SECTION 13 – FLOOD PRONE LAND

INTRODUCTION

This plan has been prepared in accordance with Section 72 of the Environmental Planning and Assessment Act (EPA Act) 1979 and Regulations. This plan came into force on 10th January 1994 in accordance with the procedure outlined in Clause 24(2) of the Environmental Planning and Assessment Regulation 1980. This plan is based on recommendations of the **Floodplain Management Plan** prepared for Muswellbrook Shire Council (Cameron McNamara 1988).

13.1.1 Application

This plan shall apply to all land within the Muswellbrook Council area which is flood prone land.

Where this is an inconsistency between this plan and another development control plan applying to the land which is the subject of this plan, the provisions of this development control plan shall prevail.

Council shall take into consideration the provisions of this plan in its determination of development applications relating to land to which this plan applies. Under the provision of Section 90(1) of the Environmental Planning and Assessment Act, 1979 (as amended), Council is required to consider a range of factors in its determination of a development application which would include the provisions of this plan.

13.1.2 Definitions

In this plan:

AEP (annual exceedance probability) means the likelihood of a flood being equalled or exceeded in any single year. A one per cent (1%) AEP event has a likelihood of one change in one hundred of being equalled or exceeded in any single year eg. 1 in 100 years.

COUNCIL means Muswellbrook Shire Council.

DEVELOPMENT means the erection of a building or the carrying out of work, in, on, over or under that land, or the4 use of that land or of a building or work on that land and includes the subdivision of that land.

EVACUATION PLAN means an outline of measures proposed for the timely, orderly and safe evacuation of persons from flood affected areas.

FLOOD HAZARD means potential for damage to property or risk to persons as a result of flooding.

FLOOD STORAGE AREA means those parts of the floodplain which are used for the temporary storage of floodwater during the passage of a flood.

FLOODWAY means those areas of land where a significant volume of water flows during floods and includes the channel of a river or stream and those portions of the flood plain adjoining the channel which constitute the main flow path for floodwaters.

HABITABLE AREA means a room or rooms (other than a bathroom, laundry, W.C., garage, storage shed or workshop or the like) that are designed, constructed or adapted for activities normally associated with domestic living.

HIGH HAZARD means possible danger to persons; evacuated by trucks difficult, potential for structural damage; possibility of high social disruption and financial losses.

MINOR ADDITION means an addition of not more than 20 square metres in area.

13.1.3 Aims and Objectives

This plan aims to:

- Provide planning provision and guidelines for the determination of development in accordance with the Floodplain Management Plan;
- Minimise the public and private costs of flood damage and risks to life associated with flood events.

The objectives of the plan are to:

- Inhibit the intensification of residential and other inappropriate uses in flood affected areas;
- Ensure that any developments which do take place are designed and constructed in a manner which is compatible with the flood risk of the area.

13.1 DEVELOPMENT AND BUILDING PRINCIPLES

Controls
The following principles must be considered in Council's determination of development proposals on land to which this plan applies. Applicants shall be advised of these principles prior to submitting development applications. These principles require that:

- Proposed development will not result in increased flood hazard or flood damage to other properties;
- Proposed development should be of a type, height and scale that is compatible with the existing urban and historic fabric of the area;
- Construction methods and materials for that part of the development below the 1% AEP flood levels (as determined by Council) should conform with the flood proofing code as detailed in Section 12.
- Proposed development shall be able to withstand the force of flowing floodwaters, including debris and buoyancy forces.

13.2 NEW RESIDENTIAL DEVELOPMENT

a) The applicant is required to obtain development consent prior to obtaining building consent for new dwellings in any residential zone.

b) In determining a development application Council will follow the principles outlined in Section 13.1.

c) The floor level of all habitable areas shall be at least 0.5m above the 1% AEP flood level, as determined by Council.

d) Materials used are in conformity with the flood proofing code, Section 13.8.

e) The proposed structure can withstand the force of flowing floodwaters including debris and buoyancy forces.

f) A report is provided by a suitably qualified consulting engineer stating that the requirements outlined above have been incorporated into the design of the development.

