Rapid Creek

Planning Concepts and Land Use Objectives

DEPARTMENT OF LANDS, PLANNING AND ENVIRONMENT

Rapid Creek

Planning Concepts and Land Use Objectives 2000

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1 BACKGROUND

INTRODUCTION

The policy area for the Rapid Creek Planning Concepts and Land Use Objectives lies within the Rapid Creek catchment between the suburbs of Millner and Jingili (Figure 1). The area consists of rural living and rural activities on large open lots, a natural creek environment set in an urban context and maintained public open space.

Various pressures on the area have generated the need for a coordinated land use plan. These include proposals for further subdivision and development of rural living allotments and a perception of environmental decline of natural systems.

Planning Concepts and Land Use Objectives establish Government policies for future use and development of land for the community, developers, service providers, the Northern Territory Planning Authority and the Planning Appeals Tribunal.

POLICY AREA

The Planning Concepts and Land Use Objectives apply to the policy area which is all land bordered by Trower Road, Freshwater Road, Seabright Crescent, McMillans Road and Rapid Creek Road (Figure 2).

STATUS

The *Rapid Creek Planning Concepts and Land Use Objectives* (LUOs) forms the policy framework for future development within the policy area. The Minister has directed the Northern Territory Planning Authority to take the *Planning Concepts* into account in the determination of any application to develop within the area. Those sections and subsections titled *Land Use Objectives* have been formally declared by the Minister for Lands, Planning and Environment pursuant to section 8(1) of the *Planning Act* 1993 to be a land use objective of the Territory. As a consequence of this declaration and pursuant to the *Planning Act* 1993, a decision of the Planning Authority relating to this policy area must be consistent with the sections and subsections of this document which are titled *Land Use Objectives*.

COMMUNITY CONSULTATION

The LUOs have been developed in consultation with the community, government agencies and the Darwin City Council.

The public consultation process as determined by the Minister included:

- The release of an "Issues Paper" which outlined issues relevant to the policy area and provided a stimulus to public discussion. The "Issues Paper" was placed on public exhibition for 33 days and written submissions from the public were invited on issues they considered important to the preparation of LUOs for the policy area.
- Four public workshops with public interest groups including: The Rapid Creek Landcare Group, Greening Australia, The Darwin City Council, The Rapid Creek Catchment Advisory Committee, the Jingili and Millner Residents Action Group and the community.
- Public exhibition of *Proposed Rapid Creek Planning Concepts and Land Use Objectives*, September 1999, in accordance with section 8(2)(b) of the *Planning Act*.

2 CONTEXT

HISTORICAL BACKGROUND

Aboriginal History

Rapid Creek lies within the traditional tribal boundaries of the Larrakia people. The mouth of Rapid Creek was a popular camping place for the Larrakia people and the whole catchment still provides a wide variety of food and craft resources.

The Larrakia name, *Gurambai* has several meanings. It is the name of the creek, a significant banyan tree near the mouth of the creek, and can also mean 'elbow', referring to the bend in the saltwater section. The place where the saltwater meets the freshwater is also significant to the Larrakia. To the north-west of the creek is *Dariba Nunggalinga* 'Old Man Rock'. Old Man Rock is a Larrakia registered sacred site. *Gurambai* and *Dariba Nunggalinga* are connected to each other, forming part of a complex link to other 'dreaming tracks'. Larrakia oral traditions state that the *Dariba Nunggalinga* site is not to be disturbed. It is believed that if visitors disrespect this area it may cause severe weather, even cyclones.

Some of the plants and animals that utilise Rapid Creek are significant to the Larrakia people, such as brahminy kites, green tree frogs, banyan, ironwood, pandanus and milkwood trees. Many bush tucker species grow along or near the creek and local Aboriginal people continue to work with other groups to ensure its protection.

European History

The earliest recorded European settlement of the area was the establishment of the St Joseph's Rapid Creek Mission in 1882. The mission originally occupied Section 18, Hundred of Bagot comprising 320 acres of land incorporating the modern day suburb of Millner. The mission building was located near the junction of Pinder Court and Ryland Road and the surrounding arable land was used to produce a variety of fruit, vegetables and tobacco. The mission closed on 3 December 1891.

Shortly after the closure of the mission, agricultural leases over Section 18 (which was divided into two portions, A & B) were granted to George Mayhew for a period between 1892 to 1921. A further agricultural lease was granted over Section 18A to Felix Ernest Holmes from the period 1924 to 1942.

The large lots adjacent to the creek were first created in 1954 and were leased for agricultural purposes to a variety of individuals. As the agricultural leases expired, freehold titles were granted to the lots. All of the lots in the policy area including land owned by the Darwin City Council now have freehold title.

In 1974, work was commenced on the Brinkin Lakes scheme, which involved building a dam at the mouth of Rapid Creek and flooding the mangroves upstream. In anticipation of this project, the mangroves north of the Trower Road bridge were cleared. Tenders for the first stage of the project had closed on Christmas Eve 1974.

Following Cyclone Tracy the Brinkin Lakes project did not proceed and the Northern Territory Government commissioned D. J. Dwyer and Associates to prepare a report on the "Rapid Creek Recreation Project". This report was the catalyst for the construction of the Water Gardens at the Trower Road end of the policy area, which is owned and maintained by the Darwin City Council.

Zoning History

The first zoning controls contained in the *Darwin Town Plan 1966* were specific and showed three zones within the policy area: the area of the Water Gardens was zoned public open space; the large lots adjacent to Rapid Creek were zoned Rural A (small farms); and the cemetery was zoned as "Cemetery". The *Darwin Town Plan 1978* also showed three zones for the policy area, including the area of the Water Gardens and rural living lots as zoned FU (Future Use), the cemetery as S1 (Special Purpose 1) and the site adjacent to the Airport Hotel as B2 (Business 2).

The *Darwin Town Plan 1982* showed the large lots zoned RB (Rural Living) and the Water Gardens zoned for Open Space. These zones subsequently changed to RL1 and O2 respectively under the *Darwin Town Plan 1990*. The requirements of the RB zone under the 1982 Town Plan were similar to the current RL1 requirements of the 1990 Town Plan. The current zoning for the cemetery and the site adjacent to the Airport Hotel (Lot 3251, Town of Nightcliff) are CP (Community Purposes) and B3 (Business 3) respectively. The existing town plan zones within the policy area are shown in Figure 3.

A major catalyst for the preparation of LUOs has been the consistent pressure for further subdivision of a number of the RL1 lots within the policy area. The RL1 zone permits subdivision with the consent of the Northern Territory Planning Authority. While the plan specifies a minimum lot size of 2 hectares in the RL1 zone, this may be reduced with the consent of the Northern Territory Planning Authority.

Existing Land Use

Land use within the policy area can be divided into three broad categories; rural living; the natural watercourse; and passive recreation. Figure 4 is an aerial view of the policy area.

Agricultural development on the RL1 land within the policy area is limited to mangoes on 3 of the 11 lots. There is a vegetable garden located in the Water Gardens which is run by the Organic Growers Association NT. Other intensive activities occurring on the RL1 land are horse agistment and stabling. It is understood that some owners are cooperating with local schools to provide access for educational opportunities.

The Water Gardens provide an established picnic and outdoor recreational resource which has regional significance. A skate park designed by the Darwin City Council has been constructed in the Water Gardens adjacent to Trower Road.

The policy area links the airport to the lower reaches of Rapid Creek and the Casuarina beaches. This link presents the opportunity to connect areas of significance with cycle and walking paths along the linear creek system.

3 EVALUATION OF PLANNING BASE

ENVIRONMENT

Rapid Creek rises in the Marrara swamp at the eastern end of Darwin Airport, and flows for 9.8 km discharging into Beagle Gulf at the southern end of Casuarina Beach (Figure 1). The Rapid Creek catchment covers an area of 28 km^2 and includes parts of the suburbs of Karama, Malak, Anula, Moil and Jingili. In these fully built up areas of the catchment, run off enters the creek via underground piped drainage systems as well as unlined and lined open drains. Although a large part of the catchment to the south of McMillans Road is undeveloped, significant portions of the airport have been cleared and/or paved. Open drains service the runways and other airport facilities. Open drains have also been constructed to drain the Marrara sporting complex.

In 1994 the Darwin City Council and Greening Australian NT received funding under the National Landcare Program to develop a management plan for Rapid Creek. In 1996 the Rapid Creek Catchment Advisory Committee (RCCAC) was established by the then Minister for Lands, Planning and Environment to advise on policy and procedures for the management of the natural resources of the Rapid Creek catchment. It continuously revises and updates the *Rapid Creek Management Plan* (Clouston 1994) and implements its strategies. The membership of the RCCAC is such that there are clear links to all interest groups, land users, Government agencies and other organisations which can provide support and resources.

This *Management Plan* suggests that a large part of the catchment is in a relatively natural state, including the Marrara Swamp, riverine monsoon forest communities, paperbark swamps, savannah woodlands, grasslands and mangrove ecosystems. However portions of the catchment have been fully developed for urban residential and other uses, including the airport. The policy area itself, although open and green, is no longer in a natural state and has suffered significant disturbance through agriculture, grazing and other land uses which have substantially altered the natural state of the flood plain.

The introduction of voluntary land management agreements has been canvassed during the process of preparing these LUOs. The concept of land management agreements have been successfully implemented in other states in Australia. Several key players, including the RCCAC, Darwin City Council, Rapid Creek Landcare Group, Greening Australia, community groups and some land owners, have expressed interest in pursuing voluntary management agreements over portions of the RL1 allotments abutting the creek. Such agreements would assist in the management of the land within the floodway and have a positive impact upon the creek system overall.

