
Sustainable Hillside Planning for Glenorchy

by
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STATEMENT

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university, and to the best of the author's knowledge and belief, this thesis contains no copy or paraphrase of material previously published or written by other persons, except when due reference is made in the text of the thesis.

EXECUTIVE SUMMARY

The sprawl which characterises most Australian cities has meant that hillsides within the urban setting have become increasingly threatened by inappropriate, unsustainable development. A major factor which enables such developments to occur is the lack of information on the environmental qualities of the hillsides. If this information is not available when planning authorities are formulating planning policies and making decisions, the most sustainable use of the land can not be considered. It also means that any planning control mechanisms that are established may not be adequate in terms of protecting these environmental values.

Cities such as Glenorchy in the Greater Hobart Area of Tasmania have a 'sustainability advantage' over many other Australian cities by virtue of their limited population growth and comparatively 'natural' surroundings. However, as this case study of the Glenorchy Municipal Area shows, urban expansion is still prevalent. If the precautionary principle is not heeded more of the natural hillside areas which contribute to the creation of the sense of place and wellbeing may be lost.

A brief historical background to people's attitudes towards the natural environment is examined, tracing perceptions from early settlement to the current emphasis on sustainable development and the maintenance of biological diversity. As well as providing an indication of how natural areas are valued, it reveals that the public of today tend to be very aware of environmental degradation caused by insensitive development controls. The new resource management and planning system of Tasmania reflects the public's concern for environmental protection by placing more responsibility on local government to explicitly consider the effects of any use or development (including subdivision) on the natural environment.

Key environmental characteristics of Glenorchy, namely slope, vegetation, fire hazards, land stability (geology), and visual prominence are discussed and mapped. This exercise emphasised the lack of current information on characteristics such as the vegetation types and the location of any rare, threatened and endangered species and communities.

The study concludes that the urban/bush interface is of central concern to the protection of the environmental qualities of the hills, as it is in this area that future development is most likely to occur. A number of broad recommendations for the hillsides of Glenorchy are made, along with more specific recommendations relating to the urban/bush interface, termed the Hillside Conservation Area.

The recommendations are:-

1. Short Term

- Undertake a comprehensive *environmental inventory* of the hillsides of Glenorchy; and
- *Establish Guidelines for the Hillside Conservation Area*, which can be also used to assess discretionary developments in the existing Landscape and Conservation Zone.

2. Medium Term

- *Re-evaluate* the Landscape and Conservation Zone boundary and those zones situated in the Hillside Conservation Area, especially the Future Urban Zones.

3. Medium/Long Term

- Lobby for a *State Policy* on sustainable hillside planning to ensure a consistent and coordinated planning approach throughout the State.

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ABBREVIATIONS

| | |
|------------|---|
| ABS | Australian Bureau of Statistics |
| AIUS | Australian Institute of Urban Studies |
| ANZECC | Australia and New Zealand Environment Committee |
| BCC | Brisbane City Council |
| CFF | Commission for the Future |
| CTCP | Commissioner for Town and Country Planning |
| DHAE | Department of Home Affairs and Environment |
| EPA | Environmental Protection Authority (Victoria) |
| FCT | Forestry Commission of Tasmania |
| GCC | Glenorchy City Council |
| GMC | Glenorchy Municipal Council |
| HCC | Hobart City Council |
| HSFAC | Hobart Special Fire Area Committee |
| KC | Ku-ring-gai Council |
| LUPAA | Land Use Planning and Approvals Act 1993 |
| MPE | Ministry for Planning and Environment |
| nd | no date stated |
| np | no publisher stated |
| NPWA | National Parks and Wildlife Act 1970 |
| pers. comm | Personally Communicated |
| PWST | Parks and Wildlife Service Tasmania |
| SPAPA | State Policies and Project Act 1993 |
| TFS | Tasmania Fire Service |
| TG | Tasmanian Government |
| TSSP | Tasmanian State Strategy Plan |

CHAPTER 1 -INTRODUCTION

We are long past the stage of discussing whether or not the hills need special care. We believe that the consensus of opinion is that they certainly do.

-Dr. D. Whitelock

CHAPTER 1 -INTRODUCTION

1.1. Purpose And Background Of The Study

1.1.1. Purpose

The purpose of this study is to improve Council's decision making to enable more effective planning and management of the hillside areas of Glenorchy.

1.1.2. Background To The Study

Australia is a highly urbanised country with over 85% of the population residing in urban areas (Caswell, 1995:116). The importance of areas of natural beauty as retreats from the crowding of city life was recognised by the first settlers in Australia who had endured the cramped, unhygienic conditions of post industrial European townships. Although historically there have been a variety of attitudes and values placed on natural areas, from a 'need to conquer' mentality, to exaltation and preservation, it is largely recognised that natural areas in the urban environment play an important role in the quality of life of its residents.

The importance of these natural areas in or close to the city has been increasingly recognised in recent years due to a number of factors such as increasing demand for outdoor recreation. Combined with a greater awareness of environmental issues, such as biodiversity and impacts of the environment on human health, public attention has been more focused on the use of natural environments to fulfil not only recreational, but psychological needs. The need for sensitive development and the conservation of some areas has also resulted from concern over issues such as air and water quality and soil erosion. Rising energy costs have also made it harder for people to travel long distances in pursuit of their leisure activities. With more and more demands being placed on natural areas such as hillsides within the urban setting, planners must recognise how increasing urban contact can impact on their environmental qualities and values, and plan accordingly.

Planners therefore have an important role to play in the blending of landscape and cityscape. They have the tools to enable both the protection and utilisation of natural areas depending on land capability, which allows city dwellers to become closer to nature and relieve the stress of urban life,

while promoting a more sustainable urban form which allows for the continuance of natural processes.

Planners often seem to regard existing parks and other natural areas as an 'historic legacy to be maintained rather than managed in response to local requirements' (Burgess et al, 1988: 455). Australia has tended to 'borrow' European ideals of what natural areas should look like, often resulting in the introduction of exotic species, mown grass and 'landscaped' areas to fulfil this ideal, to the detriment of the native Australian landscape. This attitude (which is changing) has contributed to the declining environmental quality of Australia's natural areas within, and on the periphery of cities and towns, as these natural areas are often homogenous, fragmented and threatened by inappropriate development (Elkin et al 1991:137).

A major factor in the degradation of natural areas is the increasing pressure for their development. This is brought about by the low density urban sprawl which characterises most Australian cities, and the importance the community places on the natural setting, making more natural areas desirable places to live.

It is therefore important that natural areas are not planned for in an *ad hoc* fashion, but rather are incorporated into long term planning strategies. These strategies should be built upon the values and needs of present urban community with the flexibility to cater for future generations. Planning for these areas needs to start now, because in the medium to long term the conservation of natural areas within the urban environment can only be assured if they have been planned and subsequently managed with conservation in mind (Bennett, 1991:35).

In Tasmania it is often the steeper land in settled areas which has retained its natural vegetation. The retention of these areas may not have been planned for historically, however they have remained comparatively natural due to the constraints they place on potential development. Provision of water, roads and sewage to these areas often includes expensive infrastructure. Dwellings and other developments may require expensive 'cut and fill' in order to achieve a gradient 'suitable' for building, all of which contributes to the loss of environmental quality of an area.

The City of Glenorchy is situated in the south east of Tasmania. It, along with six other municipalities makes up the area of Greater Hobart, and is one of many areas which has to contend with the issue of urban expansion and the resultant impacts on the natural hillsides. Although the population of Glenorchy is fairly static, and as such pressures on Glenorchy's hillsides may not be as great as other cities in Australia, the urban area continues to expand. An understanding of the environmental characteristics of the area is essential for assessing directions for future growth. However the shortage of current information on environmental aspects such as vegetation in Glenorchy means that land use may not be managed in the most environmentally sensitive manner (Eagles, 1984:38).

Already noticeable on many hillsides in the Glenorchy Municipal Area (here after referred to as Glenorchy) are the Hydro Electric Commission's power line easements, which are carved out of the bush setting and have resulted in large scars on the hillsides. Also prominent are roads that do not follow contours, and developments which require clearance of vegetation to minimise the fire hazard risk. The design, colour and siting of such structures, mostly dwellings - the majority of which are single detached two storey houses - also impact on the quality of the hillside landscape both in terms of aesthetics and through loss of wildlife habitat. Dwellings and other developments are much more prominent in hillside areas due to the degree of slope, compared with developments on flatter land. Although previously degraded areas may require rehabilitation, this study concentrates on the protection of those areas and characteristics that are in threat of initial or further degradation into the future through lack of environmental information and resultant inappropriate development. It is considered to be outside the scope of this report to look in detail at the rehabilitation of already degraded hillside areas.

Most planning authorities have a zone such as Glenorchy's Landscape and Conservation Zone which aims to protect the natural characteristics of the landscape. However, it is how this intent is reflected in the regulatory land use documents - the ordinance (written section) and the plan (map of land use) - that determines the effectiveness of these zones. If they do not incorporate very extensive recommendations in terms of how to retain the natural characteristics of hillside and other natural areas, the protective mechanism is virtually lost.

At an international and national level, natural areas which meet certain criteria relating to issues such as species diversity and landscape quality, can be protected from inappropriate development through achieving the status of an area of international significance, or through the designation of a National Park or Reserve under the *National Parks and Wildlife Act 1970*. However, there are smaller scale, but important natural areas within a municipality which require protecting. The new Tasmanian resource management and planning system has recognised the important role of municipal governments in regard to maintaining and promoting environmental quality. Tools need to be set in place which address the problems of urban growth and protect threatened natural areas such as hillsides at a municipal level.

This study focuses on natural areas, and more specifically natural hillside areas in Glenorchy, with specific regard to the need for their sustainable use. Planning tools are suggested to meet this end.

1.2. Central Aim And Objectives Of The Study

1.2.1. The Central Aim

To improve Council's decision making in regard to the planning and management of hillside areas in Glenorchy.

1.2.2. Objectives

The objectives of the study are as follows:

- to identify the different values that are placed on natural areas;
- to identify the importance and changing role of natural areas in an urban context;
- to outline the shift in attitudes towards today's focus on the conservation of native habitat and sustainable development;
- to document the pressures for development and the encroachment of urbanisation on the hillsides of Glenorchy;
- to analyse and make suggestions regarding the existing statutory provisions for the planning and management of hillside areas in Glenorchy;
- to draw from natural area planning and management in other parts of Australia and overseas; and to
- to recommend feasible mechanisms for the sustainable planning of the hillsides of Glenorchy based on environmental characteristics.

It was considered premature for the study to go as far as developing detailed guidelines for the planning and development of Glenorchy's hillsides for the following reasons:

- the Hobart City Council is currently undertaking the 'Open Space and Natural Values Review' which includes the reassessment of the Hills Face Zone (similar to Glenorchy's Landscape and Conservation Zone which covers much of the hillsides). Part of the brief is to compile provisions for public open space and landscape protection. Glenorchy City Council will be able to review and use some of Hobart's findings (taking into account local variations to ensure geographic continuity), to save resources and duplication and avoid possibly incompatible provisions; and
- Public consultation is a critical factor in determining the values placed on the hillside areas in Glenorchy. Consultation provides a forum for members of the general public, builders, developers, and other professionals to have an input into any code or guidelines that are developed and which will ultimately affect them. Due to resource constraints public consultation was not entered into in this study. The formulation of a code or guidelines without public input would be based on assumptions that would be better assessed with community input before and during the code or guideline formulation process.

1.3 The Meaning Of The Term 'Natural Area'

Before embarking on the study it is important to clarify what is meant by the term 'natural area'. Different people regard different things as contributing to or making up a 'natural' environment. 'Natural' generally means something which humans have had limited impact upon. However, even wilderness areas have encountered some form of human impact, for example damage from atmospheric pollution such as acid rain. The definition of a 'natural area' in this study is adapted from the Nature Conservancy definition in Eagles (1984:7) and is, "an area of land or water which either retains or has re-established, through human or natural processes, its natural character."

The Victorian Department of Conservation, Forests and Lands have established a classification system for natural areas from class 1 to 5 (MPE,

1989:10). In this classification areas with both limited and extensive human impact are recognised as 'natural'.

Classes 1 & 2 of the system encompass remote and semi-remote natural areas which are generally found outside the urbanised areas of towns and cities. The conservation movement has tended to concentrate on natural areas in these remote and semi remote regions but it is imperative that work on urban fringe landscapes continues before their natural characteristics are lost (Russell 1988: 1). Class 5 includes substantially altered urbanised environments, although the background may have natural looking elements vegetative cover is often exotic and usually heavily managed (MPE, 1989:9).

Hillsides in the urban environment of Glenorchy are generally made up of the remaining two types of natural area classification:

1. Semi Natural/Primitive

This classification includes natural- looking environments with moderate evidence of the sights and sounds of humans. Interaction between users may be low to moderate, but evidence of users is prevalent. Opportunities for both motorised and non-motorised forms of recreation are available with a high degree of interaction with the natural environment. Overall, impressions of nature are not dominated by modifications and recreation facilities (MPE, 1989:10).

2. Semi- Developed:

This classification includes substantially modified natural environments, where sights and sounds of humans are readily evident, and interaction between users is often moderate to high. It includes facilities designed for use by a large number of people and those provided for special activities (MPE, 1989:10).

1.4. Important Elements To Be Covered In The Study

The following elements need to be taken into account when planning for environmentally based hillside protection:

1. Values and Attitudes; because the values and attitudes of society influence their behaviour, it is necessary to determine if the environmental characteristics of the hillsides are valued and should be

protected. In a democratic society it is essential that planners understand the attitudes of the public, especially at a municipal level where public opinion is made known swiftly to the authorities (Eagles, 1984: 36). It is assumed in this study that members of the general public support the protection of the natural characteristics of the hillsides, and do not want inappropriate developments to degrade the natural environment of the prominent backdrop to the city.

2. Environment; planning authorities have great control over landscape quality and urban form. Therefore it is important that they have the environmental information necessary to make balanced or sustainable decisions which take into account social, economic and environmental issues; and

3. Policies and Legislation; the need for more effective planning for natural areas at a municipal level needs to be carefully integrated into the existing government structure. The planning tools that are selected to protect the environmental characteristics of the hillsides will need to be practical, implementable and justifiable.

These aspects will all be covered in this study.

1. 5. Organisation Of The Study

- This chapter has outlined the purpose, aim and objectives of the study, and has also provided a brief context for its development.
- The next chapter details the broader issue of the values placed on natural areas in the urban environment by the community, and how these values have changed over time through to the implications of the new resource management and planning legislation for local planning authorities.
- Chapter three moves on to detail where the development pressures in the Greater Hobart Region and Glenorchy in particular come from, and some of the effects this is having on the natural hillsides.
- Chapter four discusses and maps key environmental characteristics of Glenorchy in order to provide a basis from which hillside areas

requiring more stringent protection than provided at present can be established.

- Chapter five reviews the existing provisions of Glenorchy's planning scheme and other statutory requirements which could help improve environmental performance.
- Chapter six draws on other mechanisms and controls which planning authorities could use to improve environmental performance, and includes examples from interstate and overseas.
- Chapter seven provides both broad and more specific recommendations for the protection of the hillsides of Glenorchy.

CHAPTER 2 - VALUES AND ATTITUDES TOWARDS THE NATURAL ENVIRONMENT

We are not separate from our landscapes. The landscape which surrounds us is a record of our behaviour. It is an expression of our values. It is not simply visual resources we manage, it is rather something in ourselves which we attempt to manage. The evolving landscape is a visual statement of who we are as a nation. When we endanger the landscape, therefore, it is part of ourselves which we threaten.

- A. Gussow (in Hepper, 1984:9).

CHAPTER 2 - VALUES AND ATTITUDES TOWARDS THE NATURAL ENVIRONMENT

2.1. Introduction

As stated in the previous chapter, knowledge of the values and attitudes of the community are an important part of the planning process. Plans and other planning controls and mechanisms can only be implemented when they are feasible and acceptable to the public. The purpose of this chapter is to review how people's values and attitudes towards natural areas have changed throughout history in order to gain a better understanding of the arrival at today's focus on environmental awareness, sustainable development, and the need for the protection of natural areas in the urban setting. The reflection of today's values in the Tasmanian resource management and planning legislation of 1993 will also be discussed.

2.2. The Meaning Of Value

Every individual holds a different opinion as to the value of natural areas based on their own value system. Many factors contribute to the creation of a person's value system including upbringing, education and experiences. The value that is placed on a natural area involves either a subliminal or conscious estimate of worth. Value is therefore a subjective estimate of quality and what one person or group may hold as valuable may not reflect the opinion of others. Unlike services and goods that are traded in the market place which have readily quantifiable economic values translated through their price tag, it is much harder to transfer the inherent qualities of natural areas into monetary terms. Despite this many places are attempting to do so under current monetary policies so that environmental costs are factored into the equation. For example, the rationale behind the charging of park fees by the Parks and Wildlife Service for entry into National Parks in Tasmania was so that human impacts can be lessened by building protective structures and through rehabilitating degraded areas.

Several studies have attempted to describe how people value natural areas. For instance, an American landscape study found that many city dwellers were hostile toward the built environment and concluded that *'the natural setting seems to offer....a quality of experience for which the city provides no substitute'* (Nicholson-Lord, 1987:224). In a 'sensory

mapping' exercise in Wisconsin, on the shores of Lake Superior, people indicated that natural landscape features provided 79% of all valued sites.

Studies suggest that natural areas provide relief from daily routines and stress. Students from the University of Delaware were tested for their reaction to natural and urban areas by responding to slides which depicted such scenes. Students indicated that more 'natural' scenes brought feelings of safety and contentment. When viewing urban scenes on the other hand, the students felt sadder, more depressed and more aggressive (Nicholson -Lord, 1987:45).

2.3. Types Of Values Placed On The Natural Environment

Barde and Pearce (1991) outline several types of values of physiological or sustainability worth that may be placed on a natural area:

- 1) **Indirect values** arising from the ecological functions that the area might serve, such as drainage;
- 2) **Option values** which relate to values put on the area for future use; and
- 3) **Existence values** which refers to the value of the area in its conserved state to people who do not use the area, and do not expect to use the area, but who want it to exist;

De Lacy & Lockwood (1992:2) detail the following broader list of society's values of natural areas:

- 1) **Commodity values** such as timber and minerals;
- 2) **Amenity values** such as scenic views;
- 3) **Environmental quality values** such as air and water quality;
- 4) **Ecological values** for example habitat conservation, sustainability and biodiversity;
- 5) **Public use values** which include recreation, tourism; and
- 6) **Spiritual values**

Natural areas also promote attachment to a place. They provide a setting which can often be a more permanent part of the townscape than infrastructure which is continually changing due to constant maintenance and upgradings. The loss of a natural area can therefore be seen to be a loss of identity (Jacobs, 1994:7).

2.4. Relationships Between People And Nature

There are three main approaches to how these values are reflected in relationships between people and the natural environment. One approach is that humans are just one of the species on the planet and as such should not be the controlling force over all others. This is known as the 'ecological approach' and it also stresses that ecological processes should become the central determinant of form for all human activities (Owen, 1991:13). The 'anthropocentric view' is that humans have dominance over other species, and as such humans are separate from, and dominant over nature (Owen, 1991:14). The basis of the 'ecocentric' approach calls for humans to be the carers of the environment, to conserve, enhance, and maintain for present and future generations (Owen, 1991:15). This approach reflects the responsibility of planning; to add value to all aspects of society rather than merely regulating it.

2.5. A Brief Historical Background To Changing Attitudes Towards Nature In Europe

The values that are placed on natural areas today have been influenced and shaped by attitudes and actions from the past. This section draws on European attitudes to natural areas which were transported to Australia along with the convicts, officers and settlers. The way that these attitudes were translated in Australia, from initial interpretation of the natural environment to recognition of its unique qualities, enables a better understanding of the arrival at today's focus on sustainable development.

Before the rapid population increases of the cities occurred with the advent of the Industrial Revolution, people could more easily observe, and had more direct connection with their natural surroundings. The landscape was also revealed in the building materials for houses which were often taken from the immediate area. With the advent of factories, warehouses and railways, this visibility was blotted out as the city form became determined by the needs of industry or developers (Rowland, 1966:87). While cities remained small they maintained a link with the natural areas of the countryside, however as city size and populations increased, distance from the country side and nostalgia for nature rose, as did complaints about the pollution and overcrowding of city life (Spirn, 1984:31). The natural landscape therefore became more highly valued and represented health and good living, and natural areas such as the

countryside became a sought after commodity for new towns and people seeking greater interaction with nature.

This desire for accessible, visible natural areas encouraged the imitation of nature in the form of the English landscape park. Other features such as hilly and mountainous terrain which were disregarded in the classical age, came to be valued positively by the end of the seventeenth century. This new appreciation of nature was captured by the Romantic movement which drew inspiration from natural features and processes such as the diverse colours of the seasons displayed in the native European flora. This promotion of nature can be seen by contrasting figures 1.0 and 2.0 .

The Industrial Revolution brought with it huge increases in city populations resulting in overcrowding, squalor and disease for the lower socio economic groups. City designers tried to preserve the natural amenity in the urban area with the view that peoples health would be improved through the use of natural areas for exercise.

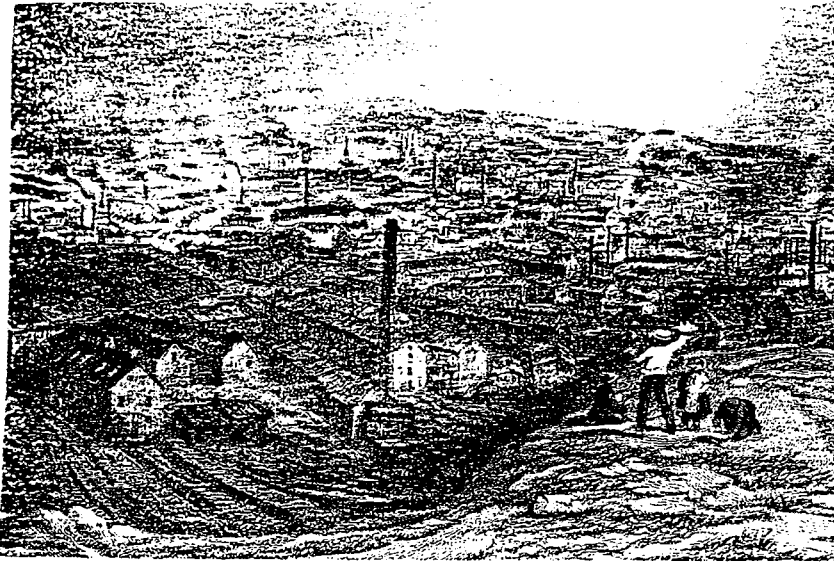
2.6. The Extension Of These Values And Attitudes In Australia

2.6.1 European Colonisation

When Australia was colonised in the late eighteenth century, the officials and settlers in Australia brought with them preconceptions about scenic qualities and carried with them the 'picturesque conventions of Europe' (Heathcote, 1976:49). Early 'Australian' values and attitudes towards the landscape leaned heavily toward temperate European, particularly English perceptions and ideals of how natural areas should look.

'Ignorance and the transplantation of inherited standards of aesthetic judgement' played an important part in the early settlers attitudes towards the Australian landscape which was seen as monotonous and harsh (Powell, 1976:14). Artists and poets such as Field wrote about the lack of inspiration it presented: "I can therefore hold no fellowship with Australian foliage, but will cleave to the British oak through all the bareness of winter" (Powell, 1976:14).

Fig. 1.0 Artists Depiction of an English City



The industrial scene
A view of Sheffield, England (above)

Source. Girardet, 1992: 51

"... tall chimneys... poured out their plague of smoke, obscured the light, and made foul the melancholy air."

Charles Dickens. *The Old Curiosity Shop*, 1841

Fig 2.0 Artists Depiction of the English Countryside



Source. Ward, 1974: 79

Designers also hoped that the morale of the people would be lifted by such inclusions into their cities, that the beauty of the landscape improved the look of the city, that property values would increase near natural areas, and finally that natural areas would provide opportunities to improve ecological education (Laurie, 1979:37). Natural areas were therefore valued as an opportunity for actual and/or visual escape from the confines of the city.

Although there were those who were sympathetic to the Australian landscape, the view that increasingly came across was that of 'profound irreverence for a land so uncompromisingly different from their home countries' (Russell, 1988:68). Familiar scenery was sought and flora and fauna were introduced, and were highly valued due to the expense involved in shipping them over from Europe.

Settlement patterns in Australia were also influenced by England where property ownership, especially land, was the index of social worth (Vandenbeld, 1988:248). The statutory instruments that were established were concerned with land management in terms of subdivision and regulations were more or less divorced from environmental considerations (Toon, 1976:99). The model of subdivision that was set up in Australia was hierarchical and exploitative, concerned with the control and distribution of land resources.

These early European attitudes towards nature are often summed up by the description of the way they seemed to treat the bush: 'shoot anything that moves, chop down anything that doesn't' (Vandenbeld, 1988:243). The forests were viewed as an inexhaustible source of timber (see figure 3.0) and by 1860 large areas of the native bushland had been made over into a landscape suitable for introduced cattle and sheep (Vandenbeld, 1988:250).

Fig. 3.0 Artists Depiction of the Australian Landscape



Cairns — an oil painting by Isaac Whitehead (1814–1881). The very scale of the bullock team and its driver suggests the early settlers' view of these mighty forests as an inexhaustible source of rich timber.

source. Vandenberg, 1988: 257

The difference between this new European culture, and the culture of the native Australian Aboriginals was marked. The Aboriginal culture was intricately tied to natural systems. The natural environment was woven into their spiritual beliefs, and they regarded the land as the source of life, not to be mistreated. They led a nomadic lifestyle and left limited trace of their impact on the land, with the exception of their use of fire. As the Europeans could not recognise any sign of land ownership amongst the different Aboriginal groups, they viewed the continent as 'empty' territory suitable for the subdivision and allocation of land (Toon, 1976:100).

