GLENMORE PARK STRUCTURE PLAN
(South Penrith Release Area)

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Prepared for: **PENRITH CITY COUNCIL**

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1.0 INTRODUCTION

1.1 Introduction

This report was required by Penrith City Council in order to provide an overall framework for decision making and implementation of a major new urban community at South Penrith called "Glenmore Park".

The report provides a "Structure Plan" that contains guidance as to the potential form development may take at Glenmore Park within the broad parameters already set by Council in Penrith Local Environmental Plan No. 188 (LEP) and Draft Development Control Plan - South Penrith (DCP).

It is intended that the structure plan will be placed on public exhibition and comments sought from the Council, community and all land holders affected by the development of Glenmore Park.

1.2 Approach

A fundamental aspect of the planning approach adopted by Council is "flexibility". This is embodied in LEP No. 188 and the Development Control Plan for the release area prepared in 1988. The need for flexibility arises from the desire to ensure that future changes in attitude, needs, requirements and circumstances can be accommodated without being prejudiced by the early stages of development and decisions taken at that time.

To ensure flexibility and at the same time providing an adequate level of guidance and direction a "Structure Plan" is needed. The structure plan (See Section 3.0) is a document that describes the main elements of the release (while remaining diagrammatic) and sets out the general principles that should apply in order that development can proceed in a co-ordinated and well managed way.

Following acceptance of the general principles contained in the Structure Plan it is intended that detailed Development Control Plans (DCP's) should be prepared for each neighbourhood and/or individual precincts. In this regard a DCP for the first neighbourhood of approximately 1200 allotments is currently under preparation.

The structure plan is only one step in the process of preparing for a major urban release. It is anticipated for example, that a number of reports will be prepared on specific issues and the overall management of the project. Apart from detailed DCP's, at this stage the following other reports are envisaged:

- Management Plan
- Open Space Plan
- Community Plan

1.3 Philosophy

Glenmore Park will be a large community and a significant addition to the City of Penrith. Its size, the opportunities provided by the site and a general dissatisfaction with conventional urban releases have led to the realisation that a modern and progressive solution for the physical design of the community and the services provided is necessary.

Specific planning goals have been set for Glenmore Park (See LEP No. 188). The main objective is to maximise opportunities for Glenmore Park as a quality living environment. The goals are based on experience with large scale community and residential estate planning not only in Sydney but other Australian cities. These goals are aimed at avoiding the mistakes of the past and are simply expressed in the following key words.

- VILLAGE
- COMMUNITY
- SELF CONTAINED
- SPECIAL CHARACTERISTICS
- SAFETY
- INDIVIDUALITY
- INTEGRATION
- INTERACTION
- DIVERSITY
- VARIETY
- QUALITY
- MANAGEMENT

To achieve these goals a planning approach has also been determined which is based on the aims and objectives stated in Section 2.0:

Summary

The physical planning for Glenmore Park must ensure the best possible integration between land use, transportation and landscape as this will create the "environment" within which the community based objectives can be achieved. However, community planning is of equal importance as this provides the basis for establishing "community spirit" and ensuring that the social outcome is acceptable. In particular, appropriate facilities and services must be provided and on time.

1.4 Summary

Some 800ha were released for urban development by LEP No. 188 in January 1989 (See Plan 1). Of this approximately 517ha was owned by the NSW State Government (Department of Housing) and the remainder in various private ownerships (See Plan 2). In May 1989 the NSW Land & Housing Corporation entered into a joint venture arrangement with Elders Finance Group Limited to proceed with development of their land. The Joint Venture is known as Glenmore Park Developments Pty. Limited.

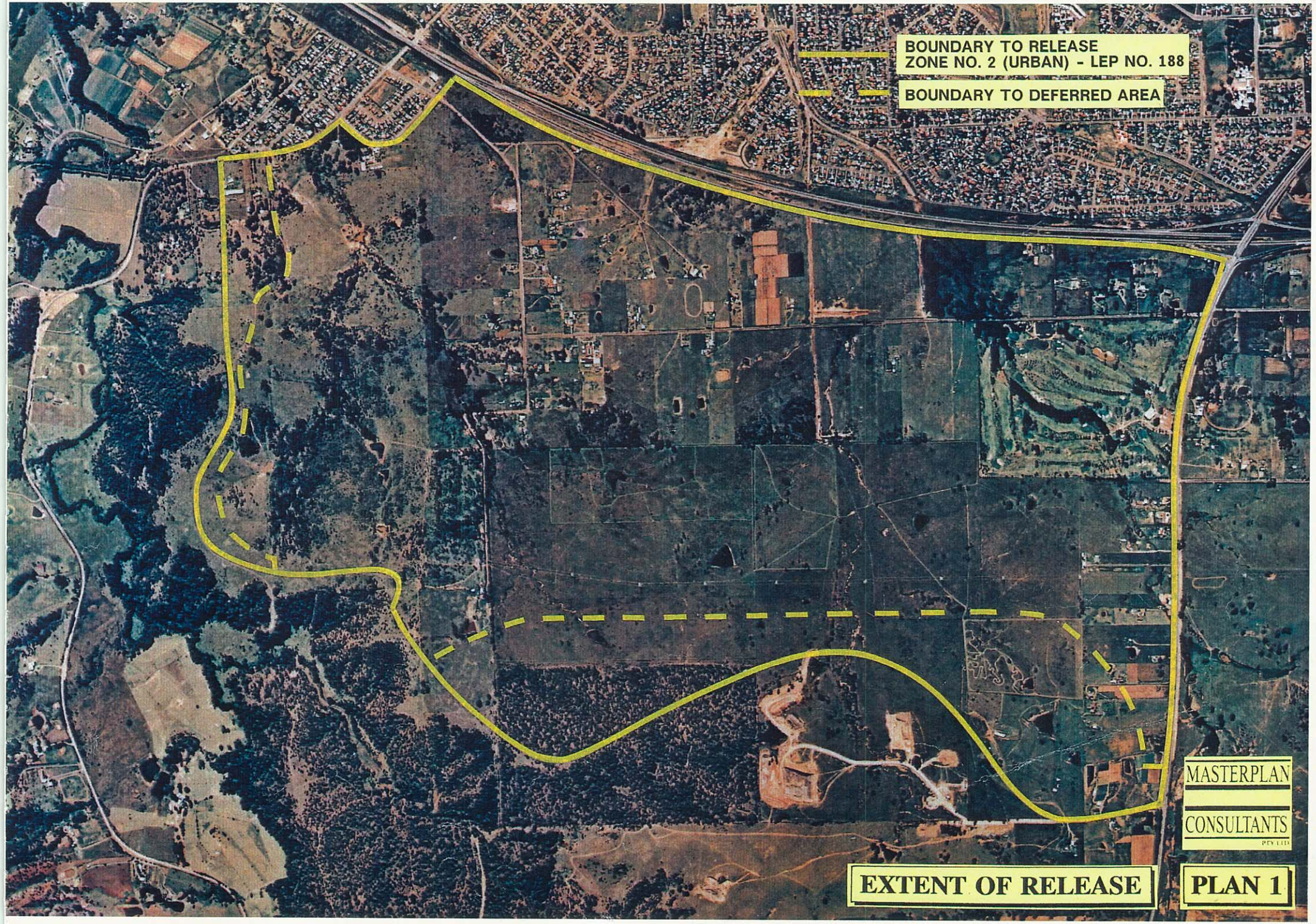
Council's aims and objectives for Glenmore Park are stated in the LEP and DCP where a clear emphasis is placed on achieving a diverse, relatively self contained residential environment for this new community so that it can develop its own positive identity. The structure plan specifically directs itself towards this key objective.

Preliminary planning estimates are that Glenmore Park could eventually accommodate 20-25,000 people with full development occurring within 7-10 years. The structure plan recommends a range of physical planning, social planning and design solutions that when implemented in concert are intended to provide the "environment" in which this new community can grow in the way Council seeks (See Plan 3).

A fundamental element of the planning for Glenmore Park is the creation of a "village" feel or atmosphere. As will be discussed later, this objective can be achieved. However, Glenmore Park as a "village" will also consist of several sub-areas or "neighbourhoods" which should support the overall village concept. Four (4) neighbourhoods have been proposed each having its own identity and its own basic facilities and services such as neighbourhood shops, playing fields and a primary school.

The four neighbourhoods are not only complemented by the facilities and services they offer but also by the overall road system, open space network, natural features and topography. They also allow the opportunity for the preparation of detailed development control plans on a neighbourhood or sub-neighbourhood basis and in accordance with an overall staging and construction strategy.

Another key feature of the structure plan is a recommended traffic management scheme involving the minimal use of major roads. In fact the only main road proposed is a single spine road through the release area (which has been called "Glenmore Parkway"). This particular solution was preferred following an examination of many other options primarily because it provided the best opportunity to ensure that individual neighbourhoods were free of major through traffic. Glenmore Parkway is intended to be a very attractive roadway along which most of the major non-residential land uses can be located including a large part of the open space system.


BOUNDARY TO RELEASE
ZONE NO. 2 (URBAN) - LEP NO. 188
BOUNDARY TO DEFERRED AREA
MASTERPLAN
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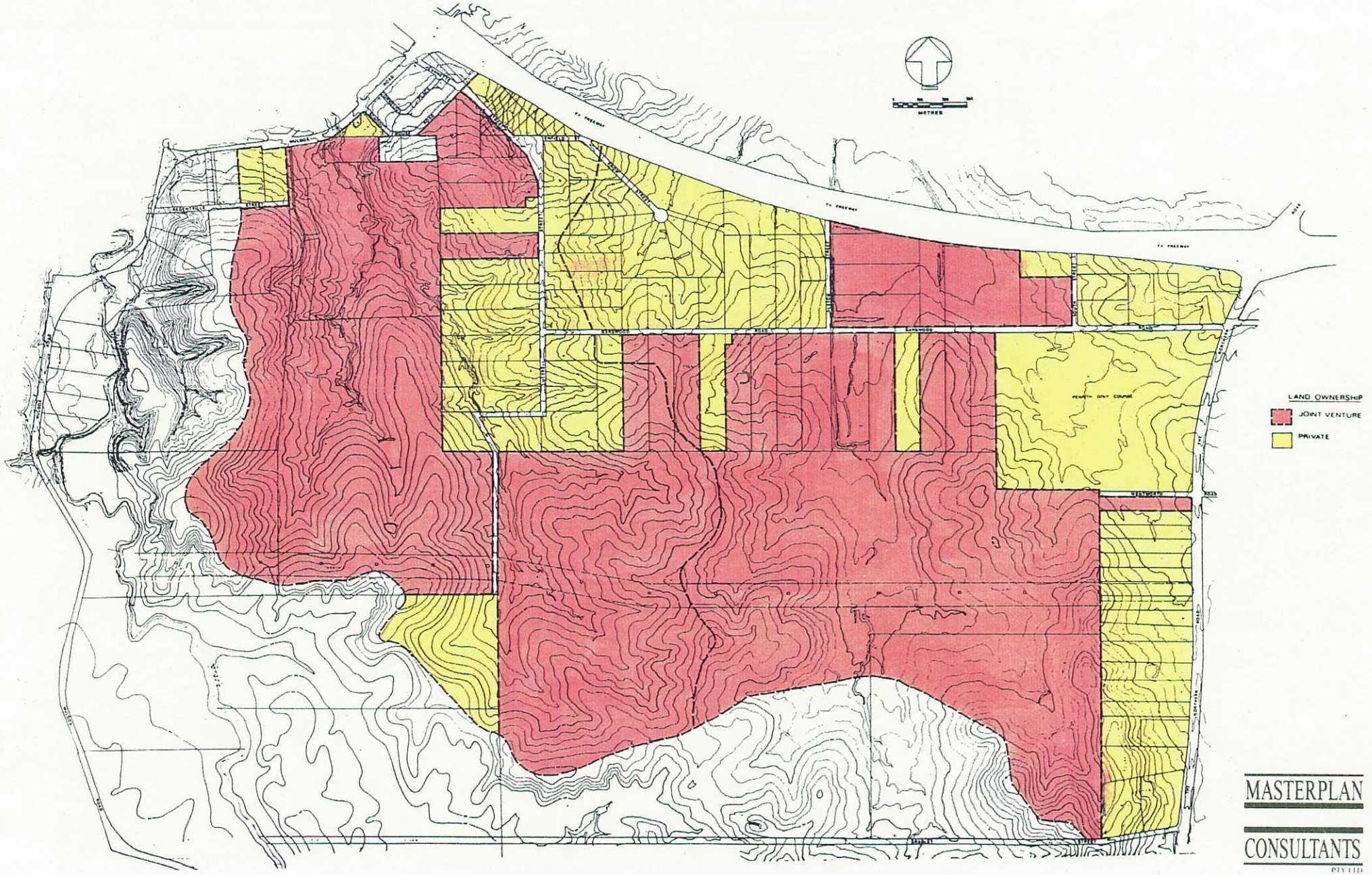
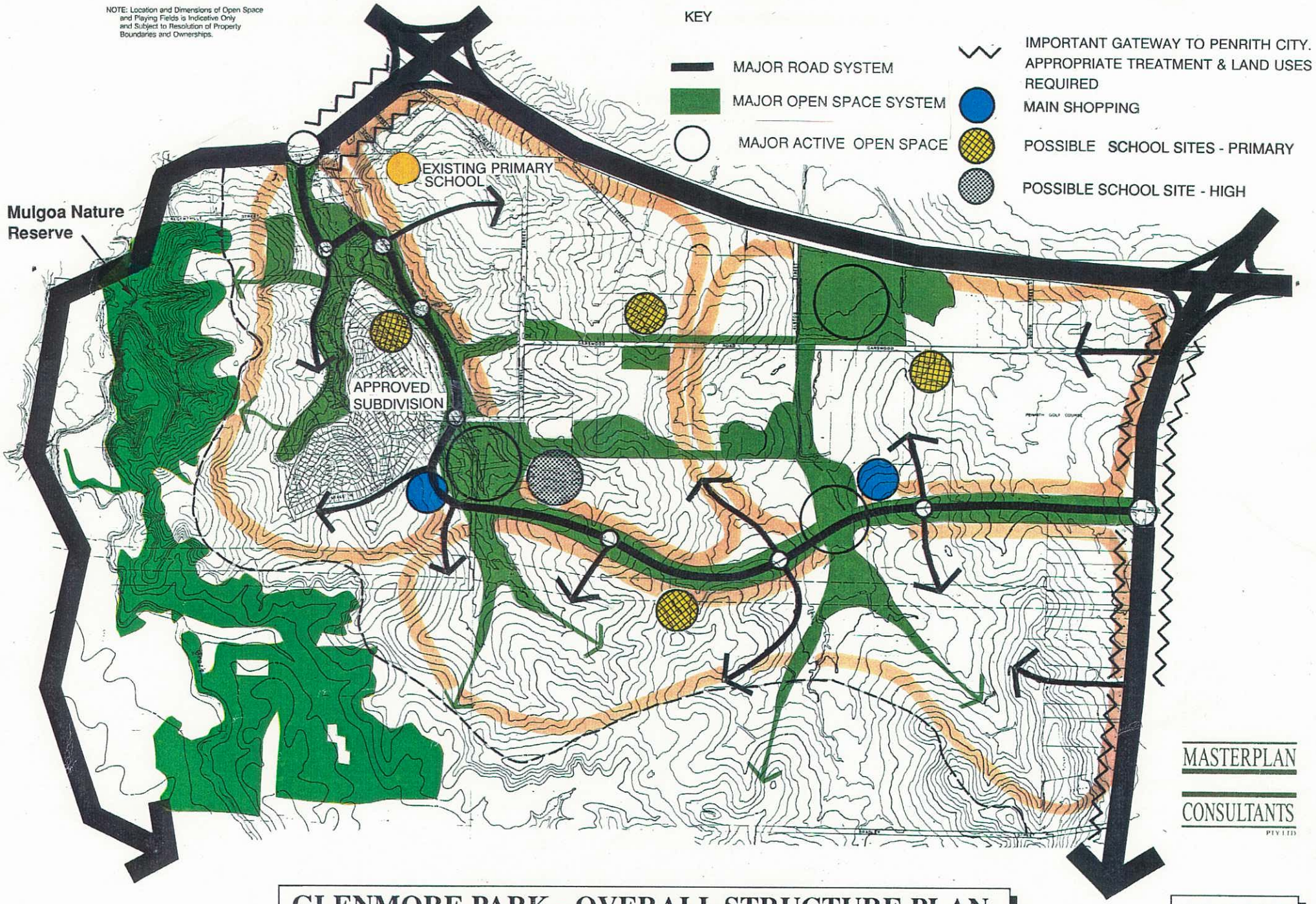
EXTENT OF RELEASE
PLAN 1



