter in Place for Medium and High Density Accommodation

Evacuation of occupants is the preferred risk management approach for medium and high density developments proposed below PMF level. Adoption of evacuation as the risk management response for a development requires a Flood Response Assessment Plan that specifically addresses the following evacuation requirements:

- Expected number of occupants/evacuees
- Typical demographics of evacuees (families with children, retirees etc)
- Mode of transportation (private vehicles, bus provided by facility etc)
- Intended evacuation destination
- Level of service provided by evacuation centre (medical, security, accommodation etc)
- Any special requirements for evacuation centre to cater for evacuees (food, water, waste, medicines etc)

If the above requirements are not able to be satisfied for all future occupants of the development, a PMF refuge shall be provided in accordance with design criteria in Note 4.

Note 4 - PMF Refuge for Urban and Rural Residential Development

Where PMF refuge is required, the refuge must meet the following minimum requirements:

- Refuge may be an additional second storey, mezzanine level or other raised refuge area above the PMF level.
- Minimum floor level to be PMF level. No freeboard required.
- Minimum floor area for a single bedroom dwelling 9m^2, add 4m^2 for each additional bedroom.
- For unit developments, may provide separate refuges within each unit, sized in accordance with the above bedroom ratio. Alternately provide a communal refuge, accessible internally by all units, floor area no less than 50% of total floor area located below PMF level, or an equivalent area that would comfortably accommodate and service the needs of the occupants for a period not less than one week.
- Refuge must comply with Building Code Australia requirements, with external components rated appropriately for storm, wind and moisture.
- Minimum 2.1m floor to ceiling/roof frame height.
- Refuge must be provided with permanent internal and external access, (may be a fixed ladder).
- The external access must be unobstructed (by trees, chimneys, aerials etc) for emergency boat access during flooding
- Refuge must have natural lighting and ventilation
- Support structures below PMF level must be capable of withstanding flood forces (water flow, debris impact, and buoyancy) and continuous submergence for up to one week, requiring an engineering certification.
- Refuge must meet all planning and building controls applicable to the site.
- Refuge must have a cupboard storage area for flood emergency kit to service all residents with provisions for isolation up to one week, consisting of food and fresh water supplies, first aid kit including medication, battery powered torch, portable radio, spare batteries, candles and water proof matches, plastic bags

and rubber gloves. All such measures must be detailed in the development's Flood Response Assessment Plan.

Note 5 - Flood Response Assessment Plan
A Flood Response Assessment Plan provides a means by which a developer can assess and nominate the most applicable flood emergency response option for a habitable development (whether it be avoidance, evacuation, or shelter in place), and for Council officers to consider during assessment of the development application.

The Flood Response Plan is not intended to be a document that provides details for the site specific management of flood preparation and response for a habitable development. Such private flood plans should be developed and implemented by owners and occupants following completion of the development. The SES may provide assistance to occupants in the preparation of private flood plans.

As a minimum requirement, a Flood Response Assessment Plan for a proposed development must provide the following details:

- Expected number of occupants
- Typical demographics of occupants (families with children, retirees etc)
- 100 year ARI flood level and PMF level for the development site (obtainable from Council)
- Nominated Flood Risk Management Approach for the development (avoidance, evacuation, shelter in place. Note that rescue is not an appropriate response for any development type)
- For evacuation, provide detail of nearest evacuation centre (as advised by the NSW State Emergency Service), the intended mode of transport to the centre, and indicative ground/road levels at significant points along the nominated evacuation route.
- Any special requirements for evacuation centre to cater for evacuees (food, water, waste, medicines etc)
- If shelter in place, provide details of refuge in accordance with Note 2 or Note 4 as applicable.

1.4.4 Non-Habitable Development
DCP Section A3 requires flood compatibility of commercial and industrial development, in terms of building materials, electrical installations, and the provision of flood free storage above the 100 year ARI flood level.

Council has not adopted minimum floor levels for non-habitable development, with the exception of self-storage units, which must achieve floor levels at least 300mm above the 100 year ARI flood level.