The importation of European attitudes provided a psychological barrier to gaining a better understanding and appreciation for Australia's natural environment during the first generations of settlement. Regardless of these preconceptions some of the early settlers and still more in future eras

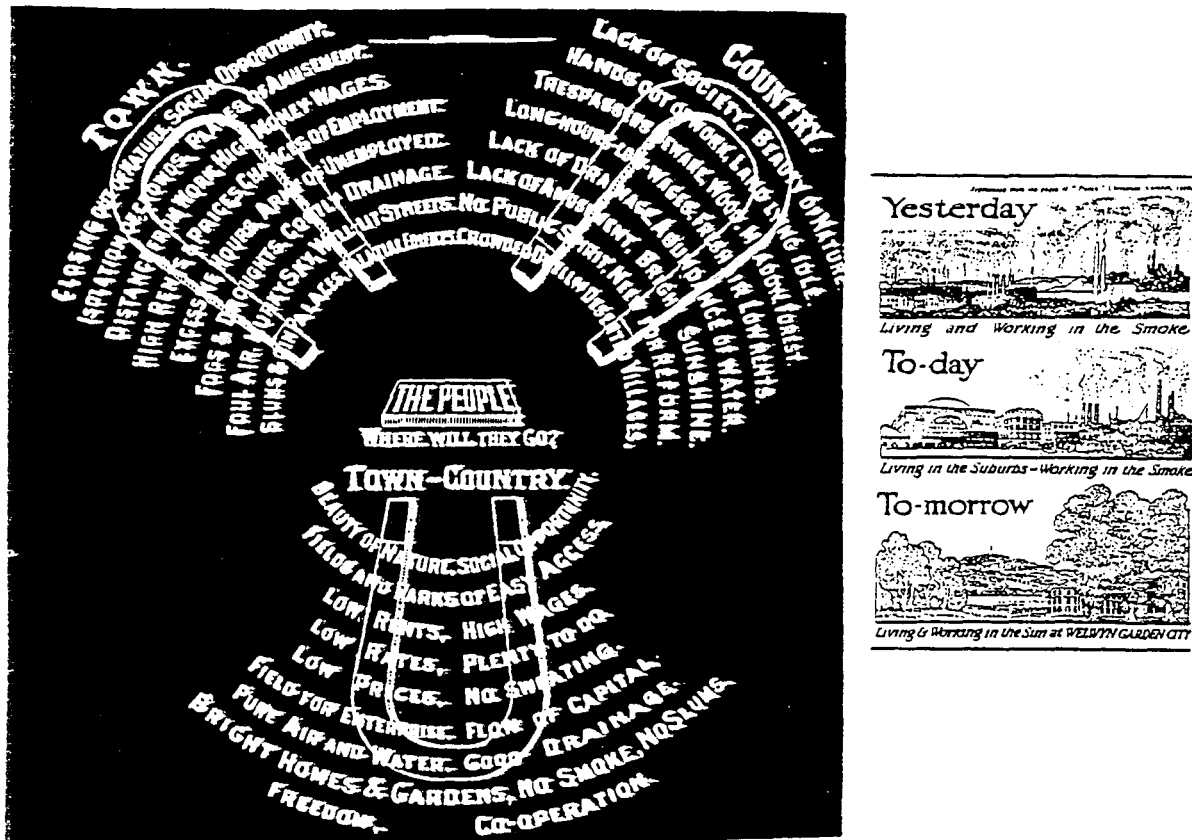
responded more positively to the challenge of the new environment and embraced the bush (Powell, 1976:15). However, attitudes are often passed down from one generation to the next, and as late as 1970 Seddon expressed the view that Australians "are still learning to see our land and to forgive it for not being England" (Russell, 1988:68).

2.6.2. Early Twentieth Century

In the early twentieth century the expansion of settlements and the evolution of towns created similar problems Britain had faced with overcrowding and squalor. As in England the planners reacted against this urban form by turning towards the natural landscape. Australian planners were influenced by the Garden City ideals of Unwin and Howard: that of urban amenities surrounded by adequate living space. These planners regarded the key to human happiness being directly related to plenty of room and stimulation from their surroundings outside the home (Davidson, 1994:4). The spread of the city outwards was a reaction against the traditional urban form, with the alternative modelled on the English country cottage. Ebenezer Howard led the movement which aimed at enabling people to enjoy the best of town and country by combining the two together in the form of a 'garden city'(see figure 4.0). Howard recognised that there were various forces affecting people's choice of where to live, one of these being proximity to nature.

Howard's garden city ideals were based on a population limit, and the creation of the city was meant to enable people to work and live in the same area. However the reality was somewhat different, as seen from the example of the Bourneville Estate, the principles of garden cities were embraced, but the outcome did not match the expectation. People did not particularly wish to live and work in the same area. The sense of removal from the workplace was not adequately achieved when the factory could be seen from the residences. Also, living outside the estate there was more access to services and less chance of being called upon to work at short notice (Freestone, 1989:153). The sprawling Australian cities of today, made up of quarter acre blocks, were perhaps initially a legacy of the desire for more space, but this urban form has been sustained and extended by the introduction of easily accessible transportation in the form of the motor car.

Fig. 4.0 Howard's Three Magnets



Source: Ward, 1974:90.

Glenorchy has its own example of a Garden City, the Cadbury Bourneville Estate set up in Claremont in the 1920's. The natural setting for the Cadbury Confectionary Factory, along with the cool climate, was an integral factor in choosing the location (Freestone, 1989:158). It was recognised that apart from the intrinsic values such as the beauty of the setting which would benefit the employees in their day to day living and working, but also that natural areas also help to give definition to the built structures. A complete garden city did not emerge, probably due to the fact that Glenorchy did not face the same overcrowding and other social problems that afflicted English towns (Freestone, 1989:158). However the cottages that were built can still be seen today.

2.6.3. Mid to Late Twentieth Century

It wasn't until the 1960's and 70's that there was a major shift in the attitudes of the broader Australian population. This shift was initially led by artists and writer's and others in society who for years had been pushing for a stronger identity with the land (Russell, 1988:68). Social commentators have pointed out this change in attitude came about because modern day Australians find the landscape more attractive because 'their forbearers learned first how to live with it, then how to accept it and finally to appreciate it' (Powell, 1976:14).

The increase in information and growth of education concerned with environmental matters also played a large role in changing perceptions and increasing awareness of the physical and natural environment. According to studies into attitudes to the environment, the general awareness of the Australian population towards the natural environment has risen quite substantially since the early 1970s, although there are still disparities between the higher environmental awareness of the younger (less than 25) age group, and older (greater than 45) age groups (Daniels & Brown, 1990:5). In Tasmania this increased awareness was viewed across Australia when conservationists protested against the bulldozing of a road into the last remnants of rainforested hillsides in south western Tasmania. As Vandenberg states, this protesting marked a new change in attitudes towards the environment in that 'a century ago, no-one thought to protect the hills against progress' (1988:243). Membership of environmental groups such as the Australian Conservation Foundation also provides a case in point, increasing its membership from 1,103 members in 1966/67, to 7, 149 in 1972/73 to 18, 816 in 1992'93 (ACF, 1972, 1993).

2.7. International Commitment To The Environment

This increased public awareness was not only occurring in Australia, but also internationally. Governments were under pressure to find remedies to the problems of city growth such as the degradation of the natural environment. This led to the establishment of the United Nations Environment Programme (UNEP) and subsequently the formulation of the World Conservation Strategy (IUCN) (Kozlowski, 1989:4). Both advocated the integration of conservation and development as the only realistic way to deal with the problems facing the natural environment.

2.7.1. Sustainable Development

The term 'sustainable development' was coined to highlight the fact that the conservation and development of natural resources are inextricably linked. Development provides for today's needs and conservation provides the stock of resources for tomorrow and as such they should not be regarded as separate entities which have little or no impact on each other (DHAE, 1983:2).

Although the term sustainable development was by no means a new phrase¹, it was the 1987 'Bruntland Report' of the World Commission on the Environment and Development ('Our Common Future' CFF, 1990) that played a key role in bringing the concept of sustainability in to the public arena. It defines sustainable development as "that which meets the needs of the present generation without compromising the ability of the future generation to meet their own needs" (CFF, 1991). A key conclusion of the report is that in promoting improvements in living standards, policies have to ensure that the environment is sustained for the sake of people's future welfare (Jacobs, 1994:6).

2.7.2. Biodiversity

Another issue that has received international attention is the need to maintain the earth's biodiversity which is under increasing pressure from the encroachment of human activities into natural ecosystems.

Biodiversity is about the structural and functional variety of life forms at genetic, population, species, community and ecosystems levels. Without international commitment and action, gene pools will be reduced and species will continue to become extinct.

Australia recognised the seriousness of the problem and its commitment to ensuring the long term maintenance of biological diversity by signing the *Convention on Biological Diversity* along with 153 other nations in June 1992.

According to the Australian Conservation Foundations Executive Director, Tricia

Caswell, the translation of these initiatives to suit Australian conditions is necessary because Australia's record on the protection and remediation of the environment has been 'very poor' (Caswell, 1995:117). One of the

Current planning practices result in ad hoc decisions that are development led, and are often made in an environmental information void

reasons she cites for this is current planning practices which result in *ad hoc* decisions that are development led, and are often made in an environmental information void.

The fact that the native vegetation of Tasmania is declining at a fairly rapid rate (which also relates to loss of habitat and as a result loss of fauna) has been noted recently in an article in The Mercury, detailed in figure 5.0. People are becoming more aware that there is a real need for better protection of native vegetation. This is especially true in areas such as hillsides that are close to major settlements and therefore have added pressures relating to human interference.

Fig. 5.0 Recent Newspaper Clipping Detailing Concern About Tasmania's Natural Environment

New studies reveal the extent of native vegetation loss

Australia's disturbed landscape

By COLIN CHUNG
In Canberra

MORE than one third of Australia's landscape has been significantly disturbed by human activity and feral animals, new studies have found.

"The magnitude of native vegetation lost during 1990 equates to over one million rugby football fields or over

two rugby fields being cleared every minute," one report said.

The clearing of vegetation was contributing to the loss of many unique plant and animal species and was affecting climate, it said.

The studies found most vegetation being cleared was original bush rather than regrowth.

Two reports by the CSIRO and the Department of Environment found more than one million square kilometres of forests and woodlands, or 20 per cent of the continent, had been cleared or thinned by 1990.

Most clearing occurred along the eastern seaboard and in Tasmania, South Aus-

tralia and parts of Western Australia.

Within the remaining land use areas, 37 per cent had been slightly disturbed, 9 per cent substantially disturbed and 15 per cent significantly disturbed.

The Department of Environment report said the amount of land cleared since

1945 equalled what had been cleared during the previous 150 years.

Clearing in Tasmania had been concentrated in areas readily accessible to the major woodchip export ports and had been undertaken almost totally in the dry eucalypt forests with grass bracken or sclerophyll scrub.

Since European settlement native vegetation in the state had decreased by about 1,768,600 hectares to 3,109,400 hectares.

Federal Environment Minister John Faulkner said yesterday unchecked land-clearing threatened biodiversity and cost the economy millions of dollars in lost productivity.

source: Chung, The Mercury 22 June, 1995 p7.

However, as the next section details, planning legislation has, and continues to evolve in an attempt to combat these problems and promote sustainable development.

2.8. The Evolution Of Legislation In Protecting The Values of Natural Areas

As noted earlier, Australian land use planning evolved from European concepts. In the period of heightened environmental awareness from the late 1960's, these policies were found to be inflexible in terms of its responsiveness to changing social values. The community recognised the need for a more holistic approach incorporating their concerns for the environment (Toon, 1976:100).

In the last quarter of a century both the State and Commonwealth governments have introduced legislation for the protection of the natural environment, and agencies such as the Australian Conservation Foundation have formed to ensure that environmental factors are fully considered in the decision making process.

Of course it is important that other factors are not ignored in the concentration on environmental issues. Inputs to any proposal need to include not only environmental considerations, but also the implications for the community in social and economic terms. In order to do so effectively, public participation at the beginning and throughout the decision making process is required so that the decision making process can be more flexible and reflect changes in societal values and attitudes.

2.9. The Role Of Legislation In Tasmania

Planning is about maximising choice, managing uncertainty, and trading off desirability with feasibility. It is about making 'people sensitive' choices with limited knowledge in order to add value to society rather than to merely regulate it (Freestone, 1993:2). In order to do so the planning process and planning professionals need to recognise that the components that make up society (environment, economics and culture) are not static, and should reflect this by being both flexible and participatory.

In Tasmania, state government departments and statutory authorities working under state legislation are directly responsible for resource use, which includes responsibilities for environmental planning (DHAE, 1983:2-4). Tasmania has attempted to highlight the issues of sustainable development and biological diversity through a new suite of resource management and planning legislation which points to a more environmentally aware system of planning control. The introduction of Tasmania's planning legislation in January 1994 enshrines both the concept and objectives of 'sustainable development' - the essence of which is about balancing human needs and the ability of the environment to meet those needs. Planning authorities (local government councils and marine boards) are now required to demonstrate that they have sought to 'further' the objectives of the resource management and planning system of Tasmania. These objectives include the promotion of flexibility and cooperation between all levels of government, encourages public

participation, recognises the need to maintain ecological processes and biodiversity. They are therefore under pressure to adopt sound planning, land and resource management practices.

'Sustainable development' as defined in the legislation means:

managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural well-being and for their health and safety while:

*(a) sustaining the potential of natural and physical resources to meet the reasonable foreseeable needs of future generations;
and*

(b) safeguarding the life supporting capacity of air, water, soil and ecosystems;

(c) avoiding, remedying or mitigating any adverse effects of activities on the environment (TG, 1993:56).

There are a number of differences between this new legislation, and its predecessors, the *Local Government Act 1962* and the *Environment Protection Act 1973*. The previous legislation recognised social issues through town planning principles, the major difference being that now there is equal weight given to social, economic and environmental considerations.

Town planning principles did provide for the protection of natural areas, however the new legislation has stated this clearly through its objectives outlined in Schedule 1 such as:

(a) to promote the sustainable development of natural and physical resources and the maintenance of ecological processes and genetic diversity ; and

Part 2 (i) to provide a planning framework which fully considers land capability (TG, 1993:56).

These objectives clearly define council responsibility to protect the natural environment. The *Land Use Planning and Approvals Act 1993* was based on New Zealand's resource management legislation. It has taken a leading role in Australia as the goal of sustainable development is not

enshrined at the development control level in any other state or territory (pers. comm. Ogden).

2.10. Implications For Glenorchy

Apart from clearly delineating the responsibility of Council toward the natural environment, the Act also introduces civil enforcement procedures which enables any person to apply for a use or development to be stopped where it contravenes or fails to comply with a provision of the Act. As the Glenorchy planning scheme of 1992 was not prepared under the new legislation, it will need to be reviewed in light of these implications to ensure that its provisions aim to promote the objectives of the Act.

The onus is therefore very much on the planning authorities and their community to ensure that the effects of planning decisions on the natural environment are explicitly considered. This increased responsibility on local government for the natural environment is a critical move in environmental protection, as local councils can more readily take into account the values and attitudes of the community than other spheres of government. It also means that in order for these responsibilities to be achieved, there has been a move to combine traditional 'landuse planning' and environmental planning which have historically been regarded as separate. It has now been recognised that concern for the environment (both natural and physical - including social, cultural and economic issues) should be incorporated into all aspects of the planning process (Gilpin, 1986:88).

2.11. Future Values And Perceptions- Conclusion

As will become clear in the following chapter, the next step in the continual evolution of values and attitudes towards the natural environment needs to be a shift from an individualist mentality to that which considers the 'common good'. Collective action will only gain consent if people realise the benefits they will gain from a healthy environment. Continued education of the cumulative impacts of humans on the natural environment will play a key role in achieving this move from a 'this belongs to me' attitude, to one which states 'I belong to this' (Jacobs, 1994:7). It is also noted that concern for familiar topography such as the Glenorchy hillsides is not about the loss of a commodity, but about the loss of identity (Jacobs, 1994:7).

¹The United Nations Conference on the Human Environment in 1972 is often credited with introducing the concept of sustainable development to the international community.

CHAPTER 3 - GROWTH AND DEVELOPMENT PRESSURES IN GLENORCHY

Cities have surged upward and outward, losing their all important sense of social cohesion.

- H. Girardet

In a relatively short space of time, humans have been able to make an enormous impact on the landscape. The growing population has demanded more space, more facilities and more services.

- J. Hepper

CHAPTER 3 - GROWTH AND DEVELOPMENT PRESSURES IN GLENORCHY

3.1. Introduction

Tasmania relies on its 'clean, green, natural' image for tourism. In years to come Tasmania will still want to be recognised for its quality landscapes which are increasingly under threat. Small and large *ad hoc* decisions are continuously being made with limited recognition of landscape values (Hepper, 1984:1).

The fact that development pressures are less intense in Tasmania than in other Australian states due to its static population, may be one of the reasons for the lack of specific protection measures for natural areas such as hillsides in the urban setting. However, this is no justification for delaying the introduction of such measures. Planning is about being proactive and addressing problems which may arise before they do so, instead of reacting against problems after they have surfaced. The precautionary principle of acting now to avoid costly and/or irreversible damage later should apply. This chapter will review the growth of Glenorchy and how the pressures for expansion are threatening natural hillsides within the urban setting.

3.2. Glenorchy In Context

Glenorchy is Tasmania's fourth largest city and has a population of approximately 43, 800 people (GCC, 1994:3). It is situated on the west bank of the Derwent River, north of Hobart and is one of six councils to make up the Greater Hobart Region. The municipal region covers 115 km² and extends from the New Town Rivulet in the south to the Black Snake Rivulet in the north, rising steeply in the west to a line of hills- see figure 6.0 (GCC, 1994:3).

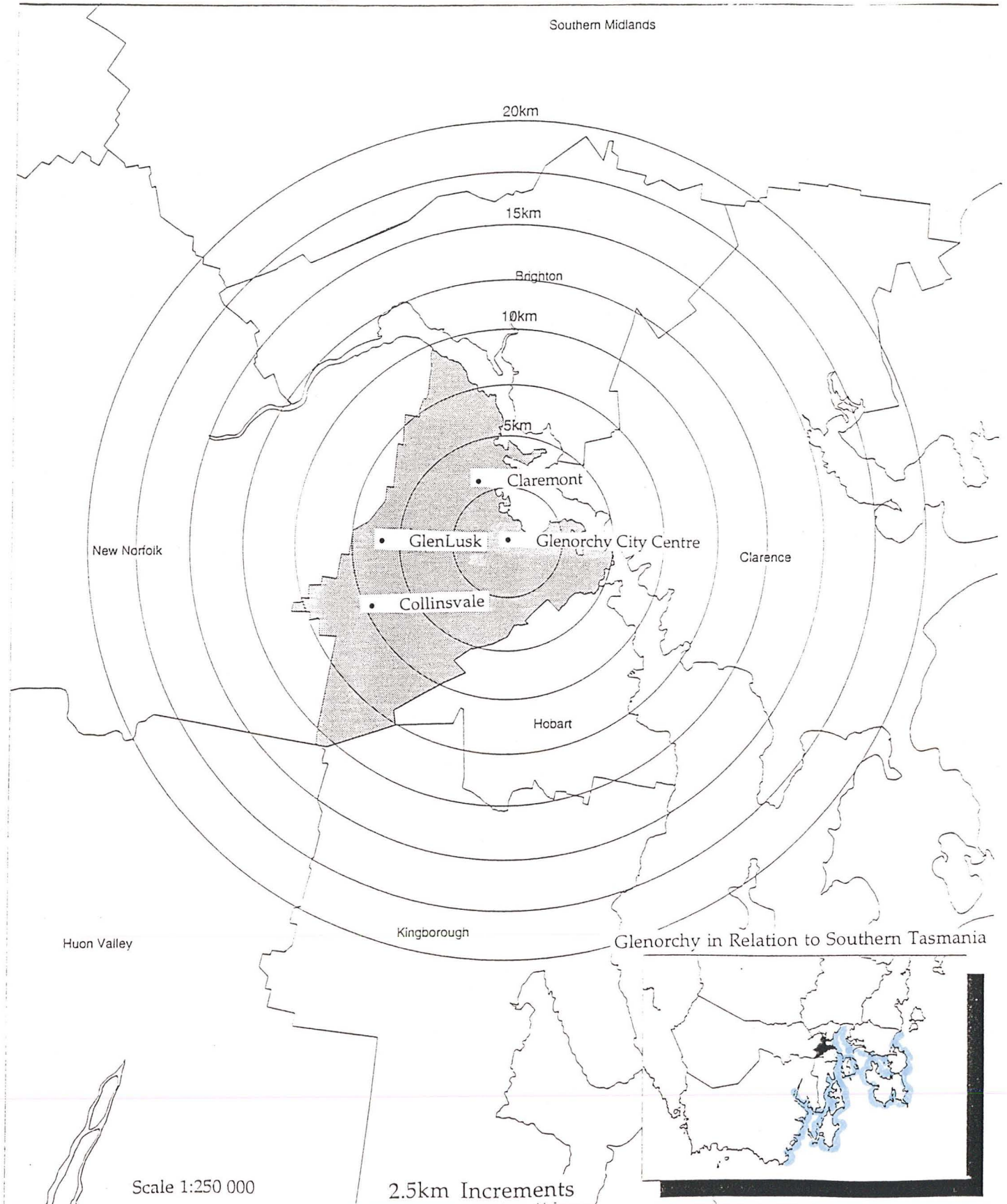
3.3. The Historical Development Of Glenorchy

3.3.1. Pre-European Phase

The Tasmanian Aboriginals were the earliest inhabitants of what is now called Glenorchy, which was part of the area of the South East tribe (Alexander, 1986:1). Presumably this tribe's impacts on the hills of Glenorchy were related to the search for food, both hunting and gathering, and the provision of the mountain streams for water. Aboriginal tribes

were known to use fire, and as such the vegetation may have been burnt through human intervention as well as naturally occurring bushfires.

Fig 6.0 Glenorchy Location Map



It is thought that prior to European settlement, some woodlands were maintained by regular burning by Aboriginals in order to keep migration routes open, to produce green pick for game, and to encourage the growth of edible herbs and other plants (Duncan, 1991:36).

3.3.2. European Settlement

The first European settlers in Glenorchy established themselves along both sides of the New Town Rivulet. Land grants were given out and by 1806 there were eighteen settlers in Glenorchy (Alexander, 1986:4).

Initially settlement was confined to the low lying areas close to the water supply of the rivulet. The first settlers impacted on the natural environment through the clearing of trees and the planting of introduced crops. Timber was used in building construction as well as for fuelling fires. The early attitudes towards the landscape can be noted by the fact that exotic species, mostly deciduous trees, were introduced in the attempt to reproduce elements of the British landscape (Russell & Clark, 1977:57).

It was not until the 1870's that human settlement expanded into the hills of Glenorchy. A community was established at Sorell Creek (later called Bismark and now Collinsvale) and by 1876 twenty people owned land in the area. Earlier settlers had ignored the valley up in the mountains because it was too inaccessible due to the steep slopes. For these reasons the land was cheap and many European immigrants bought land there. In 1881 there were forty six dwellings in Sorell Creek (Alexander, 1986:77). The settlers cleared land surrounding their residences and also cultivated mainly fruit crops, altering the natural vegetation of the region and enabling exotic plants and weeds to establish.

Timber in Collinsvale was a source for many jobs through the saw mills, the first of which was established around 1910 (Appeldorff, 1986:46). Other industries in the area also impacted on the surrounding environment, such as the use of the trees to make Eucalyptus oil, and the lime kiln which had to shut down as there was no where to dump the waste.

Through land grants, ownership of land was creeping up into the hills of Glenorchy by the 1830's. However, technological constraints and lack of services such as water supply prevented any great movement upward. The first subdivision was recorded in early 1845, and as population

increased, so did the pressures for land and dwellings. The railway between Hobart and Launceston was built in the mid 1870's and made the area more accessible. A reservoir was developed in order to keep up with the demand for water for domestic, agricultural and industrial purposes. It became evident that rural land use patterns were changing due to the demands imposed by a larger community (Russell & Clark, 1977:63).

3.3.3. Urban Transformation

By the 1920's it was clear that Glenorchy had transformed from a community largely dependant on the resources of the surrounding land, to a community comprised of urban characteristics (Russell & Clark, 1977:63). Subdivisions of the old large rural properties intensified and many of the orchards and hop farms were replaced by residential and industrial development. Industry and residential areas established quickly in Glenorchy after World War Two due to cheap land, labour, improvements in transport and the close proximity to Hobart (Alexander, 1986:279). 'One after the other new suburbs...spread up towards the hills' due to the post war building boom (GMC, 1964:49).

Once the Brooker Highway was established in the 1950's services expanded as did the population.

*One after the other
new suburbs spread
upwards towards the
hills*

The pressure for urban expansion and the development of previously natural areas can also be traced through the purchasing of reserves for recreation. During the initial half century of Glenorchy's existence, open spaces were plentiful and the need for acquiring formally designated recreation areas was not of concern (GMC, 1964:58). It was after the population and housing increased in the 1930's that concern rose over areas for recreation, and in the early 1940's the first reserves were established in preparation for increasing recreational and building demands (GMC, 1964:58).