GLENMORE PARK - LAND OWNERSHIP

PLAN 2



GLENMORE PARK - OVERALL STRUCTURE PLAN

PLAN 3

Along Glenmore Parkway will be several points where pedestrians can cross the road with maximum safety. An innovative design solution is discussed later in the report.

Sites for schools, community facilities and shopping are also nominated and an overall open space and pedestrian system is suggested.

Another feature of the structure plan is the principle of utilising the historic assets of the Regentville area and the regional open space of the Mulgoa Nature Reserve. Pedestrian links are proposed to the reserve, new parks provided and the key historic features preserved.

The main features of the plan are described below.

1. The Glenmore Parkway

A fundamental element of the "structure plan" is the construction of a spine road along which is focused most major land use elements, and in particular the main open space system and the various residential precincts. The Parkway provides the shortest possible length of main collector road and minimises the amount of road frontage requiring access controls.

The Glenmore Parkway has been designed as a "low-key" collector road that follows the main open space system in the estate and links the main built elements such as shops and schools. It is intended that the Parkway would become a pleasant and attractive drive for members of the community and visitors.

2. The Residential Precincts

The structure plan shows the potential for Glenmore Park to be formed by four (4) smaller urban units. These have been classified as neighbourhoods.

These four areas would potentially contain approximately 1200 - 1700 dwelling units which is sufficient to support its own primary school, small shops and open space areas. This approach will assist to create a focus for each area. The principle of these four areas is further enhanced by the urban design and landscape proposals discussed later in this report.

Further sub-classification of areas is possible even down to the local street (court or place) level.

The proposed heirarchy of living areas is as follows:

1.	The Village	-	Glenmore Park
2.	Neighbourhoods	-	Four areas of approximately 1200-1700 dwellings
3.	Precincts	-	Groups of say 200-500 dwellings
4.	Individual Streets	-	10-100 dwellings

3. The Shopping Centre - THE GLEN

This is the main community shopping centre and the civic focus (market place) for Glenmore Park community. The potential exists to emphasise a village atmosphere in the design of the centre and to provide direct links to the main open space system. The centre could also accommodate a variety of facilities and services including a tavern, community facilities, churches and recreational facilities.

4. The Playing Fields - THE GLENMORE GREEN

Each precinct will have its own open space however, a large central area of public open space and playing fields has been located within the major pedestrian network adjacent to The Glen Shopping Centre. The potential is therefore created to share facilities with the shopping centre, tavern etc and to create a civic leisure and recreational focus.

5. Major Road Intersections

Special major road intersections designed to overcome the conflict normally associated with crossing points for pedestrians are proposed. They also provide focus points along the major road system. Some have been designed as "mini village squares", (a most unique feature) and others could be more standard road design solutions.

6. The Reserve - MULGOA NATURE RESERVE

An exceptional opportunity exists to blend the regional open space of Mulgoa Nature Reserve with the estate via a proposal to create a new park around the "Regentville Ruins" and an open space and pedestrian network that links the reserve with the estate while at the same time preserving as much as possible of the existing tree cover.

7. Regentville Ruins - REGENTVILLE RUINS PARK

A new and substantial park is proposed surrounding the historic Regentville Ruins site. This can be linked with the Mulgoa Nature Reserve and Glenmore Park via a pedestrian walkway.

8. Community Focus - GLENMORE COMMUNITY CENTRE

Located on the edge of a large lake this will be the initial focus for community facilities and activities for the first neighbourhood.

2.0 FUNCTION, AIMS AND OBJECTIVES

As previously mentioned an approach is recommended that involves the preparation of a number of planning documents and development control plans. These documents should expand upon the following key aims and objectives:-

2.1 The Function of the Structure Plan is to:

1) Present, in the context of assumptions and forecasts about the future, a proposal indicating the main pattern of urban form, which is considered desirable and necessary.

2) Formulate, from the aims and objectives, planning policies which support the proposals made in the structure plan, and which supplemented by criteria, will act as a framework for development control plans and a continuing guide for making future planning decisions.

3) Provide information and guidance, through the plan itself, to other agencies and services, on which they can base their own decisions and prepare their own plans; and thereby move towards co-ordination of action and provision throughout many of the services provided both within and outside the locality.

2.2 Aims

(a) **Environment** : to create high quality surroundings for living, working, shopping, education and recreation.

(b) **Social and Economic Need** : to provide for those social and economic needs of the future forecast population in accordance with the policies of the day and to foster community development.

(c) **Economy** : to see that financial resources and investment are used wisely and efficiently, especially where these are the responsibility of public authorities. Because of the scale of expected future urban development, substantial amounts will need to be invested by both public and private enterprise to realise the structure plan proposals. The plan therefore needs to guide development in such a way as to make the most efficient use of such investment, mindful of overriding objectives.

(d) **Conservation** : to conserve the important heritage, natural and man-made resources and features of the area.

(e) **Choice** : to provide people with a wide freedom of choice for housing, working, shopping, education, and recreation. The structure plan is intended to guide the economic, physical and social development of Glenmore Park, in the interests of people as a whole. Yet the plan should enable people to make many decisions of their own without undue constraint.

(f) **Image** : to create a clear framework for all development in the area, whether existing or new, and so help to give identity to the various parts of the area. The advantages of hindsight help to pinpoint weaknesses in past urban developments, which are exemplified in particular by the lack of physical identity in housing areas. The structure plan seeks to create a clear physical form for the area to make full use of the variety of its features, and to provide conditions which will allow people as individuals or groups to establish identity with their surroundings.

(g) **Mobility** : to ensure that people can travel easily about the area within the context of the overall transportation network. The structure plan attempts to strike a balance between public and private transport in an inter-related system of movement which will satisfy both personal and commercial travel needs with a minimum of congestion and a maximum of safety.

(h) **Flexibility** : to be adaptable so that the plan can cope with variations in predicted circumstances which can be reasonably foreseen. A plan concerned with the developments over the next ten or more years cannot be fixed and finite. It must allow as far as possible for changes in urban form and technology and be capable of being adapted to such circumstances.

(i) **Implementation** : the success which the structure plan may achieve in securing a better future for the residents of Glenmore Park is heavily dependent on the extent to which its policies and proposals may be carried out. The responsibility for realising these will be shared by both the private sector and public authorities. The formulation of the plan's policies and proposals will therefore need to be matched by a very thorough consideration of the ways and means of implementation.

2.3 Objectives

(a) to introduce a flexible planning framework for the staged development of the South Penrith Release Area, having regard to its special characteristics and potential for the evolution of a self-contained community with its own identity;

(b) to assist the process of management of the establishment of a new urban community;

(c) to enable the council to prepare development control plans to introduce more detailed provisions relating to -

(i) development, conservation and community objectives;
(ii) urban form, structure and functioning, and land use arrangement;
(iii) staging of development and infrastructure provision;
(iv) the equitable distribution of costs of infrastructure required for the total area; and
(v) the overall management of urban development in a manner which assists community development; and

(d) to promote the managed production of residential allotments and support services in relation to local and metropolitan markets, while retaining the flexibility to adapt to changing market preferences.

3.0 THE STRUCTURE PLAN

This section of the report provides detail on the various elements/components of the structure plan. Plans 3, 4 & 5 provide an overall description of the concept. What follows are various additional diagrams to describe key aspects of the plan together with a statement of the general principles that should apply.

3.1 Flexibility

The structure plan is not prescriptive in that in certain circumstances changes will be necessary and should be accommodated. In particular, the plan in this report has been based on the assumption that current ownership boundaries will not be a major constraint and that development will proceed in an orderly fashion. However, if key land parcels cannot be acquired or developed at the appropriate time a change in the overall structure may be necessary. Alternative plans to allow for ownership constraints should be prepared if this situation arises.

The process of preparing DCP's for areas within Glenmore Park is an important part of the "flexible approach". In this way all relevant considerations can be assessed at the time of their preparation. A DCP is also relatively easy to amend, update or add to.

3.2 The Village Image - Neighbourhoods and Precincts

In order to provide logic and clarity for the development of sub areas within Glenmore Park a hierarchy or classification has been adopted which is as follows:

1.	The Village	-	Glenmore Park
2.	Neighbourhoods	-	Four areas of approx. 1200-1700 dwellings
3.	Precincts	-	Small groups of dwellings of variable size (Say 200-500 dwellings)
4.	Individual Streets	-	Say 10-100 dwellings.

It is envisaged that the eventual total number of dwellings within Glenmore Park will be in the range 5500-6500. With the type and location of facilities currently envisaged Glenmore Park could be formed by four neighbourhoods. These may be given a name different from Glenmore Park but it is important that the whole of the estate be recognised as the village of Glenmore Park.

It is also anticipated that development would proceed in orderly packages of around 300-500 allotments although more than one package may be constructed concurrently given market conditions. This provides an opportunity to utilise innovative subdivision, urban design and traffic management techniques for individual precincts and "groups" of housing which will assist to promote community identity and a sense of belonging.

The cohesion of the neighbourhoods can be achieved by creating the following:

- an identifiable name and visual image for each precinct as part of Glenmore Park,
- a principal central place for the whole community and for each precinct,
- a physical form that establishes meaningful psychological boundaries and reinforces the desired image i.e. by using the topography, road system, landscaping, vegetation etc to create individuality.