Water Quality

Water quality is managed in the Territory by the *Water Act 1992* in conjunction with the *National Water Quality Management Strategy*. Beneficial Uses can be declared under the *Water Act 1992* to protect water resources for a particular area. The term ‘Beneficial Uses’ (or environmental values) represents two concepts; the ‘use’ term indicates the use the community might want to make of the resource, while the term ‘beneficial’ ties the use to that which has some value to the community. Beneficial Uses are not scientifically nor data based but rather are statements of the community’s preferred useability of the water resources and define the long term consequences of land and water use practices that the community wants to achieve.

In relation to Rapid Creek, Beneficial Uses of Protection of Aquatic Ecosystem and Recreation and Aesthetics were declared for the saline reaches of the creek as part of the Darwin Harbour declaration in August 1996. Proposed Beneficial Uses for the freshwater reaches of Rapid Creek were exhibited concurrently with these LUOs and Beneficial Uses were declared in the Gazette on 9 February 2000.

Waterwatch Northern Territory has produced two reports on the water quality of Rapid Creek between 1995 and 1998. The reports conclude that land uses within the catchment play an important role in determining the future water quality in the creek system and make a number of recommendations to improve water quality within the creek (which are directly relevant to the policy area) including:

- further investigation of sewage contamination of Rapid Creek;
- reduction of stormwater pollutants by increasing public awareness of water quality issues within the catchment;
- the construction of gross pollutant (litter) and sediment traps on stormwater drains;
- establishment of programs to assess and monitor heavy metal (and other contaminants not monitored by Waterwatch) contamination of the creek; and
- revegetation of the creek bank between the control weir within the airport grounds and the Water Gardens.

While the RCCAC and the NT Government have not formally endorsed the Waterwatch reports, some of the recommendations have been adopted and implemented by the Rapid Creek Landcare Group and other member organisations of the RCCAC.

Flora and Fauna

The policy area contains mangrove communities, monsoon forests and some transitional vegetation. The *Management Plan* identifies the policy area as having three types of landscape character; the "mangrove and estuarine" areas are located in the north-western corner of the policy area, the "closed forest" is located in a narrow strip along both sides of the creek between McMillans Road and Trower Road and the remainder is classified as "cultivated land". The last classification includes those areas which are not dominated by natural communities. The *Management Plan* recommends that existing natural vegetation within the policy area should be maintained, protected and enhanced through regeneration. This will require increased maintenance and infrastructure provision such as pathways and fencing. The *Management Plan* also recommends that other degraded areas be revegetated with appropriate species.

The maintenance and rehabilitation of this section of Rapid Creek is crucial to its role as a fauna habitat as it is here that the tidal ecosystems meet the freshwater systems. There is unlikely to be any fauna exclusive to the policy area as the mangrove habitat extends downstream from Trower Road and the monsoon forest extends upstream from McMillans Road. Further degradation of this area, however, will have detrimental effects on wildlife utilising the creek system as habitat and as a corridor linking the upper and lower catchment. All monsoon forests in the Top End are recognised as being integral to wildlife management as fruit eating birds and bats moving between them assist in the dispersal of seeds and hence in maintaining the genetic diversity of the forests.

Linear parks have been successful in other Australian cities and have resulted in the return of fauna to suburban areas via the corridors created. Riparian corridors in particular are important, as they support diverse vegetation types and provide a range of food and nectar sources for fauna throughout the year. Different sections of the creek will produce natural roosts for fauna throughout the year. Studies of riparian species have also shown that many birds are able to extend their distribution into drier regions due to the presence of the riparian strip. While there are no conclusive fauna surveys published, anecdotal evidence suggests that numerous species of mammals, birds, reptiles, fish and invertebrates occur within the policy area. The mangroves upstream from Trower Road (Water Gardens) in the policy area are an important roosting site for black flying foxes (*Pteropus alecto*) and research is currently being carried out on this colony.

FLOODING

Flood events are generally described in terms of their chance of occurring in any one year or their annual exceedence probability (AEP) expressed in percentage terms. Thus, a 1.0% AEP flood is a flood which is estimated to have a chance of 1 in 100 of occurring in any one year. Flood studies are carried out to determine the flood levels and velocities associated with flood events of selected AEPs as well as the probable maximum flood (PMF). The outer limits of the floodplain of a stream are defined by the edge of flood waters associated with a PMF.

The *Rapid Creek Flood Study* (Connell Wagner, 1999) estimated the flood levels associated with the 5.0% AEP (1 in 20), 2.0% AEP (1 in 50), 1.0% AEP (1 in 100) and the probable maximum flood (Figures 5 to 8).

The delineated hazard zones shown in the above figures are a guide to the likely danger posed by flooding in the policy area. The extent to which floodwaters represent a hazard is a function of both their depth and velocity. The level of hazard is broadly indicative and may vary from those indicated due to variations in local conditions.

It is accepted planning practice to restrict development on land lying below the 1.0% AEP flood level. Figure 7 shows that a considerable portion of the policy area would be inundated by a 1.0% AEP flood.

Impacts of Further Development

The flood study suggests that any further significant development on the floodplain of Rapid Creek in the policy area has the potential to raise the flood level adjacent to and for some distance downstream of that development. This would result in flood waters intruding further into the urban residential area of Millner.

An extension of the flood study examined the possible impacts of future development of the Darwin Airport on flood levels in the policy area. The study suggests that development of airport land within the catchment of Rapid Creek for commercial and aviation related purposes has the potential to cause a general increase in flood levels in the policy area unless the necessary measures are put in place to minimise this effect.

Storm Surge

Flood levels associated with two storm surge frequencies have been calculated for the Darwin Region and are generally used for development control purposes in Darwin. The Primary Storm Surge has an AEP of 1.0% (1 in 100) and the Secondary Storm Surge has an AEP of 0.1% (1 in 1000).

Land likely to be affected by these storm surge events (assuming no effect from the Trower Road Bridge - see below) is indicated in Figure 9. Three allotments abutting Rapid Creek and some residential lots along Rapid Creek Road are within the primary storm surge zone. Substantial residential development has occurred within the secondary storm surge zone on the western side of Rapid Creek Road, in the suburb of Millner.

These levels do not take into account the possible effects of coincident flooding in Rapid Creek or the effect the Trower Road Bridge may have in attenuating storm surge levels upstream. The *Rapid Creek Flood Study* (Connell Wagner, 1999) considered the issue of coincident floods but concluded that the chance of the two events coinciding in time is very small.

The predicted rise in ambient sea level as a result of climate change is not expected to significantly increase the predicted storm surge levels shown in Figure 9.

BITING INSECTS

Mosquitos

Adult mosquito populations throughout Darwin are monitored on a weekly basis. A mosquito trap site is located at the eastern end of the open drain that discharges opposite Sergison Circuit, Rapid Creek. The drains into Rapid Creek, particularly those in the lower reaches, are potential breeding sites for disease vector and nuisance species. There are also several surface depressions near the margins of Rapid Creek that hold water during the Wet season and are capable of breeding mosquitoes.

Rapid Creek receives low (Dry season) flows and runoff from numerous drains of varying type including open unlined drains, open lined drains and pipe outfalls. These drains are inspected on an annual basis by the Medical Entomology Branch of Territory Health Services. Each drain is assessed for maintenance requirements to prevent the formation of mosquito breeding sites. Rectification work is a joint responsibility of the Darwin City Council and Territory Health Services.

Following very high tides or significant rainfall events, the drains and depressions are also inspected by officers of Darwin City Council, the Medical Entomology Branch of Territory Health Services or the Parks and Wildlife Commission. Where significant mosquito larvae numbers are detected, control measures are applied.

Biting Midges

The intertidal area of Rapid Creek provides breeding sites for biting midges. The Medical Entomology Branch has recently commenced monitoring for biting midges at the Rapid Creek trap site. To date, the results do not indicate a significant pest problem, although there are occasional complaints from residents in the area.

INFRASTRUCTURE AND SERVICES

Power

Electricity is supplied to the policy area by a predominantly overhead 11kV distribution system. A 66kV overhead transmission line crosses Rapid Creek at the southern end of the Water Gardens and runs along Rapid Creek Road. An underground 11kV power cable traverses part of the policy area, parallel to the 11kV overhead power line between Flint Street and McMillans Road, down the western boundary of the cemetery.

The existing 11kV system has some spare capacity, which could accommodate further infill development within the policy area in the short to medium term.

Water

The policy area is served by a system of water supply trunk and reticulation mains which are adequate for current demand.

Sewerage

The sewerage system in Rapid Creek has been recently rehabilitated to remove known system damage and other problems, such as leaking joints, cracked pipes and manholes. This is near its design capacity and should development in the area result in an increase in sewage flows, developers would be required to contribute to the augmentation of the sewerage system. Sewage overflow may occur as a result of mechanical or pump failure in pumping stations, with the greatest risk occuring in the Wet season. The Power and Water Authority has a strategy to minimise overflows and is currently working with other relevant authorities to obtain the necessary approvals and licences.

Stormwater Drainage

The existing stormwater drainage system consists of a series of pipe drains, open unlined drains and outfalls to Rapid Creek. The existing system is adequate for current demand and there are no immediate plans for upgrading. However there is a necessity for an annual drain maintenance and rectification program to prevent mosquito breeding. There is also a need for concrete inverts and erosion control structures to be constructed in various drains in the area.

Roads

The Department of Transport and Works controls and maintains McMillans and Trower Roads. The remainder of the road network is controlled and maintained by Darwin City Council.