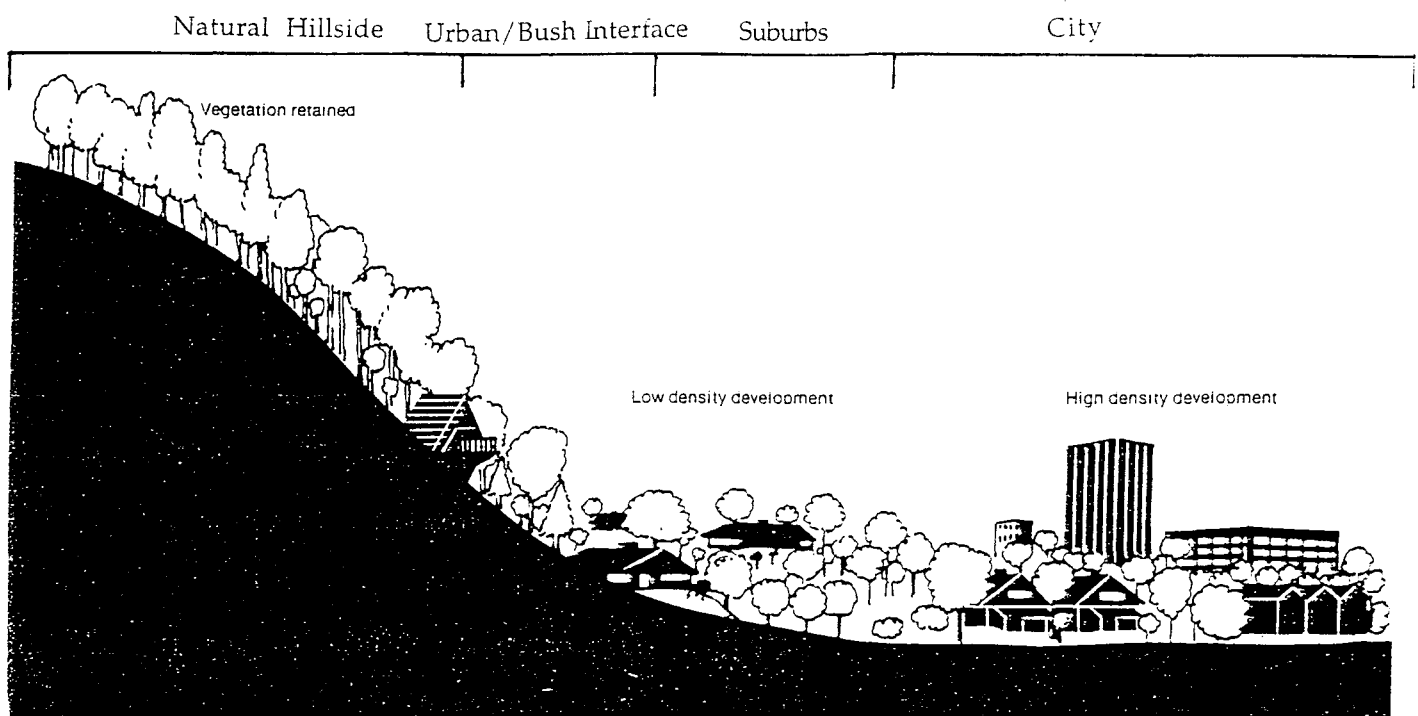
In 1964 Glenorchy Council recognised the dilemma they were faced with. The large, flatter tracts of land had largely been taken up by residential and industrial development, with a large part of steeper areas of the municipality reserved for water catchment, forest and green belt areas (GMC, 1964:52). They saw the solution, which is still promoted today, as medium density housing which would conserve ground space and cut costs in terms of the provision of services (GMC, 1964:52). The only

alternative the Council could foresee to overcome this problem was to re-zone land marked for other purposes or to extend the municipal boundaries (GMC, 1964:2).

3.3.4. Current Urban/Bush Interface Of Glenorchy's Hills

The 'urban-bush interface' is the term used to depict the area where the two meet (see figure 7.0). As depicted in plate 1.0 there is noticeable distinction between the 'natural' vegetated hillsides and the urban areas which encroach into it.

Fig. 7.0 The Urban/Bush Interface

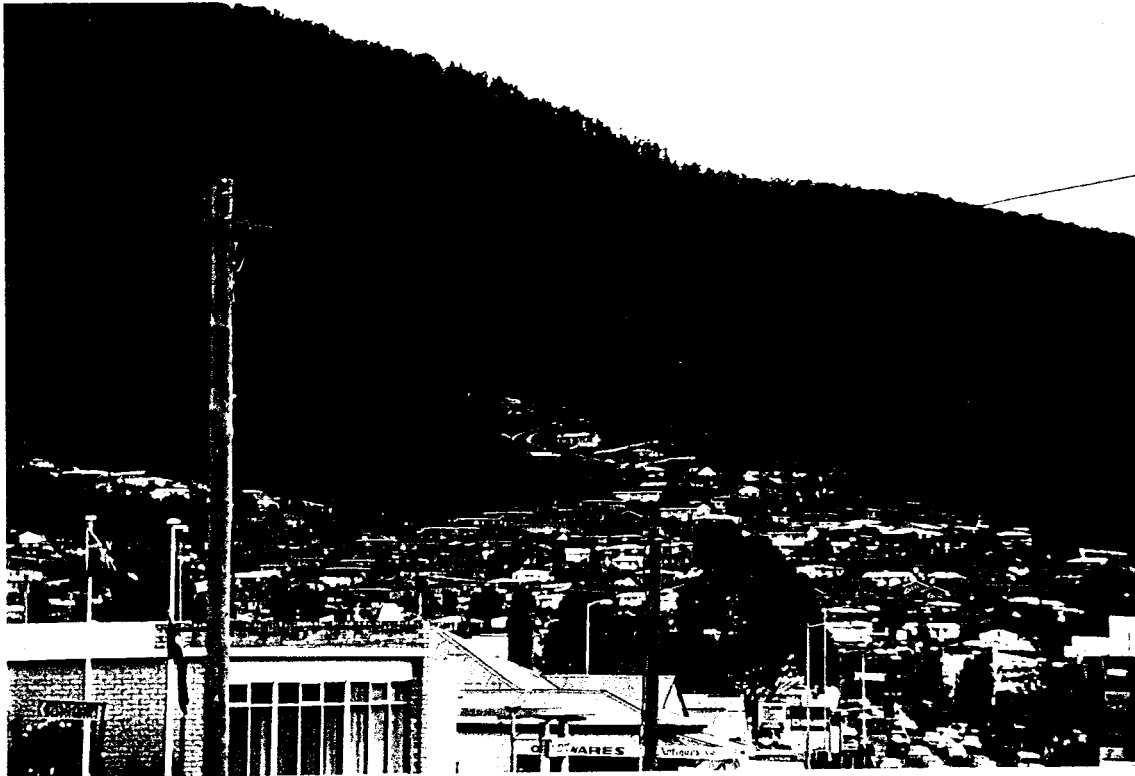


Source. Adapted from Thurow, 1975:354

Although there are off shoots of residential development such as Collinsvale in the higher hill regions, the majority of development is gradually extending upward. The urban-bush interface is sharply defined in most of Glenorchy with existing residential and 'Future Urban' zones which allow smaller lot sizes often adjacent to large tracks of hillside vegetation.

Residential development into the hills of Glenorchy is expected to continue. This is reflected in Council plans for new reservoirs to keep up with current demand and to meet the future demand of the area. Council's engineering staff advised that they have plans for several reservoirs to service the higher residential areas.

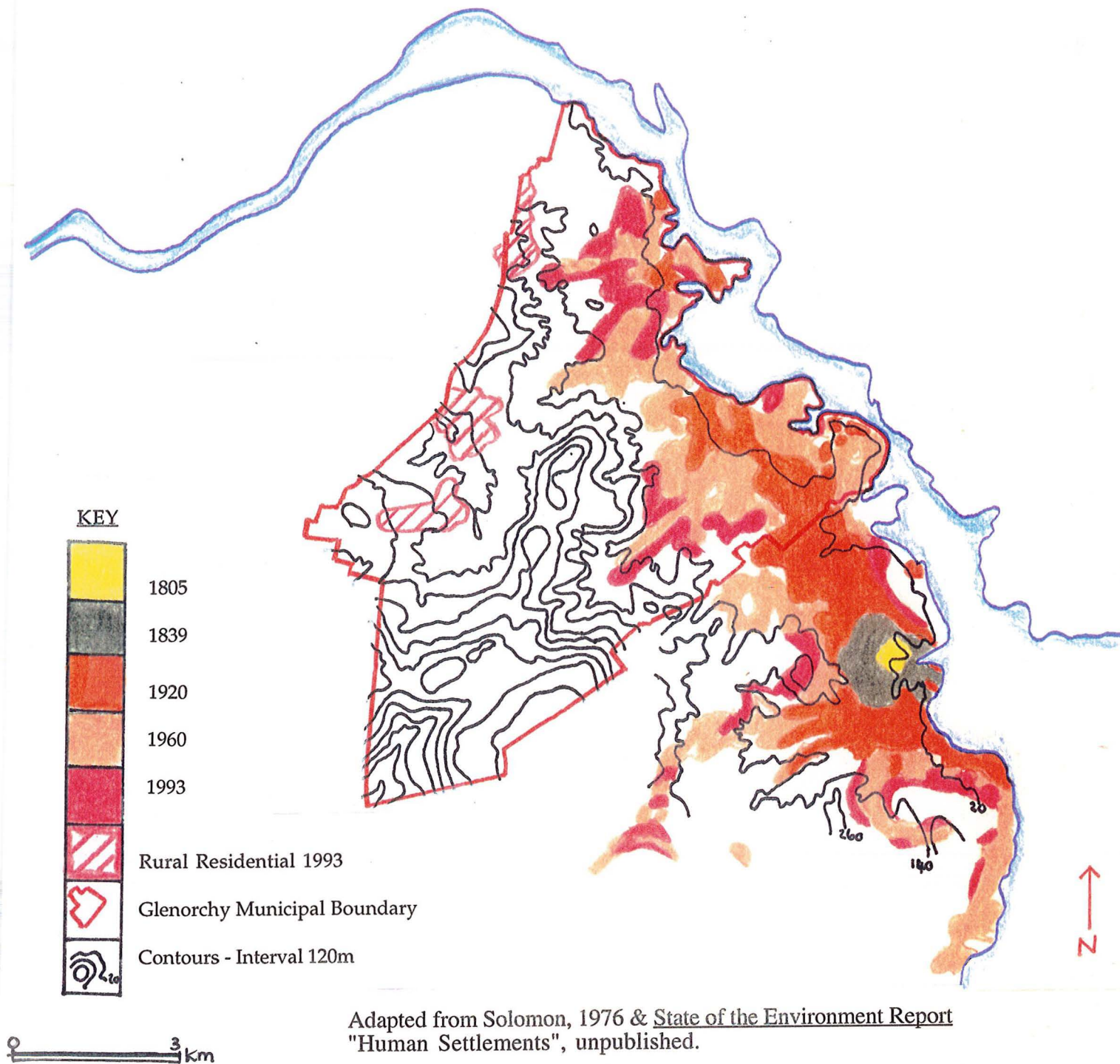
Plate 1.0 Contrast Between Residential Development and the Natural Vegetation



View of hillside development from Main Road Glenorchy

In the five to ten year proposals, reservoirs are planned at Glenlusk for the 1997/98 financial year and Hilton Hill in the 1998/99 financial year. Currently supply comes from Glenorchy and as it goes up hill the water pressure decreases. The Glenlusk reservoir is proposed to store 1.5 million litres of water and will be an independent water supply, with the Hilton Hill reservoir proposed to hold 4.5 million litres of water in order to meet the demands of future development (pers. comm Daniels). There are also plans in the next year to upgrade the existing Chigwell reservoir in the form of a new tank to increase capacity.

Fig. 8.0 Urban Expansion of Glenorchy from 1803 - Upward and Outward



As figure 8.0 shows, the majority of the expansion of Glenorchy has come after the Second World War. Since this time Glenorchy has had to contend with numerous pressures for urban growth to expand outwards and to higher levels and steeper, more natural terrain. The reasons for this are discussed briefly.

3.4. General Pressures Behind The Expansion Of Glenorchy

In general terms the urbanisation and suburbanisation of Australian cities has been rapid. The twentieth century has brought increasing open space standards, more cars, increased demand for leisure activities and a striving for an improved quality of life. These demands are reflected in the continuance of 'The Great Australian Dream' of owning a detached house on a quarter acre block in the suburbs. All of these factors have contributed to the creation and maintenance of the sprawling cities of today. The municipalities and cities of the Greater Hobart region are no exception.

3.4.1. Transport

Although the tram and rail services enabled people to live on the outskirts of the city and commute in to work, it is the motor car and the resultant road network which has made it possible for the majority of people to break the ties of workplace and residence and choose more attractive environments in which to live. Low density sprawl has been able to function effectively due to the availability of personal transport. Cars have become more affordable in the last forty years as table 1.0 below details, resulting in increased car ownership and higher mobility.

Table 1.0 Affordability of the private car in Tasmania from 1950 - 1985

| Year | Car Ownership (cars per 1000 persons) |
|------|---------------------------------------|
| 1950 | 91.7 |
| 1955 | 143.3 |
| 1960 | 188.0 |
| 1965 | 259.7 |
| 1970 | 310.0 |
| 1975 | 386.1 |
| 1980 | 432.4 |
| 1985 | 462.1 |
| 1990 | 481.1 |

Source: Hoey, 1992

3.4.2. Lifestyle And Quality Of Life

The quality of life in relation to urban living refers to the accessibility of its inhabitants to employment services, medical and educational facilities, social services and natural areas. Many people move from city living to a more natural setting for a change of lifestyle which includes more space. The National Housing Strategy surveyed home buyers in Sydney in 1991 and concluded that over 30% of home buyers chose to live in a certain area

because of its scenic/environmental attractiveness (Burgess & Skeltys, 1992:31). Ironically, with the influx of people and the accompanying services, the qualities which were found so attractive are gradually depleted.

3.4.3. House Size and Household Occupancy

The general trend in household occupancy rates in Australia shows a steady decline in the last twenty years. Contributing to this trend has been an aging population, increasing divorce rates and a growth in the number of single parent families (Hogue, 1995:7). The average number of people per occupied private dwelling in Tasmania is outlined in Table 2.0 below.

Table 2.0 Number of persons per occupied private dwelling 1976 - 1991

| | 1976 | 1981 | 1986 | 1991 |
|-----------------|------|------|------|------|
| Tasmania | 3.28 | 3.07 | 2.93 | 2.79 |

Source: Hogue, 1995:7

This trend is expended to continue, and level out over the next ten to twenty years (Hogue, 1995:7). Combined with an increase in house size over the same period it can be deduced that these factors influence the demand for more housing stock. There is also a need for a variety of housing types to meet the changing needs of the population. This means that much of the existing housing stock may not be the most appropriate form for the future. New land is often taken up to accommodate this demand and its associated services and infrastructure.

3.4.4. Affordability

The National Housing Survey conducted on Sydney residents in 1991 also showed that the major reason for home buyers and renters to chose to reside in a particular area was that housing was within an affordable price range (Burgess & Skeltys 1992:31). Average rental and home mortgage repayments are cheaper in Glenorchy than in the other urban Greater Hobart Councils as shown in table 3.0.

Table 3.0 Median monthly mortgage and rental payments: a comparison of Municipalities

| Council Area | Median Monthly Mortgage Payment (\$) | Median Weekly Rental Payment (\$) |
|--------------|--------------------------------------|-----------------------------------|
| Glenorchy | 393.10 | 79.90 |
| Hobart | 527.10 | 100.60 |
| Clarence | 394.20 | 79.30 |
| Kingborough | 470.20 | 102.10 |

Source: ABS, Censuses of Population and Housing: 1991

3.4.5. Land Speculation

Another factor influencing urban expansion is land speculation.

Speculators buy land that may not be zoned for urban development, in the expectation that the land will eventually be rezoned and a large profit made. Plans drawn up by planning authorities which indicate the future growth of the city can be used by speculators as guides for purchases.

Alternatively, before plans are drawn up speculators can exert influence within planning authorities on decisions regarding future zones and growth corridors (Sandercock, 1979:xii). In this way speculators exploit the planning process by pre-empting and pre-determining directions for future urban growth with the aim of maximising profits, with little consideration for the environmental and social consequences of their actions, such as the encroachment of cities into vegetated natural areas. This tends to result in the disbursed low-density suburbs prominent today.

The Urban Management Program has preliminary finding in regard to supply of land in 'reserved residential'² zones. In Glenorchy, the conservative estimate is that 50% of this land has yet to be developed. That is 1,188,188 m² (Hogue, 1995:9). In the Greater Hobart Region it has been assessed that there is a total of approximately 21 km² available for future urban development. Assuming that development will occur at densities of 10 lots per hectare² (conventional suburban density), representing around 20, 967 urban lots, this can be translated to about a 35 year supply of allotments has been calculated using a projection of current subdivision rates (Hogue, 1995: 9). This is considered to be a conservative estimate as the potential for infill in already serviced areas has not been factored in to the equation. These figures question the need for more 'reserved residential' zones within at least the next thirty years in the Greater Hobart Region. The estimated cost for the provision of physical infrastructure for these areas is estimated at \$21, 961, 270 and the social infrastructure \$3, 726, 156 (Hogue, 1995:17).

3.4.6. Employment And Services

The requirement of more space for production has resulted in the dispersal of large manufacturers outside city centres. Assembling the labour force in outer regions was difficult in pre-motor car days, however private car ownership has eased this problem. Land is usually cheaper to rent outside the city centre, and this is attractive to large retail companies who then situate in outer areas. In turn these retailers can often attract more residential development through offering convenience of services and employment.

Future trends such as the advent of computer technology will play an important role in the future of urban sprawl. With electronic mail and the international network (internet) the traditional ties of working in the city or regional centres may be further broken. People will therefore be able to work at home, and as such many people may choose to live further than the current suburban boundaries. New technological advances need to be factored into the planning of city growth.

3.4.7. Leisure/Recreation

Until recent decades leisure activities were dominated by the wealthy. This has now changed due to increased standards of living for the general population, combined with greater mobility. The movement away from outdoor work prior to the Industrial Revolution to indoor office work today has meant that the demand for outdoor recreation has increased (Barlowe & Steinmueller, 1963:300). This demand for outdoor recreation is placing pressure on the accessible natural areas in the urban setting.

3.4.8. Technology

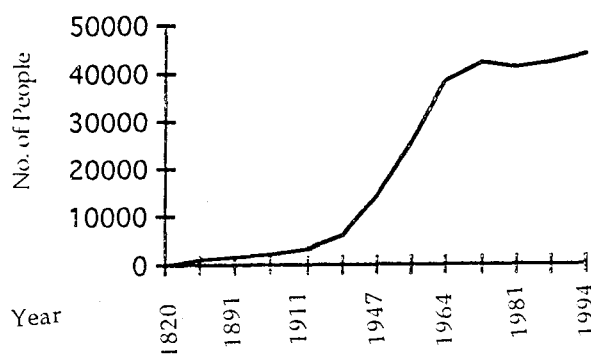
Technological advances have greatly increased the impact humans can have on the landscape. The introduction of heavy earth moving machinery and new construction technology has facilitated the speed and scale of change to the natural environment as land can now be cleared and developed at unprecedented rates. For example, before the Second World War most homes were built individually for their owners (McKain, 1963:27). However with technological advances mass production has led to speculative housing developments where many houses are built at the same time to cut costs, and then offered for sale at the same time, pre-determining demand.

Almost any structural developmental problem can now be overcome if sufficient funds are available (Owen, 1991:23). The problem lies with a building industry that favours traditional standardised layouts using cut and fill and standard house types rather than considering a style that will reflect the shape of the land (Owen, 1991:23). Structural solutions do not necessarily mean that environmental problems such as erosion are overcome.

3.4.9. Population

Although the population of Tasmania and Glenorchy is static (see fig. 9.0), the cities are undergoing the same 'doughnut effect' (figure 10.0) as many others in Australia, and indeed the world.

Fig. 9.0 Population of Glenorchy

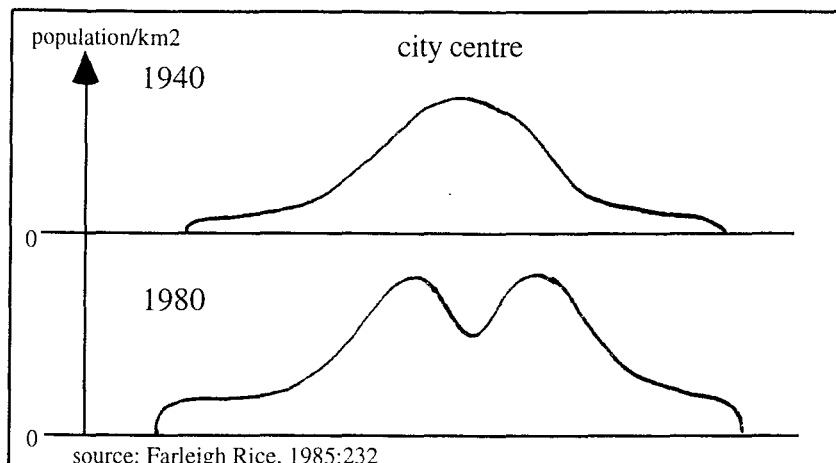


Source. ABS Censuses of Population and Housing: 1991

This doughnut effect is the result of underutilised land in the inner city with the move of retailers and services out to regional centres following the population movements. It is generally the case that some people, mostly young single people or professional couples without children, prefer to live in the city where they are close to employment and social activities. However other groups take into account aspects such as housing affordability, environmental attractiveness and lifestyle which draws them to outer areas which are within driving distance from the city centre.

Before the popularisation of the motor car, inter suburban migration was related to employment opportunities. Now however homes are the determining factor. This has generally meant a loss of population in the inner and middle suburbs resulting in a population distribution such as depicted graphically in general terms in figure 10.0

Fig. 10.0 Population movement patterns- the doughnut effect



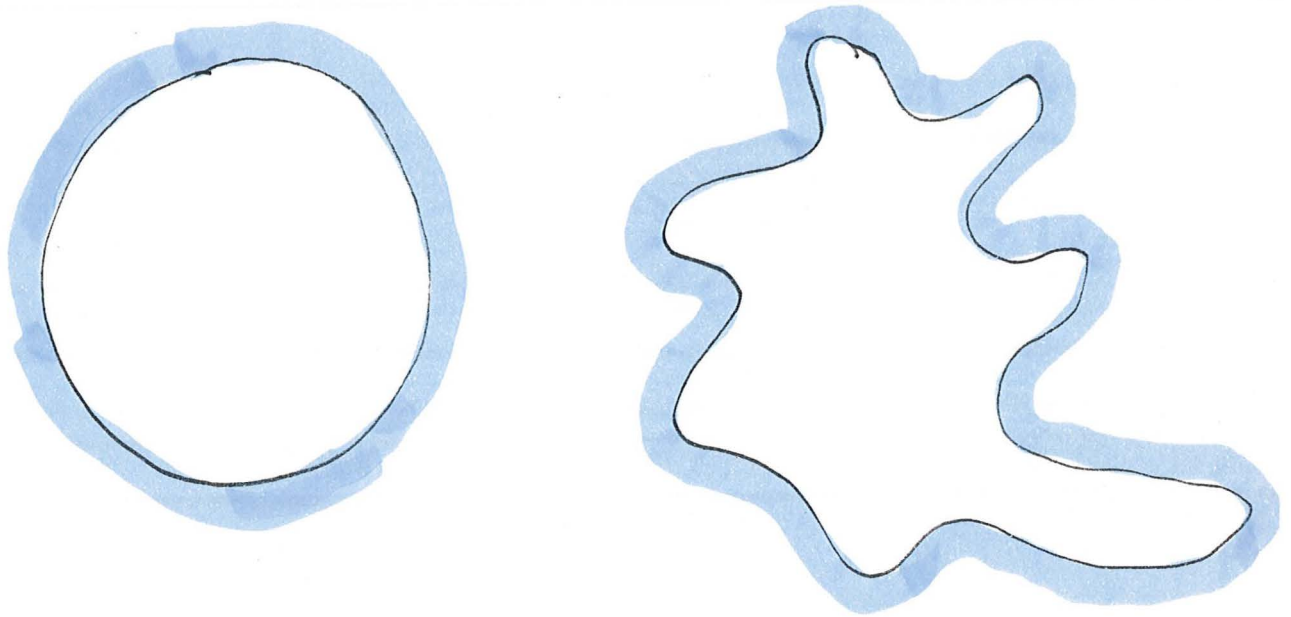
3.5. Environmental Implications Of City Growth

In 1964 a publication by the Glenorchy Municipal Council (now the Glenorchy City Council) stated the pressures facing their municipality in the following terms:

More roads, more footpaths, more water, more drainage, more sewage, more parks and recreation grounds have been a constant, unrelenting necessity from the late forties up to the present time. They still are.

All of the pressures outlined above are interrelated and combine to create environmental problems through the expansion of the urban/bush interface. The 'ideal' city shape in terms of reducing this interface is compact or circular (eg having a low perimeter to area ratio) (Duncan, 1991:38). As shown in figure 11.0, as cities expand and change shape the urban-bush interface enlarges (from a high perimeter to area ratio), resulting in more human intervention and contact with the natural environment.

Fig. 11.0 Differing city shapes and the urban-bush interface



The 'circular city' with a more manageable smaller interface zone. More manageable in terms of infrastructure provision, and in terms of services such as fire fighting.

The sprawling cities of today typical of most in the developed countries. As the city expands, so does the urban-bush interface, along with problems such as servicing and infrastructure costs, and more human intervention with the natural surroundings

3.5.1. Environmental Problems

The cumulative effects of the environmental impacts of this residential and recreational expansion into the natural hillside areas of Glenorchy can be seen in the following elements:

1. Increased Nutrients

The native vegetation has adapted to the conditions of the natural soils. However, many residential gardens include exotic species which are not suited to the natural soils and in order to survive they require fertilisers. These fertilisers increase the nutrients in the soil, and through runoff which enters the river systems and adversely affects the native vegetation. The replacement of natural permeable surfaces by artificial ones such as roads, causes very high runoff. With this technology and subsequent pollution, waterways have become a dumping ground for a wide range of pollutants, and the level of pollutants in a water body directly relates to human use of that water. Human activity has increased the concentrations of biodegradable wastes, nitrogen, pesticides, phosphorous

and plant nutrients that reach waterways. This pollution degrades the quality of the water and limits the range of uses by adversely affecting drinking water supply, the environment and on particular activities such as recreation and tourism.

2. Increased Water Supply

Where housing occurs in the hillside areas, stormwater and sewerage discharge result in a greatly increased availability of water for plant growth as well as increased nutrients (Adams, 1990:2). This not only promotes the growth of weeds, but may change conditions to favour other species over the original sclerophyll species.

3. Weed Growth

Many weeds can alter the natural environmental conditions enough to render conditions inappropriate for the germination and establishment of native species (Adams, 1990:2). The number of weeds recorded from bushland in the urban setting is extensive and numbers are still increasing (Adams, 1990:2).

4. Changed Fire Regimes

Fire regimes (which include the frequency, intensity and season of fire) of urban bushland is different today in Australia than in pre European settlement times (Adams, 1990:2). The increasing bush/urban interface resulting from urban expansion, and the increasing accessibility of such areas means that accidents and vandalism are more likely to occur. The presence of housing in certain areas may also mean that the nearby vegetation has not been burnt for some time which may alter the reproduction of native species. Fires also pose a serious threat to property and life where dwellings are located on more steeply sloping areas with particular vegetation types surrounding.

5. Introduced Animals

The fragmentation of natural areas, which is often the result of settlement hemming in and cutting off small sections of land, initially causes a large reduction in animal diversity (Adams, 1990:3). More domestic pets such as cats and dogs have access to the surrounding natural areas today than was the case in the past, and this causes further change in the natural ecosystem to the detriment of mostly small native mammals and birds (Adams, 1990:3).