13.3 ALTERATIONS AND ADDITIONS TO RESIDENTIAL BUILDINGS

a) The applicant is required to obtain development consent for all additions to existing dwellings other than minor renovations or repairs for structures in the residential zone as shown on the map;

b) In determining a development application Council will follow the principles outlined in Section 13.1;

c) Any habitable addition to a dwelling house shall not exceed a total area of 35m^2 of additional floor area of the house;

d) Any extension which exceeds 20m^2 of additional floor area of the house classed as habitable shall have a floor level at least 0.5m above the 1% flood level, as determined by Council;

e) Any addition to existing dwelling houses shall be related to the floor area of that dwelling as it existing in December 1988.

f) Materials used are in conformity with the flood proofing codes, Section 13.8.

g) The proposed additions can withstand the force of flowing floodwaters including debris and buoyancy forces.

h) A report is provided by a suitably qualified consulting engineer stating that the requirements outlined in (f) and (g) above have been incorporated into the design of the additions.

13.4 NON-RESIDENTIAL DEVELOPMENT

A range of non residential uses are permitted in the flood affected areas. These are listed in the Muswellbrook Local Environmental Plan as amended.

a) Floor levels for non residential uses, excluding habitable areas, may be permitted below flood level provided the development is in accordance with the principles outlined in Section 13.1.

b) The floor level of all habitable areas of proposed development shall be at least 0.5m above the 1% AEP flood level except in the case of change of use of an existing building.

c) The development will not result in increased flood hazard or flood damage to other properties or increase afflux by more than 0.1 metres.

d) The construction methods and materials for that part of the development below the 1% AEP flood level shall conform with the flood proofing code, Section 13.8.

e) The proposed development can withstand the force of flowing floodwaters, including debris and buoyancy forces.

f) Provision shall be made for the safe storage and/or timely removal of goods, materials, plant and equipment in the event of a flood.

g) A report be provided by a suitable qualified consulting engineer stating that the requirements outlined in (d) and (e) above have been incorporated in the design of the development.

An evacuation plan for users of the development is prepared (to the satisfaction of Council) and maintained throughout the life of the development.

In considering development application on non-residential zones, Council shall have regard to:

- the primary objective of the Special Infrastructure (SP2) and Local Centre (B2) Zone, which is to facilitate the existing and continued operation of public uses;

- the primary objective of the RE1 – Public Open Space zone, which is to facilitate the use of publicly zoned land for recreational purposes;

- the primary objective of the RE2 - Private Open Space zone, which identifies land suitable for private public recreation use;

- the primary purpose of the RU1 Primary Production zone, which is to preserve prime alluvial land for agricultural use. In the area covered by this Development Control Plan RU1 and W1 - Waterways zoning also recognises the eroding nature of some of the river bank.

In determining an application in this area Council will require the following:

a) The floor level of all habitable areas of the proposed development shall be at least 0.5m above the 1% AEP flood level, except in the case of a change of use of an existing building.

b) The development will not result in increase flood hazard or flood damage to other properties or increase afflux by more than 0.1m.

c) The construction methods and materials for that part of the development below the 1%AEP flood levels shall conform with the flood proofing code.

d) The proposed development can withstand the force of flowing floodwaters, including debris and buoyancy forces.

e) Provision shall be made for the safe storage and/or timely removal of goods, material, plant and equipment in the event of a flood.

f) A report be provided by a suitably qualified Consulting Engineer stating that the requirements outlined in (a) - (e) above have been incorporated in the design of the development.

An evacuation plan for users of the development is prepared (to the satisfaction of Council) and maintained throughout the life of the development.

In considering development applications in non-residential zones, Council shall have regard to:

- The primary objective of the B2 - Local Centre zone which is to recognise the established non-retail functions of the existing business areas outside the main business centre of Muswellbrook.
- The primary objective of the SP2 – Special Infrastructure zone, which is to facilitate the existing and continued operation of public uses.

In determining development proposals, Council should require that:

a) The principles on Part 13.1 of this Development Control Plan are taken into account;

b) provision has been made for the safe storage and/or timely removal of goods, material, plant and equipment in the event of a flood;

c) the floor level of all habitable areas should be at least 0.5m above the 1%AEP flood level determined by Council;

d) an evacuation plan for users of the development is prepared (to the satisfaction of Council) and maintained throughout the life of the development;

e) a report be provided by a suitably qualified consulting engineer to confirm that the principles and provision of this Development Control Plan have been incorporated into the design of the development.

13.5 DEVELOPMENT PROTECTED BY A LEVEE

- Minimum floor levels for all developments in the township of Denman protected by the levee shall be 107.25m AHD (Australian Height Datum).