The Council completed a Local Area Traffic Management (LATM) study for Freshwater Road in response to complaints from residents and has identified the following works for the 1998/99 LATM program:

- a roundabout at the intersection of Ada Street and Freshwater Road;
- two speed humps on Freshwater Road (opposite Lots 2688 and 3187); and
- a centre median on the sweeping bend of Freshwater Road, adjacent to Lot 3109.

Pedestrian and Cycle Access

The *Rapid Creek Access and Signage Masterplan* (Ecosystems, 1999) was prepared for the RCCAC. The Masterplan reinforces the creek corridor as a coherent linear landscape through the interpretation of distinct vegetation communities and by providing access to public land in the corridor.

Pedestrian and cycle access within the creek corridor is currently limited to a number of discontinuous paths that cross the corridor. While pedestrian access to the creek is available at many locations along the creek, there is no continuous pathway linking these locations. Compacted ground, vegetation clearance and exposed tree roots mark existing access points. There is currently little interpretive or directional signage along the creek corridor. An interpretive shelter is proposed for the Water Gardens in the theme of recreation and history. Interpretation will include information about Aboriginal and European history.

The Masterplan proposes a shared pedestrian and cycle path from Amy Johnson Avenue to the mouth of the creek at the Casuarina Coastal Reserve via McMillans Road. Provision of a safe pedestrian access across McMillans Road will be required in the future. Pedestrian safety would be enhanced by definition of a crossing point, installation of traffic signals or an overpass similar to the existing one on Trower Road. The proposed pathway provides the 'backbone' of the circulation system throughout the creek corridor and will connect all existing pathways. A shared walking and cycle path is also proposed along Freshwater Road to link with the existing shared path that connects the cemetery with Rothdale Road and McMillans Road.

LAND TENURE

Land tenure within the policy area is shown on Figure 10. The majority of land is freehold title except for the Darwin General Cemetery which is a dedicated reserve. The Water Gardens and public land along the creek are owned by the Darwin City Council. All RL1 lots are freehold title.

4 PLANNING CONCEPTS AND LAND USE OBJECTIVES

This section contains the land use objectives which have formal status by virtue of declaration by the Minister for Lands, Planning and Environment under section 8(1) of the *Planning Act* 1993.

The *Planning Concepts* associated with each objective demonstrate how they may be achieved and the general discussion of issues assists in interpreting and implementing the objectives.

INTRODUCTION

The policy area is unique in that it is dominated by a section of a natural creek in an urban context. Another unique aspect is the RL1 allotments which abut Rapid Creek. Whilst there are a few other rural living style subdivisions within the Municipality of Darwin, none abut a natural creek system.

Rapid Creek is an important natural feature and recreation resource to the Darwin area and this role is emphasized in the LUOs for the policy area. While the protection of Rapid Creek is a key issue, the potential benefits of some development of the RL1 lots has been considered.

The LUOs establish the framework for planning control within the policy area. To achieve this, LUOs are provided under *Key Objectives* and *Precinct Objectives.* The *Key Objectives* provide broad direction and principles and the *Precinct Objectives* provide area specific land use goals. The precincts are shown in Figure 11.

Land Use Objectives
Key Objectives • To protect the environmental and cultural values of Rapid Creek, as identified in the *Rapid Creek Management Plan* (Clouston, 1994). • To encourage the rehabilitation and proper management of Rapid Creek. • To promote development which maintains beneficial use categories established for Rapid Creek under the *Water Act* 1992. • To promote an integrated catchment (resource) management approach to development and land management within the Rapid Creek catchment in accordance with the strategies of the *Rapid Creek Management Plan* (Clouston, 1994). • To promote development which limits detrimental impacts on Rapid Creek and the amenity of the locality. • To promote development which does not increase the extent of land affected by flooding in Rapid Creek.

RURAL LIVING PRECINCT

Land Use Objectives	Planning Concepts
To protect and enhance the natural values of the Rapid Creek corridor.	• At subdivision, land abutting Rapid Creek, to the width of the lot and generally 30 metres in depth, should be transferred to the Darwin City Council, at no cost to the Council, for a buffer to Rapid Creek. • Areas adjacent to the creek corridor should be rehabilitated in accordance with the strategies of the *Rapid Creek Management Plan* (Clouston, 1994). • Clearing of natural vegetation should be kept to a minimum.
To promote development which complements and enhances the rural living character of the area.	• Any rural living lot created by subdivision should be a minimum of 1 hectare. It is recognised that in certain situations, lots close to, but less than 1 hectare, may be appropriate. • Subdivision should minimise the impacts on the amenity of adjoining residential areas. • Siting of new development should allow generous building setbacks between existing and future buildings on adjoining lots.
To minimise the adverse impacts of agricultural activities on the environmental quality of Rapid Creek and the amenity of adjoining properties.	• Development control should be provided over new agricultural activities.

The Rural Living Precinct consists of the eleven allotments zoned RL1. Eight of these lots are on the eastern side of Rapid Creek between the Darwin General Cemetery and the Water Gardens fronting onto Freshwater Road. Three lots are west of the creek and south of Solomon Street, Millner fronting onto Rapid Creek Road.

It is important to minimise the negative impacts of development of the RL1 lots on Rapid Creek. Potential impacts can derive from the nature, scale and intensity of development, including land fill and excavation. The clearing of land for development and the construction of impervious surfaces can cause erosion on the creek banks through increases in stormwater velocities and concentration of water inflows. Pollutants such as oil from car parking areas can be discharged into the creek system and seriously affect the water quality.

The impacts of development can be controlled by a combination of appropriate lot sizes, subdivision design and effective land management practices. These will promote rehabilitation of the creek system. The adopted minimum lot size of 1 hectare will preserve the area's rural living character.

The *Rapid Creek Management Plan* (Clouston, 1994) recognises that protection of the creek corridor from progressive invasion of weeds, nutrients, litter, siltation and fire and flood damage is a critical element in creek management. There is a need for protection of the riparian zone and for a buffer between intensive and residential uses and the vegetation systems along the creek. The Natural Resources Division of the Department of Lands, Planning and Environment advises that in order to be ecologically sustainable, the creek corridor needs to be 100 metres wide. Using the creek's centre line, the outer edges of the designated creek corridor fall within land zoned RL1 on both sides of the creek to a maximum depth of 30 metres measured from the rear property boundaries.

When land within the Rural Living Precinct is proposed to be subdivided, it is intended that an area of land abutting Rapid Creek, to the width of the lot and in most cases 30 metres in depth, be identified to be excised from the lot and transferred to the Darwin City Council, at no cost to the Council. The extension of the creek corridor is shown in Figure 11.

On some allotments, the extension of the creek corridor is less than 30 metres in width due to the winding nature of the creek and the existence of lawful buildings within the creek corridor. In the case of subdivision, existing buildings are to be setback a minimum of 10 metres from the rear boundary of the allotment.

Potential adverse impacts on the visual amenity of the creek corridor, as viewed from the creek and the privacy and amenity of adjacent development should also be considered. Applicants may be required to provide details of proposed fencing, landscaping and building setbacks on the allotments for subdivision applications.

In recognising the importance of a continuous corridor along the creek, owners of land abutting the creek who do not intend to develop their land are encouraged to enter into land management agreements with the Rapid Creek Catchment Advisory Committee for the rehabilitation and management of land within the creek corridor. However, it is not proposed that the land designated as the creek corridor will be compulsorily acquired by the Northern Territory Government.

New development should not materially increase the extent of land in the locality affected by the 1.0% AEP flood event. As a general rule, dwellings should not be located on land affected by flooding. However, as an exception, elevated dwellings may be located within the 1.0% AEP flood provided habitable rooms are a minimum of 300 mm above the flood level. All other development including excavation, filling and land clearing within the Rural Precinct should have regard to the potential impacts on creek hydrology and flood levels.

If land is surrendered for the creek corridor and the proposed development demonstrates no impact on flooding, the lots may be of a size commensurate with the character of the locality, generally at 1 hectare, provided a sufficient area of land, such as 1 000 m^2 per lot is provided above the 1.0% AEP flood level for a dwelling. The area of land used to calculate proposed allotments should not include that area of land to be surrendered for the extension of the creek corridor.

Further subdivision should be designed to minimise the adverse impacts of development on the existing character of the area as viewed from Freshwater Road, Rapid Creek Road and the creek corridor. “Battle-axe” allotments could be used where appropriate, to limit the visual impact of development from the street frontage. The “access” to battle-axe lots should have a minimum width of 10 metres for a maximum length of 200 metres. Shared vehicle access crossovers between adjoining proposed lots is encouraged. The area of land which comprises the “access” to a battle-axe lot should not be used in the calculation of providing sufficient land above the 1.0% AEP flood event per allotment.

Generous building setbacks between properties and from Freshwater Road will help preserve the open and rural living character of the area. The density of development should not be greater than one dwelling per lot.

The development of land within the Rural Living Precinct should take into account the limitations of the current sewerage system and the likely need to upgrade services. This issue is particularly important in terms of timing and staging development of all lots within the precinct. The first lot to be subdivided and developed may be required by the Power and Water Authority to provide a sewerage pumping station at the lowest point in the area, which may not be on the subject lot. As developers will be responsible for the cost of the service upgrade, the first developer may establish a contribution plan for subsequent subdivisions and developments.

The open nature and the agricultural character of the rural living lots are important features of the policy area. In recognition of this, the rural living lots can be used for agricultural activities in accordance with the zoning provisions of the *Darwin Town Plan 1990*, provided that these activities are not detrimental to surrounding residential areas.

Any agricultural uses should also ensure that the water quality in Rapid Creek is not adversely affected as a result of activities such as pesticide spraying and animal waste contamination. Adequate buffers and treatment of agricultural wastes may be required to limit the impacts of agricultural uses on the surrounding residential area and the creek.