6. Excessive or Inappropriate Use and Development

The degradation of hillside areas can occur due to inappropriate or excessive use or development. Uses such as mountain bikes and off-road vehicles (4WDs) can cause and/or exacerbate soil erosion problems. The aesthetic decay of natural regions is promoted by the clearing of trees around residential developments and the resultant public utility developments such as power lines which often protrude above the skyline. The subdivision of farms into residential allotments means more land is covered by buildings (in relation to open land), than previously (AIUS, 1973:14).

Natural areas such as hillsides are therefore under threat from a number of factors related to urbanisation (see plate 2.0 for example). These factors contribute to the prevention of the full value of natural areas from being realised. Natural areas within the urban context are subject to extreme stress from the pressures of city expansion.

The reasons people live in certain areas is related to quality of life. However the original concept of a marriage between city and country to gain the best of both did not consider the large populations that have taken up the suggestion. In this way the populations that are living on the peripheries of urban areas are destroying the very values (such as the bush character) that played an important role in the decision to live in the area in the first place.

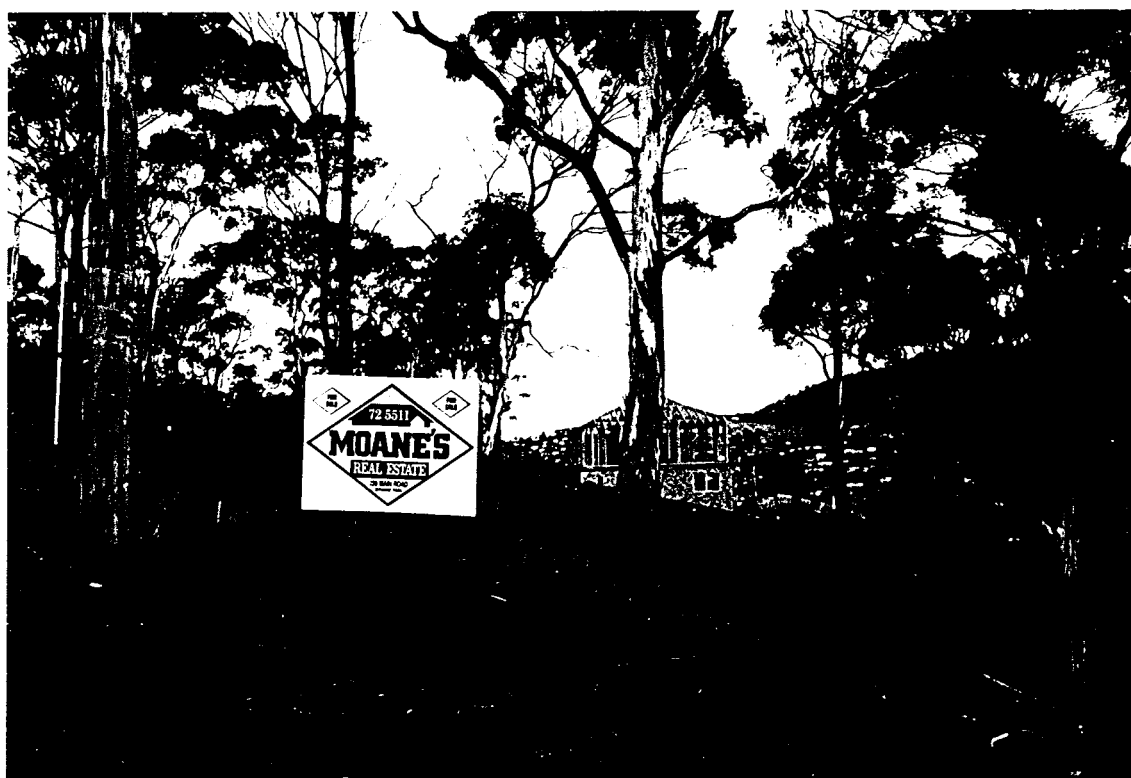
This is evident in recent subdivisions and subsequent developments in Glenorchy which are visually prominent and result in clearing of vegetation (see plate 3.0).

Plate 2.0 Scars from hillside development



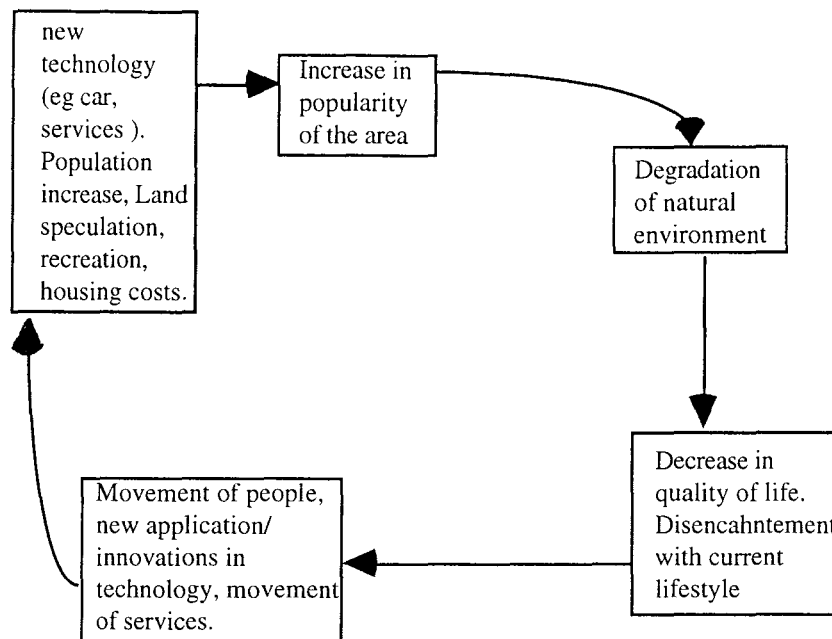
Glenlusk Road, Glenlusk

Plate 3.0 Recent subdivision and development in Glenorchy



Springfield Seventh Avenue, West Moonah

Fig. 12.0 Model of decline of natural landscape qualities of the hillsides



This cycle shows that the equation of LANDSCAPE = HABITAT + HUMANS must be foremost when decisions are being made regarding the direction of future growth and the potential impact of urban development on the natural environment.

3.6 Conclusion

Natural areas in the urban setting are under threat from the urban society which demands roads, recreational pursuits, utilities and housing. The threat to natural areas tends to be gradual and widespread, rather than dramatic which may be one factor in the slow response in establishing stricter protection measures for natural hillsides through planning tools.

The crux of the problems confronting planners today is that there are many, often conflicting demands placed on the land through development pressures, the location of which is often influenced by short term criteria rather than long term assessment. Obviously there will need to be land for residential living, for industries, for utilities and infrastructure, for food production and land for recreational purposes. There is also a need for some representation of natural areas for the preservation of flora and fauna, among the other values of these areas as discussed earlier.

The consideration of how land is used should not be driven by economic, engineering and social/political pressures such as those outlined above, but rather by the capacity of the land to support those uses.

CHAPTER 4 - BIOPHYSICAL CHARACTERISTICS OF GLENORCHY

Francis Bacon wrote, "Nature, to be commanded, must be obeyed". Good planning practice is based on this principle. It does not imply a passive subservience to the forces of nature but rather recognition of natural processes and conditions and any associated hazards.

- P. Hollingsworth

CHAPTER 4 - BIOPHYSICAL CHARACTERISTICS OF GLENORCHY

4.1. Introduction

One of the fundamental roles of planning is the allocation of land use. Land is a resource that comes under pressure from numerous areas as discussed in the previous chapter. Different activities require different qualities of land, and it is the responsibility of planners to ensure that decision makers are fully informed about the environmental consequences of any use or development of land, so that the site and the use are complementary (Kozlowski, 1989:18). The provision of environmental information which is readily accessible is necessary as the basis for the evaluation of landform and landuse. This basic information is a fundamental requirement for framing planning policies, creating development plans for land-use allocation, and in order to exercise an informed judgement in development application assessment (Owen, 1991:105). Physical surveys and mapping may be considered by some to be an antiquated method of achieving this aim, however for objectives relating to the natural environment they are essential (Owen, 1991:105).

Ian McHarg was one of several who attempted to arrive at a practical approach to ecologically and socially sensitive planning through techniques measuring land capability. In his book *Design with Nature* he states that many environmental qualities are 'totally unprotected from despoliation by existing powers of planning and zoning' (1969:79). He then goes on to add that:

the normal expectation is that growth will be uncontrolled, representing short term values. Slowly nature will recede, to be replaced by growing islands of development. These will in time blend into a mass of low grade urban tissue, having eliminated all natural beauty (1969:79).

McHarg's approach was to outline ecological principles and he notes that each area of land and water has an intrinsic suitability for certain single or multiple land uses. He would overlay different components such as slope and flood prone areas to produce a composite from which he could assess the capacity of the land to support various uses, not only in economic and social terms, but also on environmental grounds rather than being led by development pressures.

In terms of planning for the hillsides of Glenorchy, this means working toward long term rather than short term goals and decisions. This chapter provides a more detailed analysis of the environmental considerations of the hillside areas of Glenorchy that need to be taken into account before land use and development criteria are formulated. To date, lack of information and concentration on environmental issues in other areas of Greater Hobart (such as vegetation assessment of Hobart) has left decision makers in Glenorchy a limited environmental information base from which to work.

Many environmental qualities are totally unprotected from despoilation by existing powers of planning and zoning

4.2. Environmental Characteristics

In order to improve the long term planning of the hillsides of Glenorchy, the following information has been mapped and will be discussed in more detail below:

- visual prominence;
- geology;
- vegetation;
- fire hazard; and
- slope.

These characteristics provide a basis from which to identify areas requiring tighter land use controls in order to protect people from hazards, and to protect the environmental characteristics of the hillsides from adverse human impacts.

4.3. Visual Prominence

The problem with hillside development is that some developments are more visible and are more or less imposed upon people who view the area. This has created debate over whether to 'hide' developments by creating standards to promote the 'blending in' of the development, such as specifications relating to colour and height, or whether, in some instances, to allow 'traditional' (often red and white dwellings) developments.

As mentioned in chapter 2, the visual aspect of the hillsides of Glenorchy is a critical element in creating a sense of place- it gives a unique identity to

the region. The visual prominence of the hillsides is therefore an important factor in any assessment of environmental qualities in order to ensure that this 'visual attachment' is protected through siting dwellings in areas that are not of high visual prominence.

As plates 4.0 and 5.0 below indicate, there are many factors which contribute to visual prominence.

Plate 4.0 Visually prominent structure



Glenlusk Road, Chigwell

As shown in the photograph, this structure is very prominent and is characterised by steeply sloping land, reflective colour and materials of structure, clearing of vegetation around the structure and cultivated grass contrasting with the colour and texture of the surrounding native vegetation.

Plate 5.0 Less prominent structure



Bismark Avenue, Collins Cap

Characterised by flat land, retention of native vegetation surrounding the dwelling, the use of colours and materials which 'blend' in with the surrounding colours and textures.

As well as biophysical factors such as slope there are other issues which relate to the prominence of various areas. Perceptual factors such as distance, number of viewpoints, number of viewers and the duration of viewing are also important. Structures in the immediate foreground are more noticeable than structures in the middle to back ground as distinctions can not be made as readily and visual contrasts are less marked (FCT, 1990:80). The scale (size) of the activity, such as residential housing must also be considered.

Plate 6.0

Panorama of Glenorchy's hillsides from Ferry Road, Old Beach (Brighton)



7.0

Panorama of Glenorchy's hillsides from the Bowen Bridge (Clarence)



8.0

Panorama of Glenorchy's hillsides from Otago Bay (Clarence)



Figure 13.0 Visually Prominent Areas of Glenorchy

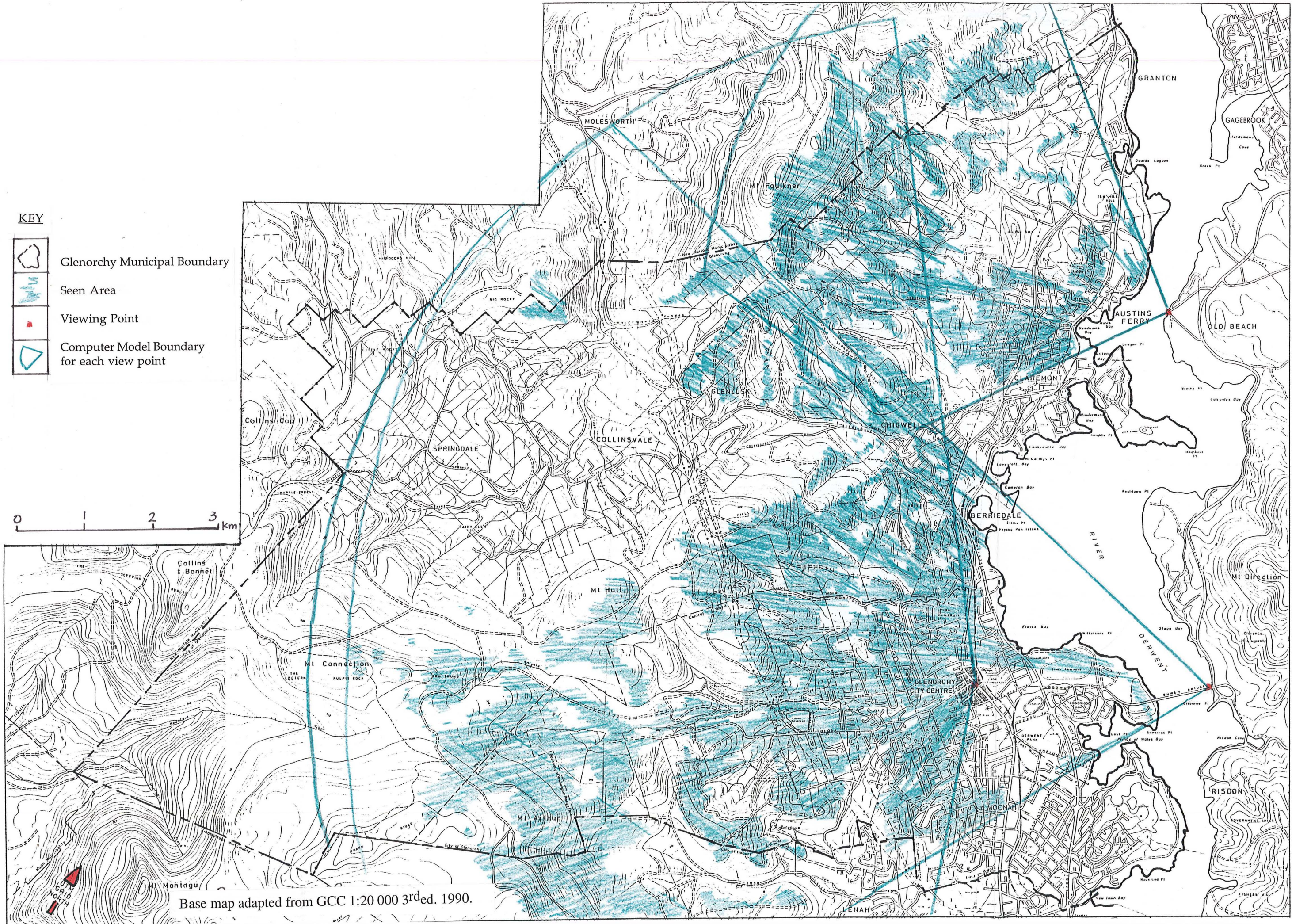


Figure 13.0 Visually Prominent Areas of Glenorchy

In order to determine the visually prominent areas of Glenorchy, three view points were used. These being Old Beach (see plate 6.0), a growing residential area of Brighton, the Bowen Bridge (see plate 7.0) which is used by commuters and tourists, and the Central Business District of Glenorchy where people shop and work.

All three areas are important in terms of the duration of, and number of people viewing the hillside landscape of Glenorchy. A computer program was used to simulate the 'seen areas' from the three points, and the information was then transferred to the base 1:50, 000 map.

The approach adopted in this report in terms of mapping visual prominence has been taken from Forestry Tasmania's *Manual for Forest Landscape Management* technique, which has specifically been established to assess Tasmanian landscapes. It is easily adapted to suit the urban issues facing the hillsides of Glenorchy. It is noted that Hobart is also using this technique in their hillsface zone review. For a more detailed methodology reference to the Manual is recommended.

As figure 13.0 details, a lot of the municipality can be viewed from both local and more regional viewpoints. Consideration must be given to siting, height and colour/materials when development applications come in for those areas which are prominent and which are outside the Wellington Range Park Protected Area (see fig. 21.0 Chapter 5).

4.4. Soil And Geology

Soil and geological analysis identifies soils and base rock that are suited or otherwise to differing forms of development. Tasmania's humid climate has resulted in the moderate to strong leaching of most soils (TSSP, 1976:22). In highland areas sheet erosion can be serious and landslips also occur, especially when soils become waterlogged (TSSP, 1976:22).

The removal of vegetation increases the potential for erosion by enabling water to travel faster over the bare soil surface (TSSP, 1976:22). This can result in the loss of top soil and the scarring of the landscape, with siltation and eutrophication of streams occurring as a secondary effect (TSSP, 1976:22).

Unfortunately many of the activities associated with the development of hillside residential areas will de-stabilise a marginally stable slope (Hollingsworth, 1982:10).

Development Activities which Decrease the Stability of a Latent Slide

Increase the Driving Forces

Load the Top Portion

- Houses
- Reservoirs
- Above ground swimming pools
- Extra earthfill for roads, carports, etc.
- Increase the moisture content

Decrease the Resisting Forces

Excavate the Toe Area

- Removal of fill
- Benching for home sites
- Roadcuttings

Alter Pore Water Pressure

- Poor drainage
- Septic tanks
- Leaky water mains, reservoirs
- Leaky swimming pools
- Over-watering gardens

source. Hollingsworth, 1982:10.

The ability to prevent landslides from occurring in developed areas depends on the recognition of the hazard and effective planning controls (Hollingsworth, 19482:11). Planning authorities in Tasmania usually require a geotechnical report which details the likelihood of hazards such as landslips. However, it is important that this potential is known on a broad scale before areas that may not be suitable are zoned for residential, future residential, or other incompatible uses. Planning in hazard areas fall into three categories as follows:

1) Avoidance

Where the risk is so great that the area is best left undeveloped, or utilised as parkland or forested area;

Figure 14.0 Engineering Geology of Glenorchy

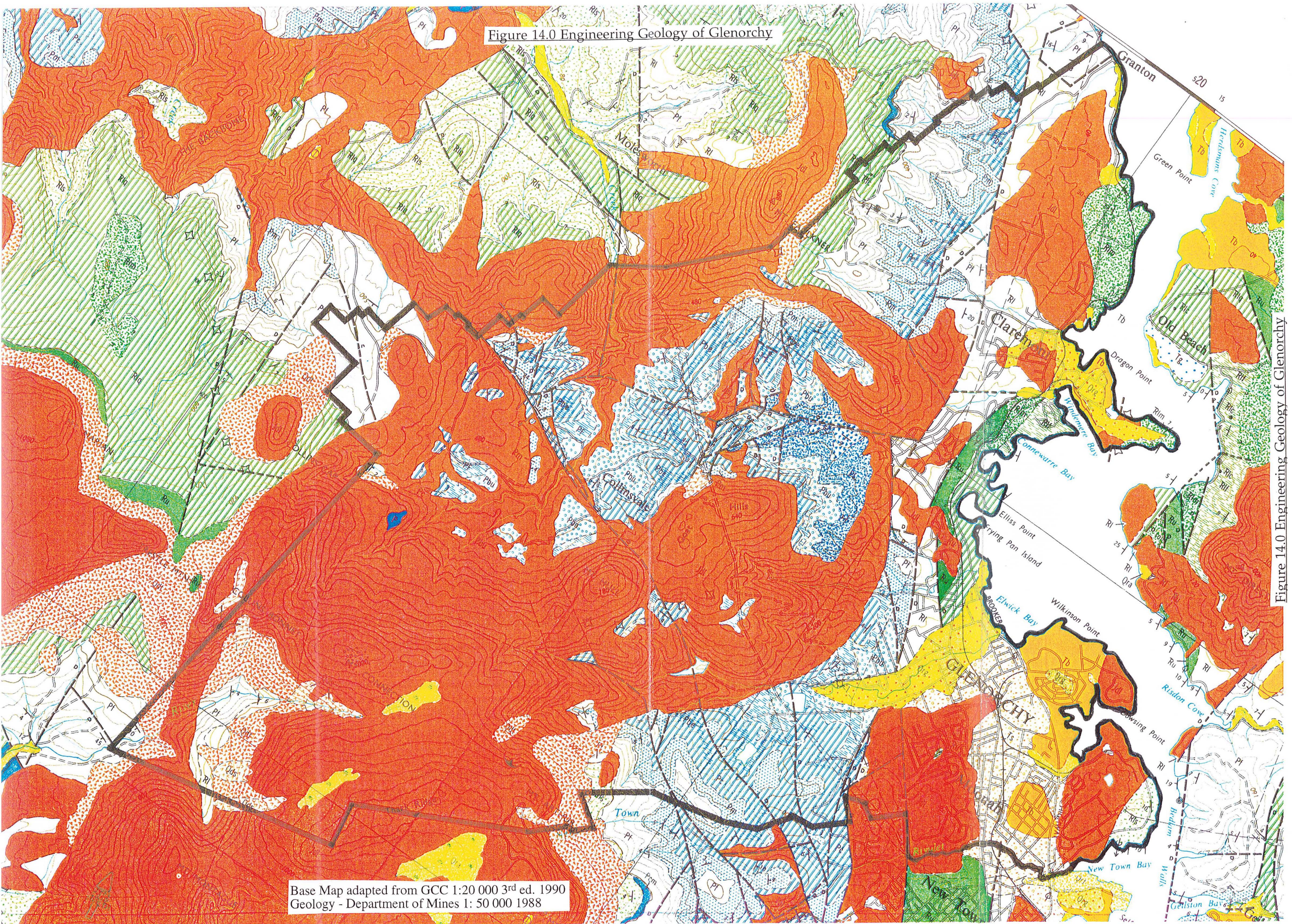

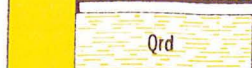

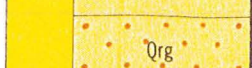






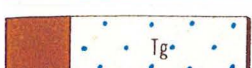
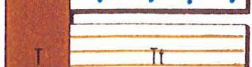






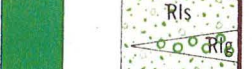

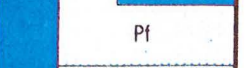


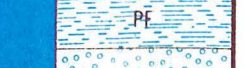


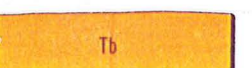
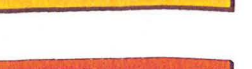



Figure 14.0 Engineering Geology of Glenorchy

Base Map adapted from GCC 1:20 000 3rd ed. 1990
Geology - Department of Mines 1: 50 000 1988

| | | Unit Description | Soil Description | Hazards | Septic Tank Suitability | | | |
|--|--|---|--|---------|-------------------------|---|---|--|
| CAINOZOIC | QUATERNARY |  Qrf | Reclamation fill. | | | Generally suitable. Caution in areas where sand covers clay pans. Possible ground water contamination in areas of high water table. | | |
| | |  Qrd | Dune and windblown sand. | | | | | |
| | |  Qra | Alluvial deposits including younger gravel and marsh and swamp deposits. | | | | | |
| | |  Qrg | Older gravel. | | | | | |
| | |  Qds | Dolerite scree. | | | | | |
| | |  Qdt | Dolerite talus. | | | | | |
| | |  Qbt | Basalt talus. | | | | | |
| | |  Qpt | Permian siltstone talus. | | | | | |
| |  Qmas | Mary Ann Bay sandstone. | | | | | | |
| | TERTIARY |  Tg | Post-basalt gravel. | | | Variable from thin grey yellow sand to brown sandy clay/clay. | Gully and tunnel erosion common on cleared sloped. | Areas of high clay content may be unsuitable due to low permeability. |
| | |  Tr | Sub-basalt tuff. | | | | | |
|  Ts | | Predominantly sub-basalt silt and fine sand with lignite bearing material stippled. | | | | | | |
| Unconformity. | | | | | | | | |
| MESOZOIC | TRIASSIC |  Ru | Upper Triassic lithic arkose and lutite, coal bearing, undifferentiated. | | | Yellow grey sand of variable thickness. Black, high plasticity clays may be present where dolerite intrudes Triassic sediments. | Gully and tunnel erosion common on cleared slopes. | Generally suitable. Areas of shallow bedrock or soils with high clay content may be unsuitable. Care with erosion at outlet. |
| | |  Rlm | Predominantly massive quartz mudstone, minor quartz sandstone, occasional beds of lithic sandstone coal. | | | | | |
| | |  Rlf | Dominantly medium and fine quartz sandstone, minor mudstone. Much mica and graphite on bedding contains 10% feldspar — Clay pellet lenses (indicated). | | | | | |
| | |  Rlc | Dominantly medium-coarse quartz sandstone with minor mudstone minor mica, and feldspar content, contains clay pellet beds. | | | | | |
| | |  Rlg | Thickly bedded, medium-coarse quartz sandstone with grit (Rlg) and very minor usually black shale layers. | | | | | |
| | |  Ris | Thickly bedded, medium-coarse quartz sandstone with grit (Rlg) and very minor usually black shale layers. | | | | | |
| | |  Rle | Thickly bedded, medium-coarse quartz sandstone with grit (Rlg) and very minor usually black shale layers. | | | | | |
| PALAEOZOIC | PERMIAN |  Pcm | Cygnet Coal Measures—including quartz arkose, carbonaceous mudstone rocks containing carbonaceous fragments. | | | Variable from thin yellow grey silty sand to gravel. Often overlies thick yellow clayey gravel/clay. Soil composition extremely variable over very short distances. | Gully and tunnel erosion, and land-slides common on cleared slopes. Sheet erosion common on rocky hilltops. | Generally suitable. Areas of shallow bedrock or soils with high clay content may be unsuitable. Care with erosion at outlet. |
| | |  Pf | Ferntree Group—unfossiliferous quartz siltstone, including Risdon Sandstone and correlates at base. | | | | | |
| | |  Pm | Malbina Formation—quartz sandstone and siltstone fossiliferous in upper and lower members only. | | | | | |
| | |  Pc | Cascades Groupe—fossiliferous beds of dominantly mudstone and siltstone, with Berriedale Limestone indicated where present. (Pbe). | | | | | |
| | |  Pbe | Cascades Groupe—fossiliferous beds of dominantly mudstone and siltstone, with Berriedale Limestone indicated where present. (Pbe). | | | | | |
| | |  Pbu | Faulkner Group—conglomerate, sandstone, mudstone, and shale. Occasionally fossiliferous | | | | | |
| | |  Pbu | Bundella Formation—fossiliferous sometimes calcareous mudstone. | | | | | |
| | |  Pd | Undifferentiated Lower Permian, predominantly unfossiliferous quartz mudstone. | | | | | |
| Igneous Rocks | |  Tb | Tertiary basalt. | | | Red brown high plasticity clay/sandy clay. Variable thickness, sometimes containing basalt fragments. | Potential landslides and soil creep on steep slopes with thick soils. Possible foundation movement due to expansive clays | Areas of high clay content may be unsuitable due to low permeability. |
| | |  Jd | Jurassic dolerite with granophyres stippled. | | | Brown clay, light brown sandy clay and black clay. | Potential landslides and soil creep on steep slopes with thick movement due to expansive clays | Areas of high clay content may be unsuitable due to low permeability. Black |

Key for Figure 14.0 Engineering Geology

2) Non- conflicting use

The risk depends on the nature of the proposed use. A use that does not overload, undercut or saturate the substrata is recommended, and as such this rules out close residential development;

3) Engineering Controls

Where moderately unstable areas have been zoned for residential use, this should only occur under specified and closely controlled conditions (Hollingsworth, 1982:7).