1.4.5 Planning Controls for High Flow Areas
In accordance with Tweed Valley Floodplain Risk Management Study Part 2 - Planning Controls for High Flow Areas (September 2006), the following development controls shall be applied to future development in mapped "high flow" areas of the floodplain:

• **Land Zone**	• **Development Controls**
• *1(a) Rural and 1(b) Agricultural*	• Exclude all new residential development from the mapped high flow areas. •

• Land Zone	• Development Controls
	• Other development only permissible within high flow areas if the development will not change ground levels by more than 300mm (for local drainage purposes) or obstruct flood flows. • • Examples of permissible development include: • • buildings with footprints less than 80m^2, and separated from other structures by no less than 30m; • • levees, bunds, or road formations no more than 300mm above natural ground level; • • wire strand fencing.
• *2(a) Low Density Residential*	• Permit residential redevelopment within the mapped high flow areas provided total enclosure below design flood level is less than 50m^2. •
• *3(c) & 3(d) Business (Commerce and Trade and Waterfront Enterprise)* •	• Permit development in mapped high flow areas, subject to maximum 50% site coverage for buildings and other obstructions to flow on each lot. • • At least 50% of any cross section for each lot, transverse to the direction of flood flow, must be preserved clear of flow obstructions down to natural ground level. • • Fencing must be permeable to allow the passage of flood flows (minimum 90% void space), or be collapsible under flood flow (e.g. timber palings). •
• *4(a) Industrial*	• Exclude all development from Lot 4 DP 591604. • • Permit development in all remaining mapped high flow areas, subject to maximum fill height to ARI 20 year flood level, and maximum 50% site coverage for buildings and other obstructions to flow. • • At least 50% of any cross section for each lot, transverse to the direction of flood flow, must be preserved clear of flow obstructions above the ARI 20 year flood level. • • Fencing must be permeable to allow the passage of flood flows (minimum 90% void space), or be collapsible under flood flow (eg. timber palings). •
• *5(a) Special Uses (School)*	• Permit development in mapped high flow areas, subject to maximum 50% site coverage for buildings and other obstructions to flow on each lot. • • At least 50% of any cross section for each lot, transverse to the direction of flood flow, must be preserved clear of flow obstructions down to natural ground level. • • Fencing must be permeable to allow the

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• Land Zone	• Development Controls
	passage of flood flows (minimum 90% void space), or be collapsible under flood flow (eg. timber palings). •

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1.5 LEP AMENDMENTS AND REZONING APPLICATIONS

In accordance with Tweed Valley Floodplain Risk Management Study Part 3 - Habitable Land Use on the Floodplain, the acceptability of applications to amend the Tweed Local Environment Plan to permit habitable uses or intensified residential development on the floodplain shall be assessed on the basis of topographic characteristics of the subject land, according to Figure 1 below and the related risk management approach to flood events in Table 1.

Figure 1 - Land Classification

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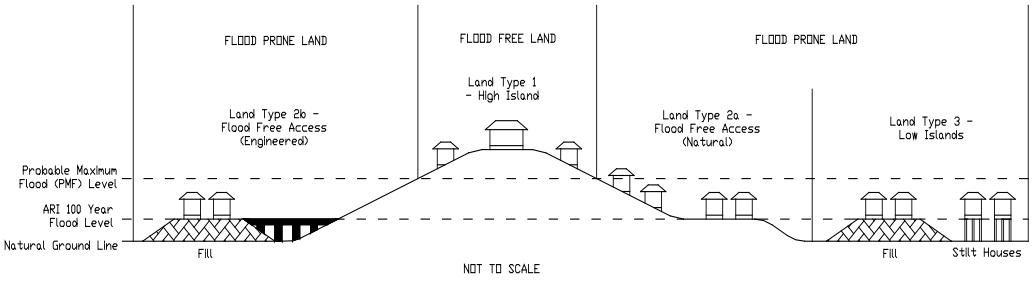

Table 1 - Assessment Criteria for TLEP Amendments that Facilitate Additional Habitable Land Use on the Floodplain