CREEK CORRIDOR PRECINCT

Land Use Objective	Planning Concepts
To protect and enhance the natural features and physical integrity of the Rapid Creek corridor.	• All areas of natural vegetation within the precinct should be conserved and rehabilitated. • A walking trail and cycle path along the Rapid Creek corridor linking McMillans Road with Trower Road, should be provided.

The Creek Corridor Precinct is defined by the extent of remnant vegetation along the banks of Rapid Creek and includes the mangrove community in the north-west of the policy area.

The primary land use concept for the Creek Corridor Precinct is the protection and enhancement of the natural character of the Rapid Creek corridor through remedial works and revegetation. The implementation of catchment strategies identified in the *Rapid Creek Management Plan* (Clouston, 1994) will help protect and enhance Rapid Creek as a valuable ecological and recreational resource.

A shared pedestrian and cycle path is encouraged within the creek corridor linking with the Recreation Precinct, Rapid Creek Road and McMillans Road, in accordance with the *Rapid Creek Access and Signage Masterplan* (Ecosystems, 1999). The path should be constructed so as to cause minimal physical impact on the creek corridor. The path is intended to incorporate interpretative signage and rest areas. The pedestrian and cycle path should be clearly defined for users.

WATER GARDENS PRECINCT

Land Use Objective	Planning Concept
To maintain the Water Gardens as the focus for organised and passive recreation activities in the locality.	• Pedestrian and cycle links between the Water Gardens and the creek corridor should be provided.

The Water Gardens Precinct located in the north-east of the policy area is defined by the boundaries of the Water Gardens. The Water Gardens will continue to provide a recreational resource for local residents and the Darwin Region. A variety of recreation uses are encouraged in the park utilising active and passive recreational facilities such as a skate park and walking and bicycle paths.

CEMETERY PRECINCT

Land Use Objective	Planning Concept
To retain the cemetery.	• Tourist accommodation may be developed on the vacant land within the cemetery zoned for commercial uses but the development should not adversely impact on the amenity of the cemetery.

The Cemetery Precinct is defined by the boundaries of the Darwin General Cemetery. The cemetery is zoned for community purposes with the exception of a portion approximately 5 000 m^2 zoned B3 Highway Commercial located in the south-eastern corner of the site, adjoining the Airport Hotel. The commercial zoning of the vacant land was created as a possible future extension to the Airport Hotel.

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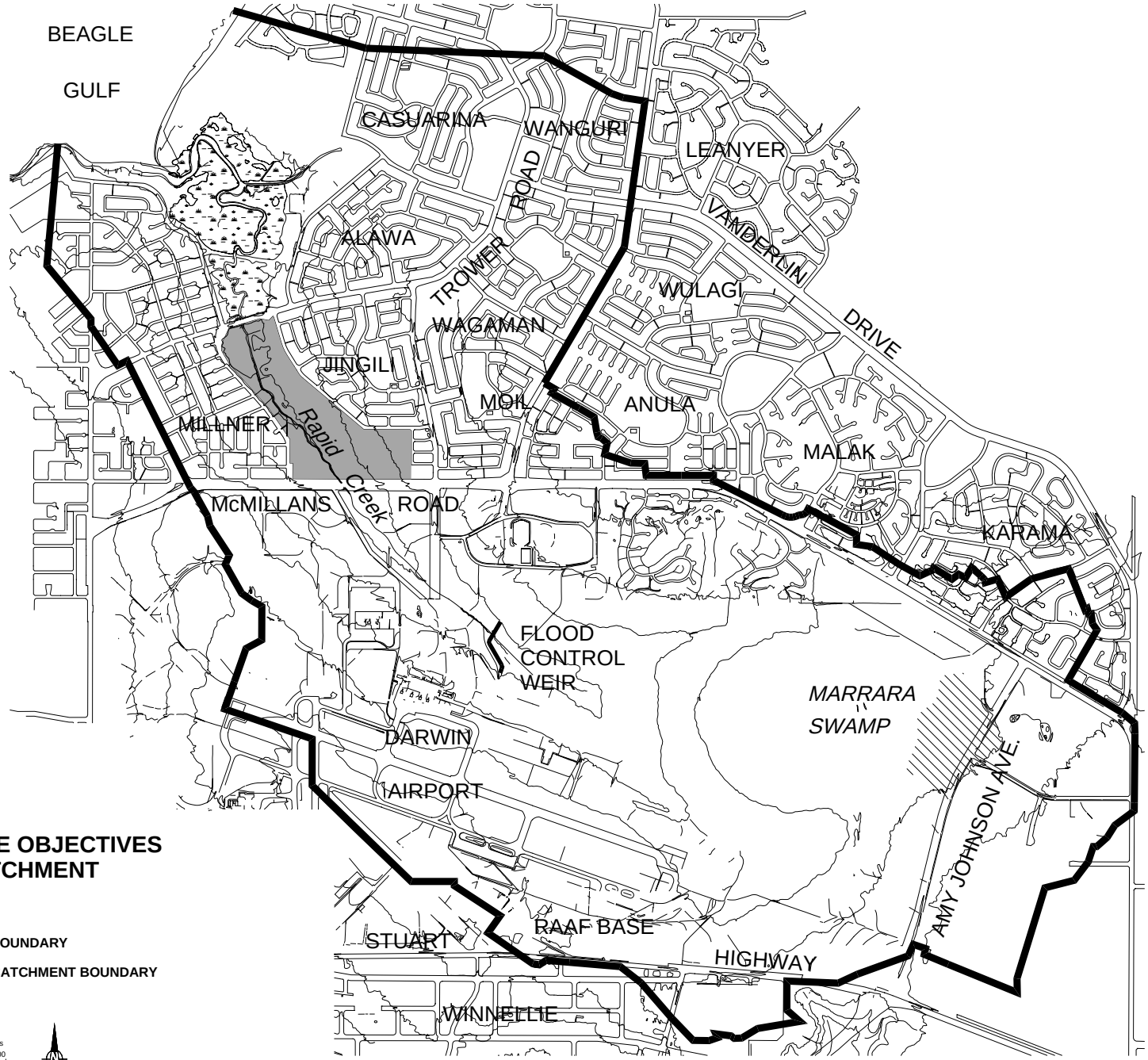

FIGURE 1

RAPID CREEK LAND USE OBJECTIVES
RAPID CREEK CATCHMENT

LEGEND

POLICY AREA BOUNDARY

RAPID CREEK CATCHMENT BOUNDARY

r:\darwin\rapidck\rck_catchment.dgn

FIGURE 1

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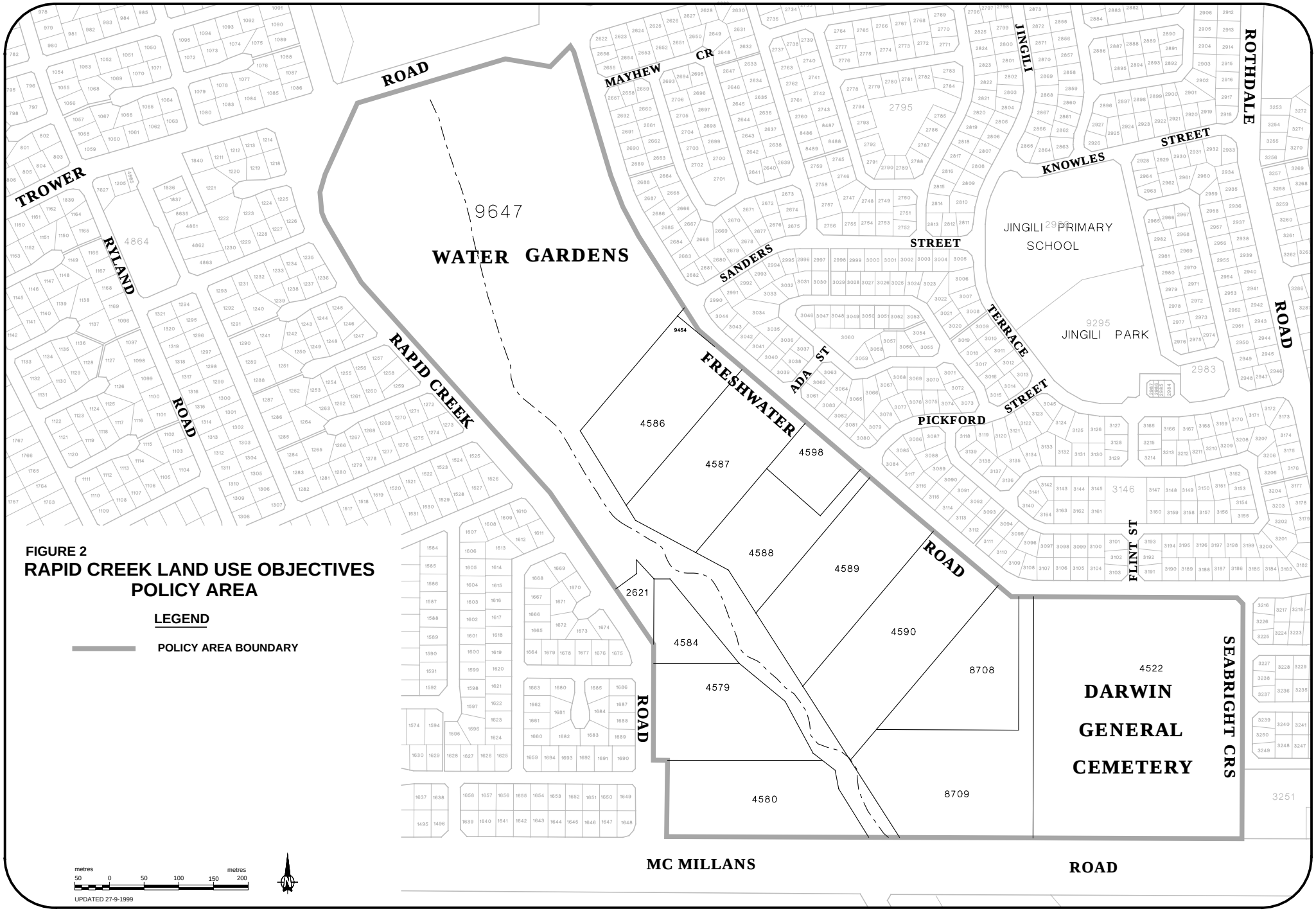