- Minimum floor levels for all developments in the township of Muswellbrook protected by the levee shall be 146.3 AHD (Australian Height Datum).

- Where new buildings or additions are proposed within 40m of the existing levee a structural engineer's certificate shall be submitted with a construction certificate certifying that the proposed structure has been designed to withstand the flood pressures, including debris and buoyancy forces, imposed in the event of an adjacent levee failure.

Loads imposed will be assessed from the velocity/depth data indicated below:

VELOCITY AND DEPTH FLOOD WATERS
DUE TO A LEVEE BREACH

Height of Adjacent Levee	Distance from Levee							
	5.0		10.0		20.0		30.0	
	V (m/s)	D (m)	V (m/s)	D (m)	V (m/s)	D (m)	V (m/s)	D (m)
1.0	2.6	0.25	1.0	0.3	*	*	*	*
2.0	5.0	0.4	3.7	0.35	2.0	0.5	*	*
3.0	6.4	0.6	5.5	0.5	4.0	0.5	3.2	0.7

NOTE: V = velocity of flow
D = depth of flow
* = values not determined

13.6 RURAL AREAS

13.6.1 Prior to any subdivision or new development on land affected by the 1% AEP flood, a report from a suitably qualified consulting engineer shall be submitted detailing information on flood levels and flood velocities. The report will also satisfactorily demonstrate that the development or development proposed on allotments to be subdivided, will not increase the flood hazard or flood damage to other properties and shall also satisfy Council that the afflux created at any other point on the flood plain will not be increased by more than 0.1m as a result of the development.

13.6.2 Minor additions to existing dwellinghouses, such as verandahs, patios or the like, will be permitted to be constructed below flood level provided materials used are in conformity with the flood proofing code.

13.6.3 Additions to the floor area of dwellings as at December 1988, such additions comprising no more than 20m^2 of total additional habitable area of the house at December 1988, may be carried out at the existing floor level provided:

a) Materials used are in conformity with the flood proofing code;
b) The proposed additions can withstand the force of flowing floodwaters including debris and buoyancy forces;
c) A report is provided by a suitably qualified consulting engineer stating that the requirements outlined in (a) and (b) above have been incorporated into the design of the additions.

13.6.4 Additions to the floor area of dwellings as at December 1988, such additions comprising more than 20m^2 of total additional habitable area of the house may be carried out, provided:

a) The floor level is at least 0.5m above the 1% AEP flood level, as determined by Council;
b) Material used are in conformity with the flood proofing code;
c) The proposed additions can withstand the force of flowing floodwaters including debris and buoyancy forces;
d) A report is provided by a suitably qualified consulting engineer stating that the requirements outlined in (a), (b) and (c) above have been incorporated into the design of the additions.

13.6.5 New dwellings, including replacement of dwellings, may be carried out, provided:

a) The information required by Clause 13.6.1 is submitted with the development application and Council is satisfied the dwelling is not located in a high hazard flood area;
b) The floor level is at least 0.5m above the 1% AEP flood level, as determined by Council;
c) Materials used are in conformity with the flood proofing code;
d) The proposed building can with stand the force of flowing floodwaters including debris and buoyancy forces;
e) A report is provided by a suitably qualified consulting engineer stating that the requirements outlined in (a), (b), (c) and (d) above have been incorporated into the design of the additions.

13.6.6 Other rural buildings such as hay sheds, machinery sheds, dairies and the like will be permitted to be erected below flood level, provided:

a) The information required by Clause 13.6.1is submitted with the development application;
b) The proposed building can withstand the force of flowing floodwaters including debris and buoyancy forces and a structural engineer's certificate is submitted stating that the building has been designed to withstand such forces.

13.7 FENCING

- Council will require lodgement of a development application for the erection of fencing in the Racecourse Road area other than rural fences such as 5 wire fences.

- In determining the application, Council will require a report from a Structural Engineer to verify that:
  - The construction will not result in increased flood hazards or flood damage to other properties or increase afflux by more than 0.1 metres.

13.8 FLOOD PROOFING CODE

As part of the Floodplain Management Plan, a Flood Proofing Code as outlined below will be adopted for all buildings or structures including alteration, extensions, renovations and repairs to existing buildings located in flood prone land.

Construction Methods and Materials

Materials used shall be as listed below. These materials will be used in all situations where the component specified will be inundated by the 1% AEP flood.