Figure 14.0 has been adapted from the Tasmanian Department of Mines 1:50 000 geological atlas series and Map 1 of the Engineering Geology of the Greater Hobart Area by Hofto. It identifies areas of potential hazard, soil structure and septic tank suitability. This provides a basis from which to determine which areas would not be suited to residential development.

4.5. Vegetation

The natural vegetation of Glenorchy is not well recorded. The vegetation map (fig. 15.0) is compiled from a number of sources and is very broad brush identification of the major vegetation types. Reserves such as Wellington Park and the water reserves already cater for the protection of vegetation and are not considered high risk areas in terms of species decline through neglect or development pressures. Even so, there is the problem of identification of rare, vulnerable and/or endangered species. Several of the reports which detail the vegetation types of council reserves do not include pictures of the vegetation that has been identified as requiring protection. Therefore any works within these reserves may result in the accidental removal of some of these plants/trees. This could be remedied by ensuring that the briefs for botanists who create an inventory of species in any area of Glenorchy include easily identifiable pictures.

The Forestry Commission's recommended areas for protection are also included on the map as areas to be conserved until field assessment of these sites occurs in the next year or two. These recommended areas do not cover private land and therefore are far from complete, however until a vegetation study has been undertaken they should be protected. Note that most of this area falls within the Wellington Range Park, and therefore already has quite strict protection.

Figure 15.0 Vegetation Types of Glenorchy

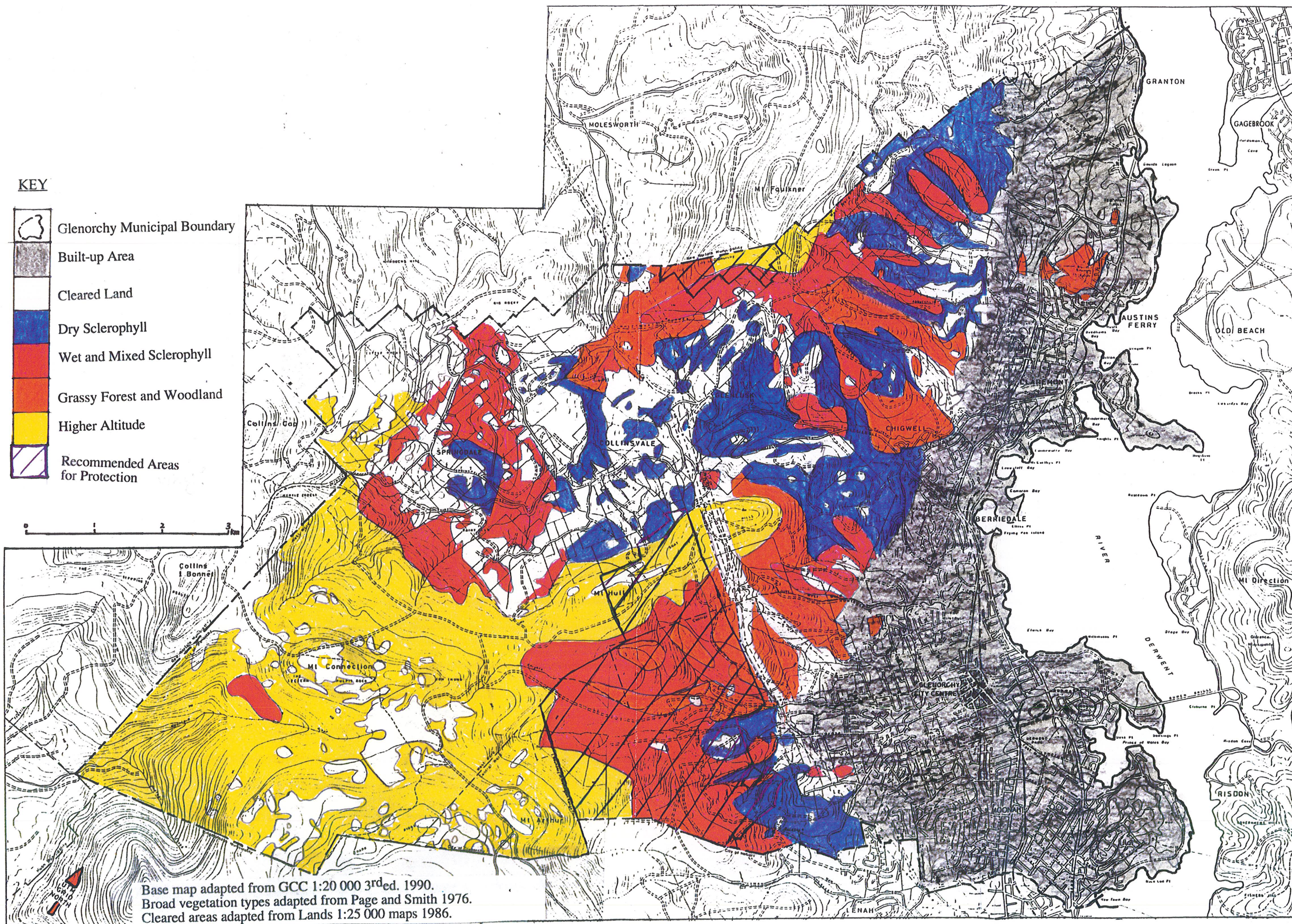


Figure 15.0 Vegetation Types of Glenorchy

Figure 15.0 was adapted from information contained in Page and Smiths thesis, and the Lands Department 1:25000 scale maps (1986) in order to get more recent information about the amount of vegetation clearance.

These broad classification types are beneficial in helping to establish a fire management strategy, however more specific details are needed in terms of protecting sensitive vegetation species and communities.

Table 4.0 Vegetation types in Glenorchy

| Classification | Typical Understorey | Dominant Eucalypt Species |
|--|---|--|
| Cleared Land | Very variable ranging from managed annual grasses to unmanaged areas where weeds have invaded. | - |
| Grassy Forest and Woodland | High proportion of grasses. Variable mix of dry sclerophyll shrubs and sedges. | <i>E.globulus</i> , <i>E.pulchella</i> , scattered <i>E. viminalis</i> , <i>E.ovata</i> on poorly drained sites. |
| Dry Sclerophyll Forest | Variable mix of dry sclerophyll shrubs and sedges. Very sparse understorey on drier slopes and ridge tops. | <i>E.tenuiramis</i> , <i>E.amygdalina</i> , some <i>E.viminalis</i> and <i>E. obliqua</i> . |
| Wet Sclerophyll and Mixed Sclerophyll Forest | Broad leaved shrubs in true wet sclerophyll phasing into mixture of broad leaved and sclerophyllous shrubs in mixed sclerophyll. Generally much taller and denser underforest, Variable component of bracken and sedges | <i>E. obliqua</i> , <i>E. globulus</i> , <i>E. viminalis</i> , <i>E. regnans</i> . |
| Higher Altitude Communities | Variable; ranging from broad leaved wet sclerophyll shrubs to australmontane shrubberies. Broken, rocky terrain common. | <i>E. delgatensie</i> phasing into <i>E. urnigera</i> , <i>E. johnstoni</i> and <i>E. coccifera</i> above around 800 metres. |

Source: Page and Smith, 1976:28.

The Parks and Wildlife Service have also provided a list of species found in the Glenorchy Municipal Region, however the extent of these species on the ground is not well known and has not been mapped. What it does show is that there are sensitive species and possibly communities in Glenorchy, most likely situated in the hills. This list is included in Appendix A.

In regard to natural areas in the urban setting, the Draft National Strategy for the Conservation of Australia's Biological Diversity recommended the conservation of these areas by:

- *encouraging retention of habitat;*
- *improving strategic planning and infrastructure coordination so as to enhance the biological diversity of urban areas;*
- *seeking ways of reducing fringe development and focusing future development on existing built up areas in Australian cities;*
- *encouraging action by local governments to retain and improve natural ecosystems and to use locally indigenous species for planting in urban areas; and by*
- *integrating biological diversity conservation considerations into relevant policies and programs* (ANZECC Task Force, 1993:17).

It is important that these suggestions be actively taken up to ensure that the natural areas in the urban setting, such as the hills of Glenorchy, do not become 'green islands' with no connections to other natural areas.

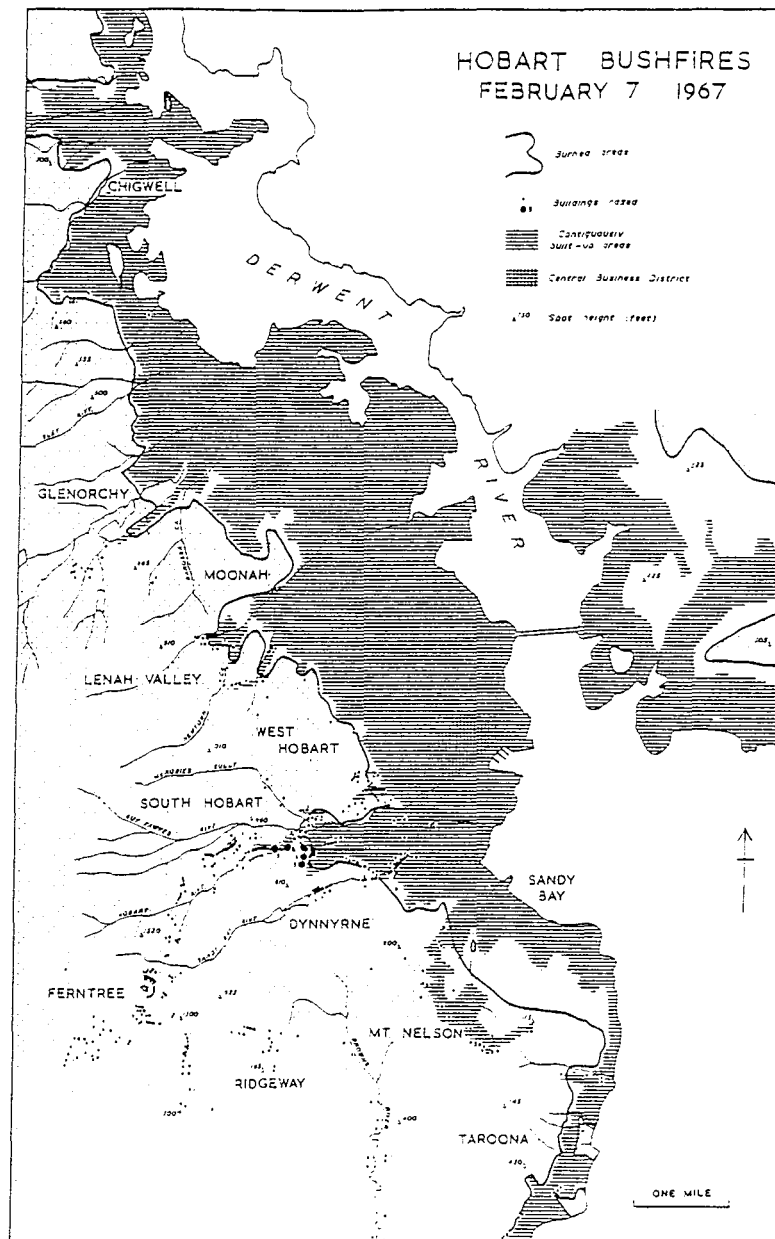
4.6. Fire

The south eastern regions of Australia are particularly susceptible to bushfires (Martin & Allenby, 1988:119). The hillsides of Glenorchy constitute a bushfire hazard due to the large amount of vegetation dominated by *Eucalyptus* species which have high contents of volatile oils (Fensham, 1991:1).

However, it is the human element that plays a large role in bush fire potential as the majority of bush fires are initially deliberately lit (Page & Smith, 1976:41). The threat to human life and property from fire in Glenorchy is compounded by residential developments at the bush/urban interface. The 'fingers' of housing (seen in figure 8.0 Chapter 3) that stretch out into the existing vegetation of the hillsides help create a larger fire risk than that which would naturally occur (Page & Smith, 1976:41).

This was clearly evident in the bushfires of the summer of 1967 in which 62 people died and 1466 buildings were destroyed or severely damaged (Fensham, 1991:1). Of the buildings burned, in the whole urbanised zone, half of them lay between the 60 and 180 metre contours, 42 were between 180 and 240 metres, 38 between 300 and 400 metres, and 44 between 460 and 520 metres (Solomon, 1976:209). Figure 16.0 shows the extent of the fire.

Fig. 16.0 Hobart bushfires: February 7 1967



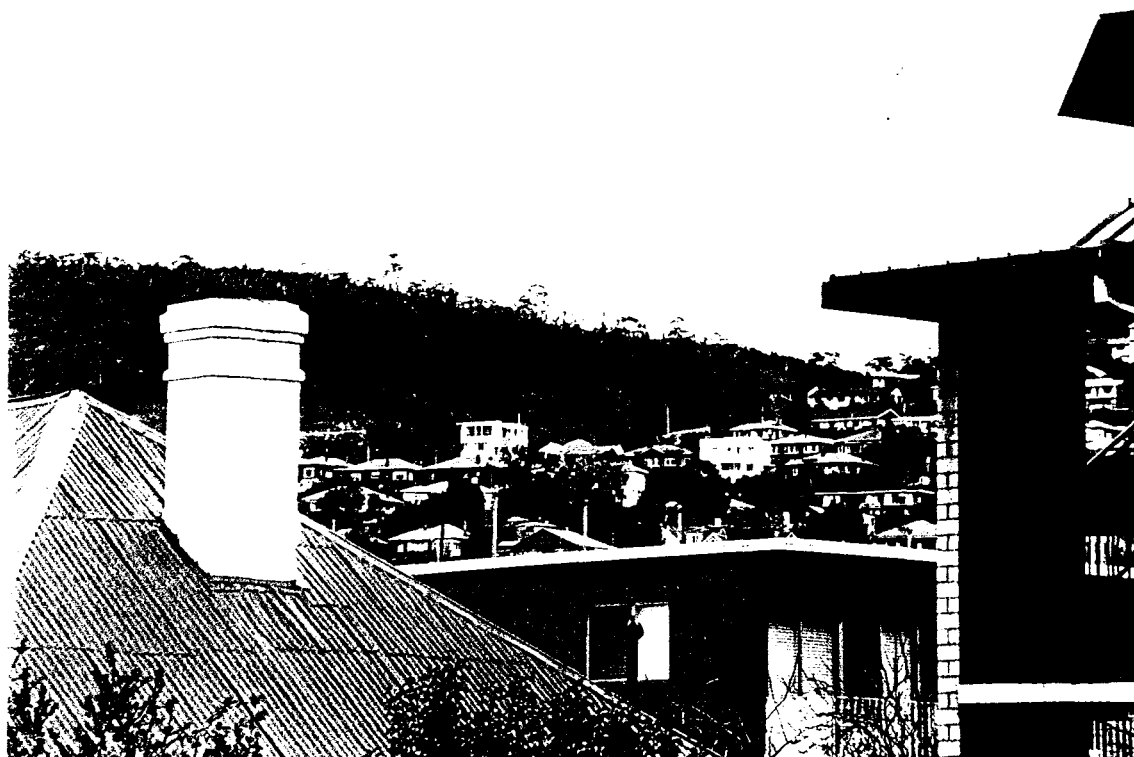
Distribution of areas burned and buildings destroyed in Hobart and environs by the summer bushfires of 1967.

Source: Solomon, 1976:210.

The fire of February 1995 at Mount Nelson in Hobart provides a more recent example. As plate 8.0 shows, the fire placed many homes in jeopardy, and the scars from the burn are still prominent.

The problem for council, the fire services and bushland managers is to provide for the protection of life and property while maintaining the environmental, aesthetic, water catchment, and recreational values of the hills.

Plate 9.0 - The result of the Mount Nelson fire, February 1995



The northern face of Mt. Nelson viewed from Regent Street Sandy Bay.

Many factors contribute to the rate and intensity of bushfire spread. These include slope, vegetation type, weather conditions and fuel quantity and dryness (Fensham, 1991:1). Housing development adjacent to bushland is aggravating the threat posed to habitation by bushfires (Page & Smith, 1976:38).

In terms of fire risk, Page and Smith (1976) outline the fire danger relative to vegetation type and aspect (see table 5.0).

Table 5.0 Fire Danger and Vegetation Type

| | Aspect | Vegetation Type |
|-----------------------------|---|--|
| Increasing Fire Danger ↓ | S, SW, SE. Easterly Westerly N, NW., NE. | Wet Sclerophyll Higher Altitude Communities Mixed Sclerophyll Dry Sclerophyll |

Source: Page & Smith, 1976

In terms of the formulation of fire management plans for Glenorchy, there are several factors that need to be considered in conjunction with the vegetation type and fire risk (Duncan, 1991:36). 'Ecological factors and

processes in the forest' and 'special values' (such as rare, and fire susceptible flora and fauna) also help to determine the regularity of burning (Duncan, 1991:36).

In some instances no burning may be the option chosen for botanical protection purposes, in circumstances such as those listed below:

- where on-site regeneration is desired and minimal retained seed trees are present;
- the presence of steep or erodible sites where burns followed by rain may cause erosion problems and heavy sediment and nutrient loading in streams;
- where there is a risk of burns escaping into relict forest or other fire sensitive vegetation; and
- where fire sensitive species of conservation significance have been identified (Duncan, 1991:36).

Unfortunately there has yet to be a comprehensive vegetation survey of Glenorchy to identify significant species and communities. However the fire service have made some general judgements about the area, and can see no benefits in burning the wet forests of the upper slopes dominated by wet sclerophyll and the higher altitude communities (pers. comm. Percival). This is because they pose less of a fire hazard in terms of vegetation type, and due to the fact that these areas come into contact with fewer people.

The major area of concern for the Tasmanian Fire Service in terms of strategic planning is the urban/bush interface. The hillside areas of Glenorchy are freely accessed by cars which bring rubbish and the possibility of invading weeds. The priorities for the hillsides is to reduce the means by which people traverse the existing trails (pers. comm. Percival). There is also a need for weed eradication and the upgrading and securing of fire trails in order to assist in the prevention and fighting of fires that threaten private property.

The fire service usually control burns on public land only, however they can provide advice as to how to go about burning on private land. Educational brochures and videos on what the options are for protecting house and life have been published and they include measures such as wetting down, fuel reduction, and the installation of special sprinkler

systems for isolated houses in heavily vegetated areas. This type of information needs to be made available to the wider public, one approach being that the educational brochures could be sent out by Council with rates notices. However, Glenorchy really needs a fire management plan which details the fire history of the area in order to identify which areas need to be burnt and how often this should be carried out. Glenorchy has embarked on this process, however it is difficult to come up with a comprehensive plan without the vegetation data. Ideally the fire management plan should wait until this has been produced.

In recognition of all of these factors, the Hobart Special Fire Area Report (HSFA, nd) divided Glenorchy up into three fire management zones (see figure 17.0):

- 1) High Altitude/Remote Area Zone
- 2) Fuel Reduction Burning Zone; and
- 3) Urban Area Protection Zone.

The High Altitude/Remote Area Zone is generally situated above the 700 metre contour level, and the HSFA report recommends the suppression of *all* fires within this zone.

This is to protect the 'fragile' and 'vulnerable' ecology of the area and to reduce the potential for increase in fire size and spread (HSFA, nd:III/2). Fire suppression in this area will be difficult due to remoteness, lack of available water, steep terrain.

Therefore it is important that residential uses and associated activities do not infiltrate into this area, and that those who do come into the area for recreational purposes are educated as to the risks of their behaviour in relation to fire.

Figure 17.0 Fire Hazards and Management Zones of Glenorchy

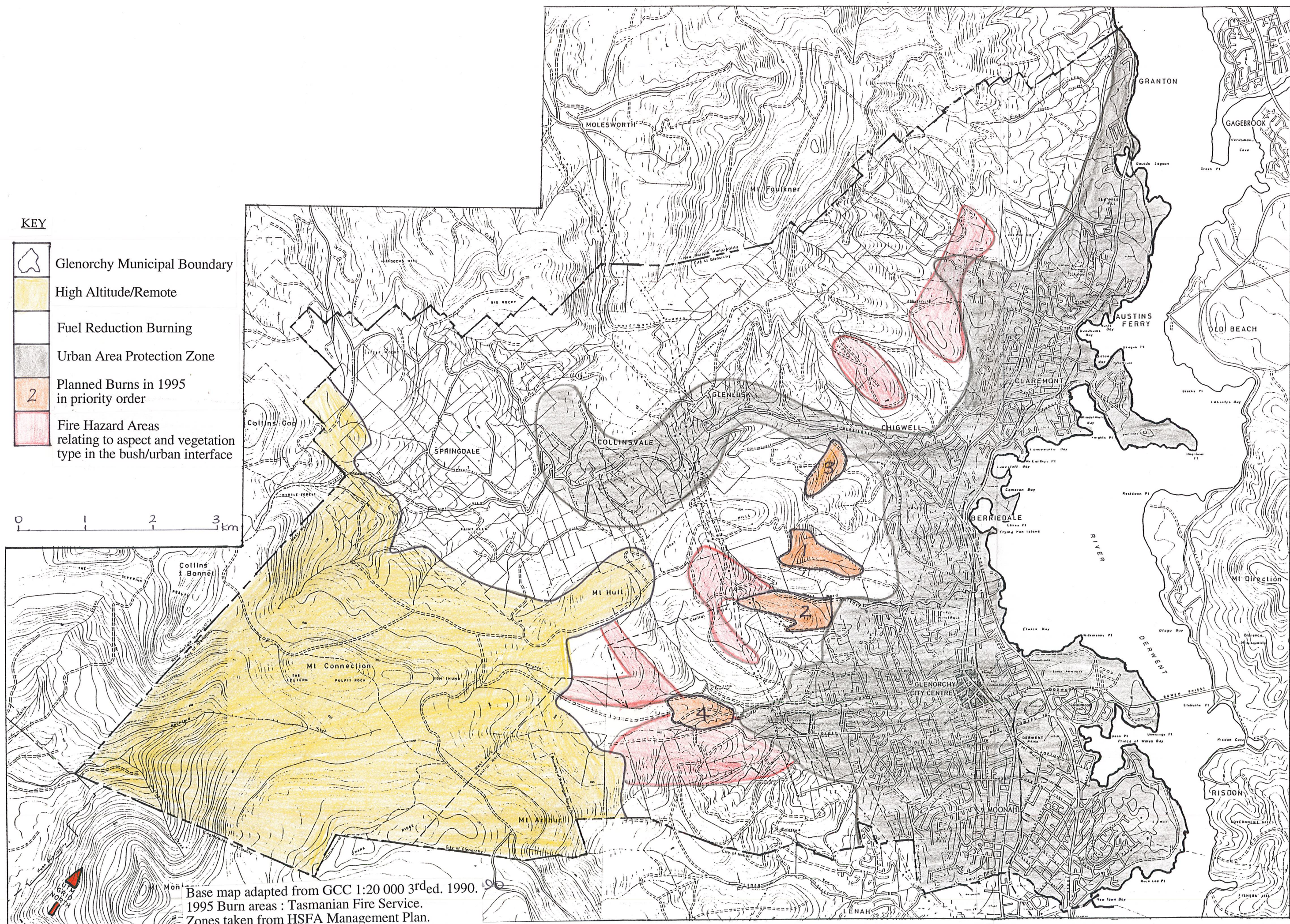


Figure 17.0 Fire Hazards and Management Zones of Glenorchy

The Fuel Reduction Burning Zone generally occupies the lower foothills outside the settled urban areas (HSFA, nd:III/3). The area contains a wide variety of uses including, reserves, water catchment areas, recreational and provides a scenic backdrop to Glenorchy. Depending on conditions, some fires in this area could threaten those dwellings in the urban/bush interface and the higher altitude plant communities. Protection of this area can be achieved to a certain degree through fuel reduction burning in strategic strips, or over a broader area (HSFA, nd:III/5). The Fire Service has recognised this through the burning they have carried out so far this year, and in their plans to do in the remainder of the year (see figure 17.0). The map also details the high fire danger areas which affect the interface region relative to aspect and vegetation type, that needs to be considered for burning in the near future.

The Urban Area Protection Zone involves the urban/bush interface area. This zone poses the greatest risk in terms of loss of life and property. Both ribbon development along ridgelines, and more isolated (eg. Collinsvale) communities occur in this zone. Protection involves 'fire proofing' houses, education, fuel reduction, and buffer zones around housing. The Tasmanian Fire Service stresses that building design and construction can significantly reduce the impact of fires (TFS, nd :5). For example, the tops of steep ridges, steep land in general, houses built on piles, dry northerly aspects, and buildings located some distance away from major access routes can all pose problems (TFS, nd :5). Glenorchy has a clause in the planning scheme which states that development in fire hazard areas can be referred to the Fire Service, however the Fire Service do not see applications on a regular basis (pers. comm Percival). Co-operation between Glenorchy Council and the Tasmanian Fire Service should be encouraged to avoid gaps or repetitions in information.