Plan 6 illustrates how the spine road design and topographical features of the land can be used to create logical neighbourhood areas. This together with the principles shown on Plan 4 will assist in establishing meaningful neighbourhoods.

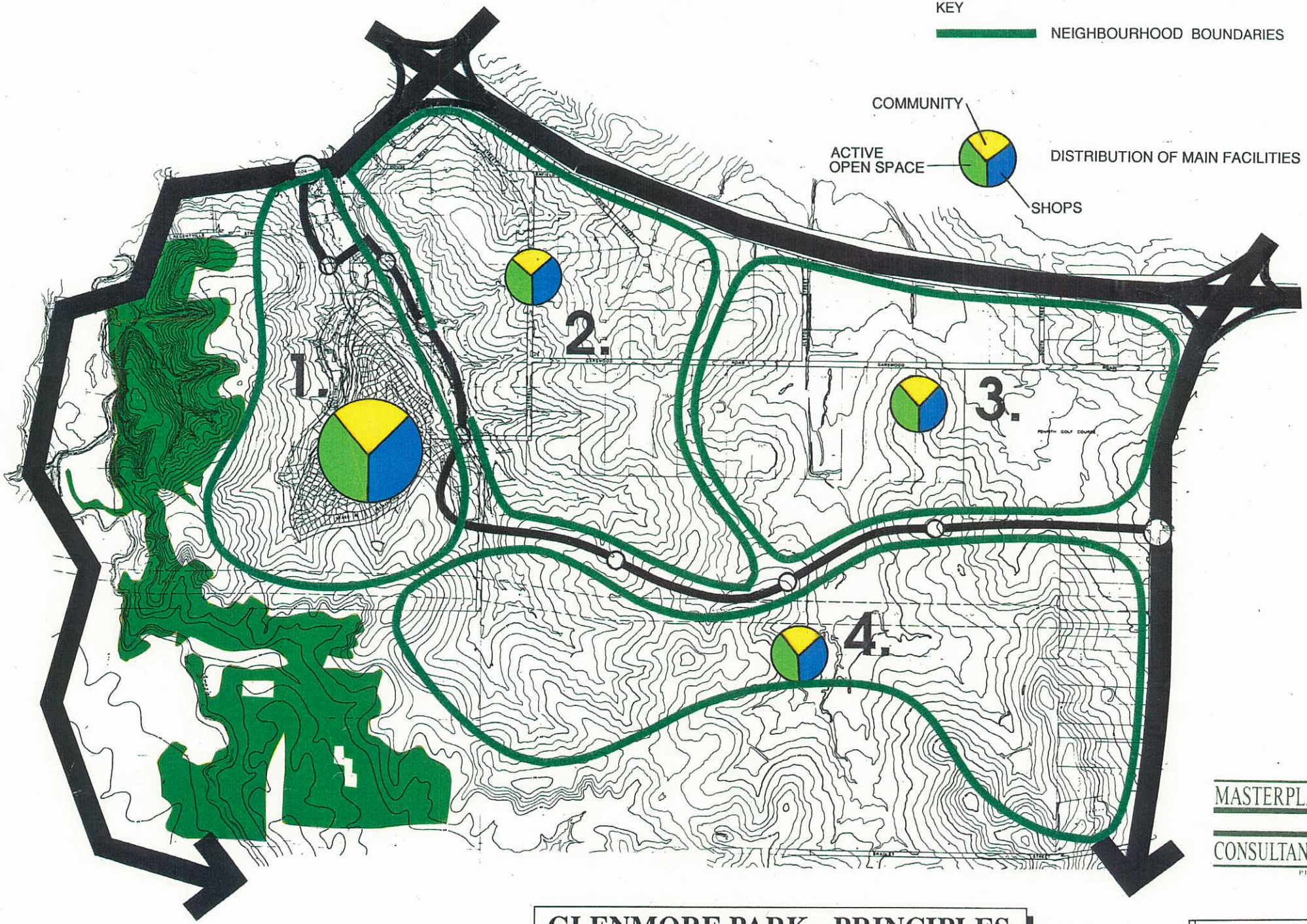
3.3 General Requirements

At the time of preparation of this structure plan several areas within the release were constrained in varying degrees from development (See Plan 7). These include:

- a deferred area east of the Mulgoa Nature Reserve,
- a deferred area north of the southern boundary,
- areas currently semi developed fronting the Northern Road and within the release,
- the Penrith Golf Club site.
- areas of significant vegetation and flood liable.

However, assuming that current constraints on the land holding can be resolved an eventual yield of approximately 5500-6500 allotments and a population of approximately 20-25,000 people can be expected. If this is the case the following minimum or basic major facilities will be required:

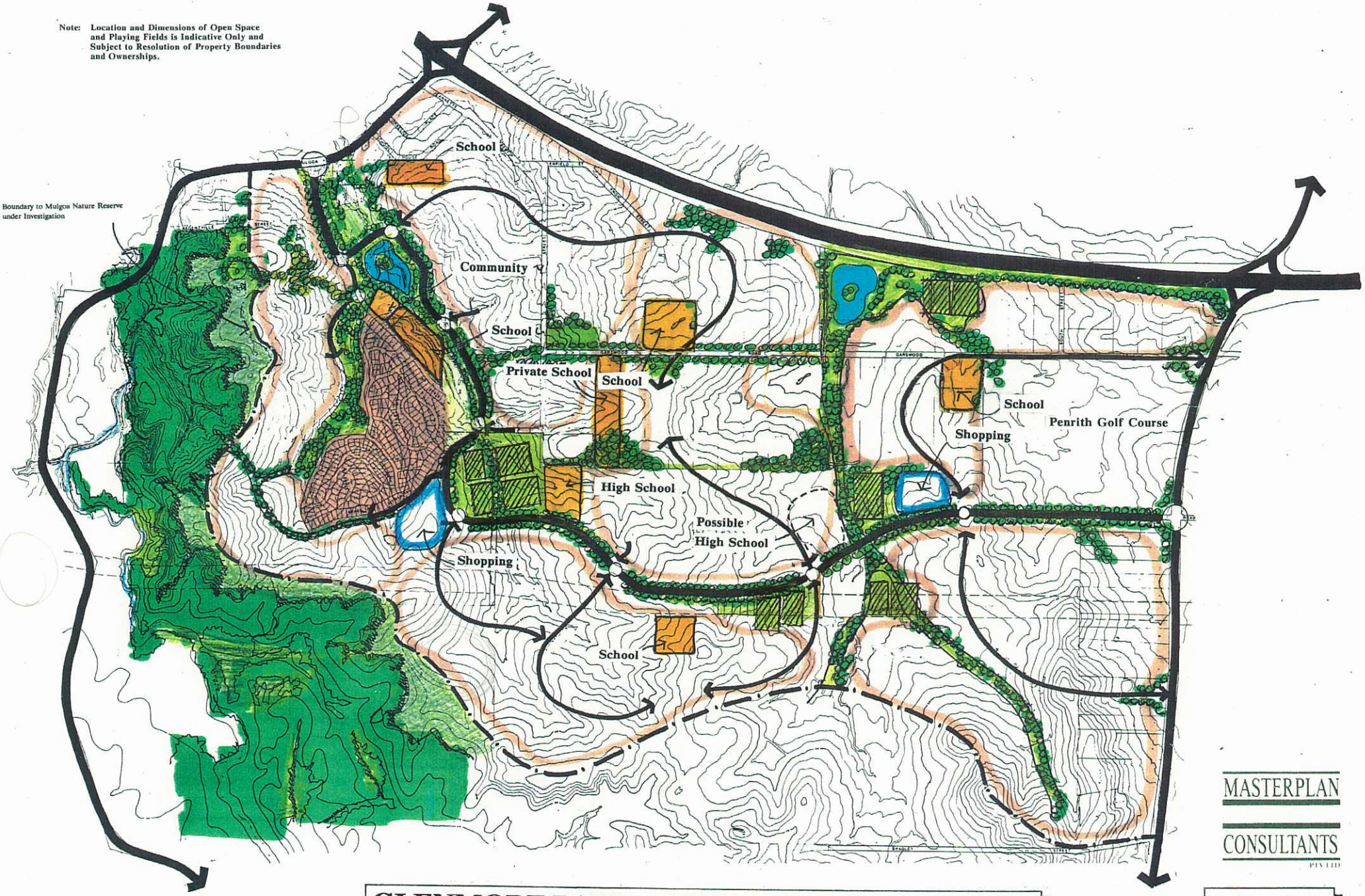
(i) At least one major or possibly two High Schools - Public
(ii) One or Two Schools - Private (one existing)
(iii) Four Primary Schools - Public (one existing)
(iv) A "Group" or large Shopping Centre
(v) An Intermediate or smaller Shopping Centre or alternatively several neighbourhood centres, which may include five or six Neighbourhood/Local Activity Centres
(vi) Approximately 50-60 hectares of Open Space (Active & Passive)
(vii) Various Community Facilities
(viii) A pedestrian and Cycleway System.



GLENMORE PARK - PRINCIPLES

PLAN 4

Note: Location and Dimensions of Open Space and Playing Fields is Indicative Only and Subject to Resolution of Property Boundaries and Ownerships.