Component	1st Preference	2nd Preference
Flooring and Sub Floor Structure	• concrete slab-on-ground monolith construction. *Nb: clay filling is not permitted beneath slab-on-ground construction, which could be inundated.* • Suspension reinforced concrete slab.	• Timber floor (T & G boarding, marine plywood) full epoxy sealed joints.
Nails, bolts, hinges and fittings	• Brass, nylon or stainless • Removable pin hinges	• Galvanised steel • aluminium
Floor Covering	• clay tiles • concrete, precast or insitu • concrete tiles • epoxy, formed-in-place • mastic flooring, formed-in • rubber sheets or tiles with chemical-set adhesives • silicon floors formed-in-place • vinyl sheets or tiles • ceramic tiles, fixed with mortar or chemical-set adhesive • asphalt tiles, fixed with water resistant adhesive	• cement/bituminous formed-in-place • cement/latex formed-in-place • rubber tiles with chemicals • set adhesive • terrazzo • vinyl tile with chemical set adhesive • vinyl-asbestos tiles asphaltic adhesives • loose rugs • alkali-resistant grout
Wall Structure	• solid brickwork, blockwork reinforced, concrete or mass concrete.	• Two skins of brickwork or blockwork with inspection openings.
Roofing Structure	• Reinforced concrete • Galvanised metal construction	• Timber trusses
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	• Flush panel or single panel with marine plywood and water proof adhesive • T&G lined door, framed ledged and braced • Painted steel • Timber frame fully epoxy • Sealed before assembly
Insulation	• Foam or closed cell types	• Reflective insulation
Wall and Ceiling	• Asbestos-cement board • Brick, face or glazed • Clay tile glazed in water proof mortar • Concrete • Concrete block • Steel with water proof applications • Stone, natural solid or veneer,	• Brick, common • Plastic wall tiles • Metals, non ferrous • Rubber mouldings and trim • Wood, solid or exterior grade plywood fully sealed.

	water proof grout • Glass blocks • Glass • Plastic sheeting or wall with water proof adhesive	
Windows	• Aluminium frame with stainless steel or brass rollers • Galvanised or painted steel	• Epoxy sealed timber water proof glues with stainless steel or brass fittings

Electrical and Mechanical Equipment

For dwellings constructed on flood liable land, the electrical and mechanical materials, equipment and installation should confirm to the following requirements:

Main Power Supply - subject to approval of the relevant county council the incoming main commercial power service equipment, including all metering equipment, shall be located above the 1% AEP flood. Means shall be available to easily disconnect the dwelling from the main power supply.

Wiring - all wiring, power outlets, switches, etc. should, to the maximum extent possible, be located above the 1% AEP flood. All electrical wiring installed below the 1% AEP flood should be suitable for continuous submergence in water and should contain no fibrous components. Only submersible type splices should be used below the 1% AEP flood. All conduits located below the 1% AEP flood should be so installed that they will be self draining if subjected to flooding.

Equipment - all equipment installed below or partially below the 1% AEP flood should be capable of disconnection by a single plug and socket assembly.

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.