FIGURE 2

RAPID CREEK LAND USE OBJECTIVES POLICY AREA

LEGEND

POLICY AREA BOUNDARY

metres 50 0 50 100 150 200 metres

UPDATED 27-9-1999

r:\darwin\rapidck\rck_local.dgn

FIGURE 2

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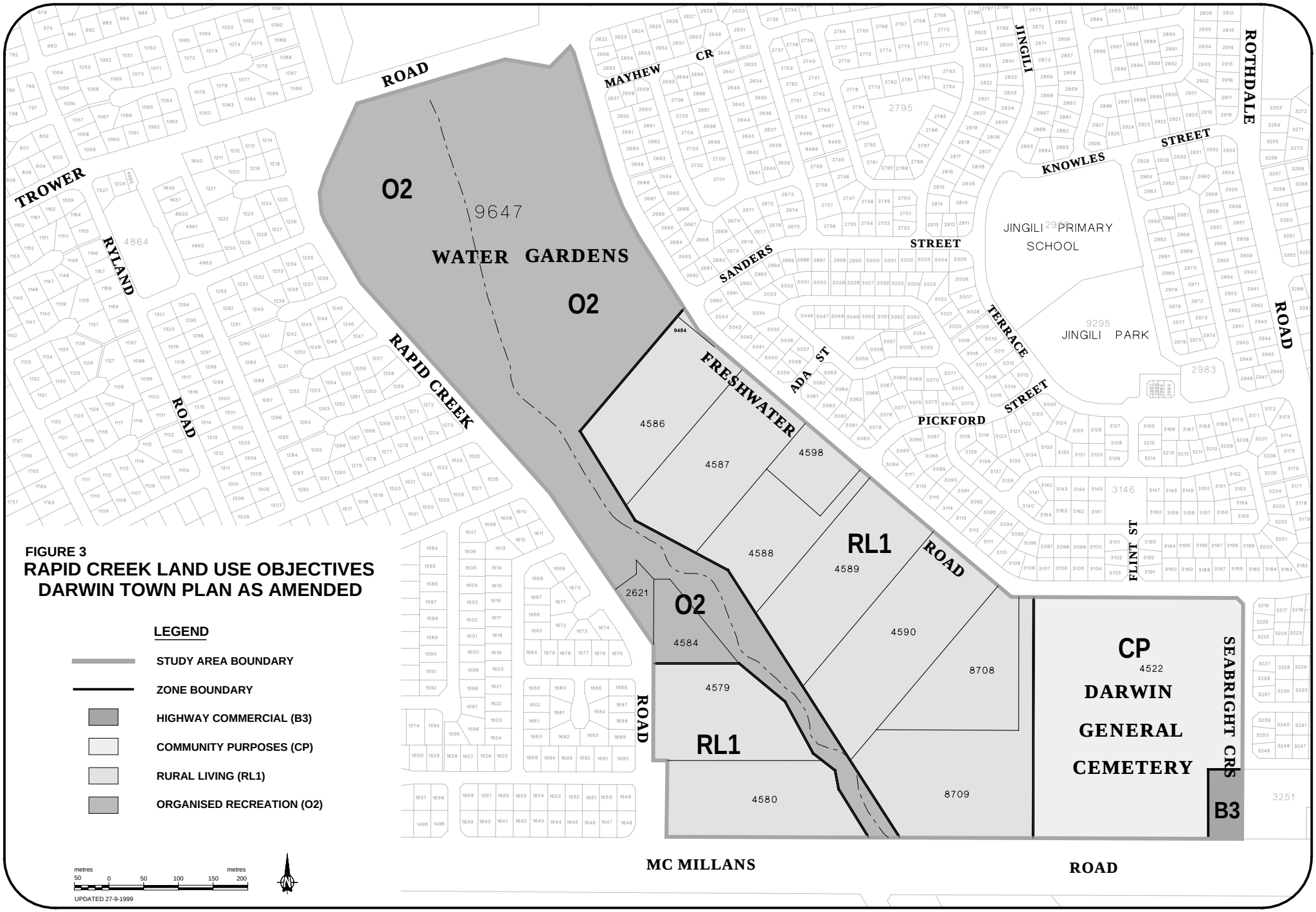

FIGURE 3

RAPID CREEK LAND USE OBJECTIVES DARWIN TOWN PLAN AS AMENDED

LEGEND

- STUDY AREA BOUNDARY
- ZONE BOUNDARY
- HIGHWAY COMMERCIAL (B3)
- COMMUNITY PURPOSES (CP)
- RURAL LIVING (RL1)
- ORGANISED RECREATION (O2)

metres 50 0 50 100 150 200 metres

UPDATED 27-9-1999

r:\darwin\rapidck\rck_tpzones.dgn

FIGURE 3

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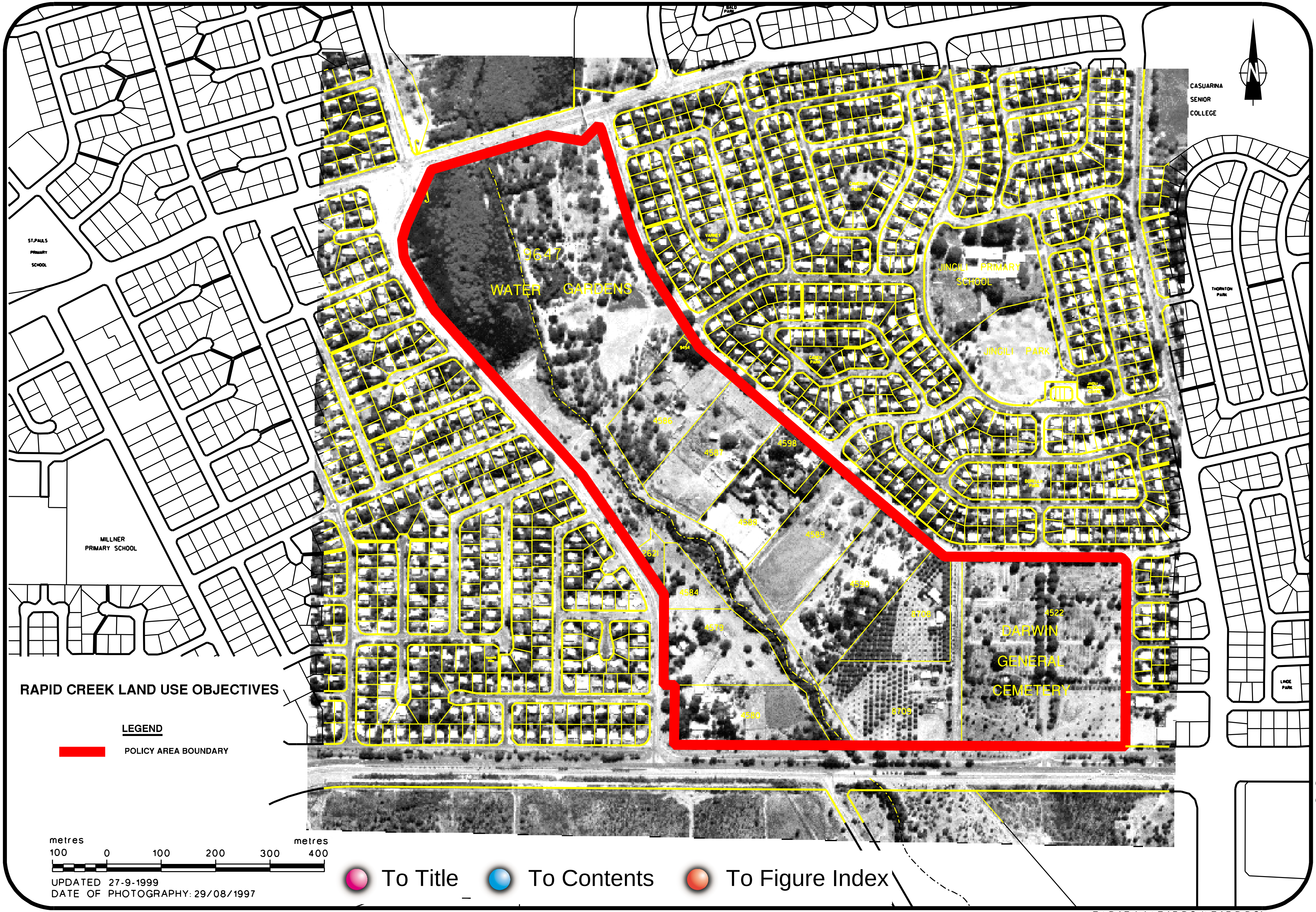