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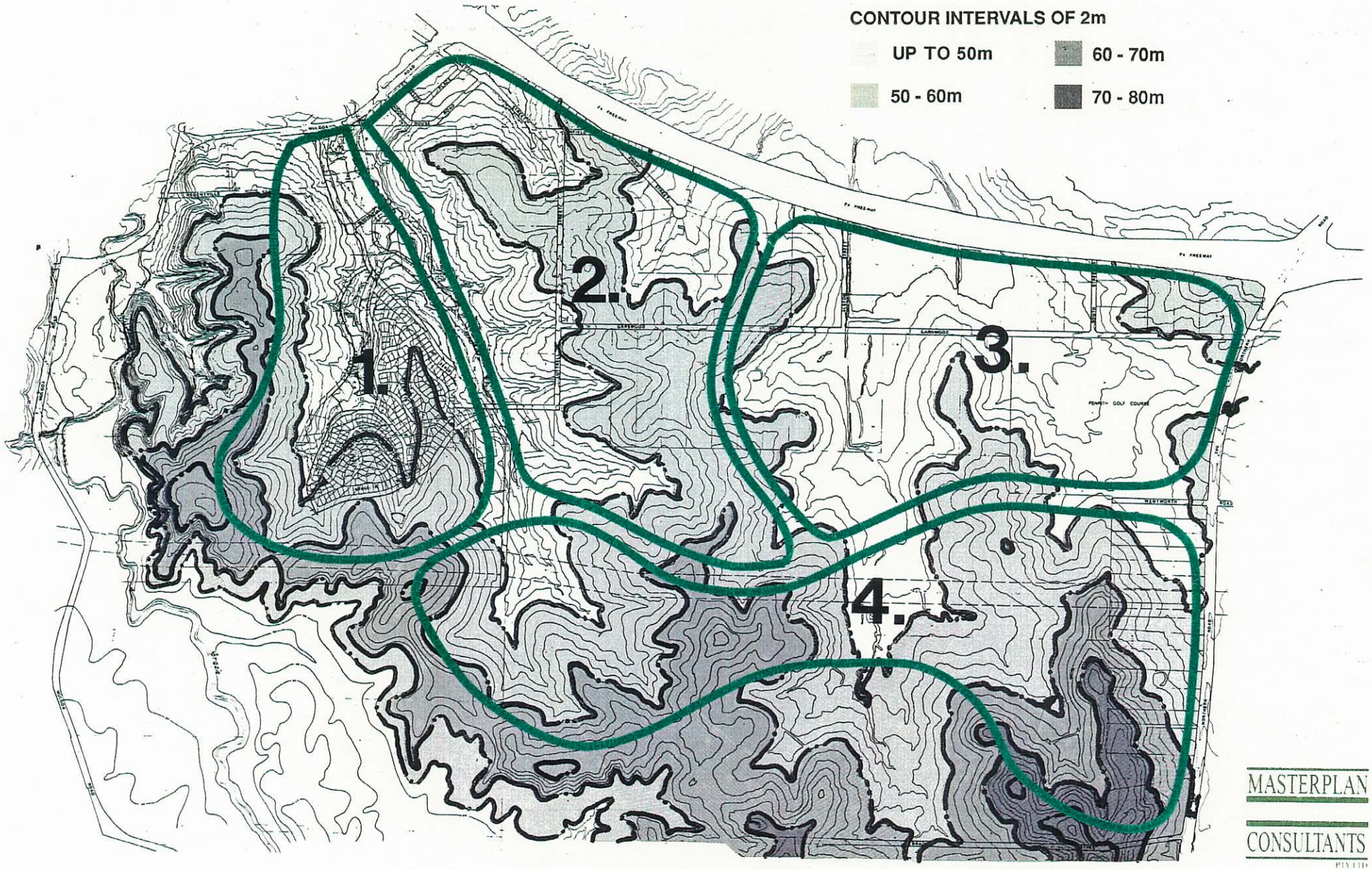
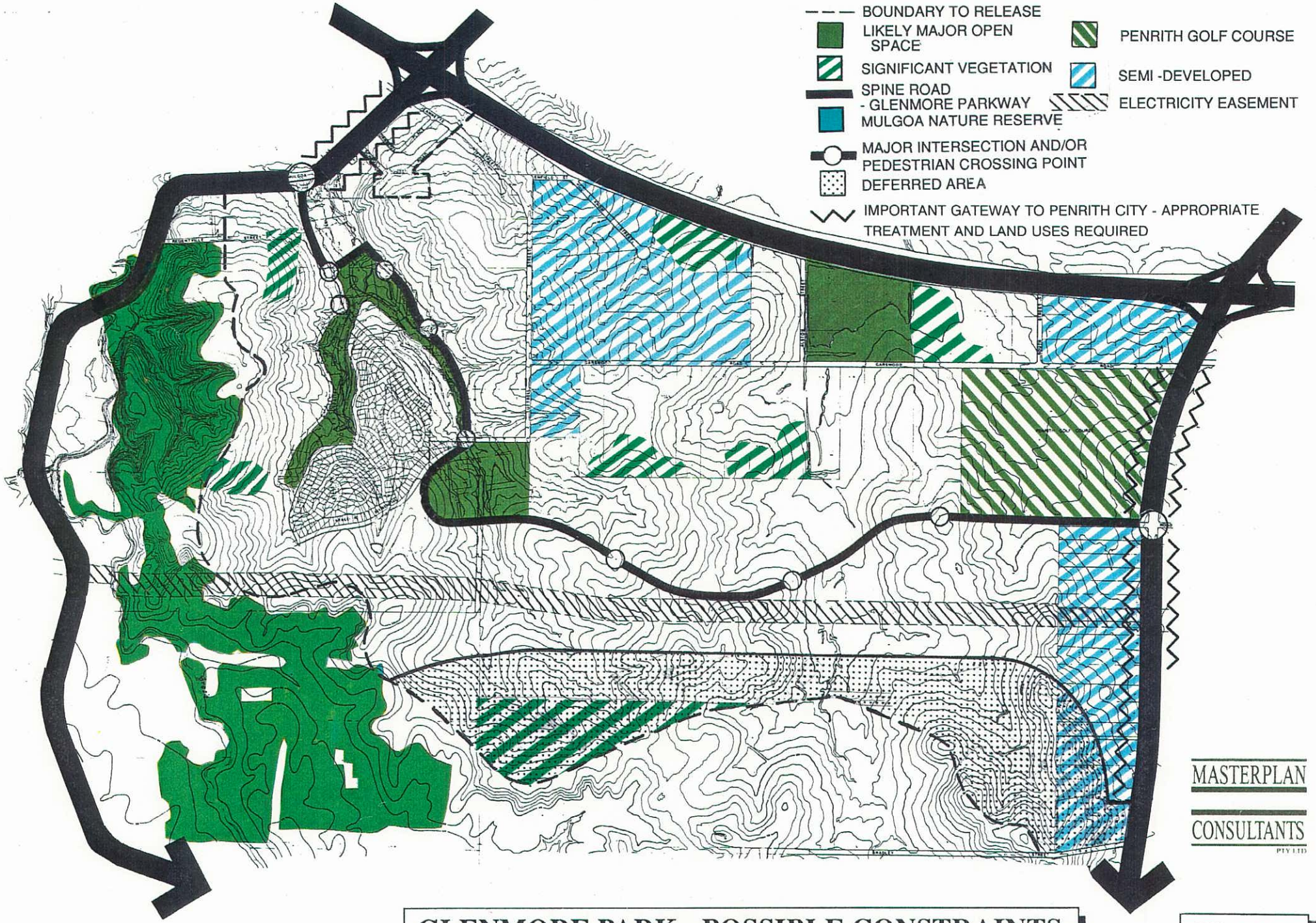
GLENMORE PARK - OVERALL CONCEPT PLAN

PLAN 5



GLENMORE PARK - LAND UNITS

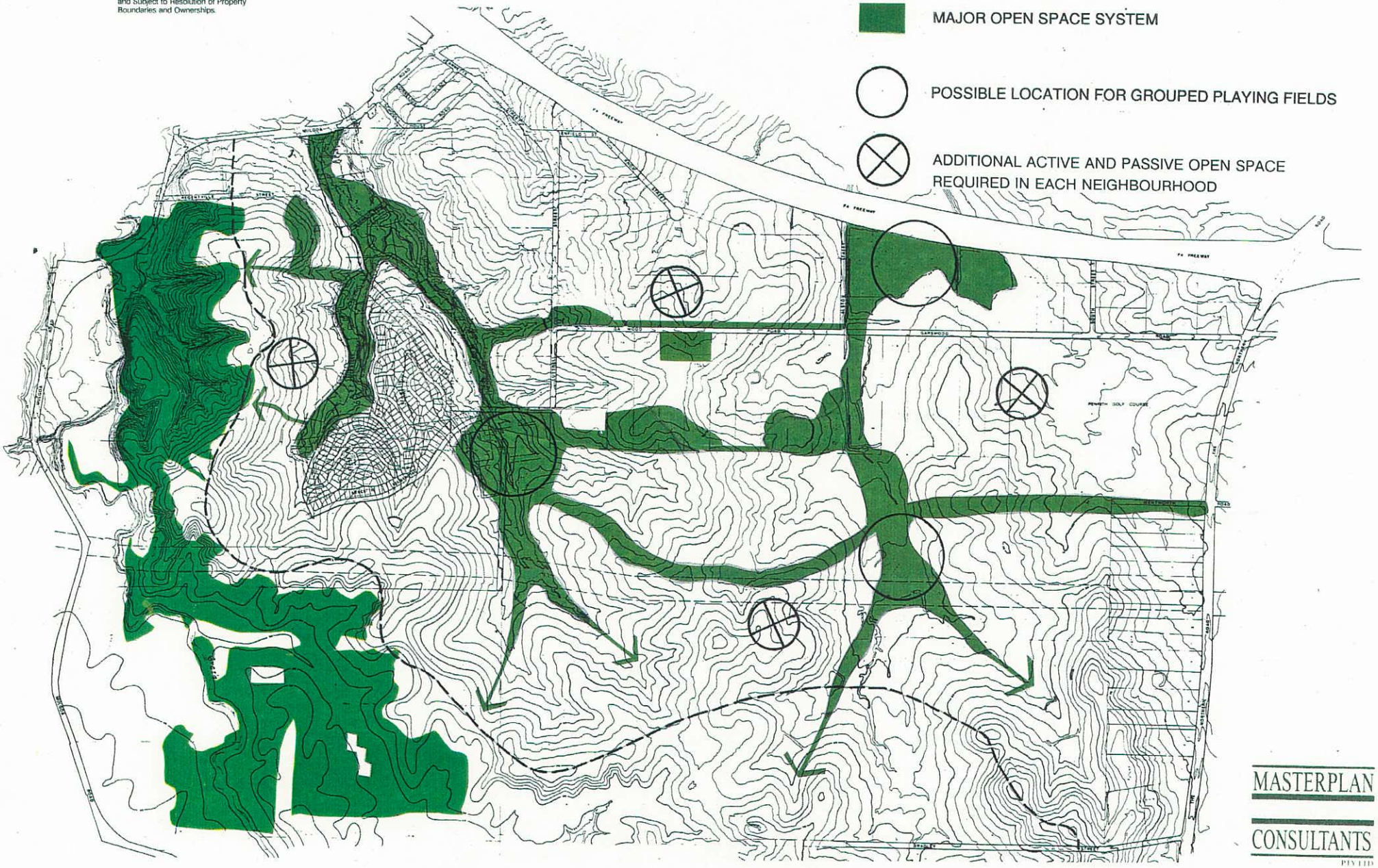
PLAN 6



GLENMORE PARK - POSSIBLE CONSTRAINTS

PLAN 7

NOTE: Location and Dimensions of Open Space and Playing Fields is Indicative Only and Subject to Resolution of Property Boundaries and Ownerships.



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GLENMORE PARK - OPEN SPACE SYSTEM

PLAN 8

3.4 Social Planning

The successful development of Glenmore Park, particularly in the eyes of its future residents and the community at large, will relate very much to the availability of appropriate facilities/services and its image as a community rather than merely a clustering of new housing on the edge of Penrith. To assist in this regard a Community Plan should be prepared.

The Community Plan should seek to identify issues arising from the Latona Masterman report[1] and its practical implementation in Glenmore Park given current funding conditions and the physical planning requirements of the estate. It should review the current status of the recommended baseline and threshold facilities/services and the funding options for achieving this provision. It must also establish a base for the implementation framework for Glenmore Park and highlight issues of concern relating to funding of facilities/services and physical planning considerations.

3.5 Open Space System (See Plan 8)

A significant emphasis has been placed on creating an effective open space system. It is important to maximise the value of the parkland and landscape areas and to extend this influence in visual and functional terms as far as possible into the residential precincts. Subdivision should therefore be designed to focus development onto parkland rather than hide it from view and houses and other development immediately fronting it should respect this environment by careful design and siting (particularly fence treatments).

Public open space and parks should be provided to the minimum standard of 2.83 hectares per 1000 population in the release area (excluding utility open space unless this forms a useful function and contributes to the overall quality of open space provided). The main public parks should be large enough and shaped to create useful areas and effective landscape as well as being economical to maintain. Five types of parks are suggested -

- major sports areas potentially and preferably adjacent or linked to the high schools and/or alongside the road corridor;

- local parks adjacent or near the primary schools where the school is separated from the major sports areas;

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[1] Latona Masterman - People Before Figures - South Penrith Release Area Community Needs Assessment, 1987.

- amenity parks with facilities for children;
- pocket parks at places of high pedestrian concentration and public interest;
- passive recreation areas for walking and enjoyment.

The structure plan proposes at least three (3) large active sports areas with one main area called the Glenmore Green providing a focus for active recreation near the main shopping centre. A total of approximately 60 hectares of open space is the theoretical requirement for a population of 20,000. (35 hectares of this allocated for active recreation)

3.6 Pedestrian System (See Plan 9)

Pedestrians

The use of the Low Key Spine Road and access controlled roads - (See description Section 3.7) both depend on street and path layouts which direct (and force by positive means) pedestrians to suitable crossing points.

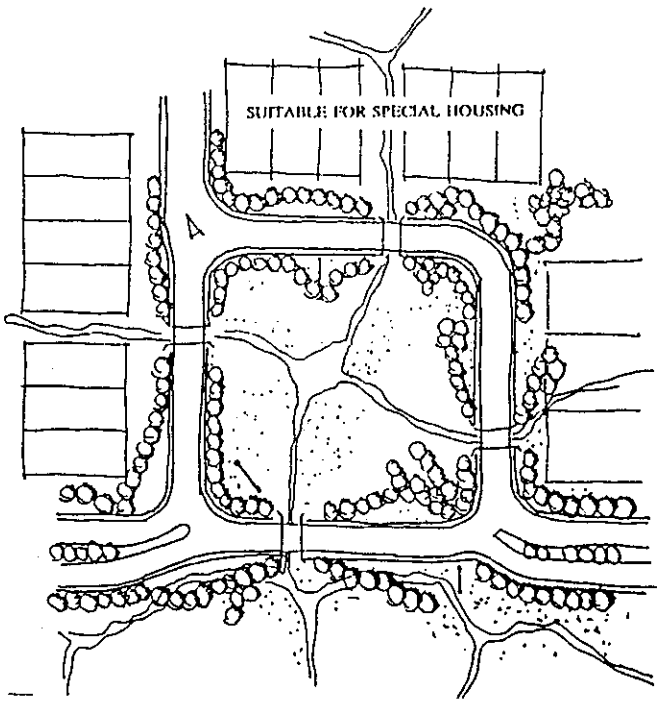
These points are important elements in the residents "map" of an area. Furthermore, they become part of an overall identity for the area. The focus of suburban areas can be enhanced and, at the same time, safety can be improved at low cost, by the provision of well defined, precisely located, pathways.