Figure 18.0 Slope Classes of Glenorchy

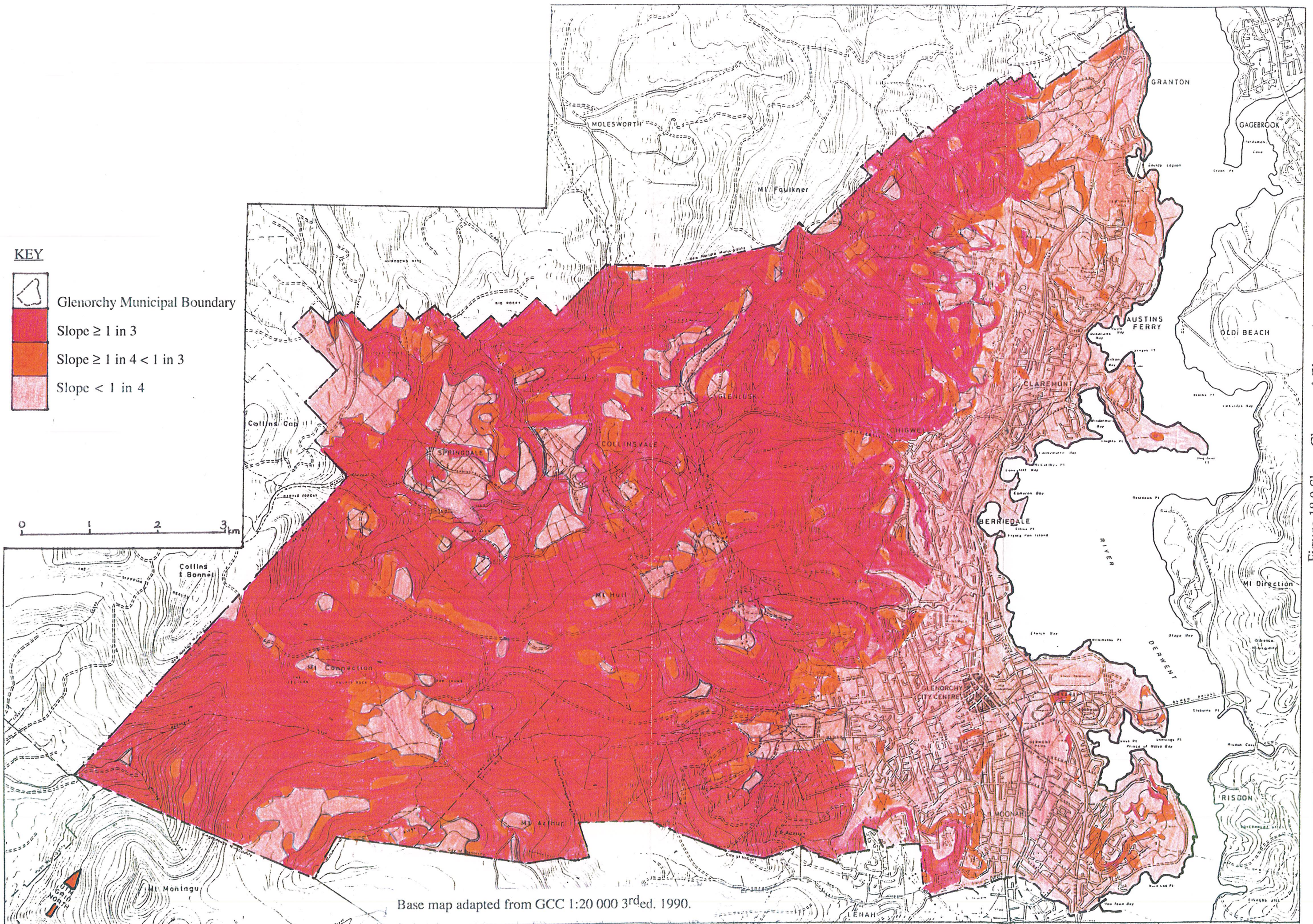


Figure 18.0 Slope Classes of Glenorchy

4.7 Slope

Slope is an inhibiting factor on development (HCC, 1986:17). A group of consultants from Canberra recommended one approach to development based on a steepness factor where a potential subdivision can be placed within a 'steepness zone' with corresponding design criteria then applied (HCC, 1986:17).

These categories are as follows:

1. Gentle - slopes up to 1 in 5
2. Moderate - slopes up to 1 in 4
3. Steep - slopes up to 1 in 2.5
4. Very Steep - slopes exceeding 1 in 2.5.

The report concluded that constraints on development start at 'steepness zone' number 2, and by the time a slope of the magnitude of category 4 is reached the constraints are 'considerable' (HCC, 1986:17). Professional evidence seems to point a slope of 1 in 3 as the critical point beyond which subdivision should be actively discouraged (HCC, 1986:17). Figure 18.0 details the 1 in 3 and greater slope, the 1 in 4 to 1 in 3 category and less than 1 in 4. As shown in the map, the majority of the municipality falls within the 1 in 3 category. Urban development to date has dominated the flatter areas of Glenorchy, however as technology improves, and demand increases, the urban development is gradually moving up into the steeper hillside areas. Development constraints are not the only issue in steep areas. As mentioned earlier slope also effects the rate of spread of bushfires. A slope of 1 in 3 and greater poses a 'very high fire danger' in terms of fire spread (TFS, nd :9).

4.8. Conclusion

Environmental information is necessary not only for the development of sustainable planning mechanisms, but also to provide a base line from which to monitor environmental changes over time. Although the initial outlay for this type of information is large, maintaining it through updates is much less consuming in terms of resourcing.

Once the information has been collected and mapped, current and potential planning mechanisms can be reviewed in light of how best to protect the environmental characteristics, and prevent development which will impinge on these characteristics, or that will threaten human safety.

CHAPTER 5 - CURRENT CONTROL MECHANISMS FOR HILLSIDE LANDUSE

The necessity for governmental involvement in environmentally sensitive land comes from the essentially public character of these land resources. When we talk about the destruction of environmentally sensitive areas we do not just mean the possible loss of some "intrinsic" environmental values or benefits, but also loss to the social and economic welfare of a community.

- C. Thurow.

CHAPTER 5 - CURRENT CONTROL MECHANISMS FOR HILLSIDE LANDUSE

5.1. Introduction

There are a number of planning tools that can be used to regulate land use. This chapter will outline the current means of controlling development of the hillsides of Glenorchy, as well as discussing possible alternatives and/or additions. Mechanisms which have been used elsewhere for the protection of environmental qualities of natural areas on both public and private land will also be detailed.

Planning authorities such as Glenorchy in Tasmania tend to assess applications on the 'individual merit' of single proposals often without the benefit of a long term strategy for the municipality. In order to plan for the sustainable use of hillsides, it is important that information is available from which to assess the effects of both individual and incremental development on the natural characteristics of the area as described in chapter 4. Development control can play a part in the prevention of hillside quality decline if used in conjunction with long term strategies by arranging for the following:

1. identifying and preserving land for conservation and other uses;
2. protecting and managing vegetation in sensitive areas;
3. avoiding placing houses, buildings or other development in unsuitable locations such as visually prominent areas;
4. controlling subdivision and development in areas subject to hazards or constraints such as landslip or soil erosion; and
5. maintaining hillside vegetation and biodiversity by preventing its fragmentation into small lots (Boss, 1986:57).

These aspects will be discussed in relation to Glenorchy in detail below.

5.2. Identifying And Preserving Land For Conservation Through The Planning Scheme

Zoning is the main form of development control of the hillsides in Glenorchy. Zoning establishes areas or districts within a municipal area in which certain uses are allowed (Hendra & Madden, 1990:131).

Theoretically these zones protect the community from conflicting land

uses. It can be used to deflect land use pressures away from sensitive natural areas (Owen, 1991:114). However one of the problems with this method of regulation is that variances and exceptions can be made due to political pressures, prospects of economic gain or other motivations (Hendra & Madden, 1990:131). Conflicts can often arise between members of the community who, for example, may want to preserve skylines and vegetation on the hillsides, and developers who want to maximise their profit margins through developing them. Therefore planning authorities need to carefully plan the growth of their region and manage their natural resources in a sustainable manner. In order to do so both the planners and the community need to be well informed in order that planning decisions are made for the good of the largest number of people both now and into the future. This may mean using other tools besides zoning in order to better regulate land.

Most Municipalities in Tasmania now have some form of planning system in place. However these are diverse (there are around 90 planning schemes and interim orders in effect) and range in their protection of hillside areas and their natural characteristics. Landscape Protection or a similar zoning is often used as a tool to protect the environmental values of hillsides. The zoning ordinance of a planning scheme specifies the land use districts in the community and establishes rules for the intensity of use in each. The most important characteristic of a landscape protection zone is the extent to which it controls the intrusion of development into the vegetated 'bushland'³ area. If the zoning permits too many uses and development, then the protective goal is lost.

5.2.1. Key Characteristics For Protection

The protection of the characteristics of Glenorchy's hillsides can only be achieved if there is an ability to constrain or influence urban expansion or redevelopment.

Over 70% of Glenorchy is zoned 'Landscape and Conservation' (see fig 19.0) specified in clause 5.1.3 of the Glenorchy Planning Scheme (GCC 1992:33) as:

...covering those areas which contribute to the image and natural setting of the City or which form part of the water catchment. The Zone principally protects the forested character of the higher slopes and skyline. The Zone allows for the

continuation of present land use, whilst restricting those uses and Developments which would degrade the landscape and conservation values.

Clause 5.4 states that:

The intent of this Zone is:

- (a) to retain the landscape values of the forested hills and skylines within the Planning Area;*
- (b) to restrict uses and Development within the water catchment areas that result in the degradation of a clean water supply; and*
- (c) to protect the habitat of flora and fauna (GCC, 1992:34).*

The key is to determine what the important characteristics or qualities of the hillsides are, so that appropriate regulatory methods can be refined (Thurrow, 1975:15). Drawing from previous chapters, hillsides in the urban context are important because:

- they provide a scenic backdrop to the city contributing to the identity of Glenorchy and providing visual relief;
- they retain much of their natural vegetation which provides habitat and helps preserve biodiversity of both plant and animal species, and prevents soil erosion;
- they provide a natural recreational area within close proximity to the urban areas which is easily accessible;
- they are important water catchment areas; and
- they have intrinsic values such as beauty.

These attributes of hillsides have been recognised through the aims and objectives covering the rural, open space and landscape and conservation zones as outlined in the Glenorchy planning scheme. The aim is to 'ensure that development will have minimal impact on the landscape and other land uses' (GCC, 1992:37). The objectives to satisfy this aim are as follows:

- (a) to retain the rural character of the area and protect the natural skyline;*
- (b) to minimise the impact of uses and development on adjoining land uses;*
- (c) to restrict the use and development of land which is flood prone, subject to high bush fire risk or affected by other environmental or physical hazards; and*
- (d) to protect watercourses and the natural landscape. (GCC, 1992: 37).*

Figure 19.0 Location of Existing Landscape and Conservation Zone and Zones in the Urban/Bush Interface of Glenorchy

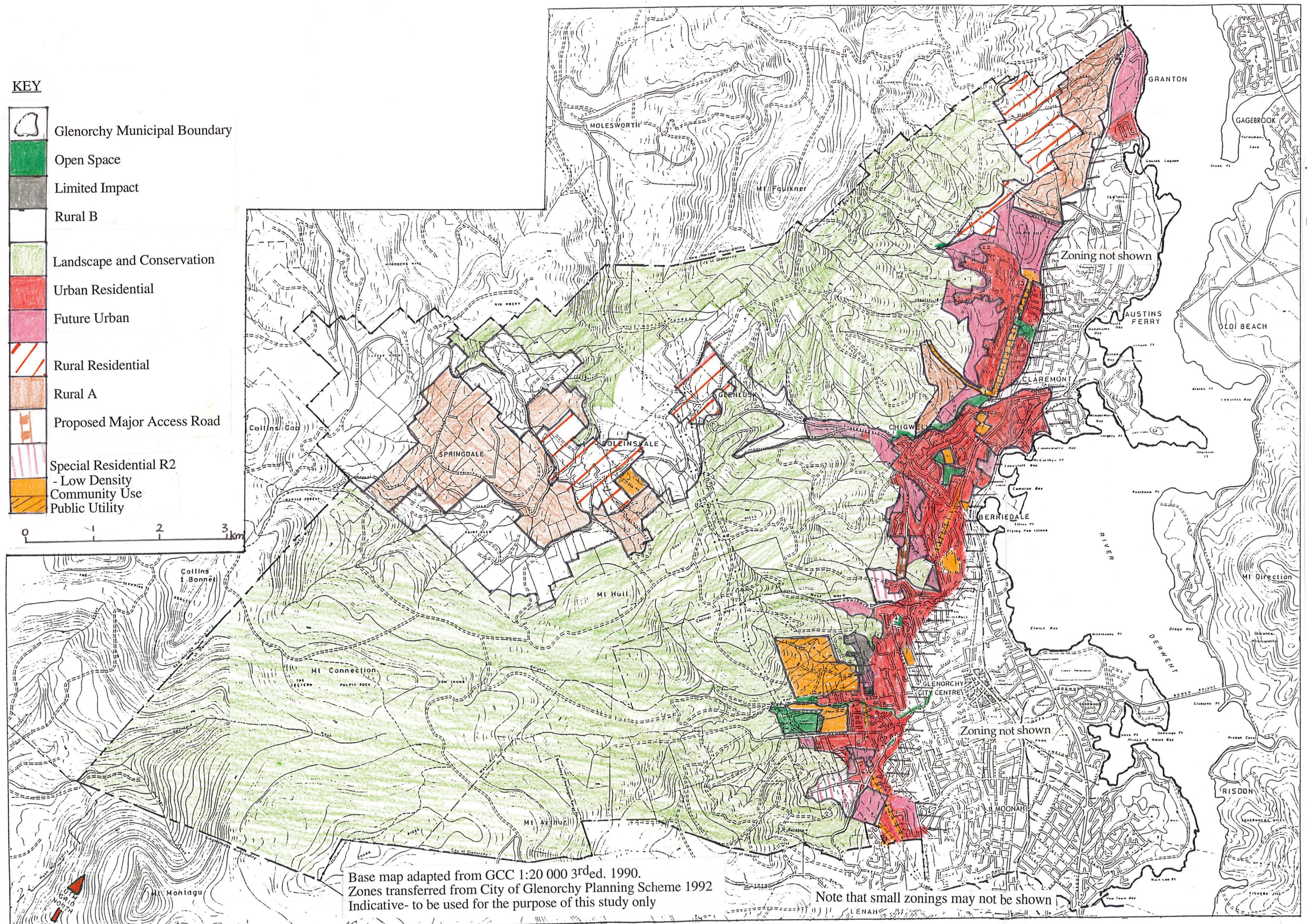


Figure 19.0 Location of Existing Landscape and Conservation Zone and Zones in the Urban/Bush of Glenorchy

The critical protective mechanism for the retention of environmental characteristics can either be strengthened or lost in the next step. That is, how these aims and objectives are translated into development control.

5.2.2. Use And Development Status In The Landscape And Conservation Zone

The planning scheme also details what uses and developments are permitted, discretionary and prohibited in the Landscape and Conservation zone in keeping with the intent. They are grouped in table 6.0 according to their use and development status.

Table 6.0 Use and Development Status in the Landscape and Conservation Zone

| Use and Development Category | Landscape and Conservation Zone |
|--|---------------------------------|
| Home Activity | P1 |
| Public Park | P |
| Auxiliary Dwelling | P |
| Agricultural Training/Research | D |
| Agriculture | D |
| Animal Keeping | D |
| Extractive Industry | D |
| Forestry | D |
| Home Business | D |
| Home Child Care Centre | D |
| Public Utility | D |
| Miscellaneous | D |
| Tourism Facility | D |
| Plant Nursery | D |
| Stable | D |
| Single Dwelling | D |
| Hospital | X |
| Intensive Animal Farming | X |
| Outdoor Recreation Complex | X |
| Guest House/Holiday Flat/Holiday Cabin | X |
| Animal Stockyard | X |
| Car Park | X |
| Caravan Park Camping Ground | X |
| Communal Dwelling | X |
| Places of Assembly | X |
| Produce Stall | X |
| Rural Industry | X |
| Veterinary Establishment | X |

Source: GCC, 1992: pp 35- 36

KEY

- P1 = The use or development of the Land may take place without obtaining a permit, provided the use or Development complies with all relevant Development standards of this Scheme
- P = The Corporation will grant a permit for the use or Development of the Land conditionally or otherwise provided it complies with all relevant Development standards of this Scheme

- D = The Corporation has the discretion to grant a permit or refuse to grant a permit for the use or Development of the Land
X = The use or Development of the Land is prohibited.

Over 40% of uses that are able to be established in the zone are made at the discretion of Council. This means the planning authority of Glenorchy has the power to relax or modify any development standards of the scheme and can either grant a permit with or without conditions, or refuse to grant a permit.

This discretion has both positive and negative aspects in terms of effective protection of the hills. Discretion enables the assessment of individual sites to be done on a more site detailed basis in order to take into account localised environmental issues. However, as mentioned earlier, this discretion can also be manipulated by political and other pressures in which case decisions may not be environmentally sound. Emphasis is also placed on the administration of the ordinance which can be costly and time consuming. Discretionary permits are subject to appraisal and decision by the elected council members. All discretionary decisions are subject to appeal through the Resource Management and Planning Appeal Tribunal, adding a further stage. The assessment and appeal process is demanding on staff time and other resources, however it does enable local knowledge and site specifics to be taken into account.

Other discretionary uses such as forestry, extractive industries and public utilities may conflict with the intent of the zone. However these activities are also controlled by other Acts such as the *Forest Practices Act 1985*, which override the *LUPA Act*. In these cases the planning authority can only suggest the conditions of approval or operation.

Single dwellings are also discretionary due to the fact that subdivision has already occurred in the Landscape and Conservation prior to the provision that there be no further subdivision in that area. Once subdivision has occurred it is very hard for Council to deny or prohibit the construction of a dwelling. The discretion allows some control over the design and siting of such houses in the zone.

5.2.3. Rationale For The Landscape And Conservation Zone Boundary

It is extremely important that any zone such as the Landscape and Conservation zone, established as stated in the scheme to protect the natural values of Glenorchy's backdrop, be based on environmental information and the values expressed by the community. However, the rationale behind the boundaries of the Landscape and Conservation zone is somewhat unclear. It appears to be influenced by a combination of water supply, which in the main can be serviced up to the 120-135 metre contour line, and the boundaries of titles, although it also includes the identified water catchment districts. This approach to zoning tends to be based on development potential rather than the consideration of environmental qualities and factors.

5.3. Protection And Management Of Vegetation In Sensitive Areas

In terms of vegetation protection, clause 9.7 of the Glenorchy planning scheme states that:

a person shall not ringbark, cut down, top, lop, remove, injure or wilfully destroy any tree within the Planning Area which has:
(a) a height greater than 10 metres measured from the lowest adjacent ground level; or
(b) a spread of branches greater in diameter than 6 metres;
except with the consent of council given with or without conditions. (GCC, 1992: 54).

This quantifiable approach was introduced to combat the fact that with the definition of 'Development' under the scheme, the removal of any vegetation (such as grass and weeds) would constitute works and as such would require a permit. The current definition of development as defined in the Glenorchy planning scheme includes:

- (a) the construction, exterior, alteration or exterior decoration of a Building; and*
- (b) the demolition or removal of a Building or Works; and*
- (c) the construction or carrying out of Works; and*
- (d) the subdivision or consolidation of Land, including buildings or airspace; and;*
- (e) the placing or relocation of a Building or Works on Land; and*
- (f) the construction or putting up for display of signs and hoardings*
(GCC, 1992:87).

Where the definition of Works is:

any change to the natural or existing conditions or topography of Land including the removal, destruction or lopping of trees and the removal of vegetation or top soil, but not including forest practices as defined in the Forest Practices Act 1985 carried out in State Forests. (GCC, 1992:92).

There is no doubt that assessing a development application for the removal of any vegetation would tie up council resources that could be more effectively and efficiently used elsewhere. In terms of protecting the important aspects of hillsides mentioned earlier such as water quality and soil, clause 9.7 may have limited use. Its intention is to protect mature trees, although shrubs and plants are also of importance. The retention of some vegetation of all ages and sizes is necessary to ensure habitat and microclimate to suit the variety of flora and fauna that make up the ecosystem. Also, rare, threatened and/or endangered flora are not restricted to larger trees, and as such will not be comprehensively covered by this mechanism once their mapping is complete. Although the Threatened Species legislation (due for implementation towards the end of 1995) should help protect this vegetation, communities are left uncovered. Important trees are not necessarily determined by their size. Vegetation along drainage channels for example play a vital role in environmental quality regardless of size.

The tree preservation provision relates to flatter as well as hillside areas in the urban context. Problems relating to trees in these two areas are somewhat different and this is not picked up in a blanket provision. For instance, some large trees may pose problems such as interference with power lines and services and this control may also be too restrictive within the dense residential setting.

5.3.1. Riparian Vegetation

Clause 9.6 relates to watercourse protection and states that any use or Development (includes tree removal) within 30 metres of any Watercourse listed in Schedule 6 (Sorell Creek, Myrtle forest Creek, Derwent River and Humphrey Rivulet) which would otherwise be permitted (P) shall be deemed to be discretionary (D) in accordance with Clause 7.5 (GCC, 1992:53).

Although this clause recognises the importance of river bank protection, the discretion does not prevent development taking place within 30 metres of a scheduled watercourse (and indeed as is the case with the approved Northgate expansion, approval was granted for Humphrey's Rivulet to be built over).

5.4. Control Of Development In Areas Subject To Hazards Or Constraints

5.4.1. Fire Hazards

Clause 9.3 of the Glenorchy planning scheme states that Council must not grant a permit if it is of the opinion that the subject land is an area of high fire risk unless it is satisfied that the use of development of that land will not contribute to the fire risk, and that fire prevention and protection measures will be taken to reduce that risk (GCC, 1992:53).

As mentioned, Council is currently embarking on a fire management plan, and has not yet identified high risk fire areas in a comprehensive manner. According to the Fire Service, the provision for referral to their agency is also not being used to its fullest potential, possibly due to time in which applications have to be assessed.

5.4.2. Land Stability

Clause 9.1 of the planning scheme states that the council must not grant a permit if the subject land is located on soils of known or potential instability unless it is satisfied that the use or development of that land will not cause, contribute or be subject to erosion, land slip or subsidence or that it will not cause any undue risk to occupants, users or the public (GCC, 1992: 52).

As discussed in chapter 4 development can impact on the stability of a moderately stable area. As such this provision, without the promotion of housing designs to reduce development impact in such areas, may not achieve its objective.

5.5. Avoid Placement Of Houses, Buildings Or Other Development In Unsuitable Locations

There is no specific mention of the need to protect areas of visual prominence, however this intent is found in various clauses. For example, in terms of setbacks and building height clause 5.7.1 provides the minimum setback from the boundaries within the Landscape and Conservation zone is:

| Minimum Dimension (m) | | |
|-----------------------|------|------|
| Front | Side | Rear |
| 20 | 10 | 10 |

The specified maximum height for a building in the Landscape and Conservation Zone is detailed in clause 5.7.3 as 10 metres (up to three stories). This height limit may result in multi storey housing on prominent areas of land.

Although standards are quantified, clause 5.7.4 states that the planning authority may relax the Development Standards in Clauses 5.7.2 and 5.7.3 after considering the following:

- (a) the particular shape, contours, or slope of the subject land, or of the adjoining land;*
 - (b) the need to protect existing natural features or qualities of the locality;*
 - (c) the adjoining land uses and/or zoning;*
 - (d) the existing setback in the vicinity; and*
 - (e) relevant professional advice on environmental hazards;*
- if it is satisfied that such a relaxation would not conflict with the intent for that zone and the aim and objectives (GCC, 1992:37).*

5.6. Maintaining Hillside Vegetation And Biodiversity By Preventing Its Fragmentation Into Small Lots

Clause 5.11.1 states that there is to be *no further subdivision* in the Landscape and Conservation zone except at Council discretion for boundary adjustments, to make provision for public utilities, or to make provision for public open space or access to public open space (GCC, 1992:39).

It is commendable that Glenorchy has recognised the important qualities of the hillside areas covered by the zone, and provides for their protection through limiting subdivision. However, although subdivision in the

Landscape and Conservation Zone is prohibited, council can apply for a rezoning or a specified departure from the planning scheme (or a dispensation from an interim order) to enable subdivision to take place. This must be approved by council and the Land Use Planning Review Panel who must take into account any objections. In the Adelaide hillsface zone, a decision such as this would be made by the Supreme Court and not by a planning appeal board or body such as the Panel. The requirement for change at the Supreme Court level makes it much harder for the planning scheme provisions relating to the hillsface zone to be changed so ultimately the protective mechanism is stronger.

The Future Urban Land Assessment commissioned by the Glenorchy City Council in January 1995, provides some useful information on the suitability of the land zoned for urban uses in the future. Some of these parcels are adjacent to Landscape and Conservation Zone and may require re-assessment in terms of their suitability. This was based on a number of factors, namely vegetation, aspect, gradient, size, existing lots, special features (such as rivulets), topography and the 'presence of any aspects of the built environment' (Waight & Byrne, 1995:i). There is also a need to take into account the cross boundary effects of any development in the Future Urban zones on the adjacent vegetated Landscape and Conservation zone.

5.7. A Review of the Effectiveness of Statutory Planning Tools In The Protection Of Environmental Characteristics

5.7.1. Zoning

Zoning alone is not enough to protect hillsides. The lack of permanence of the zoning is a major issue. Changes in zoning districts are inherent in the zoning process (Furuseh & Pierce, 1982:51). Rezoning of natural areas such as hillsides is often a "move that local municipalities have frequently been unwilling to halt owing to the implications for local revenue in many jurisdictions" (Bryant et al, 1982:202). For these reasons most attempts to control the alienation of natural land by reliance on zoning mechanisms have only been marginally successful.

5.7.2. Written Ordinance

In the absence of any other policies, the ordinance must have strong provisions for the protection of hillsides which can stand up to the close scrutiny of an appeal. The State Government is able to assist in the preparation of planning schemes, and has circulated a model ordinance as a guide to council's.

Rezoning of natural areas such as hillsides is often a move that local municipalities have frequently been unwilling to halt owing to the implications for local revenue in many jurisdictions

This ordinance includes provisions for scenic area, skyline protection or woodland and water course protection areas, fire hazard areas, unstable land, land clearing, wildlife sanctuary reservations, and recreation reservations.