Heating and Air Conditioning Systems

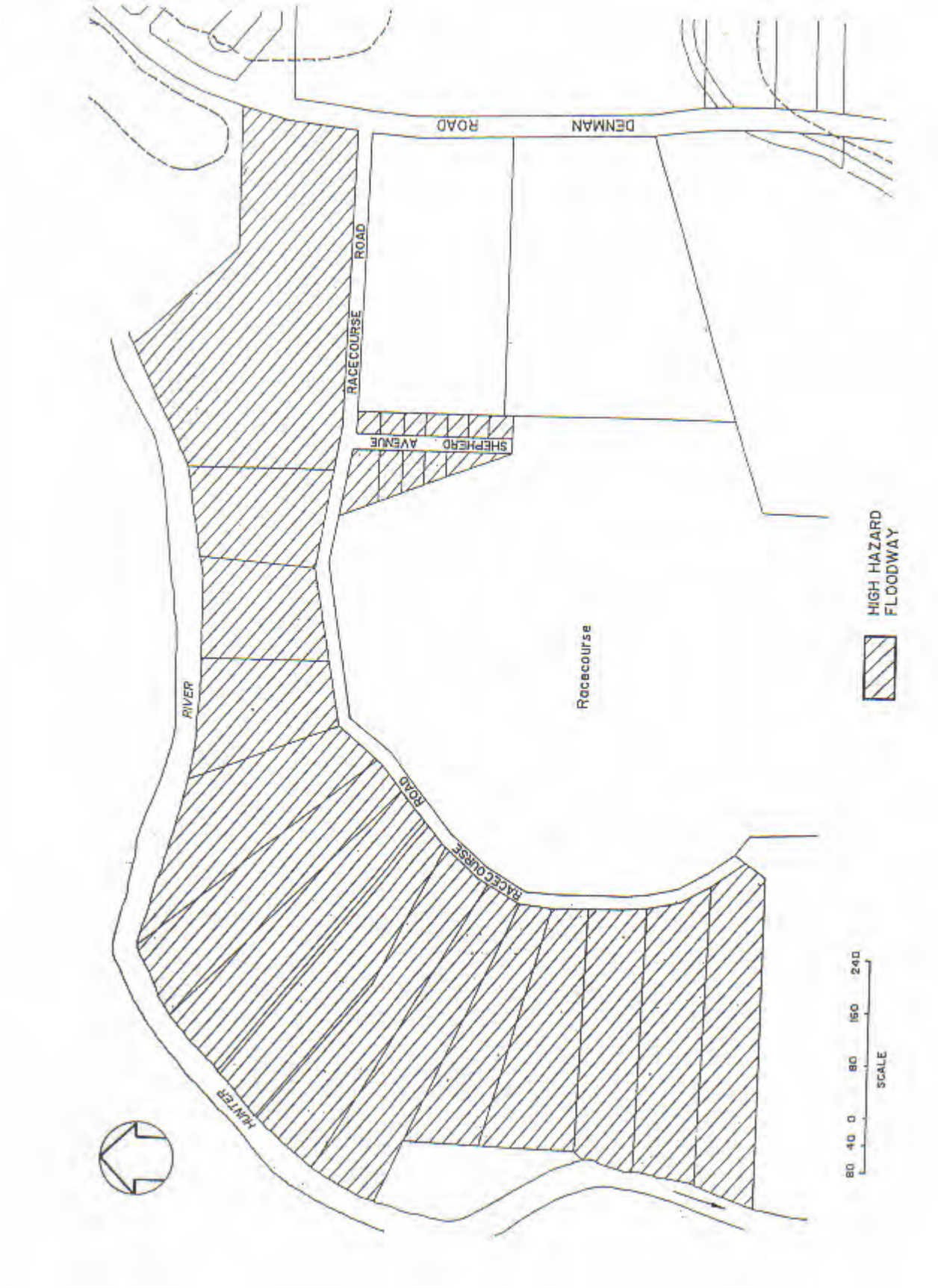
Heating and air conditioning systems should, to the maximum extent possible, be installed in areas and spaces of the house above the 1% AEP flood. When this is not feasible, every precaution should be taken to minimise the damage caused by submersion according to the following guidelines.