RAPID CREEK LAND USE OBJECTIVES

LEGEND

POLICY AREA BOUNDARY

metres 100 0 100 200 300 400 metres

UPDATED 27-9-1999
DATE OF PHOTOGRAPHY: 29/08/1997

FIGURE 4

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R:\DARWIN\RAPIDCK\RAPID.DGN

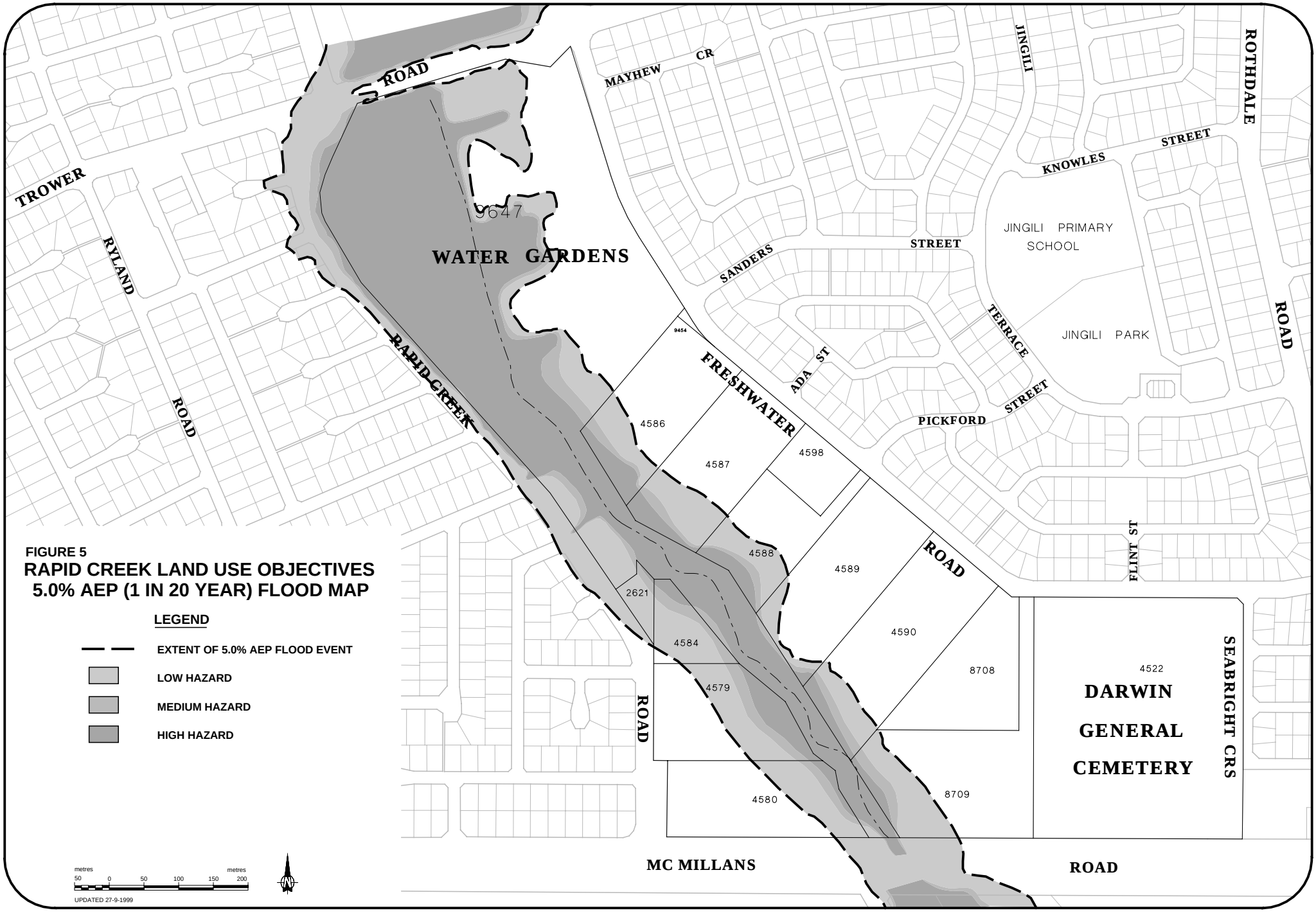

FIGURE 5

RAPID CREEK LAND USE OBJECTIVES 5.0% AEP (1 IN 20 YEAR) FLOOD MAP

LEGEND

- EXTENT OF 5.0% AEP FLOOD EVENT
- LOW HAZARD
- MEDIUM HAZARD
- HIGH HAZARD

r:\darwin\rapidck\rck_1in20.dgn

FIGURE 5

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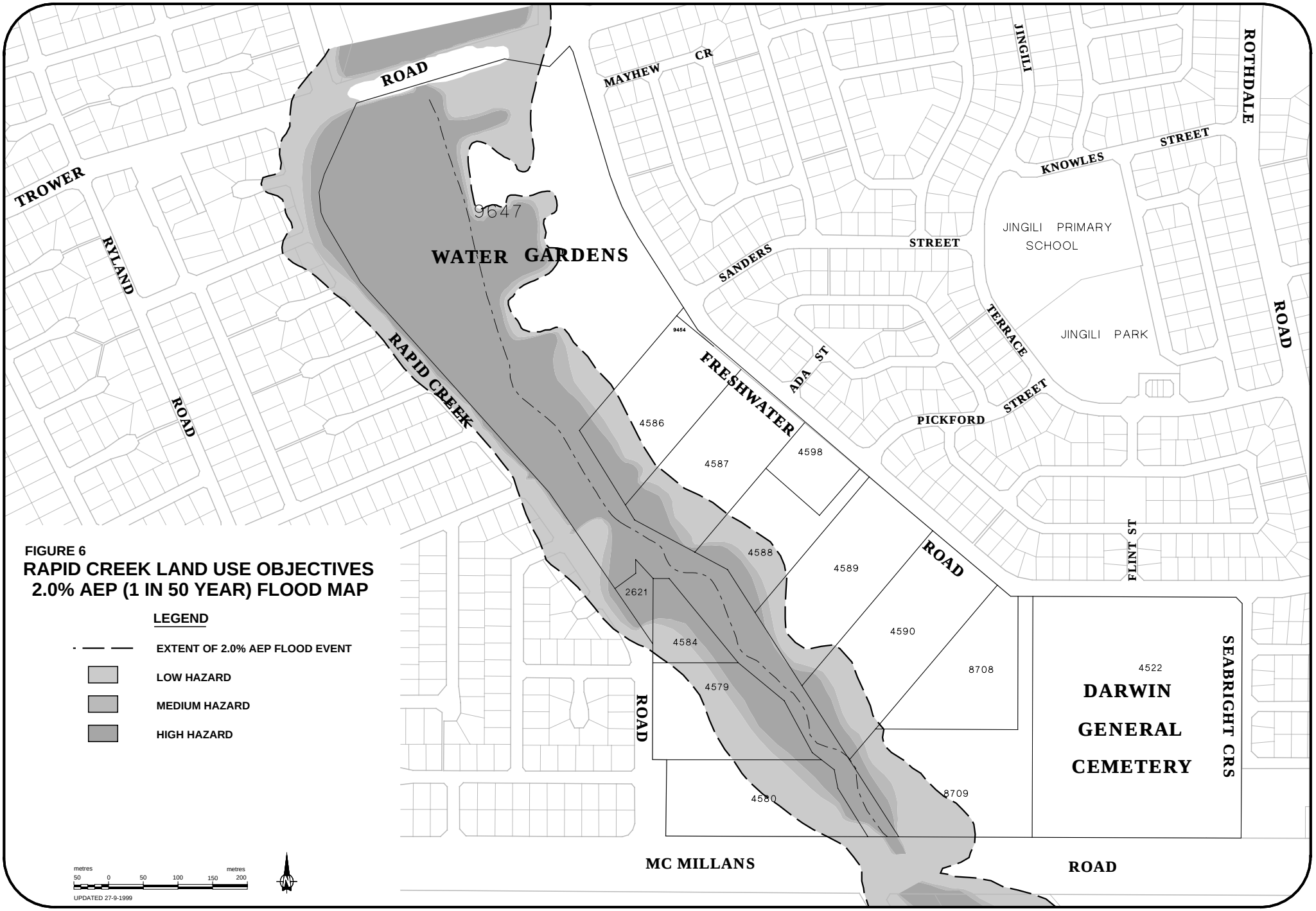