5.7.3 Review Mechanisms

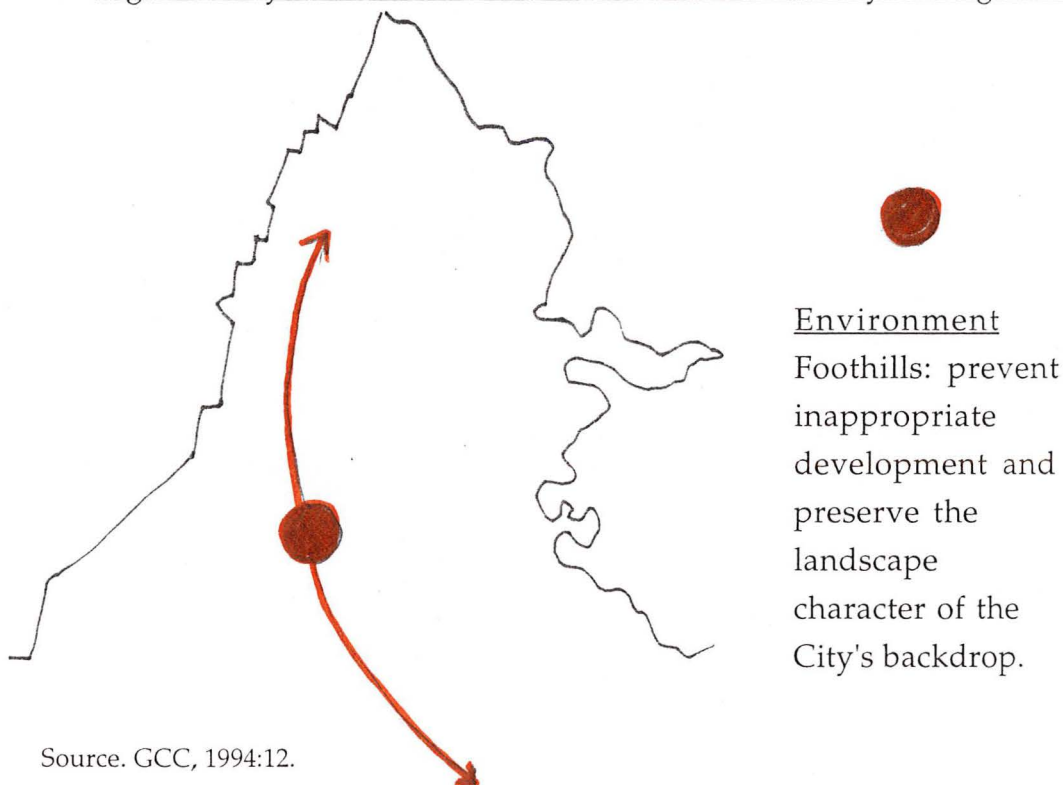
There are problems with the life span of planning schemes. Under the previous legislation, planning schemes used to be reviewed every five years. Under LUPAA, review is to be 'ongoing', in response to yearly strategic plans, and no specific time periods for review are mentioned. However, planning schemes are required to reflect strategic plans which are mentioned later. Planning schemes need to reflect the rapid increase in information about a municipality such as Glenorchy (eg. the advent of vegetation and fire management plans). Other changes are also constantly occurring, and this has implications in terms of stipulating methods of development and site preparation in the planning scheme. Technological changes may mean that new techniques are better able to produce compatible development (Thurow, 1975:12). Strict stipulations in schemes which do not undergo regular review, close off the possibility of finding and using better techniques. Therefore plans need to be assessed at regular intervals in order to take this information into account and adapt accordingly. There is also the need for a longer term vision for environmental protection to ensure policies and plans are not led by development pressures, and that applications are not considered in isolation from the broader context.

5.7.4. Strategic Plans

As mentioned, the review of planning schemes is also required to be tied into council strategic plans. The new legislation requires local government to prepare a strategic plan which has a five year life and is subject to yearly review. This plan is set up to define social, economic, environmental, and financial objectives, policies, programs and actions for the municipal area.

Environmental objectives for hillside protection could easily be incorporated into this strategic plan and a monitoring system set up to ensure the objectives are being achieved. Glenorchy *has* recognised the need for stronger provisions for the protection of its hillsides, and this is reflected in their strategic plan for 1994-1999 which states that in terms of foothills a key issue is to "prevent inappropriate development and preserve the landscape character of the city's backdrop" (GCC, 1994:12).

Fig. 20.0 Key Focus Areas as Defined in the Glenorchy Strategic Plan



Source. GCC, 1994:12.

5.7.5 State Policy

The *State Policies and Projects Act 1993* provides for the establishment of state policies, representing a new mechanism to deal with planning and environmental issues such as hillside protection at a state level. It ensures a coordinated and consistent approach across municipal boundaries.

As soon as possible after the State Policy coming into effect, the Land Use Planning Review Panel must amend planning schemes and interim orders to remove any inconsistencies, and policies must be reviewed regularly by the Minister to ensure that the objectives of the Act are being furthered in light of any changing circumstances (TG, 1993:8).

A State Policy relating to the protection of natural hillsides would therefore ensure consistency in approach on a state wide basis, and ensure some level of protection over and above what is currently available through most planning schemes and interim orders in Tasmania to date. However, as no State Policies are in place at the present time (there is a draft state policy relating to coastal issues) this option must be viewed in the medium to long term time frame.

The *State Policies and Project Act 1993* also introduce State of the Environment Reporting which will provide a useful indicator of natural area degradation, and the major causes of this degradation when it is released late this year, or in early 1996.

5.8 Conclusion

The implementation of the new suite of planning legislation with its focus on sustainable development, and the introduction of tools such as strategic plans, state policies and state of the environment reporting emphasises the importance of natural areas and ecological processes. The statutory planning tools this legislation establishes are essential in order to give basic protection to environmental characteristics. The overriding legislative structure is only part of the solution as it is how well these statutory measures are implemented by individual councils that determines the extent and effectiveness of this protection.

CHAPTER 6 - OTHER CONTROL MECHANISMS FOR HILLSIDE LANDUSE

Our preferences for food and habitat, as well as the density of human occupation, force us towards a constant management of the environment. Our means of management are now so powerful that mistakes can be far-reaching.

- K. Lynch

CHAPTER 6 - OTHER CONTROL MECHANISMS FOR HILLSIDE LANDUSE

6.1. Introduction

There are many other mechanisms outside obligatory statutory regulations that can be used by councils to control land use and protect important environmental characteristics. Many of these discussed below, such as conservation covenants, are currently not used to their full potential. Likewise, many smaller councils may not have sufficient resources to establish non-statutory controls or measures such as a local environment policy, in which case their statutory controls must be strong enough to stand alone.

This chapter outlines some of the other mechanisms which can be used by planning authorities to strengthen their environmental performance.

6.2. Mechanisms To Improve Environmental Performance On Private Land

In Glenorchy, the majority of land outside the reserves such as the Wellington Range Park and water reserves is privately owned (see figure 21.0).

Although the planning scheme states what uses are permitted, prohibited and discretionary, it does not give guidance in relation to land use practices which may damage the natural environment. It is therefore necessary for protective mechanisms and incentives to be established to ensure that private land practices are sensitive to the environmental qualities of the hills. For example, tree decline on private freehold land is a major problem which needs to be rectified, especially in light of the future urban zones abutting the treed hillsides.

There are several ways this can be achieved, with some examples being discussed in this chapter.

Figure 21.0 Land Tenure

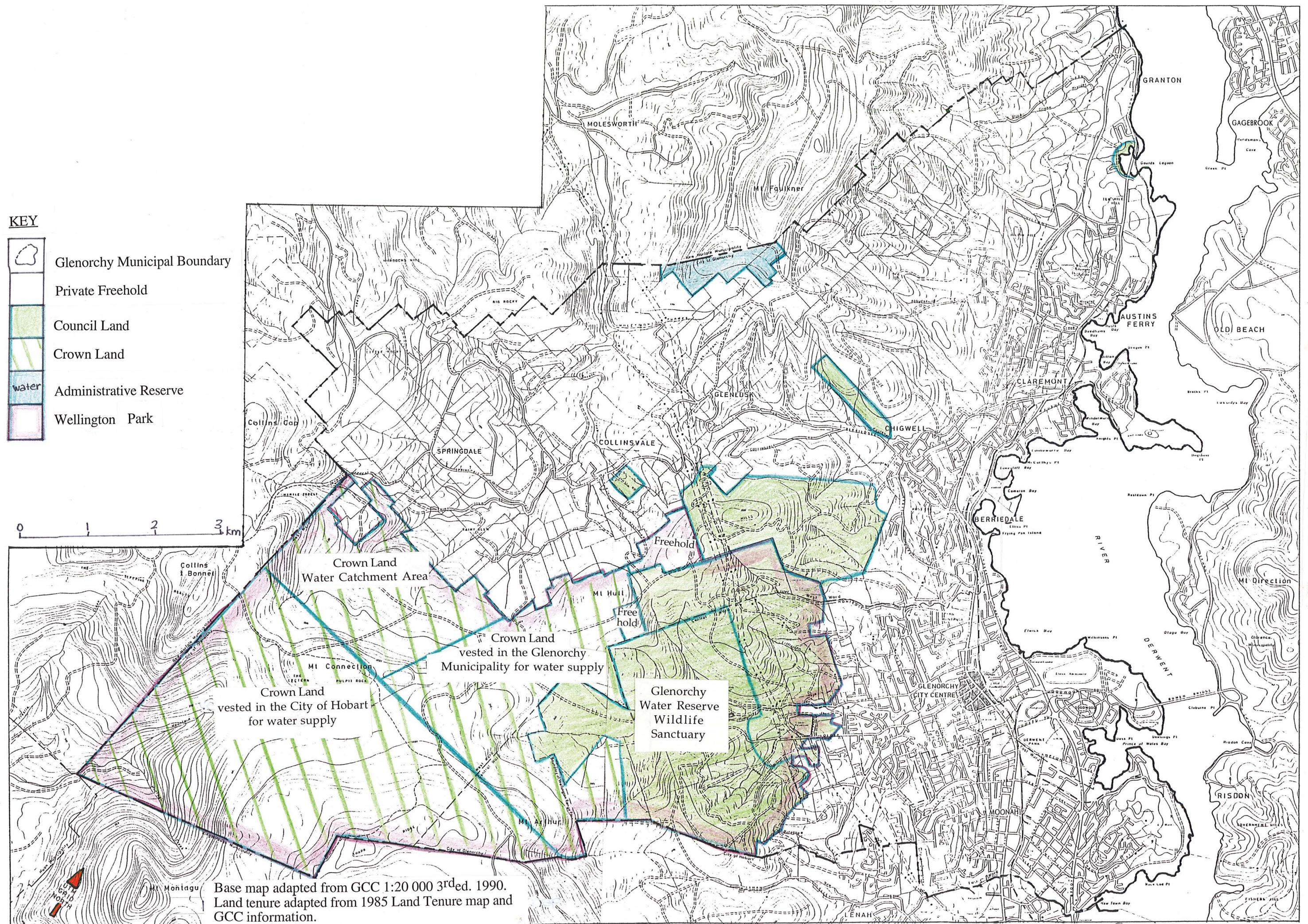


Figure 21.0 Land Tenure of Glenorchy

6.2.1. Landcare

The Landcare program was initiated in the 1980's when land holders got together to address problems such as soil erosion and salinity (Gibbs, 1994:23). It is based on a self-help and group-action approach, and is voluntary and autonomous. Since the early 1980's the Government has lent its support for the concept (both State and Federal government provide funding and some specialist support) and the number of groups that have been formed to focus on sustainable land practices has increased (Gibbs, 1994:23).

Many landowners will adopt new practices if they contribute to the long-term viability of their activities, and they are aware of the benefits they can capture through the new practices. It is up to professions such as planning, and organisations such as Landcare to highlight and demonstrate these benefits to the community.

Glenorchy does have a part time Landcare officer who is instrumental in setting up groups, educating and involving the public and promoting environmental awareness. Landcare is an excellent way in which both large and small council's can promote the sustainable use and management of land, which requires a limited amount of council resources.

6.2.2. Resident Action Groups

In recent years resident action and information groups have started to become more active in the planning process. An example in the Greater Hobart Area is the recently established Clarence Plains Information Network. This group of residents banded together due to concern for their area, such as incremental development of small lots into the vegetated hills and the impact on lifestyle and the environmental and financial consequences of this development. The group makes representations at planning appeals and tribunal hearings and act as 'watchdogs' for the area of Clarence Plains as well as informing other residents about proposals in the area which may affect them (for example, see figure 22.0).

Community action groups have a significant role to play in the protection of environmental qualities, but it must be recognised that many have limited resources, and should not be used as unpaid guardians of the

environment. More effective use of planning controls is needed to ensure that this does not occur.

Figure 22.0 Extract from Community Newspaper Relating to Hillside Development

Care needed in hillside development

I REFER to Cr Les Glover's response (Star, June 15) to my letter published in your edition of June 8. I cannot allow some of his remarks to pass without comment.

The thrust of my criticism of his public statements was directed at development on the Howrah/Rokeby hills and particularly those facing west.

I freely admit to knowing nothing about the problems of the Skyline Drive area, nor do I have any interest in development in that location. I leave that to those people currently involved.

I resent the implication that I am one of those described as having directed venom at subdivisions approved before Cr Glover was elected to council.

The development of much of the Eastern Shore has been fairly random — in accordance with the needs of the time and mostly on the lower slopes of hills.

I have no criticism of what is past; the clock can't be turned back. However, new development on an accelerated scale is now rising to much higher levels. This has been the focus of my concern.

Had Cr Glover taken his own advice and examined public input to the Clarence Council's plans for the developmental rezoning of Droughty Point, he would have discovered I had made a submission.

Cr Glover was kind enough to arrange for me to examine the latest map of proposed development in that area. I wonder how many people realise that the Droughty Point plan envisages 6,000 new

residential blocks in all, albeit over quite a few years.

Ratepayers should be aware that aerial photos and contour maps provide a very poor idea of the aesthetics of the proposed development. In many areas, normal residential building will be permitted to the 75-metre contour; that is, roughly parallel to those blocks above the high side of Oceana Drive.

Proposed early developments leading to the extension of Oceana Drive will destroy quite picturesque areas where access is relatively easy.

Above that will be a protected area at the northern end of the hills, extending roughly to a line drawn from Puncches Reef. From that area, the land from 75 metres to the crest, extending practically to the sea at Droughty Point, is described as 'landscape conservation'.

While that term might at first appear to imply no development, such is not the case. Apart from a few areas where rare species of flora are totally protected, it means development in the form of 20-hectare blocks for housing.

The council's regulations governing retention of much of the character of the area and the style of buildings are commendable in many respects. They will probably meet generally agreed notions of sympathetic development, but there are no easy ways to ascertain where roads will be built, their effect on the landscape, the inevitable damage wrought by installation of power and sewerage and the passage

of trucks and other construction machinery.

The fact remains that a significant proportion of the area will be alienated from public use, which will be restricted to a track of about 10 metres width. With the best will in the world, it is hard to believe that development is as balanced as Cr Glover suggests, or that it will retain the character of the area, something

Resident action groups are one way through which council can couch reactions to proposals and they can play a positive role in the planning process.

that I think we owe to greater Hobart.

Finally, I would like to thank the surprising number of people who contacted me personally and by telephone to offer support for my criticism of Cr Glover's claims.

Christopher A Pownall
all
Howrah

□

Source. Pownall, Bay City Star, 6 July 1995 p 2.

6.2.3. Economic Incentives, Controls And Agreements

Economic controls are financial incentives or impositions placed on land users in order to influence their behaviour with respect to the use of land (Goldin et al, 1974:135). As so much of the hillsides of Glenorchy are in private ownership in many cases a 'reward' including economic incentives may be necessary in order to convince people to retain natural features such as:

- vegetation cover;
- retain scenic values; and
- control the spread of residential development (Edgell, 1991:7).

6.2.4. Conservation Agreements

In the United Kingdom a centrally funded statutory body, the Nature Conservancy Council, was set up to prepare Conservation Agreements in conjunction with the landowners (Caldicott, 1974:24). The aim of these agreements is to 'ensure the preservation of natural habitat for the purpose of nature conservation. the retention of the natural or rural character of the landscape' (Caldicott, 1974:25). The agreements generally last around 21 years, and the plan that is prepared details management methods and goals agreed upon by both the landowner and the Council in return for some financial compensation (Caldicott, 1974:25).

6.2.5. Private Wildlife Sanctuaries

Under the *National Parks and Wildlife Act 1970*, landholders can give their consent to proclaim their freehold land, or land vested in authorities such as local government, as a private wildlife sanctuary. Wildlife sanctuaries recognise the specific conservation value of certain areas, and only land which has been assessed as such can proceed to the proclamation of a reserve. Landholders are not restricted from carrying out their usual activities, but enforceable conservation area regulations are imposed on the public (PWST, nd:1). For a wildlife sanctuary to become effective it must have the consent of the owner and be registered on the property title, and the sanctuary remains in place even if the land is sold (PWST, nd:1).

6.2.6. Conservation Covenants

Conservation covenants are a new conservation option which was brought about by an amendment to the *National Parks and Wildlife Act 1970*, under the *Public Land (Administered and Forests) Act 1991* (PWST, nd:2). Landholders enter into a conservation covenant on a voluntary

basis, which once implemented becomes binding on the property title (PWST, nd:2). It is intended that the covenants provide permanent protection for an area or species subject to the agreement. Prescription relating to management practices are worked out between the landholder and the Parks and Wildlife Service, and any breach of these prescription can result in a maximum fine of \$10 000.

The problem with both the private wildlife sanctuaries and the conservation covenants is that enforcement is often difficult due to lack of resources. Officers must visit the sites regularly to ensure that measures are being adhered to and that prescriptions are not broken. Also, the landholders who consent and/or volunteer that their land be subject to management conditions, are probably already aware of environmental problems and their link to land use practices. Nonetheless, both tools are worth pursuing, and as the numbers of sanctuaries and covenants grow, resourcing will need to follow.

6.2.7. Vegetation Protection Orders- Example Brisbane City Council

The Brisbane City Council was concerned about the amount of tree clearing on private land which makes up 60% of the city's bushland. They introduced Vegetation Protection Ordinances in November 1991 as part of an overall Bushland Management Strategy (BCC, 1992:3). The ordinances protect vegetation on both publicly and privately owned land and a nomination to protect vegetation can be made by the landowner or by Council.

Rather than adopting a blanket tree preservation approach, Brisbane City Council opted for a flexible nomination model which applies to the most significant natural areas and not to every bush, shrub or tree within the city (BCC, 1992:4). This was decided in order to protect the most valuable natural assets while reducing the resourcing costs involved in policing the entire city. There are five categories of protection which enables response to particular landowner needs. These five categories are

- a group or stand of trees;
- vegetation of a particular class;
- vegetation of a particular species;
- vegetation of any nature in a particular area; and
- individual trees (BCC, 1992: 8-12).

Vegetation protection orders currently protect about 1% of important natural areas in the city's properties (BCC, 1992:5). There is an independent Vegetation Protection Advisory Committee (VPAC) whose role is to assess all objections from landowners and advise Council on objections relating to the making of a vegetation protection order and requests for consideration of Council's decisions on applications to clear vegetation (BCC, 1992:5). This reconsideration process is separate from the courts, is free, and as such enables Council to provide a fast and accountable process (BCC, 1992:5).

6.2.8. Other Solutions For Further Consideration

Other solutions or partial solutions which require more research and study and which are not discussed at length here but which could be used to improve the protection of hillsides are:

- marketing of planners and planning to ensure that people know what planning achieves and the benefits it can provide;
- urban consolidation as a tool to divert pressure for new housing from the hillsides to infill and medium density dwellings in existing residential areas;
- review urban and rural subdivision controls;
- manage demand through pricing infrastructure-many people move to fringe areas for more affordable housing and place more demand on the uptake of natural areas such as hillsides;
- make cities more attractive-livable, exciting vibrant; and
- education programs to change attitudes by a better understanding of ecological processes.

6.3. Broader Mechanisms To Improve Environmental Performance

There are many broader mechanisms outside planning schemes which are available to planning authorities in Tasmania. A few of these options are considered below.

6.3.1. Planning Education

Planning needs to adopt a multi-disciplinary approach. This could be achieved by stipulating that planning is only undertaken as a post graduate degree, to ensure a variety of background disciplines. Education is a primary factor in adopting sustainable development. Planners and the public should have a clear idea of what the term means, and what it

involves in terms of implementation. Planning and school courses should incorporate an environmental component to better understand the processes involved and methods to mitigate adverse developmental and decision making impacts.

6.3.2. Land Capability Studies

The Land Use Planning and Approvals Act, 1993, states an objective of the Act as being, "to provide a planning framework which fully considers land capability."

As previously discussed, different kinds of land uses have different requirements. Land Capability is regarded as a basic tool available to local government planners in order to better assess strategic land use planning issues (EPA, 1994:11). The Department of Conservation and Natural Resources in Victoria has established a land capability rating system for building foundations, domestic waste water disposal, agricultural pursuits, forestry and land based recreation.

Information from land capability studies should not be used solely to restrict the development of land, but to indicate to councils the principal constraints that the characteristics of the land may impose on the development of particular areas such as hillsides (EPA, 1994:11).

Development limits should be related to land capability classification, and the hydrological regime should be altered as little as possible and included as a constraint in any plan (Mosley, 1975:9).

Tasmania has seven classes of land capability geared at the potential of the land in terms of agricultural production. Class one is most suited to agricultural production and seven the least. However up until the commencement of Land Capability Project (agricultural lands) for Tasmania in 1988-89, no land capability surveying had been done at a regional scale, only minor surveys on an *ad hoc* basis. The study is not expected for completion until 1997. It would be beneficial for planners if the other classes such as the capability of the land for building foundations was also entered into at the same time. In this way many problems

resulting from the inherent limitations of the land can be avoided (EPA, 1994:11).

6.3.3. Local Environment Policy

A local environment policy is a management tool for enhancing a councils environmental management performance through an overarching framework. It aims at achieving an integrated and comprehensive environmental management approach for council operations and functions. The benefits of producing a local environment policy (LEP) are threefold: for economic/ financial, political and social gain. For instance, in an economic/financial sense a council may seek to take advantage of the following:

- reducing or recovering its costs through efficiency, conservation and recycling
- reducing the risks involved in its operations by avoiding penalties for environmental offences
- staff productivity maximisation by improving their work environment; and
- higher property values and increased revenue resulting from better environmental management

From a political view elected members might be interested in:

- responding to voter expectation for a more responsible local government in regard to environmental management; and
- meeting legislative requirements and/or conditions for funding of environmental programs.

Socially a council could be seen to be:

- setting a good environmental example to the community and improving its image; and
- recognising the link between the quality of life and the quality of the environment.

The steps involved in the formulation of a Local Environment Policy once objectives and principals (consistent with the objectives of the Act) have been established are (Adams, 1993):

1. To set the priorities to determine the order in which particular matters will be dealt with by a policy team, and to identify urgent matters &/or

matters that can be initiated using information or expertise that is already available. The order of priority that the policy team determines should be referred to both council and community, via an appropriate consultation process, for response prior to step three.

2. Assessment of the current situation, involving an investigation of particular areas of council operations and the practices being used in them. Evaluate the outcomes of those operations to determine any connection between the operations and environmental consequences.
3. The objectives and policy position then needs to be stated and should be straight forward, comprehensive, and readily understood by all those who will be affected by the council's LEP.
4. The implementation and evaluation of the LEP is achieved through sets of action plans. The report should advise council of the results of the action plan's evaluation of outcomes and the need for any supplementary action plans. The appropriateness of the objectives and policy statements that the plan addressed is also determined and any further recommendations regarding this area of the policy should be suggested.

A Local Environment Policy is a long term proposition in which broad, regional issues need to be taken into account, and which incorporates a principle of public consultation and participation in decision making. A LEP focuses on a broad range of environmental considerations, and then recommends more detailed specific studies and controls. In terms of the hillsides of Glenorchy a LEP may not be specific enough to concentrate on mechanisms to deal with problems associated with for example steep slopes. The exercise is worthwhile to establish focus areas, however, in this instance the hillsides have already been established as the focus point and more detailed emphasis is necessary, although the steps in the process can be taken from the LEP.

6.3.4. Planning Guidelines And Codes

In the urban/bush interface area, where subdivision and building is permitted or is discretionary, planners have a responsibility to ensure that the natural environment is taken into account in the application assessment and design process. Most planning applications have a design

impact on the physical environment, be it in terms of subdivision layout or building siting and design. Planners vary in their ability to create briefs for architects and landscape architects to detail what is required to be taken into account in the design process, but even then a lot of applications are not designed by these professionals.

This is where a code or guideline for development (including subdivision) covering both the Landscape and Conservation Zone and the sensitive urban/bush interface area would become useful, in order that professionals and the public have an idea of what is required before they embark on the design and application process. To date no planning authority in Tasmania has a code or guidelines relating to hillside management, nor do the regulatory land use documents, the ordinance (written section) or the plan (map of land use) incorporate very extensive or specific recommendations in relation to this.

In terms of resourcing, both time and cost wise, the option of planning guidelines or codes is appealing. They can be effective if researched thoroughly, and do not take up large amounts of resources.

6.3.5. The Relevance Of Guidelines And Codes In Tasmania

Under both the old and new planning legislation, codes and guidelines adopted by planning authorities do not have the same status as planning schemes or interim orders. The old Planning Appeal Board (now the Resource Management and Planning Appeal Tribunal), did give some weight to codes and policy documents to give guidance to Councils. This only applied when making decisions in relation to discretionary developments or when attaching conditions of approval on permits.

Some Councils have tried to apply codes as a statutory power, but unless they are incorporated into the planning scheme of interim order at the outset, or through an amendment to the scheme, this is not possible (pers. com S. Ogden, 1995).

In terms of a guidelines or code for hillside protection, the Commissioner for Town and Country Planning advised in correspondence of March 1990, that subdivisions on steep land pose a number of concerns. These range from community concerns over hillside protection, bushfire hazards of new development, the extent of engineering works, the costs of servicing,

and the fact that although subdivisions and consequent developments may comply with requirements such as minimum lot sizes, it was noted that there are no specific provisions in many planning schemes against which subdivision of steep land should be assessed (CTCP, 1990).

6.3.6. Example Of A Planning Code - Ku-ring-gai Council

Other States have examples of the use of codes for the protection of natural areas. Ku-ring-gai Council in Sydney released its draft Development Control Code for Properties Adjoining Bushland, in December 1993. The code was developed in order to assist Council's aim to conserve and improve the existing landscape character, biodiversity and environmental quality of the municipality in accordance with state legislation and the expectations of the community (KC, 1993:1). The code is used in assessing applications for all subdivision, development and building activities within the municipality. It recognises the urban/bush interface as containing multiple land uses which need to strike a balance between development and conservation to ensure that development is compatible with the long term conservation of remnant bushland (KC, 1993:1).