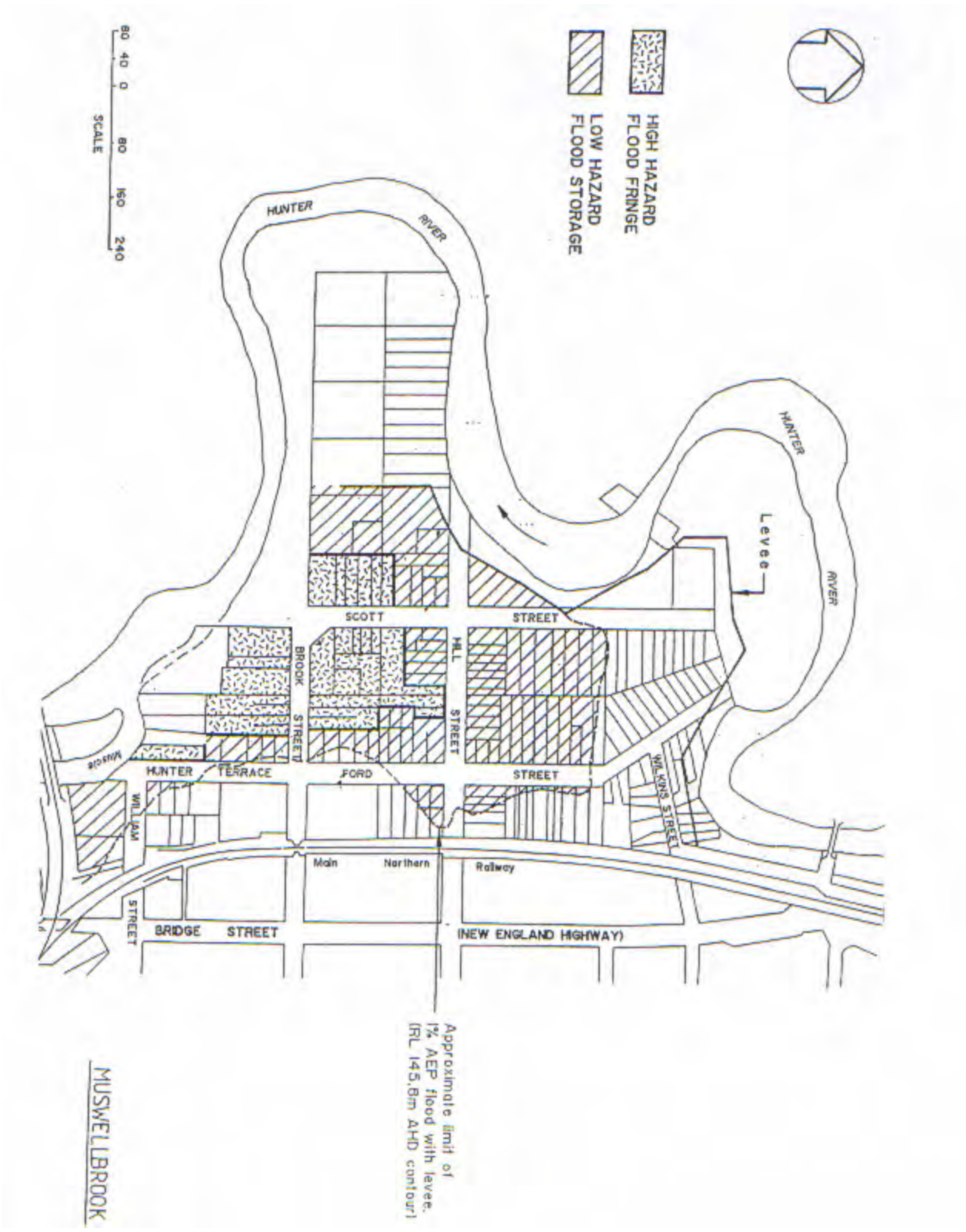
Fuel - heating systems using gas or oil as a fuel should have a manually operated valve located in the fuel supply line to enable fuel cut-off.