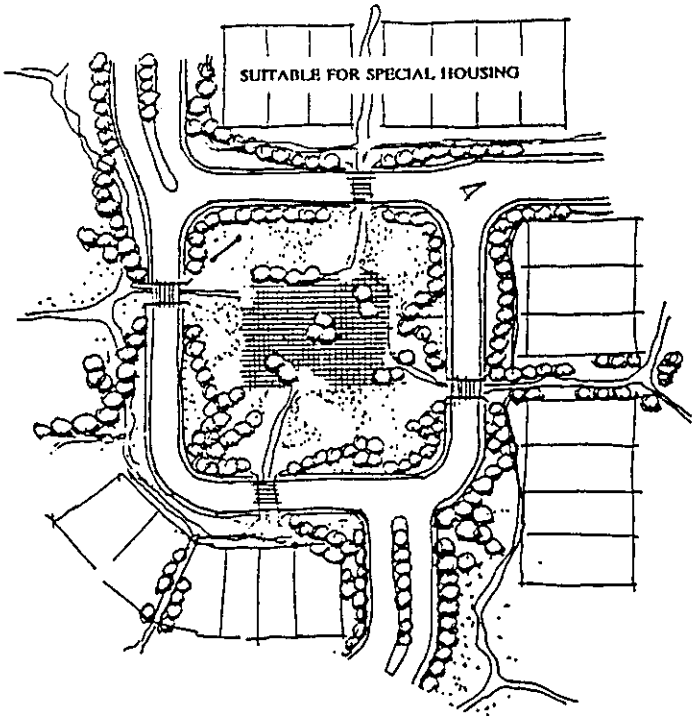
The "power" of these pathways as part of the strength of the urban form has been highlighted in most recent urban estate planning. In effect these paths replace the traditional village road system which created a low key character.

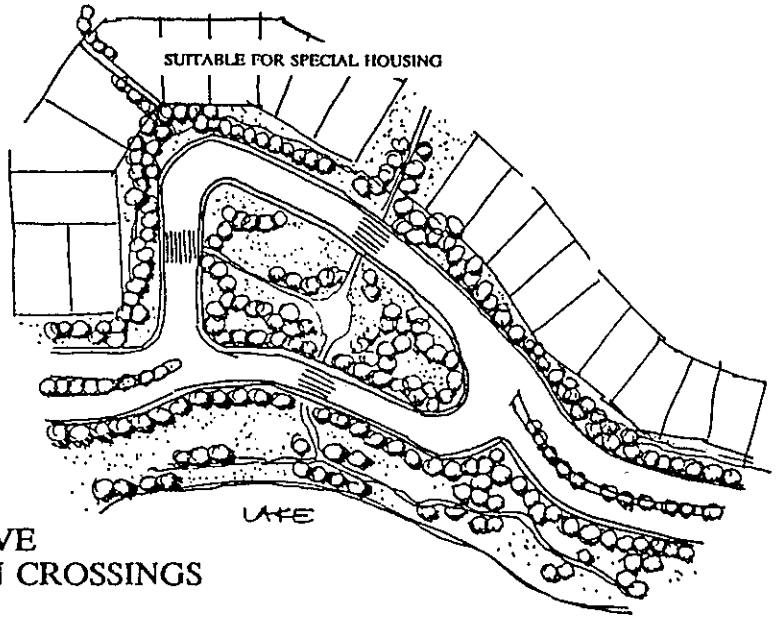
Plan 9 illustrates the proposed pedestrian system for Glenmore Park. As can be seen the hub of the network are the various school and shopping centre sites. From these radiate "strong" pedestrian pathways within the open space corridors.

The pedestrian network has therefore been designed to predominantly coincide with the main open space system and to link the major land use elements such as schools and shops and the Mulgoa Nature Reserve. In addition, where the pedestrian system must cross a major road (such as Glenmore Parkway) special traffic control measures are proposed. One method to achieve an acceptable separation between vehicles and pedestrians and provide a safe crossing is shown opposite.

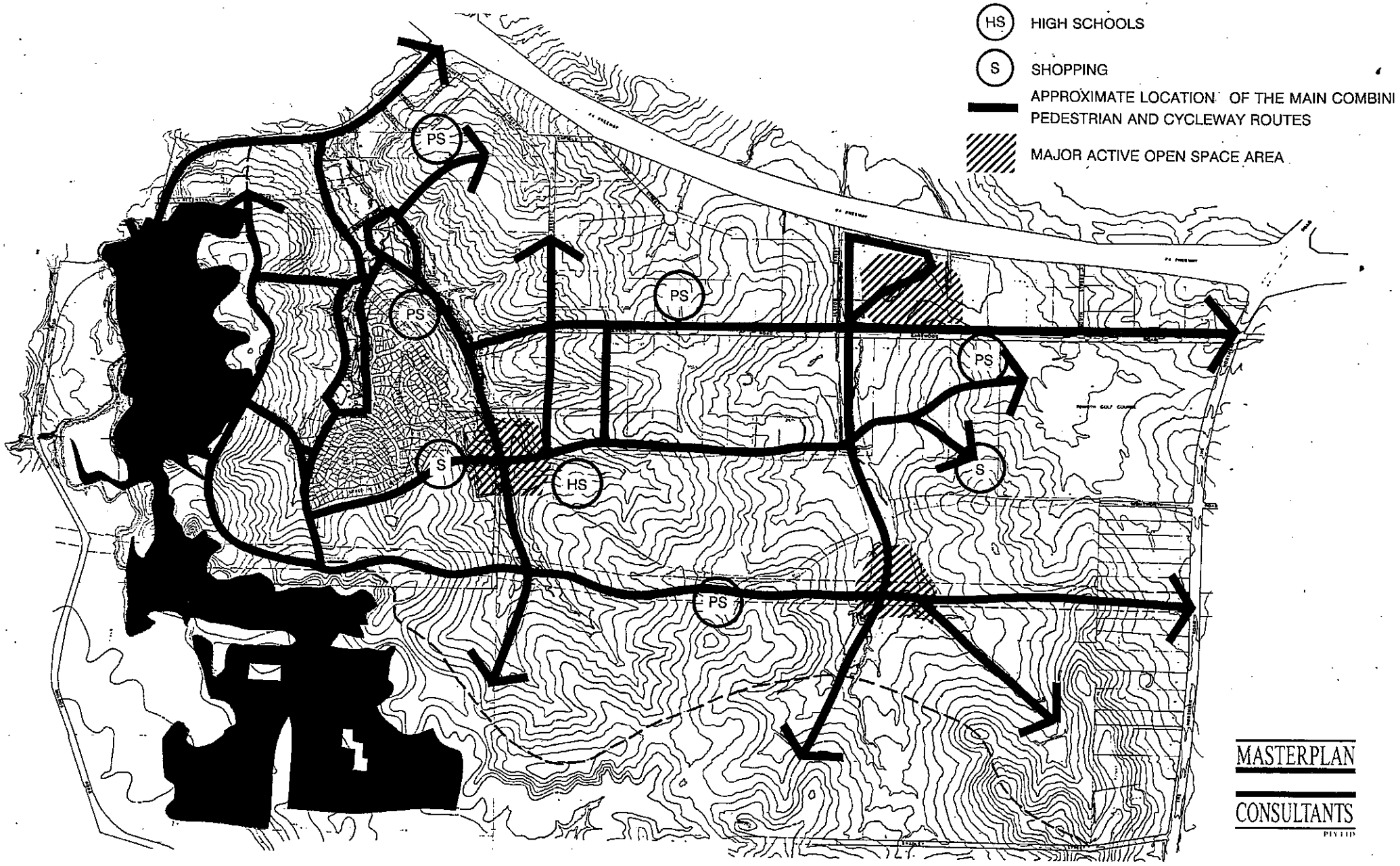
This type of traffic management solution provides a low key one way vehicle system and an opportunity for pedestrian crossing at selected points where traffic has or can be







EXAMPLES OF INNOVATIVE
VEHICULAR/PEDESTRIAN CROSSINGS



GLENMORE PARK - PEDESTRIAN AND CYCLEWAY SYSTEM

PLAN 9

slowed to a safe speed. As shown opposite they provide for pedestrian crossing in various directions and also the opportunity for a pleasant open space setting, visual termination of the roadway and a point or location for establishing an individual identity for the various neighbourhoods. The areas within these devices are in effect small parks or "commons". Depending on the particular geometry chosen it is possible to design them as "mini village squares" or they can be irregular or free form in shape. The particular design will depend on the topography, vegetation and land uses at the site.

However the fundamental principles of these devices are that -

- all traffic must make a sharp left turn on entering
- the circulating carriageway must be wider at points of entry (possibly 7.0m)
- where traffic (one direction) will always be less than 9000 vpd the carriageway can be narrowed to 4.0m at the places where the paths cross into the centre of the island
- paths should not cross to the centre within 30m of an entry or 20m of an exit, therefore the minimum distance between two entries to a common is about 60m.

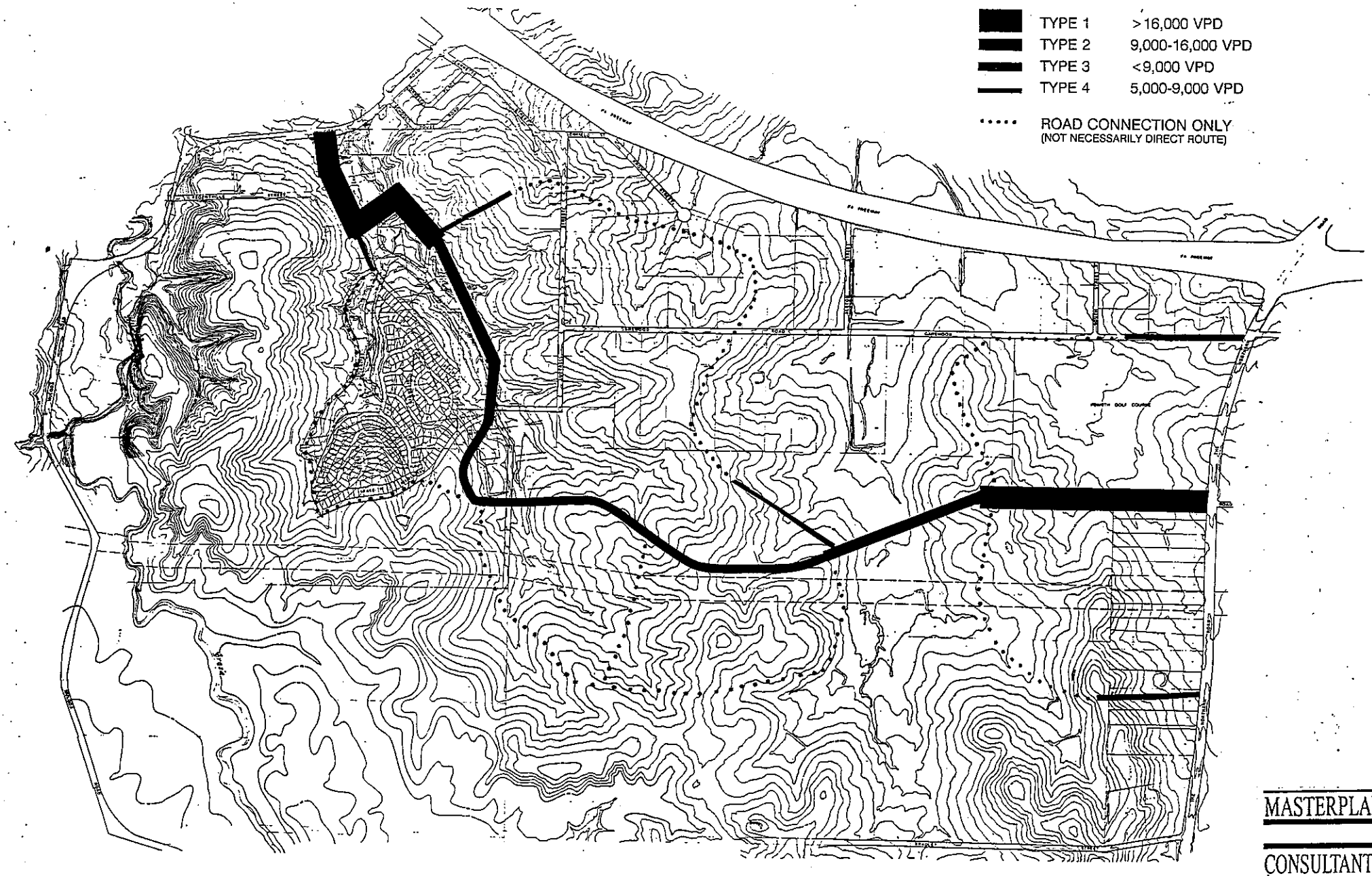
Similar designs would also be suitable at places where paths cross the road not at an intersection.

It is also desirable to use a recognised theme for places where pedestrians cross non-residential streets. The theme should indicate to drivers that pedestrians are likely to be encountered and that special attention has been given to protecting pedestrians. This encourages drivers to respond positively and watch out for possible problems.

One possible theme for Glenmore Park is for brick paving at crossings and for protective fencing on either side of a crossing that should be angled to the carriageway to give a funnel effect to drivers approaching the crossing. The fence starting, say, 3.0m from the side of the road and narrowing to 1.5m at the crossing. This should occur over a distance of, say, 20m either side of the crossing. The fencing does not need to physically stop all pedestrians but should stop small children. A height of 600mm is desirable. The fencing should also allow drivers to see pedestrians approaching the crossing. For Glenmore Park a style of post and rail fence could be appropriate.