Land Classification	Description	Risk Management Approach	Comments	Is Application Acceptable for Further Consideration?
Land Type 1 - High Islands	Land is above PMF level	Shelter in Place - Flood Free Refuge	Residents remain in situ for duration of the flood emergency. High islands may or may not be serviced by critical infrastructure such as hospitals.	Yes
Land Type 2a - Flood Free Access (Natural)	Topography naturally grades to land that is above PMF level	Evacuation	Residents relocate to flood free areas as flood levels rise above design flood level for local roads and dwellings. Evacuation efficiency is dependent upon mode of transport (road or pedestrian evacuation), services available at the destination (evacuation centre, medical facilities), and ability of residents to travel (aged, infirmed, disabled, young children).	Yes
Land Type 2b - Flood Free Access (Engineered)	Land is linked to land above PMF level by fill, roads, bridges	Evacuation	As for 2a	Yes

Land Classification	Description	Risk Management Approach	Comments	Is Application Acceptable for Further Consideration?
	and the like			
Land Type 3 - Low Islands	Land and dwellings are constructed at design flood level but below PMF level, with no flood free access to land above PMF	Rescue	Relies on emergency services to remove residents from the flood risk for events that cut local access routes. This is contrary to Tweed LEP 2000 and the NSW Floodplain Development Manual and is not a valid risk management approach.	No

The above table provides criteria for the exclusion of LEP amendment proposals that contain unacceptable flooding risks to human life. Applications that pass this test and are eligible for further consideration will still be required to deal with other flood related risks (e.g. impact on flood behaviour, floodplain environment or flood conveyance function) in accordance with this Policy, DCP Section A3 and Floodplain Risk Management Studies, as well as non-flood related planning issues.

1.6 COMMUNITY AWARENESS & EDUCATION

1.6.1 Provision of Flood Level Information

Flood levels are determined as part of the Flood Studies carried out for the individual floodplains within the Tweed Shire. Flood levels can assist property owners and their representatives in assessing possible flood risk on properties and should be used in conjunction with a detailed topographic ground survey.

Flood Level information is available by contacting Council's Engineering & Operations Division. Fees and charges may apply.

In rural areas where Council does not have any flooding records, it is recommended that interested parties satisfy themselves as to the possible extent of flood affect on the property, if any, by seeking out and heeding reliable local historical information.

1.6.2 Community Awareness

Community awareness and appreciation of the existing flood risk on the floodplain will promote appropriate land use and development in flood affected areas. A well informed community will more readily understand the need for protection of life and property and general building and development controls imposed by Council.

One aspect of a community's preparedness for flooding is the "flood awareness" of individuals. This includes awareness of the flood risk in their area and how to protect their family and property when an event occurs. It is fair to assume that the level of awareness drops as individuals' memories of previous experience dim with time. Community awareness of flood risks can be maintained or increased by measures including:-

- Distribution of flood safe publications to residences and businesses, prepared in conjunction with the SES;
- Community workshops and displays;
- Media releases and advertisements;

- Provision of additional flood information at community outlets, such as Libraries and Community Centres and on Council's webpage.

Other measures may also be identified and implemented as part of the Floodplain Risk Management Study and Plan process.

1.6.3 Management of Emergency Response

The State Emergency Service is the primary combat agency responsible for emergency response during a flood event. The SES, with assistance from Council's Local Emergency Management Officer (LEMO), facilitates an appropriate emergency response and evacuation strategy, co-ordinated through the Tweed Shire Local Emergency Management Committee (LEMC). The SES and the LEMC, with the assistance of Council, is responsible for the preparation and review of Local Flood Plans to develop an appropriate disaster response plan.

Due to local topography and demographics, and the expected intensity of flood producing weather events, emergency response in Tweed Shire may be significantly constrained. Flood modelling shows that even urban areas, such as the Murwillumbah CBD, which are protected by a levee, can be rapidly inundated with little warning should overtopping and/or failure of the levee occur. A high intensity rainfall event in June 2005 demonstrated that many urban areas in the Lower Tweed, including contemporary subdivisions and filled housing estates, can be subject to stormwater flash flooding that rapidly cuts evacuation routes and access roads.