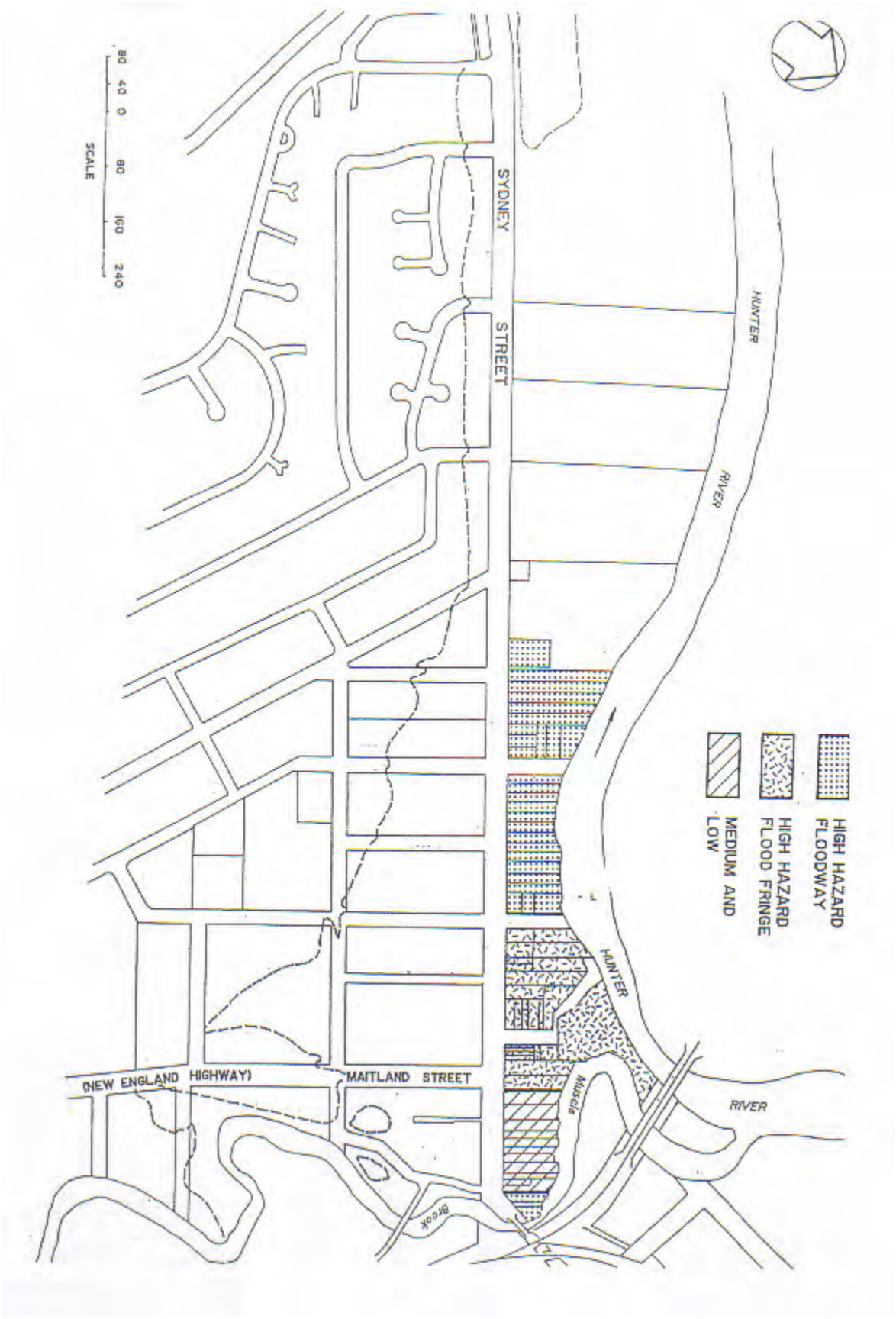
Installation - the heading equipment and fuel storage tanks should be mounted on and securely anchored to a foundation pad of sufficient mast to overcome buoyancy and prevent movement that could damage the fuel supply line. All storage tanks should be vented to an elevation of 600mm above the 1% AEP flood.

Ducting - all duct work below the 1% AEP flood should be provided with openings for drainage and cleaning. Self draining may be achieved by constructing the duct work on a suitable grade. Where duct work must pass through a water-tight wall or floor below the 1% AEP flood, the duct work should be protected by a closure assembly operated from above the 1% AEP flood.


Levee
Creek
Sandy
Hunter
River
MEDIUM AND
LOW FLOODWAY


DENMAN ROAD
RACECOURSE ROAD
SHEPHERD AVENUE
RIVER
Racecourse
RACECOURSE ROAD
HUNTER
HIGH HAZARD FLOODWAY
SCALE
80 40 0 80 160 240


80 40 0 80 160 240
SCALE
LOW HAZARD FLOOD STORAGE
HIGH HAZARD FLOOD FRINGE
HUNTER RIVER
HUNTER RIVER
Levee
SCOTT STREET
HILL STREET
BROOK STREET
HUNTER TERRACE
FORD STREET
WILLIAM STREET
WILKINS STREET
Main Northern Railway
BRIDGE STREET
(NEW ENGLAND HIGHWAY)
Approximate limit of 1% AEP flood with levee. (RL 145.8m AHD contour)
MUSWELLBROOK


SCALE
80 40 0 80 160 240
SYDNEY STREET
HUNTER RIVER
HIGH HAZARD FLOODWAY
HIGH HAZARD FLOOD FRINGE
MEDIUM AND LOW
HUNTER RIVER
(NEW ENGLAND HIGHWAY)
MAITLAND STREET
Maeda
Brook


SCALE
80 40 0 80 160 240
SYDNEY STREET
HUNTER RIVER
FLEMING STREET
SKELLATAR STREET
BARRETT STREET
STREET
MITCHELL
NEW ENGLAND HIGHWAY
MAITLAND STREET
HUNTER RIVER
HIGH HAZARD FLOODWAY
HIGH HAZARD FLOOD FRINGE
MEDIUM AND LOW