Cycleways

The main cycleway system (See Plan 9) is also intended to be incorporated into the open space network. That is, the pedestrian pathways will also function as cycleways. In



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GLENMORE PARK - THE MAJOR ROAD SYSTEM

PLAN 10

addition to these, cycleways should also be incorporated into the local road system and designed wherever possible to link with the off street cycle routes discussed above. The intention is to provide the most direct route possible between the neighbourhoods, the high school and shopping centre sites.

3.7 Roads and Traffic (See Plan 10)

Various road layouts were explored and tested against the following objectives.

(a) To ensure that a major though route (for traffic other than in the estate) did not eventuate.

(b) To ensure that the road system is appropriate to the high quality residential character to be achieved.

(c) To ensure that unnecessary land wastage did not occur as a result of the need to create access denied roads and large setbacks for noise attenuation.

(d) To provide the best possible "safe" pedestrian environment.

Having considered the options, the preference is for a "CORRIDOR/PARKWAY" concept to replace the more usual standard of a major arterial/distributor road between two rows of parallel fences. Adjoining land uses and landscape treatment are required to be very important inputs in the design. The proposed corridor must be designed to minimise the impact of traffic noise on adjoining residential areas and to provide where possible attractive views to make driving an interesting and visual experience. The preferred option therefore has two components. Firstly, minimising the amount of residential frontage to the main roads and secondly, reducing the necessity for over-design.

Whilst there has always been an emphasis on cost, safety and amenity in the design of new estates, the continuing increase in car ownership and use of cars has had a detrimental effect on the environment of many older suburbs. Many of the very early faults in subdivision and estate design have been corrected but more recent work has pointed to the extreme danger of wide collector roads in residential areas and the continuing loss of amenity in the majority of residential streets.

The problem in the wide collector road is the speed of traffic which is combined with high volumes of turning traffic and young pedestrians.

The general loss of amenity is felt by traffic noise and the difficulty for slow or young pedestrians of crossing even moderately fast traffic.

In seeking answers to these problems two facts emerge;

i) Improved environments can be produced for less, or the same cost as current planning practices and, the larger the area the better the opportunity to reduce costs.

ii) It is not necessary to drastically alter the form of suburbia, rather to use each element more efficiently and reject the unnecessary limits placed by certain groups of users.

The Solution

The solution entails a sliding scale of road designs which progessively give more priority to the pedestrian environment.

The result will allow people of all ages the opportunity to walk further in safety. Younger children safe in many local streets, primary school children able to walk along most local streets and to school across roads having moderate traffic flows, high school children able to cycle and walk safely throughout the entire area of Glenmore Park, the vulnerable groups of pedestrians able to cross, at convenient places, all roads within the estate. Only the immediate connections to Mulgoa Road and The Northern Road will have too much traffic for convenient, safe access; all other streets provide the opportunity for a more environmentally sensitive transport solution.

This fundamental design principle is based on work from South Australia, West Dapto and Port Macquarie, proposals for Bligh Park (Windsor) and remedial work for arterial roads in Denmark. A major feature is to limit the absolute maximum speed of traffic by a range of physical design means. These moderate flow roads also direct the conflicts between pedestrains and traffic to places where concentrations of pedestrians can be expected to cross the road and where the speed of traffic can therefore be reduced for a limited distance to provide a safer crossing.

Two groups of roads have been suggested and are discussed below. They are:

Group 1 - Access Controlled Roads
Group 2 - Residential Streets

Group 1 - Access Controlled Roads (ACR)

This group of roads is intended to provide easy travel for traffic and to direct pedestrians to a limited number of safe crossing points.

The free flow of traffic is maintained by limiting access; the safety of traffic is enhanced by restricting access, thereby limiting parking and random access to the road by pedestrians.

An unusual feature of this structure plan is the tree and branch look of the road network which replaces the more traditional loops or through roads. In fact the connectivity of the roads is no different to typical plans (see Plan 10), the difference lies in the style of road which is "permitted" to intrude into the residential areas. The aim of the plan is to limit the intrusion into residential areas of "higher traffic order" roads which form barriers to pedestiran activity.

The design of the carriageway should vary to accommodate the required traffic demands. The designs should also reflect the aims of the urban design and landscaping features of the estate and at the same time provide a range of ways to slow traffic.

Group 1 can be subdivided into four Types of Road.

Type 1 Glenmore Parkway - Serving more than 16000 Vehicles per day (vpd)

This is the main access road and formal entry to the village from the east and west.

The western section of this road has been built and consists of two 7.0m carriageways, standard kerb and guttering and a 5.0m median.

A similar design will be required from the eastern end of the site and this will need to extend to the first intersection west of the Penrith Golf Course.

Type 2 Glenmore Parkway - Serving 9000-16000vpd

The theme for this road is informal, the speed of traffic is to be controlled by physical design, and all points where pedestrians cross the road are to have a design speed of 30km/h or less.

The outline proposal is to control the maximum speed to 50km/h by the use of roundabouts or corners to be located at intervals of about 200m and joined by two one lane carriageways of 4.0m in width.

The informal nature of the road is established by ensuring the carriageways do not run parallel but are separated by between, say, 2m - 10m. This will also allow for the introduction of landscape elements.

Wider (6.0m) sections of carriageway may be needed at places where parking is required for adjacent land uses. This can be in the form of a separate parking bays or bus stops.

There should be no access to local streets and all paths directed to crossings where traffic speed is limited to 30km/h.

Type 3 Glenmore Parkway - Serving less than 9000vpd

The central part of the Glenmore Parkway will carry less than 9000vpd. A single carriageway is sufficient to carry this volume of traffic however the conditions will not suit cyclists and vulnerable pedestrians. This section of the Parkway can be designed as follows:-

One, two-lane carriageway 7.0m in width and a separate bikeway.

No access to local streets and all paths directed to crossings where traffic speed is limited to 30km/h. (Suitable for access to school)

Informal median islands (with or without speed controls) at 200m intervals to limit opportunities for excessive overtaking.

All path crossings to be located where the speed of traffic is limited to 30km/h.

Type 4 Access controlled collector roads (ACCR)

Some short sections of road leading off the Parkway will carry more than 5000 vpd and must have access controls.

The aims of the design are to limit the possibility of pedestrians, especially children, straying onto the (busy) road, and to limit costs by ensuring only essential parking is provided.

Driveway access to properties should be limited to travel in a forward direction. The off-street parking supply for any activity must be for all normal daily use (i.e. greater than the code for units). This will generally restrict access to larger unit development or non-residential land uses.

The design details for ACCR are:-

One, two-lane carriageway 7.9m in width with edge marking providing two 2.75m lanes and two 1.2m edge strips used as cycleways.

Speed controlled by limiting the length of the street, gentle but effective curves ($r<160m$), or traffic management including thresholds for pedestrians at 200m intervals.

Connections to local streets designed to discourage use by pedestrians or footpaths physically separated from the road.

Group 2 Residential Streets

It is intended that over 80% of dwellings front onto streets serving less than 100 dwellings. Such streets provide the greatest flexibility for the design which reflects the sharing of road space by cars, pedestrians and community activities. These streets will provide an environment which encourages "neighbourly" pursuits such as cleaning the car, playing and just talking to neighbours.

The layout of the Parkway and the ACCR is such that the majority of residential streets can be designed to serve less than 100 dwellings.

The environmental aspect of a street serving more than 100 dwellings changes from a neighbourly environment to one where the volume of traffic has some dominance. Also parking is likely to be an issue and possibly cause undue delay to passing traffic.

Many recent reports on the residential environment suggest that residential streets should not serve more than 200 dwellings. The reason for this is the increased occurrence of accidents and a steady increase in the proportion of residents who report an unsatisfactory environment for traffic flows in excess of 200 vph. The practicalities of the site at Glenmore Park suggest that some residential roads will be needed to serve more than 200 dwellings. Residential Streets can be subdivided into three types:-

Type 5 Residential Street - serving 200 to 500 dwellings

Once a street serves more than 200 dwellings then there is likely to be a rapidly progressive loss of pedestrian freedom for various groups in the community.

Residential streets serving more than 200 houses should be avoided if possible.

The safety of cyclists becomes an issue, vulnerable pedestrians find it difficult to cross the road, the safety of smaller children becomes an issue. Other limiting conditions such as noise in houses and difficulty entering a driveway becomes critical if more than 500 dwellings are served by one road.

Residential streets serving more than 200 dwellings require a separate bike path or shared use of the footpath by cyclists.

The design should be a "boulevard" style with a median which serves as a refuge for pedestrians and stops many of the complex conflicts which occur on a two way residential street. The carriageways of the boulevard can be 3.0m wide plus an intermittent 2.0m parking lane. (Only a single 4.0m carriageway is required in sections not serving dwellings).

A roundabout or other means of allowing residents to make U-turns is required about every 200m. Not all U-turns need to accommodate trucks.

Type 6 Residential Street - serving 100 to 200 dwellings

"Soft" design should be utilised in these (slightly) busy streets. The flexibility for including street activities on the carriageway is limited and parking is likely to be perceived as an issue (by the new residents).

It is therefore desirable to provide a "third" lane for at least 80% of the length of the street.

This can be provided by a carriageway 7.0m - 9.0m (or more) in width, or by providing a separate paved parking lane off a 5.0m carriageway.

Irrespective of the need to accommodate the volume of traffic on the carriageway the design should include physical features which limit the speed to 50km/h or less.

Many young children will not be able to participate unaccompanied in social activities on these streets.

Type 7 Residential Street - serving less than 100 dwellings

This is the typical design of a residential street. These quiet streets should include physical features which limit the maximum speed to 40km/h or less. This generally implies short lengths of street separated by intersections or physical features such as narrowings, or narrow carriageways.

The design can be in any form which conveys the shared nature of the public road space. This implies "soft" design such as rolled kerbs or special edge treatment, variations in paving and avoidance of signs and lane markings.

Within the guidelines above the width of the carriageway between the physical features can vary. Standard widths which are acceptable are 5.0m, 7.0m and 9.0m or more.

The wider carriageways provide more space for street activities. Narrower carriageways provide more seclusion, a carriageway width of 3.5m is also acceptable for streets serving less than 20 homes and where adequate provision has been made for parking.

It is intended that a variety of road designs are appropriate.

Bus Routes

In some instances quiet residential streets will be specified for use as bus routes. Generous parking provisions or carriageways of 7.0m are required to accommodate bus routes. (No major trunk bus routes will pass through local streets).

Thresholds and speed humps should be avoided on local streets used as bus routes.

3.8 Bus Routes (See Plan 11)

The provision of bus services is based on the very high standard that all houses should be within 400m walking distance or 250m "crow fly" distance of a bus route, and that the bus route should be suitable for efficient bus operations. This requires that the bus routes will follow not only the Access Controlled Collector Roads and access denied roads but also local streets where necessary.

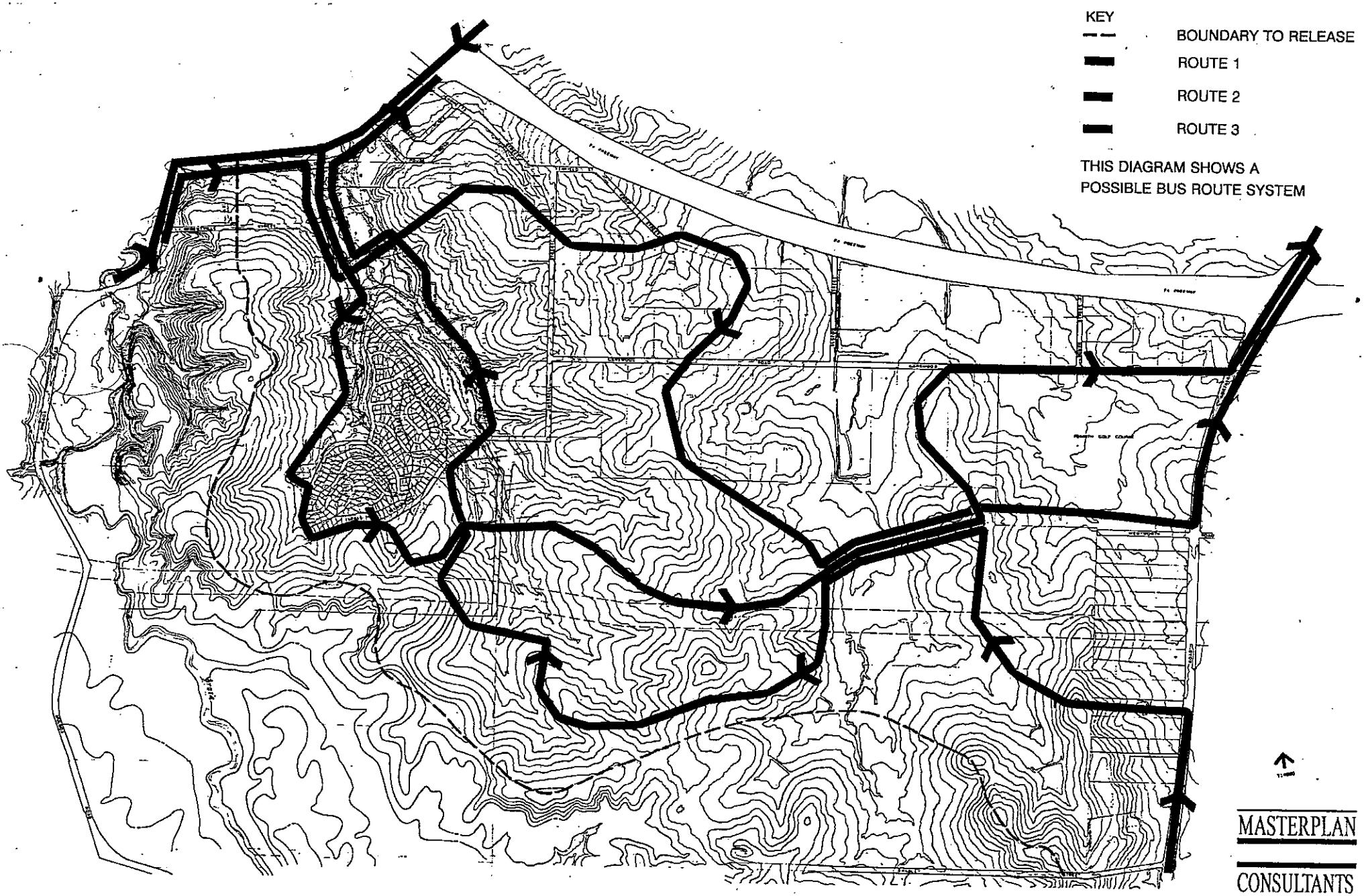
In respect of general pedestrian safety against convenience of access to bus routes it is considered essential not to widen local (residential) streets specifically for bus services.