FIGURE 6

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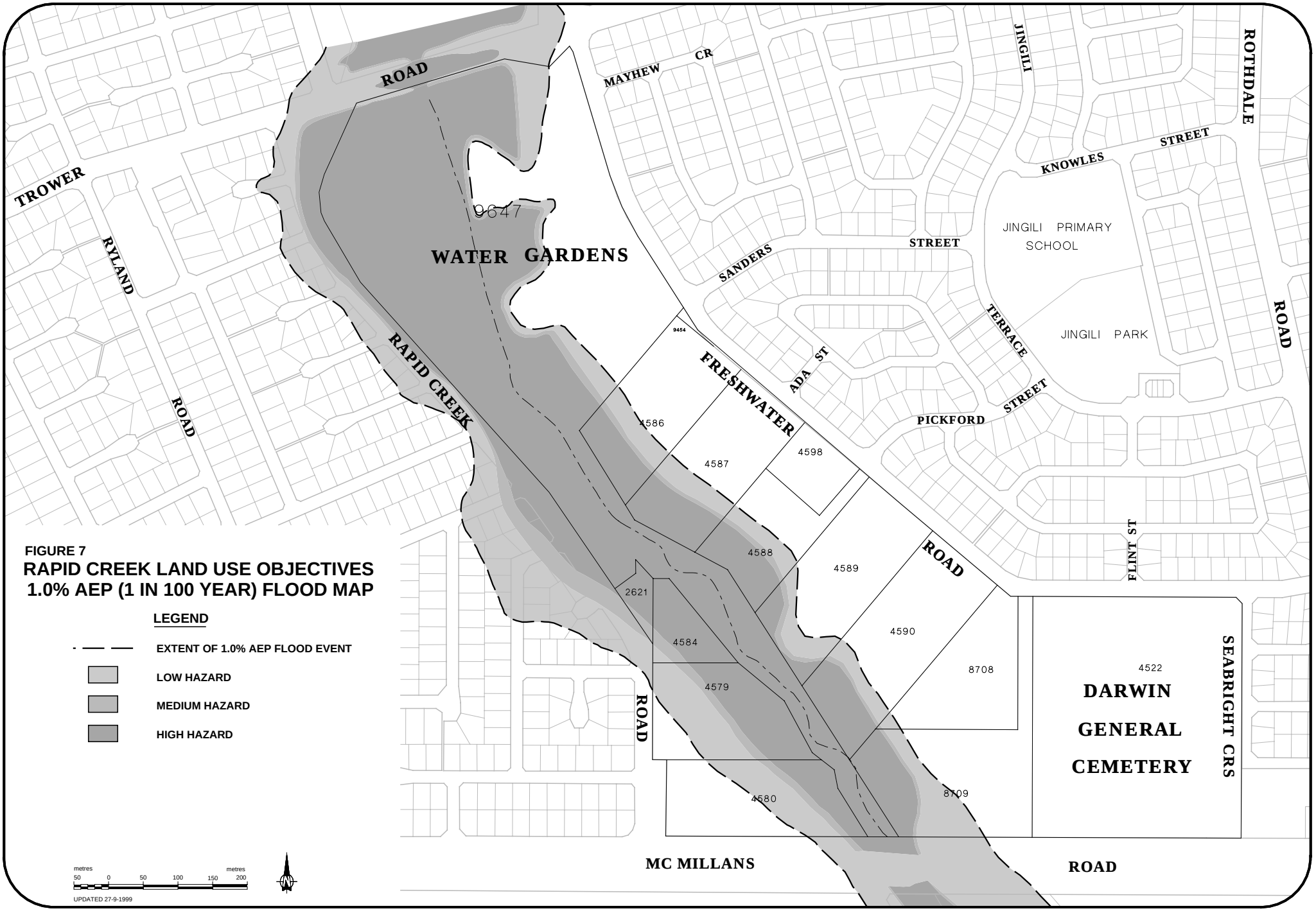

FIGURE 7

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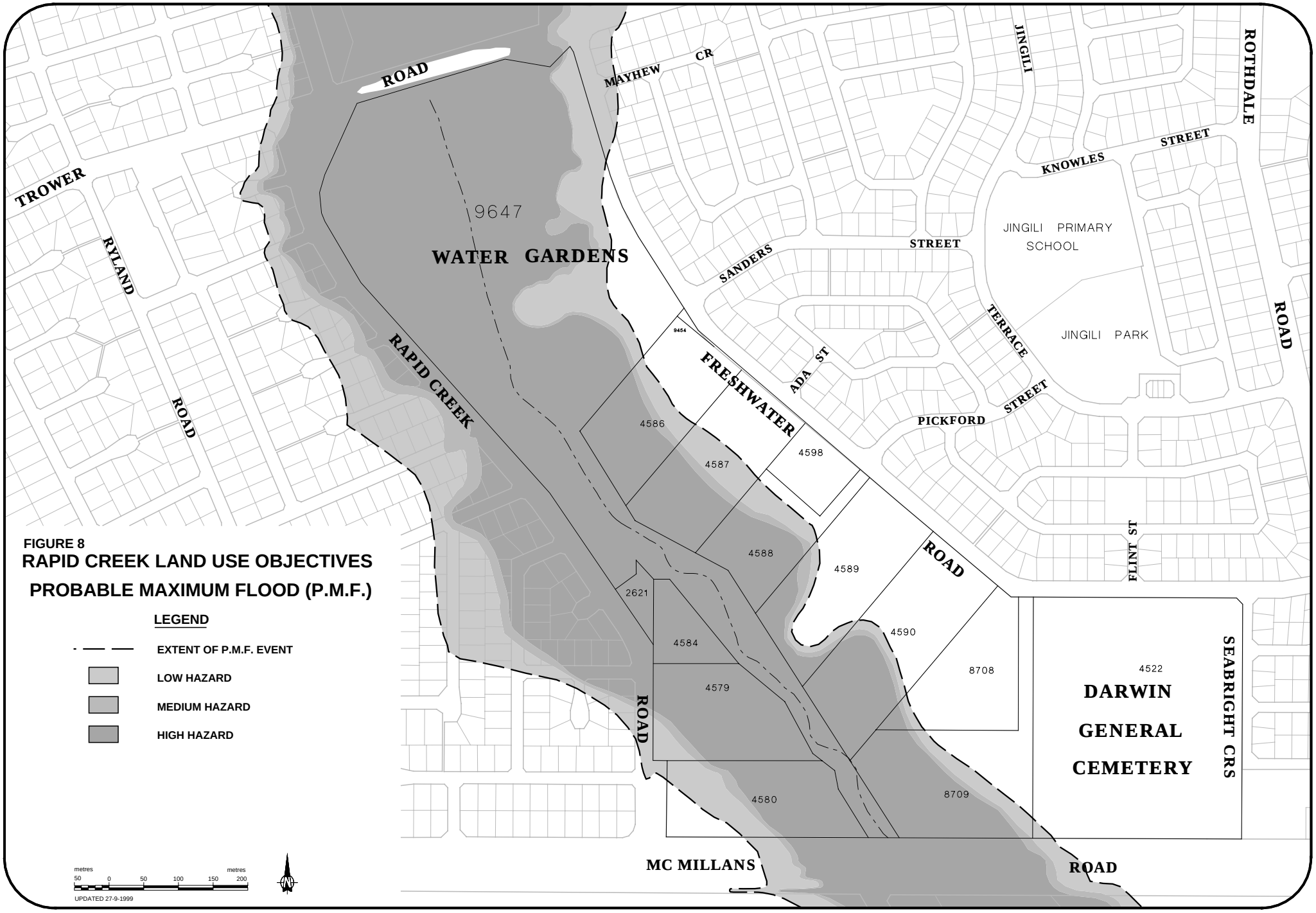

FIGURE 8

RAPID CREEK LAND USE OBJECTIVES

PROBABLE MAXIMUM FLOOD (P.M.F.)

LEGEND

- EXTENT OF P.M.F. EVENT
- LOW HAZARD
- MEDIUM HAZARD
- HIGH HAZARD

r:\darwin\rapidck\rck_pmf.dgn

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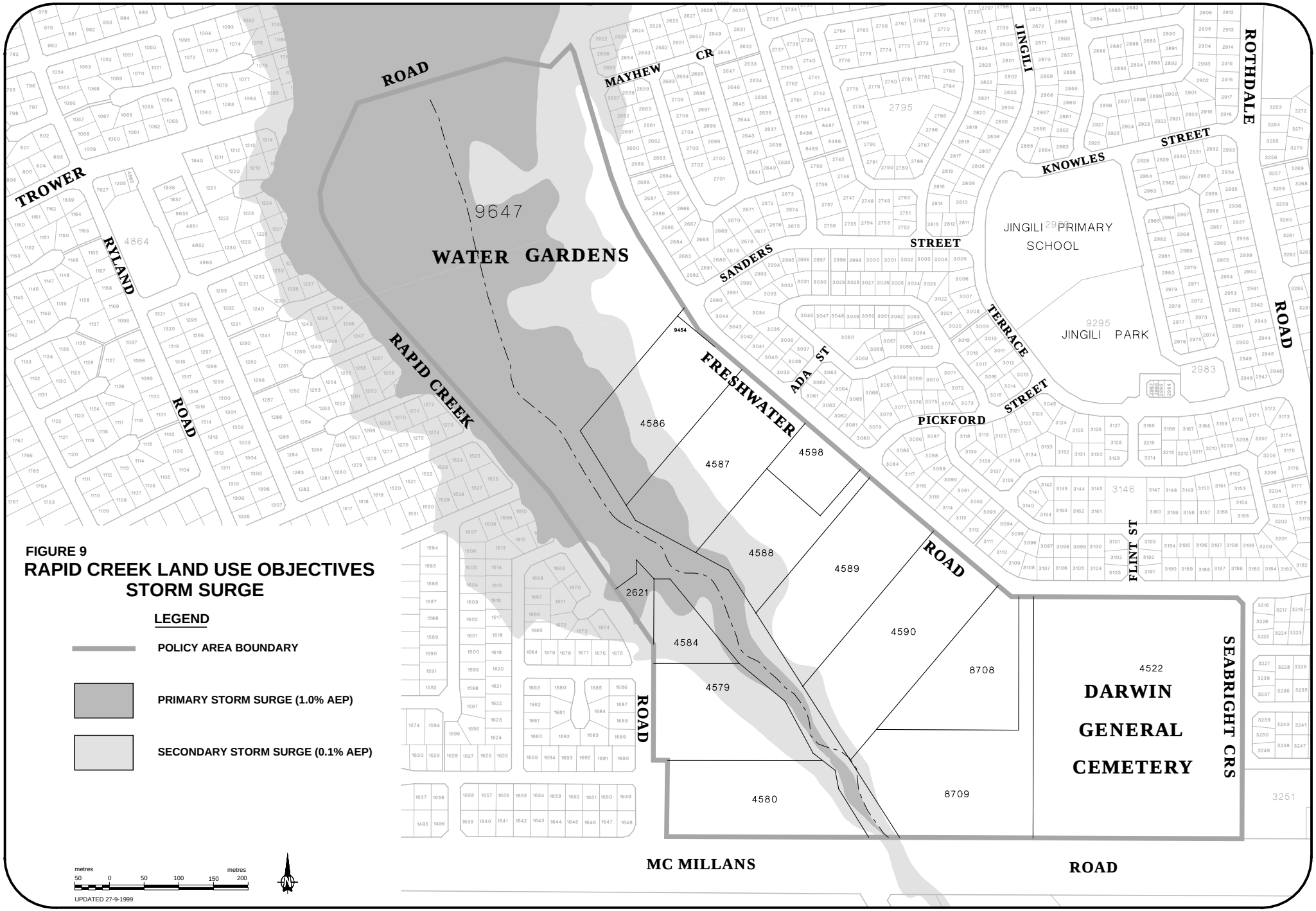