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The potential lack of suitable lead time for flood emergency response means that individual property owners need to be prepared in their own right, and be able to act wisely without assistance. Where properties are within an area that can be affected by any flood event, occupants should ensure that they have in place an appropriate evacuation plan known to all household members. This plan should ensure that any chosen evacuation route will be available in such an event. The evacuation plan should consider the safety of the family pets and the preservation of important items such as legal documents and family memorabilia such as photographs. Residences should also maintain an emergency kit, containing items including a portable radio, torch, spare batteries, candles and waterproof matches, a first aid kit, medication supplies, fresh food and water, strong shoes, rubber gloves, and waterproof bags for valuables. The SES may provide advice to home and business owners as to appropriate emergency response measures in their area.

During flood emergencies, community enquiries should be directed to the SES. The Bureau of Meteorology is responsible for issuing all watches and warnings associated with severe weather and flood events, for dissemination by local media outlets.

1.7 FLOOD MITIGATION WORKS

1.7.1 Implementation of Structural Works

The purpose of flood mitigation measures is to modify the behaviour of a flood by reducing flood levels or velocities or by excluding floodwaters from areas at risk.

Flood mitigation measures, by their structural nature, may have environmental and ecological impacts (positive or negative) and so any proposal for such works must be

subject to strict and detailed assessment in accordance with the existing planning and assessment legislation.

Structural works such as detention basins, levees and drainage amplifications, are determined through assessment within the Floodplain Risk Management Studies and preferred works are nominated through the Floodplain Risk Management Plans. Council currently has a Floodplain Management Plan for Murwillumbah (1989), which outlines a number of structural flood mitigation works recommended for the locality. Many such measures, such as the raising of the Murwillumbah levee, have already been completed.

The implementation of works is undertaken through Council's works programs and is subject to the availability of funding from various sources including Council's revenue, government grant funding, Section 94 Contributions and developer direct contributions.

1.7.2 Voluntary House Raising and Voluntary Purchase

Voluntary house raising and voluntary purchase of flood affected dwellings, where justified by a Floodplain Management Plan, are valid strategies for minimising the risk to life and property.

Council will continue to investigate these strategies, along with other works and planning measures, as part of its future preparation of floodplain management studies and plans.

1.8 INTERACTION WITH THE LOCAL FLOOD PLAN

Implementation of management measures can impact on the emergency management planning for floods documented in the local flood plan. (refer Appendix N of the NSW Floodplain Development Manual 2005)

Changes in flood behaviour, flood warning systems, or critical levels for evacuation can impact upon flood response and associated planning.

Therefore, it is important that the SES and LEMC be informed of any such changes, as and when they occur so adjustments, as necessary, can be made to the local flood plan.

Council will continue to interact with the SES and other relevant agencies through the Floodplain Management Committee and the Local Emergency Management Committee to ensure compatibility with local flood plans and procedures.

APPENDIX A - Definitions

Average Recurrence Interval (ARI) - ARI is the long-term average number of years between the occurrence of a flood as big as (or larger than) the selected event.

Design Flood Level - Flood level selected as a basis of design in flood prone areas, as defined by Tweed Development Control Plan Section A3 - Development of Flood Liable Land.

Flood Conveyance Zone - Those high flow areas of the Tweed Valley floodplain that are not defined as floodway, but still provide an essential flood water conveyance function.

Flood Planning Levels (FPLs) - Are the combinations of flood levels (typically derived from the 100 year ARI flood for habitable purposes) and freeboards selected for floodplain risk management purposes, as determined in management studies and incorporated in management plans.

Flood Prone Land (Flood Liable Land) - Land susceptible to flooding by the PMF event. Defines the extent of floodplains. Flood Prone Land is synonymous with flood liable land.

Habitable Area - A living or working area, such as a lounge room, living room, dining room, rumpus room, kitchen, bedroom, office or the like, and includes rooms constructed and furnished for these purposes. Rooms containing a bath and/or shower are considered habitable. Rooms containing a toilet or basin are not considered habitable if additional to a main bathroom.

Habitable Land Use - Development that facilitates the occupation or use of buildings or rooms by persons for accommodation. Includes residential accommodation; backpackers accommodation; bed & breakfast accommodation; boarding houses; dwellings; hostels; hotel accommodation; moveable dwellings; caravan parks; residential care facilities; seniors housing; services apartments; tourist and visitor accommodation; hospitals; accommodation, residences or dwellings associated with educational establishments.