Plan 11 demonstrates one possible bus route system for Glenmore Park. It will be necessary however to stage the bus routes for progressive development and in this respect some routes may have temporary sections for a short period of time.

3.9 Retail Activity

Based on current estimates the ultimate growth of Glenmore Park will support two main shopping centres. The first of approximately 6,500m^2 the second of 1,800m^2.

The structure plan therefore nominates two (2) possible sites for these centres. Initial analysis tends to indicate that the main shopping centre should be located within the early stages of development as this will assist to ensure appropriate shopping facilities are provided as soon as practicable.



GLENMORE PARK - BUS ROUTES

PLAN 11

Components of the Proposed Centres

Components of the proposed centres have been derived (Hirst, 1989 - See separate report) with regard to trading potential and requirements of the retail industry. The centre components are:

Large Neighbourhood Centre

Large Supermarket - 3,500sq.m.
Speciality Shops - 2,500sq.m.
Total - 6,000sq.m.
Also Tavern and Fast Food outlets

Small Neighbourhood Centre

Self Serve Grocer - 800sq.m.
Speciality Shops - 1000sq.m.
Total - 1800sq.m.

Locational Principles

The general locational principles adopted for the commercial centres include:

(i) Location on highly visible sites with direct or near-direct access to the major collector roads (i.e. Glenmore Parkway).

(ii) Location requiring most residents to drive past the centre before leaving the area.

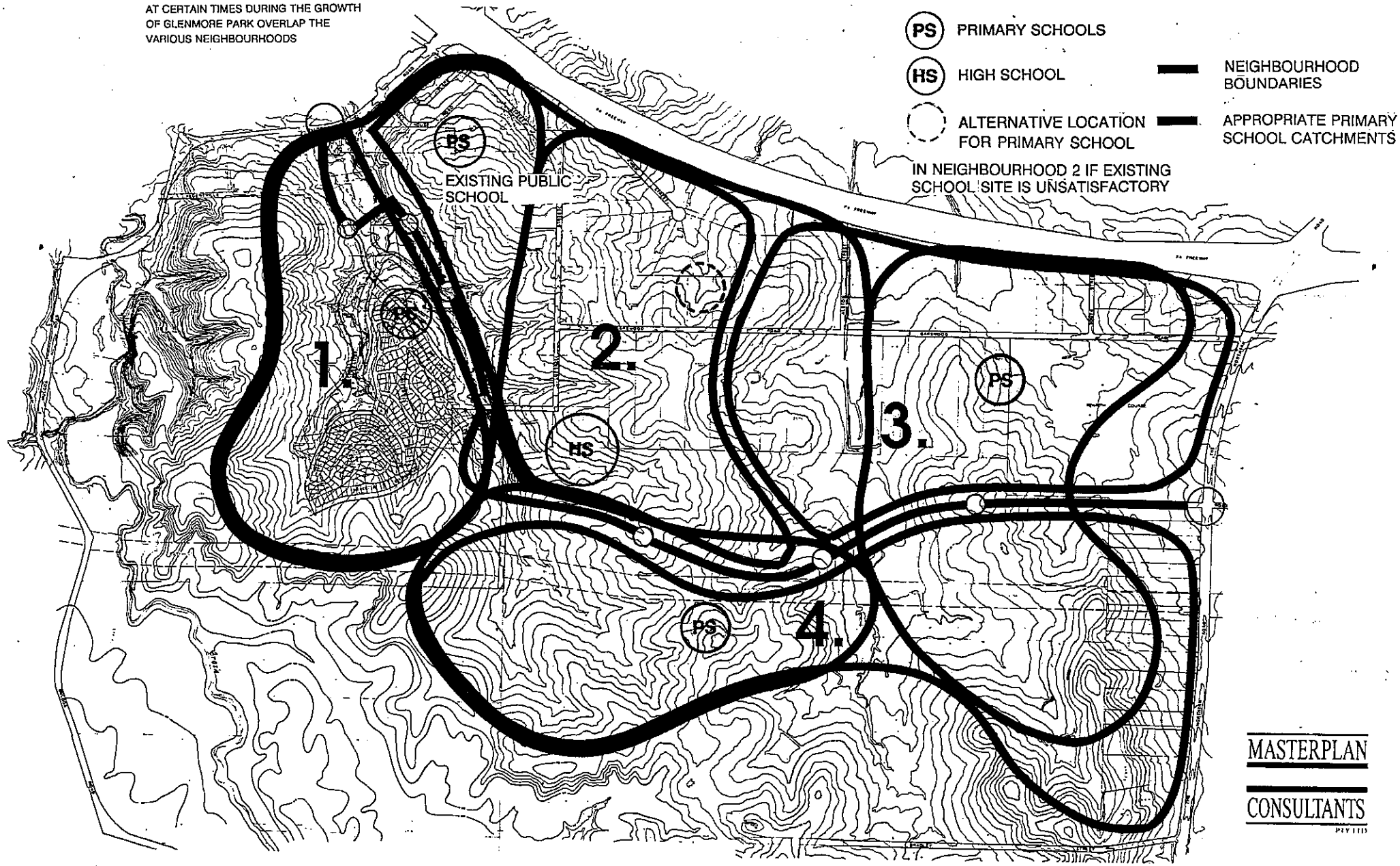
(iii) Located near community facilities, potential medium density areas and other higher activity land uses.

3.10 Schools (See Plan 12)

Until detailed neighbourhood plans have been prepared the precise location of all school sites is difficult to determine. However, the structure plan shows a possible scenario which involves locating one primary school in each precinct and providing for one centrally located high school. Another high school could however be accommodated.

Discussions with the Department of Education have indicated that continued use and expansion of the existing Regentville Primary School may be the most feasible solution for providing the initial requirements for the release. However, in the longer term this site may not be located centrally within its neighbourhood, an alternative location is therefore

NOTE: DUE TO REQUIREMENT FOR A MINIMUM OF 1400 DWELLINGS SERVING EACH PRIMARY SCHOOL, CATCHMENT AREAS WILL AT CERTAIN TIMES DURING THE GROWTH OF GLENMORE PARK OVERLAP THE VARIOUS NEIGHBOURHOODS



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GLENMORE PARK - SCHOOL SITES

PLAN 12

shown on the plan. The plan also shows potential catchments for each primary school. However these will change over time.

Pre-Schools

Although not shown on the structure plan pre-schools should be located wherever possible with a primary school.

Primary Schools

Primary Schools should serve a catchment of between 1000-1500 dwellings depending on the type of school selected. A site area of 3.0-4.0 ha is required, preferably regular in shape and oriented to permit the buildings to be open in the north-east.

High Schools

High Schools are to be provided on the basis of a catchment of 4400-5500 dwellings. A minimum area of 6ha is required for the site which should be selected and shaped to enable a multi-purposes sports field, tennis and basketball courts etc. The site should preferably be contiguous to the public sports areas and not be located too close to the shopping centres.

Combined Schools

Where possible High Schools, Primary Schools and Private Schools can be combined in order to save on land requirements and promote the flexible use of shared facilities. This potential is shown on the structure plan with the High School located adjacent to the Carolyn Chisolm School site and public sports areas.

3.11 Other Land Uses

The following is not a comprehensive list but provides an indication of the range of other uses and their land area requirements. This should be considered at the detailed planning stage.

(1)	Community hall and meeting rooms	500-1000m^2
(2)	Community health centre	800-1000m^2
(3)	Library	1500-2000m^2
(4)	TAB	150m^2

(5)	Taverns	500-1000m^2
(6)	Squash Courts (site 30 x 50mm)	500-1000m^2
(7)	Church sites	
(8)	Licensed sporting clubs	
(9)	Youth club	
(10)	Service stations	

Many of these activities could be located with the shopping centres and they would then generate an off-peak parking demand for the available parking. A tavern should be closely associated with the retail floor space in the main shopping centre.

As a general principle all of the above land uses should be accommodated along Glenmore Parkway and not within the various residential neighbourhoods.

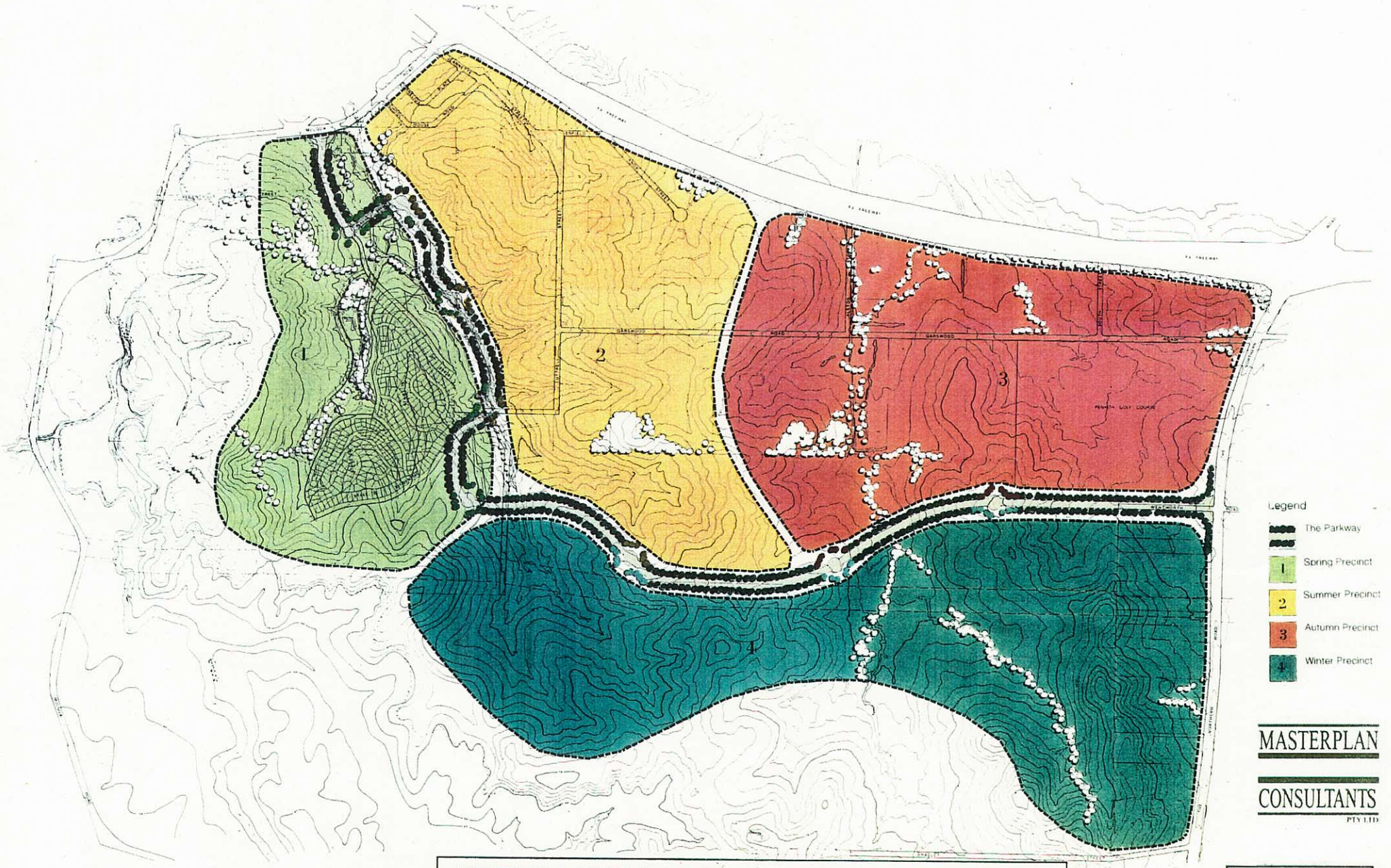
3.12 Housing Mix

It is an important objective that Glenmore Park should provide for and accommodate a wide choice of housing types and allotment sizes. However, an equally important consideration is the marketability of innovative or unusual housing forms and the manner in which they can be integrated within the community without causing unnecessary concern.