FIGURE 9

RAPID CREEK LAND USE OBJECTIVES STORM SURGE

LEGEND

- POLICY AREA BOUNDARY
- PRIMARY STORM SURGE (1.0% AEP)
- SECONDARY STORM SURGE (0.1% AEP)

R:\darwin\rapidck\rc-storm.dgn

FIGURE 9

To Title To Contents To Figure Index

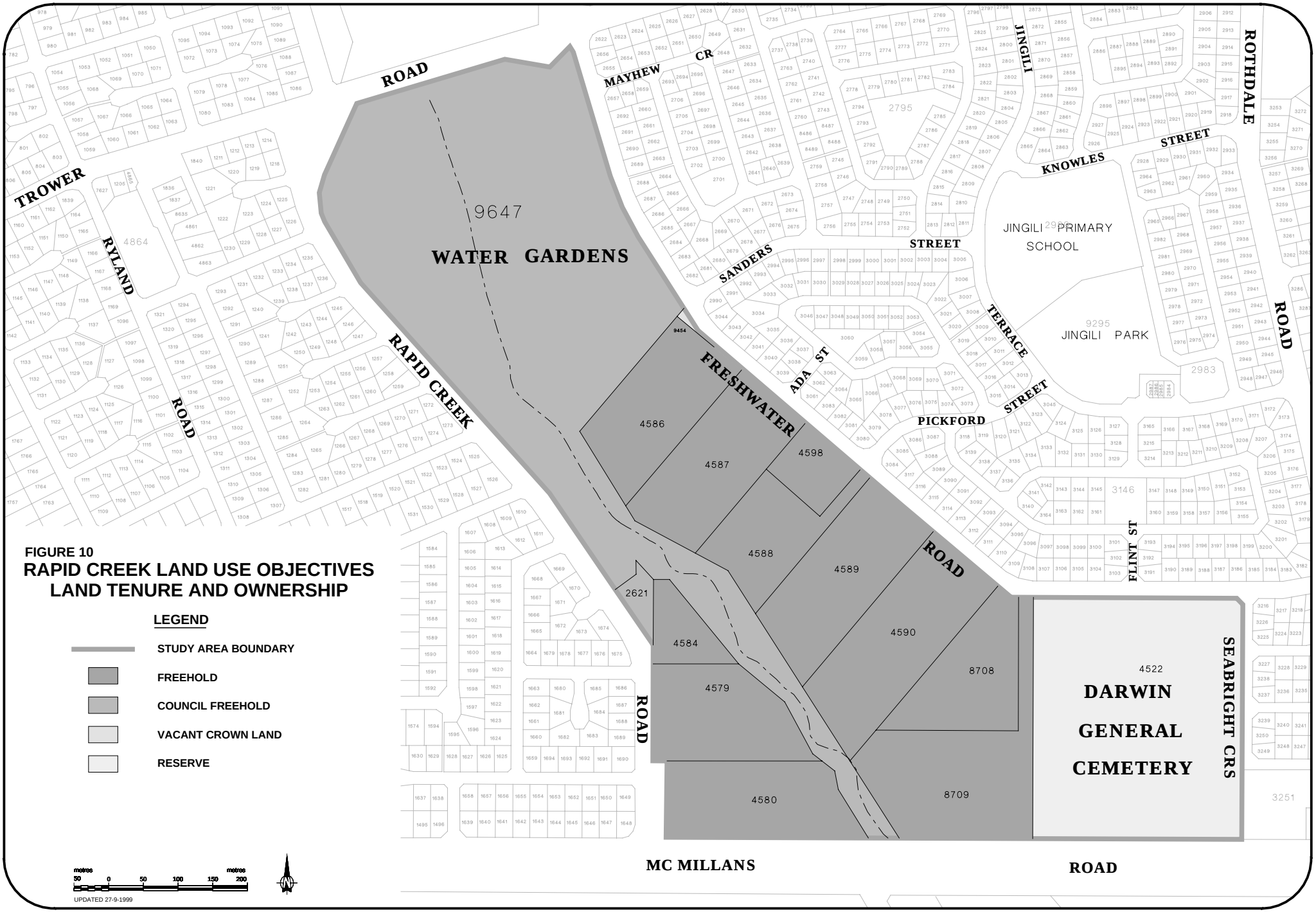

FIGURE 10

RAPID CREEK LAND USE OBJECTIVES LAND TENURE AND OWNERSHIP

LEGEND

- STUDY AREA BOUNDARY
- FREEHOLD
- COUNCIL FREEHOLD
- VACANT CROWN LAND
- RESERVE

r:\darwin\rapidck\rck_tenure.dgn

FIGURE 10

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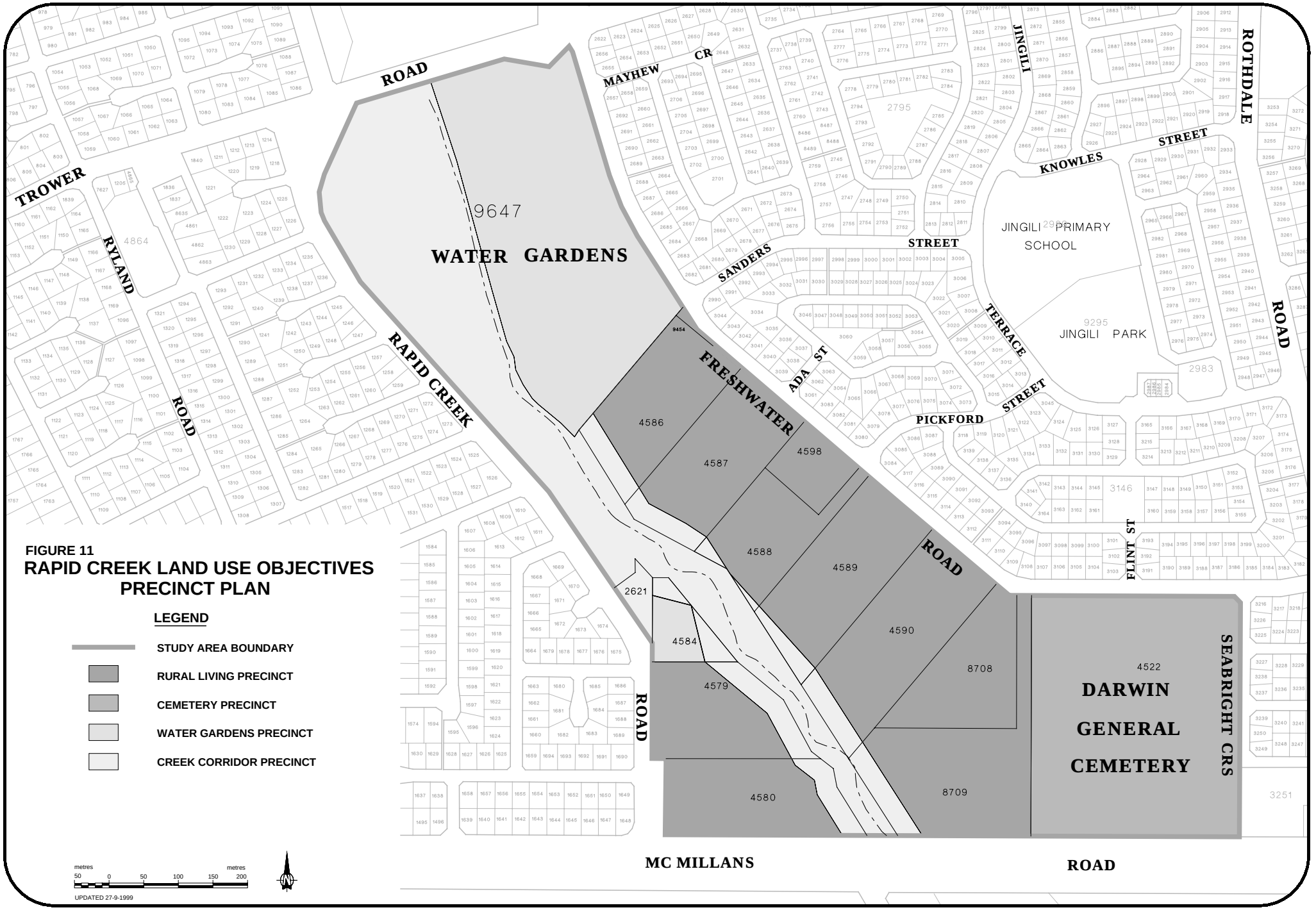

FIGURE 11

RAPID CREEK LAND USE OBJECTIVES PRECINCT PLAN

LEGEND

- STUDY AREA BOUNDARY
- RURAL LIVING PRECINCT
- CEMETERY PRECINCT
- WATER GARDENS PRECINCT
- CREEK CORRIDOR PRECINCT

metres 50 0 50 100 150 200 metres

UPDATED 27-9-1999

r:\darwin\rapidck\rck_pplan.dgn

FIGURE 11

To Title To Contents To Figure Index