High Flow Area - Those areas of the Tweed Valley floodplain coloured red in Figures 1, 2 and 3 of Part 2 of the Tweed Valley Floodplain Risk Management Study. As defined by the Part 2 Study, flood prone land is classified as being subject to high flow if the product of flood velocity and depth at the peak of the ARI 100 year flood event exceeds 0.3 (vxd > 0.3). Areas coloured blue in Figures 1, 2 and 3 are classified as "low flow areas", and have a velocity-depth product less than 0.3. High flow areas convey the majority of flood waters, and consist of floodways and flood conveyance zones.

High Island - A high island is an area above the PMF that is surrounded on its entire perimeter during a PMF event. A high island can either be a natural landform such as a high ridge (local examples are Terranora, Bilambil Heights and Hospital Hill in Murwillumbah); or can be created by raised dwellings, fill pads and upper storey refuges.

High Land - Land that is situated above PMF level.

High Level ~~Access (High Road)~~Evacuation Route - A road or footway (as applicable based on the development type), whose entire length has a level (measured at top of kerb for roads) of not less than the ~~100 year ARI~~design flood level and, which provides a route to enable people to evacuate to land above the PMF. Ideally a high ~~road~~ level evacuation route will have a rising grade that ensures users will not be cut off as floodwaters rise. Overland stormwater flow paths on high level evacuation routes ~~roads~~ must be designed to remain trafficable when conveying the 100 year ARI design stormwater flow. High~~-~~ level evacuation routes ~~access~~ should have levels that in combination with effective warning time, development type and flood duration, provide adequate time for evacuation to land above the PMF.

Low Island - An area that is above the FPL and surrounded on its entire perimeter during and 100 year ARI event, but is inundated by the PMF. When flood levels exceed the FPL, in events up to the PMF, low islands become totally inundated, posing significant risk to isolated residents without flood free access to high land or shelter. Local examples include filled residential estates in Banora Point, West Kingscliff, and Pottsville, and raised dwellings in Chinderah, South Murwillumbah and Rural Villages.

Major Flood - in Murwillumbah, is classified by the NSW State Emergency Service as an event with a level exceeding 4.8m AHD on the Murwillumbah Gauge.

Minor Extension or Expansion - For of an existing single dwelling, means the addition of not more than 15% in floor area or $30m^2$, whichever is the lesser. For other habitable development, means the addition of not more than 10% of existing gross floor area.

Probable Maximum Flood (PMF) - The largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation, coupled with the worst flood producing catchment conditions. The PMF defines the extent of flood prone land, that is, the floodplain. The PMF has been calculated for the Tweed River Floodplain from Byangum and Boat Harbour upstream of Murwillumbah to the river mouth in the Tweed Valley Flood Study 2005. In the Lower Tweed, PMF levels were approximately 1.8m above 100 year ARI flood levels. In Murwillumbah, the difference was approximately 4.4m. PMF levels for other coastal floodplains (Cudgen Creek, Cudgera Creek and Mooball Creek) are yet to be modelled, however for the purposes of this policy, an assumed interim PMF level 2.0m above 100 year ARI flood level will be used for these other floodplains.

PMF Refuge - A habitable area, being an upper storey, mezzanine level or other refuge located above PMF level, to provide residents of developments without high road access for evacuation with a means of sheltering safely in place until flood waters subside. PMF refuges must be structurally safe and accessible by boat during floods up to the PMF and contain sufficient facilities and supplies to sustain occupants for the expected duration of a PMF. PMF refuges are a form of high island, isolated from external essential services.

APPENDIX B - References

1. Floodplain Development Manual - The Management of Flood Liable Land, New South Wales Government, April 2005
2. Murwillumbah Floodplain Management Plan, Tweed Shire Council, April 1989
3. Tweed Shire Council Development Control Plan, Section A3 - Development of Flood Liable Land
4. Tweed Shire Local Flood Plan, State Emergency Service
5. Tweed Valley Floodplain Risk Management Study, Part 1 - Establish Appropriate Planning Levels for Residential Development
6. Tweed Valley Floodplain Risk Management Study, Part 2 - Planning Controls for High Flow Areas
7. Tweed Valley Floodplain Risk Management Study, Part 3 - Habitable Land Use on the Floodplain

APPENDIX C - Flood Maps