A firm decision on specific "medium density" housing sites should not be made at this time. This is consistent with the general thrust of LEP No. 188 which aims at a flexible approach to determining housing choice and mix. Instead it is preferred that as detailed development control plans (DCP's) are prepared for each neighbourhood, sites for "special housing" are indicated.

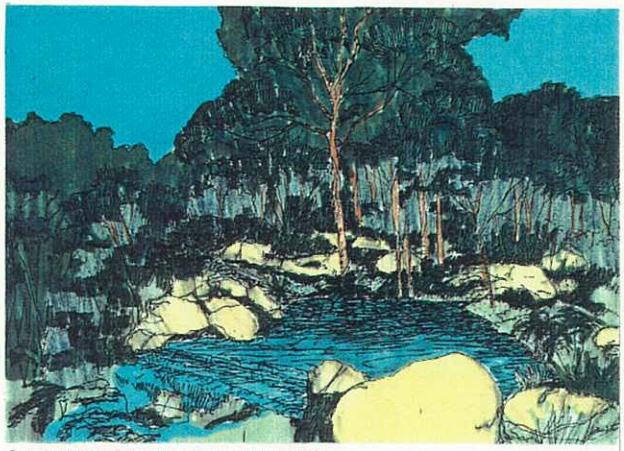
3.13 Urban and Landscape Design (Plans 13-14)

Consistent with the objectives of creating a quality residential living area, the environmental character, of Glenmore Park will be very important. The following principles are therefore considered to be relevant:



GLENMORE PARK - LANDSCAPE THEME

PLAN 13

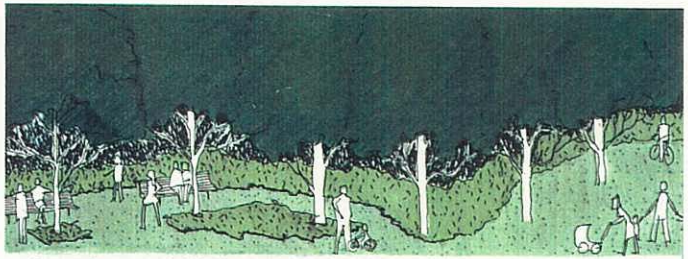


Open Space with Native Planting

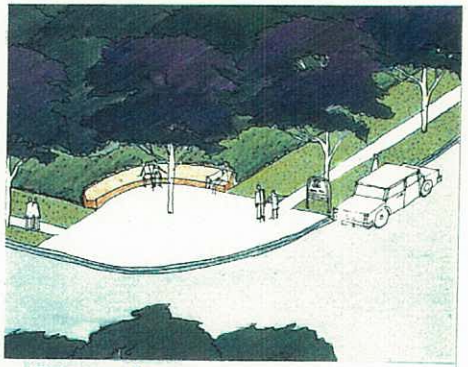
Open Space with Exotic Planting

Playing Fields

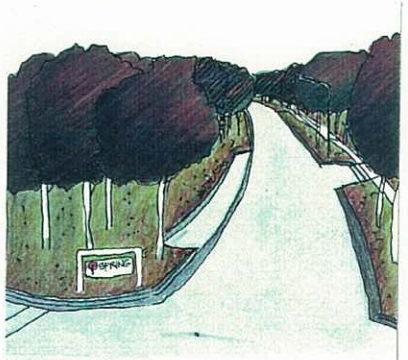
Entrance Area



Open Space with Native Planting



Entrance Area



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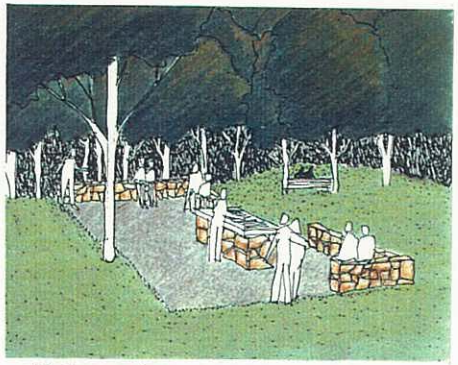
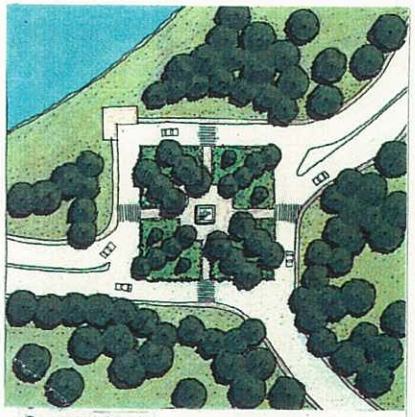
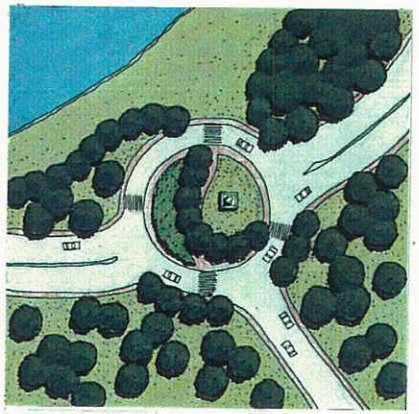


Barbecue Area



Squareabout



Roundabout

GLENMORE PARK - LANDSCAPE THEME

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PLAN 14

General Principles

1. Wherever possible the physical planning should utilise the existing natural site assets to create a pleasant environment and to provide a basis for a thematic approach to site planning and landscaping.

2. An overriding principle is the creation of a local image (low-key, village) and identity built upon:

   - preservation of trees
   - ample open spaces and landscaping
   - extensive walking environments
   - attractive views
   - "low key" roads
   - quality architectural elements and built forms.

3. The use of all possible urban design techniques and treatments to reinforce the concepts of village, neighbourhood and small scale residential precincts.

4. Preservation and enhancement of the historic associations and values of the locality.

5. The creation of a "sense of place" through careful consideration of the relationships between the built form and the natural assets of the land. This includes all design features such as landscaping, signage, architecture and nomenclature.

6. To provide the opportunity for innovation in the design of residential areas by allowing unique or unusal concepts to be explored.

7. Where appropriate to use innovative ideas and concepts to create variety and interest as a means of fostering local identity.

8. Preservation of the natural assets of the land by the use of appropriate development solutions.

9. Creating visual interest and clarity by providing for views from significant public vantage points and from the residential areas where available.

10. Providing for a cost effective maintenance system by incorporating and retaining as much as possible of the natural features and systems of the land within the "public" areas.

Landscape Principles

1. To preserve as much as possible of the existing vegetation and to incorporate this within public areas.

2. To preserve wherever possible the existing vegetation by utilising senstive development techniques and appropriate forms of development.

3. Creating a landscape theme or themes for the development that relate to the overall physical plan. In particular the development of neighbourhood based themes.

4. Focussing new landscape work on areas of high visual significance and importance.

5. Creating public awareness of the landscape environment and how they can contribute.

6. Providing for the incorporation of landscape treatment as early as possible.

Urban Design Principles

1. The design of quality architectural elements (especially public buildings) that are functional and well suited to their site and context. A general principle is that all major buildings should support the "village" concept.

2. The provision of signage, landscaping etc to reinforce the agreed design theme for Glenmore Park and the various neighbourhoods and precincts.

3. The creation of residential precincts of a size appropriate to the objective of fostering the development of small "street based" community groups. In this regard the provision of culs-de-sac as a basic element in the residential area designs would be appropriate. Other designs should also be explored.

4. The design of all local streets such that they are appropriate to their use with an emphasis on ensuring that these streets function as part of the living environment and not just as a means of access to allotments. This will involve the use of a variety of traffic and physical planning techniques (e.g. road widths).

5. The creation of pleasant and effective public areas through the use of appropriate landscaping, provision of pathways, cycleways, quality active open spaces, retention of trees, views, amenities and facilities.

The above principles are not exhaustive as it is anticipated that much of the detail will be left to site specific assessment and contained within the detailed development control plans. However, the principles stated above are a guide to the general intentions of the structure plan. In addition the following is a discussion of one possible concept that could be followed.

Preliminary Landscape and Urban Design Concepts

A landscape theme for each of the four neighbourhoods is shown on Plans 13 and 14. It is a simple theme utilising one of the four seasons of the year to provide a landscape emphasis and therefore identity for each neighbourhood.

The following description and schedule of plant species is provided together with examples of how they might be used (See Plans).

It is suggested that the landscape design for the Glenmore Park development draw on elements found in the surrounding area for its influences, firstly the indigenous landscape of eucalyptus trees and secondly the cultural landscape of exotic species planted by the early settlers to the area.

This theme is developed by using eucalypt species as the "backbone" of the scheme, with exotic planting used as a highlight. The site has been divided into four distinct landscape precincts, which will be planted out in the four seasons of spring, summer, autumn, and winter. These distinctions will give a sense of identity and a special character to each area, with a succession of changes to Glenmore Park as the seasons change.

Passing through the development will be similar to the experience of driving through certain country towns which are renowned for their floral displays at certain times of the year. Plants used will provide interest and variety at all times of the year.

Indigenous tree species include:

Botanica Name	**Common Name**
Eucalyptus crebra	Narrow-leaved Red Ironbark
Eucalyptus fibrosa	Broad-leaved Red Ironbark
Eucalyptus longifolia	Woollybutt
Eucalyptus moluccana	Grey Box
Eucalyptus paniculate	Grey Ironbark
Eucalyptus sideroxylon	Red Ironbark
Eucalyptus tereticornia	Forest Red Gum

Typical plants for each season include:

Spring

Magnolia x soulanglana	Pink Magnolia
Malus floribunda	Japanese Crab Apple
Erlostemon myoporoides	Waxflower
Plmelea ferruginea	Rice Flower
Plumbago auriculata	Cape Plumbago
Choisya ternata	Mexican Orange Blossom

Summer

Brachychiton acerifolum	Illawarra Flame
Jacaranda mimosifolla	Jacaranda
Schinus areira	Pepper Tree
Bauera rubioldes	Dog Rose
Murraya paniculata	Orange Jessamine
Raphiolepis x delacourll	Pink Indian Hawthorn

Autumn

Acert palmatum	Japanese Maple Tree
Liquidambar styracaflua	Liquidambar
Ulmus glabra "Lutescens"	Golden Elm
Berberis thunbergil "Atropurpurea"	Purple Japanese Barberry
Lagerstroemia indica	Pink Crepe Myrtle
Tibouchina granulosa	Laslandra
Verbena peruviana	Verbena

Winter

Chaenomeles japonica	Flowering Quince
Prunus persica	Red Flowering Peach
Acanthus	Bear's Breeches
Gordonia axillaris	Gordonia Shrub
Hebe speciosa	Veronica
Viburnum tinus	Laurustinus

Within each precinct will be found special areas which will give a landscape focus to that space and provide a thematic "heart". The division of the site into seasonal precincts will allow the promotion of a sense of place and a special horticultural emphasis to the entire development. That is a sense of pride in the landscape and the private and public gardens of Glenmore Park. This could be fostered by a programme aimed at the education of the residents in the design philosophy of the estate and in the practicalities of garden establishment and maintenance.

The parkway will be the major roadside landscape spine through the site. It will be planted with eucalypts to give a dense green avenue, with focal planting at the entrances to each seasonal precinct, and at the site entrances at Mulgoa Road and the Northern Road.

Glenmore Park will have the image of a high quality residential area with significant tree conservation and planting and flowing green expanses of lawn. This will give a spacious parklike atmosphere. Extensive native planting is intended to extend the indigenous tree cover from the Mulgoa nature reserve, in landscape "bands" across the site.

The internal views and vistas of Glenmore Park will be a constantly changing array of vegetation and built form. Arrival at the site could be announced by an impressive entrance and accent planting. Vistas will open out to reveal views of entrances, the lake and other special features. Other views will be of avenues of trees along the roadside, or more intimate pedestrian areas in the open space. The intention is to have a constantly changing view, to achieve changes in scale and interest.

The streetscape of the area is intended to be one of significant numbers of indigenous and exotic street trees. Each housing lot should for example have at least two street trees. Planting species should be chosen to identify different streets and areas within the site. Thus streets adjacent to the nature reserve or significant areas of native planting could be treed with eucalypts, whilst streets adjacent to more urban parts of the site could be predominantly exotic species. Overall, the effect is intended to be of interest and diversity, using groupings or avenues of trees to create many different kinds of streetscapes.