The code recognises that impacts of development and urban activities are not confined to the development site boundaries, but can lead to the degradation of natural areas and biodiversity.

The code applies to land which has a common boundary with or, at some point along the property adjoins bushland, such as those areas in Glenorchy zoned Landscape and Conservation, and declared reserves. For these properties, special conditions apply to the types and standards of development. They include specifications regarding:

- the amount of site cover;
- on-site bushfire protection;
- building location and design;
- landscape design;
- development exclusion areas;

The code was developed in order to assist Council's aim to conserve and improve the existing landscape character, biodiversity and environmental quality of the municipality in accordance with state legislation and the expectations of the community

- vegetation retention and replenishment;
- specific on-site urban runoff control standards and measures; and
- stringent environmental controls during construction to avoid and minimise soil erosion and sediment movement (KC, 1993:3).

In contrast to the legal status of codes and guidelines in Tasmania, the Kuring-gai code states that its provisions will take precedence over existing development control mechanisms for those properties it covers.

6.4 Conclusion

Land management problems are not contained by political or property boundaries. There is therefore a need for effective consultation and the implementation of planning mechanisms which address the environmental degradation of natural areas.

Several planning authorities have adopted policies or strategies for dealing with aspects of natural areas, such as tree preservation orders, however these tend to be separated from comprehensive long term strategies, and there is no consistency on a regional or state wide basis. As natural area degradation has not been covered extensively in the past, many policies that are now brought into place may be reactive and incremental rather than anticipatory and comprehensive. Anticipation of future needs is what planning is all about. Isolated individual responses will not solve the problem of loss of environmental quality.

CHAPTER 7 - RECOMMENDATIONS

*...Much of the job is making sure that enough research is done
... so that politicians and communities are able to understand
the consequences of their policies and decisions within a range
of longer term contexts...*

- D. Winterbottom.

CHAPTER 7 - RECOMMENDATIONS

7.1. Introduction

This chapter will detail a number of broad recommendations for the hillsides of Glenorchy, along with more specific recommendations relating to the urban/bush interface, termed the Hillside Conservation Area.

Three aims have been identified as a basis for local hillside planning:

1. to protect both the intrinsic and extrinsic values and characteristics of the natural environment in the urban setting;
2. to create as many natural environmental benefits as possible for the community; and
3. to avoid or overcome problems posed by the natural environment (Owen, 1991:106).

The key issue in order to achieve these aims is to ensure the availability of environmental information from which informed long and short term planning decisions can be made. Without this information, decisions will be based on incomplete social and economic criteria and *ad hoc* environmental information. The basic issues from each chapter have been extracted to produce the process Glenorchy needs to undertake for the long term sustainable use of its hillsides.

7.2. Recommended Process for Hillside Planning in Glenorchy

1. Better identification and monitoring of environmental constraints.
2. Identification of hillside landscape values and the perception of the hillside landscape by users and the general public.
3. Assess compatibility of proposed use(s) in the hillside landscape
4. Establish a list of sites or regions that should be better preserved, protected, maintained and/or rehabilitated.
5. Establish guidelines for development in terms of use and design, siting and construction criteria.
6. Determine regional strategies (Hepper, 1984:62).

7.3. Better Identification And Monitoring Of Environmental Constraints

The environmental characteristics discussed and mapped in chapter 4 provide a basis from which to formulate initial strategies. However, these need refining and some require further investigation as detailed below.

7.3.1. Vegetation

It is recommended that a full inventory of the vegetation in the municipality is done so that poorly reserved, rare, threatened and/or endangered species and communities are located and protective measures such as vegetation protection orders can be put in place. Without this information there is a risk of species being lost from the area.

The vegetation study of the municipality should follow the categories of vegetation classing already undertaken by Johnson for the Hobart City Council (1994) in order to maintain consistency for better regional interpretation of vegetation data. It is also recommended that detailed pictures of rare, threatened and/or endangered species are included for ease of identification by land managers such as planners and land owners.

7.3.2. Fire Hazard

It is noted that fire hazard increases with vegetation type and slope, with land of a slope of 1 in 3 and greater has a very high fire danger rating (TFS, nd.:8). Development in these fire risk areas needs to be strictly controlled. Where development is discretionary guidelines should be in place to help to minimise fire risk. Glenorchy has already embarked on the preliminary background research into fire management plans and Glenorchy fire history with Tasmanian Fire Service. However the plan should not substantially commence until vegetation data has been gathered, otherwise the plan may need to be reviewed and altered in light of the vegetation findings. This fire management plan should also reflect the Hobart Special Fire Area recommendations for Glenorchy to ensure that work is not duplicated. It is important that all information on fire occurring in Glenorchy are recorded. Accurate fire history records are needed in the planning process to determine prevention measures such as fuel reduction burning. Serious consideration needs to be given to the burning of areas identified as visually prominent.

7.3.3. Visual Prominence

The visual prominence mapping should be taken further to also assess the scenic quality of these prominent areas in accordance with Forestry Tasmania's *Manual for Forest Landscape Management*. More sensitive use and development criteria should be encouraged in these identified areas.

As previously discussed, although certain developments are exempt from planning legislation, it would be beneficial if Council liaised with utility providers so that their impact on the environmental characteristics of the hillsides, such as the visually prominent areas, is minimised.

7.3.4. Land Stability Hazards

The Land Hazard map details broad land hazards, however a base map identifying the level of these land stability hazards should also be prepared. This can be done by identifying the hazard, qualitatively assessing the degree of risk and establishing corresponding development guidelines. Three categories are suggested:

- a) a stable category with normal development control;
- b) a risk category which requires geo-technical assessment of individual sites; and
- c) a zone of active slope failure where development is prohibited.

Although this has been done to some extent by Glenorchy City Council, an information update is required.

7.3.5 Environmental Monitoring

Environmental information provides baseline data from which to assess the quality of the natural environment. This information will highlight areas in need of attention and funds can be directed toward the remediation of any problems. The monitoring of environmental characteristics of hillsides will enable a better understanding of the effects of development on the natural environment.

In order to help monitor environmental performance it is recommended that once this data has been accurately established, that each be included (ie slope, vegetation etc) in the Geographical Information System being established by Council. This will enable decision makers such as planners to consider comprehensive environmental information when assessing applications.

It is noted that the initial outlay of this type of venture is expensive and Council may not have the resources to complete a full biophysical inventory of this nature. If this is the case then it is recommended that the inventory focus on areas where development is most likely to occur in the near future. As resources become available the rest of the hillsides and the entire municipal area can then be mapped. This will ensure that the most immediately vulnerable areas can be assessed in terms of the development effects on environmental characteristics such as vulnerable vegetation. Other information such as the habitat of fauna of the area could then also be added as the information is researched.

7.4. The Identification Of Hillside Landscape Values And The Perception Of The Hillside Landscape By Users And The General Public

There are numerous ways to consult with the public (as well as government and industry) and it is recommended that this occur before and throughout the process of the formulation of any guidelines. It is important to choose a method carefully in order to obtain the sort of information that is required, but which also gives the most information and satisfaction back to the community. The South Australian Urban Land Trusts *Human Services Planning Kit* details the pros and cons of a variety of consultation methods.

7.5. Assess Compatibility Of Proposed Use(s) In The Hillside Landscape

It is the urban/bush interface area which is most susceptible to development, and this area includes a range of zones from future urban, rural residential, special use to public utility and limited impact (see figure 19.0). Many different uses and developments are therefore permitted or discretionary within this interface region.

A more comprehensive look at the appropriateness of the zones adjoining the Landscape and Conservation zone needs to be carried out to determine the possible environmental impacts of the different use and developments on the hillside qualities. This could occur along the lines of the Future Urban Land Assessment report.

7.6. Establish A List Of Sites Or Regions That Should Be Better Preserved, Protected, Maintained And/Or Rehabilitated

Glenorchy Council has enough information on specific sites with hazardous areas and excessive slope to detail these areas on the planning scheme, and reflect these hazards with appropriate zones. In terms of fire, these areas are fairly broad due to limited vegetation data and the keeping of fire histories. Sites where rare/threatened and endangered species and communities of vegetation occur have also not been identified to date. Once the natural area inventory, including a comprehensive vegetation analysis is complete, these areas can then be mapped.

7.7. Guide Proposed Development By Way Of Controls And Guidelines

It is recommended that the area of the urban/bush interface has more stringent development controls in place. More specific aims, objectives and development controls need to be incorporated into the planning scheme for stronger protection of the environmental characteristics of the interface area.

7.7.1. Zoning

The interface area could be better controlled through rezoning to, for example, a Hillside Protection Zone which has more stringent control over development. At present there are many different zones adjoining the vegetated Landscape and Conservation Zone, and Council may be reluctant to become involved in a large scale rezoning of this kind.

This highlights the dilemma faced by many councils, that of locking themselves into land zoned for residential and/or urban purposes well ahead of requirements, and without a full investigation of the environmental consequences that these zones and their subsequent uses may have on the area. This existing pre-emptive zoning makes it hard to re-examine appropriate uses for these pieces of land.

However, it is still recommended that Council review areas that have already been zoned but which may not have been developed. Council should review the rationale behind the zones in light of the environmental characteristics of the planning area as a whole, and the impacts on the backdrop of Glenorchy- the hillsides. It is suggested that

Council consider the option of zoning land they are considering for residential and urban purposes as 'Deferred Urban'. This means that the decision on whether the use and developments associated with urban and residential zones is deferred pending further investigation at a time when the demand for more urban areas has been shown. This then allows Council to consider all aspects about the land including environmental effects and consequences before ultimately deciding on the most suitable zoning for the area.

7.8. Hillside Conservation Area

A more immediate solution may be the amendment of the planning scheme by overlaying a special 'Hillside Conservation Area' onto the area of the bush/urban interface, and relate this conservation area to corresponding guidelines which can be incorporated into the provisions of the planning scheme ordinance. As the existing Landscape and Conservation Zone does not permit any further subdivision, this zone could remain as it is until the next planning scheme review when the boundaries need to be re-examined. However, any application for a discretionary dwelling on an already subdivided lot in the Landscape and Conservation zone could also come under the planning and development guidelines.

The Hillside Conservation Area was determined by overlaying the maps of environmental characteristics provided in Chapter 4 as per McHarg. This helped identify areas requiring more stringent protective mechanisms with the focus on the urban/bush interface where development pressures are most likely to occur and where human activities can have negative effects on the natural environment. Existing zones such as Future Urban were also included as they may be developed in the future and will require development guidance.

The intent of the Hillside Conservation Area (detailed in figure 23) is to guide development in the urban/bush interface in order to protect areas prone to natural hazards, excessive slope, visual prominence and native vegetation cover which could be adversely affected by inappropriate developments. Through these controls the Council will not only be helping to protect the values and characteristics of the hillsides, but also preventing and/or controlling development which would pose a threat to life and property.

The Hillside Conservation Area will require objectives to be included in the planning scheme so that they have statutory weighting, and so intent of the Area is clear to potential developers, and council officers.

7.8.1. Suggested Aim And Objectives For The Hillside Conservation Area

Aim: to minimise the environmental impact of any use or development on the hillside landscape

Objectives

- (a) to protect prominent and other noticeable land configurations; (*
- (b) to minimise the impact of uses and development on adjoining land uses;*
- (c) to restrict the use and development of land which is flood prone, subject to high bush fire risk or affected by other environmental or physical hazards or which prejudices the appearance or damages the physical structure of the landform;*
- (d) to protect watercourses and their associated riparian vegetation in order to maintain water quality and reduce the potential for erosion;*
- (e) to fully consider the implications for the recharge of groundwater and to encourage proposals to reflect the natural drainage pattern in order to assist the percolation of water into the ground and to reduce run-off;*
- (f) to maintain tree canopy cover, significant stands and/or individual specimens of native vegetation; and*
- (g) where development is acceptable in principle, planning permission will only be granted where the effect on the native flora and fauna is minimised or enhanced and the nature conservation value of the area is taken to be a major consideration in determining an application.*

The Hillside Conservation Area does not include ridgelines outside the urban/bush interface, as these areas of prominence are such that any development needs to be Prohibited and therefore come under stricter zone controls.

Figure 23.0 Map of the Hillside Conservation Area - Glenorchy



Figure 23.0 Map of the Hillside Conservation Area - Glenorchy

7.9. Planning And Development Guidelines For The Hillside Conservation Area

It is recommended that guidelines relating to development in the Hillside Conservation Area be established and the planning scheme amended to incorporate these guidelines to give them statutory weighting in planning appeals.

This could be done as follows:

- Amend planning scheme by inserting a clause stating that notwithstanding the provisions of the underlying zones, if an area is overlayed with the Hillside Conservation Area, all development must comply with the guidelines contained in Schedule X of the planning scheme;
- insert a Schedule of guidelines which relate to the Hillside Conservation Area;
- amend scheme to include the aim and objectives of the Hillside Conservation Area;
- amend the scheme plans to include the Hillside Conservation Area;

Note that although at the present time the boundary of the Landscape and Conservation Zone should remain the same, these guidelines could also cover development in the existing Landscape and Conservation Zone, where single dwellings and other developments are discretionary due to existing subdivisions in the area.

7.9.1. Aspects for Inclusion Into The Planning And Development Guidelines

Although it is beyond the scope of this study to detail the guidelines, from the environmental information obtained to date a list of aspects which need to be addressed in any guidelines that are established for the Hillside Conservation Area is briefly covered.

- 1) At the Subdivision stage it is imperative that environmental considerations are taken into account. Once subdivision approval is

granted it is then harder to refuse a development application for a dwelling. For example, one criteria may be that where subdivision is either permitted or discretionary within the Hillside Conservation Area, the developer is required to submit a site analysis along with the plan of subdivision. This will enable planners to assess the level to which the developer has considered the aspects detailed in the guidelines, such as slope and vegetation. An indicative submission showing where any structures such as dwellings may be placed, the effect on the surface drainage, tree removal and the like would also help planners assess the suitability of development at the subdivision stage. Building envelopes (detailing the area where a structure can be placed and the maximum height of the structure) could also then be considered.

2) In terms of site planning the guidelines should cover:

- location and design of structure so as to have as minimal effect as possible on the natural environment
- driveway layout and maximum steepness
- standards relating to earthworks;
- height limit of buildings;
- road construction: steepness, following the natural topography and hazardous areas;
- standards relating to the construction process such as replacement of rocks and topsoil, mandatory drainage controls (eg. refer Appendix B);
- provisions which cover the presence of rare, threatened and/or endangered vegetation on a proposed development site
- vegetation removal and landscaping provisions which list native species that may be planted in the area without permission, and those that can be removed without permission (such as weeds), and accompanying diagrams where possible;
- that there be no development allowed within a certain set back from any waterway;
- the effect of the proposed development in the hydrological cycle. Materials such as porous paving should be suggested where practicable;
- provisions for bushfire protection (example in Appendix C);
- rehabilitation works in the event of the development not being carried out

7.10. Determine Regional Strategies

Administrative and natural boundaries rarely correspond, and it is important that resource management is conducted on a regional basis. A uniform approach to conservation and environmental protection legislation would help avoid delays in development applications and duplication of procedures. Anticipatory and precautionary policy approach is a key feature of sustainable development as reactive policy tends to burden future generations with environmental risks.

7.10.1. State Policy Option

A State Policy may be implemented detailing hillside protection and development. A State Policy would require Glenorchy to make changes to their planning scheme where it is inconsistent with the State Policy. There is currently only one draft State Policy (coastal) in progress, with several others (such as contaminated lands, bushfire and rural) in the pipeline. It may therefore be some time before a State Policy on hillside planning could be implemented. Despite this, the option of a State Policy is favoured in the medium to long term as it would enable a coordinated approach to hillside planning, while still enabling councils to take into account local variations and determine which areas are important to its community. It provides an opportunity to ensure that the development of, or adjacent to naturally vegetated hillsides is planned in a way which protects their natural characteristics and furthers the objectives of sustainable development.

7.10.2 Cost Of Hillside Protection

The issue of equity and 'fairness' in terms of the cost of hillside protection must also be addressed. Should Glenorchy bear all the costs of protecting their hillsides which offer benefits to residents outside the area by way of views and vistas, or access for recreational pursuits? One way of potentially overcoming this problem is to set up a Hillside Protection Fund, to which all the Greater Hobart Councils, the State and possibly the Commonwealth would contribute. This fund would be used for acquisition purposes and the provision of financial incentives and protection measures in any of the Greater Hobart municipalities. A steering body would need to be established in order to prioritise the areas. Alternatively there are already established bodies such as the Australian Bush Heritage Fund, which raise funds to buy and protect private lands of

conservation value. Councils can also promote bequests of money and land as a way in which individual can show their concern for the protection of the natural environment.

7.10.3. Use Of Open Space Contributions

Glenorchy City Council may consider using their 5% cash in lieu of open space contributions made during the subdivision process to acquire the most sensitive areas of the hillsides as they become available, particularly those areas which will be identified through the natural inventory study which Council commissioned in mid June 1995. This inventory will map areas of conservation value and could be used as a guide to set targets and priorities for the purchase of these areas.

7.11. Summary Of Key Recommendations And Conclusion

There is increasing recognition that the degradation of environmental quality does exist, is important, and needs to be regulated and monitored. However, although planning for natural areas such as hillsides is still generally perceived as a problem by the planning profession, rarely do planners 'home in' on the causes of the problems such as the absence of land management practices and inadequate protection mechanisms.

In order to best protect the assets provided by the hillsides of Glenorchy it is necessary to build on the existing planning control system by maintaining strategic guidance and strengthening the provisions for the most vulnerable areas through the following key recommendations:

1. Short Term

- Undertake a comprehensive *environmental inventory* of the hillsides of Glenorchy; and
- *Establish Guidelines for the Hillside Conservation Area*, which can be also used to assess discretionary developments in the existing Landscape and Conservation Zone.

2. Medium Term

- *Re-evaluate* the Landscape and Conservation Zone boundary and those zones situated in the Hillside Conservation Area, especially the Future Urban Zones.

3. Medium/Long Term

- Lobby for a *State Policy* on sustainable hillside planning to ensure a consistent and coordinated planning approach throughout the State.

In the meantime planning authorities should heed the precautionary principle and act to prevent irreversible damage that may already be occurring to the natural hillside environments.

REFERENCES

- Adams, G. *Guidelines for the Development of a Local Environment Policy*. Department of Environmental and Land Management, Adelaide: 1993.
- Adams, P. *Urban Vegetation Pamphlet*. National Trust, Canberra: 1990.
- Alexander, A. *Glenorchy, 1804-1964*. Glenorchy City Council, Glenorchy: 1986.
- ANZECC Task Force. *Draft National Strategy for the Conservation of Australia's Biological Diversity*. Government Publishing, Canberra: 1993.
- Appeldorff, G. *Memories of Collinsvale*. Hobart: 1986.
- Australian Bureau of Statistics. *1991 Census - Restructured Local Government Areas: Tasmania*.
- Australian Conservation Foundation. *Organising for Future Growth*. Australian Conservation Foundation, Canberra: 1972.
- Australian Conservation Foundation. *Annual Report 1992/93*. Australian Conservation Foundation, Canberra: 1993.
- Australian Institute Of Urban Studies. *Land For the Cities*. Australian Institute Of Urban Studies, Canberra: 1973.
- Barde, J & Pearce, D (ed). *Valuing the Environment: six case studies*. Earthscan Publications Ltd, London: 1991.
- Barlowe, R. & Steinmueller, M. 'Trends in Outdoor Recreation' in *A Place to Live*. The United States Department of Agriculture, Washington D.C: 1963.
- Brisbane City Council. *Vegetation Protection Ordinances*. Brisbane City Council, Brisbane: 1992.
- Bennett, R. 'The Need for Urban Bushland Conservation Planning' in *Australian Parks and Recreation*. Vol. 2 pp 35 - 58: 1991.
- Boss, A. The Justification for Rural Planning, in *Review*. Vol. 54, No. 3, December 1986 pp 53-57.
- Box, J & Harrison, C. Natural Spaces in Urban Places, in *Town and Country Planning*, September 1993 pp 231-235.

- Buchanan, R. *Urban Parks, Bushland and Other Natural Areas: Guidelines for Preparing Inventories and Management Plans*. Total Environment Centre Inc., Canberra: 1988.
- Burgess, J et al. People, Parks and the Urban Green: A study of Popular Meanings and Values for Open Spaces in the City, in *Urban Studies*, Vol 25 pp 455-475 1988.
- Burgess, R & Skeltys, N. *National Housing Strategy- The Findings of the Housing and Location Choice Survey: an overview*. Australian Government Publishing Service, Canberra: 1992.
- Caldicott, R. 'A Plan for the Adelaide Hills' in *The Adelaide Hills: Plans for Preservation*. University of Adelaide, Adelaide: 1974.
- Caswell, T. 'Design with Natural Landscapes' in *Australian Planner*, Vol 32, No 2: 1995.
- Christie, T. *Natural Resource Management Course Manual*. Griffith University, unpublished, 1992.
- Chung, C. 'Australia's Disturbed Landscape' in *The Mercury*, June 22, 1995 p 7.
- Commission for the Future. *Our Common Future* (Australian Edition). Oxford University Press, Melbourne: 1990.
- Commissioner for Town and Country Planning. Memo to Hobart City Council. Unpublished: 1990.
- Daniels, P & Brown, L. *Environmental Attitudes of the Queensland Population in 1990*. Griffith University, Brisbane: 1990.
- Davidson, G. 'The Past and Future of the Australian Suburb' in *POLIS: The National Urban Review*. Issue No. 1 Feb 1994 pp 4-9.
- Department of Home Affairs & the Environment. *National Conservation Strategy for Australia: Conference Draft*. Canberra: Australian Government Publishing Service, Feb 1983.
- De Lacy, T & Lockwood, M. in *Valuing Natural Areas: Applications and Problems of the Contingent Valuation Method*. The Johnstone Centre of Parks, Recreation and Heritage, Albury: 1992.
- Duncan, F. *Forest Botany Manual: Nature Conservation Region 7*. Forestry Commission Tasmania, Hobart: 1991.
- Eagles, P. J. *The Planning and Management of Environmentally Sensitive Areas*. Longman, London: 1984.

- Elkin, T et al. *Reviving the City*. Friends of the Earth, London: 1991.
- Environmental Protection Authority. *Planning Measures for Environmental Protection*. Government of Victoria, Melbourne: 1994.
- Farleigh Rice, W. *The Fabric of Geography*. Longman, Harlow: 1985.
- Fensham, R. *Fire Management in Hobart's Bushland*. University of Tasmania, Hobart: 1991.
- Forestry Commission Tasmania. *A Manual for Forest Landscape Management*. Forestry Commission of Tasmania, Hobart: undated.
- Freestone, R. *Spirited Cities*. The Federation Press: Sydney, 1993.
- Freestone, R. *Model Communities: The Garden City Movement in Australia*. Thomas Nelson Australia, Melbourne: 1989.
- Furuseth, O & Pierce, J. *Agricultural Land in an Urban Society*. Association of American Geographers, Washington: 1982.
- Gibbs, N. *Enabling Sustainable Communities: a strategic policy paper*. Ministry for the Environment. Christchurch, 1994.
- Gilpin, A. *Environmental Planning: a Condensed Encyclopedia*. New Jersey: Noyes Publications, 1986.
- Girardet, H. *The Gaia Atlas of Cities: New Directions for Sustainable Urban Living*. Gaia Books Ltd., London: 1992.
- Glenorchy City Council. *Glenorchy Planning Scheme 1992*. Glenorchy City Council, Glenorchy: 1992.
- Glenorchy City Council. *Strategy Plan 1994- 1999 Final Draft*. Glenorchy City Council, Glenorchy: 1994.
- Glenorchy Municipal Council. *Glenorchy, 1864-1964: A Review of a Century of Progress*. Glenorchy Municipal Council, Glenorchy: 1964.
- Goldin, P. et al. *The Dandenong Ranges Report*. Victorian Public Interest Research Group Inc, Clayton: 1974.
- Heathcote, R. 'Early European Perceptions of the Australian Landscape' in *Man and Landscape in Australia*. Australian Government Publishing Service, Brisbane: 1976.

- Hepper, J. *Future Directions for Landscape Assessment Planning in Tasmania*. Tasmanian Conservation Trust, Hobart: 1984.
- Hendra, D. & Madden, M. *Land Use and Abuse*. Franklin Watts, New York, 1990.
- Hoey, C. *Options for Reducing Land Transport Fuel Use in Tasmania*. Masters Thesis. Unpublished, University of Tasmania: 1992.
- Hobart City Council. *Peripheral Areas Study*. Hobart City Council, Hobart: 1986.
- Hobart City Council. *Report on Options for Mount Nelson Structure Plan*. Hobart City Council, Hobart: 1994.
- Hobart Special Fire Area Committee. *Hobart Special Fire Area: Fire Management Plan*. np, nd.
- Hofto, P. *Engineering Geology Greater Hobart Area Map 1*. Division of Mines and Mineral Resources, Hobart: 1990.
- Hogue, S. *Strategic Issues Discussion Paper: Future Urban development and Infrastructure Provision in Greater Hobart*. Unpublished, 1995.
- Hollingsworth, P. 'Landslides and Residential Development', in *Landslides Hazards in Hillside Development*. Griffith University, Brisbane: 1982.
- Jacobs, M. *Environment, Economic Rationalism and the Sense of Place* Presented at the Conference 'A Sense of Place, a Place for People', Hobart: 1994.
- Johnson, D. *Mapping the Vegetation of Hobart*-Masters Thesis. University of Tasmania, unpublished: 1994.
- Ka-ring-gai Council. *Draft Development Control Code for Properties Adjoining Bushland*. Unpublished, Sydney, 1993.
- Kozlowski, J. *Integrating Ecological Thinking into the Planning Process*. University of Queensland, Brisbane, 1989.
- Kozlowski, J. 'Toward Ecological Orientation of the Planning Process' in *Impact Assessment Bulletin* Vol. 8 No's 1 & 2:1989 pp 47-68.
- Lands Department. *Tasmania 1:100 000 Land Tenure Index Series (ed.1) : Derwent*. Lands Department, Hobart: 1985.

- Lands Department. *Tasmania 1: 25 000 Series Maps: New Norfolk, Collinsvale, Longley, Hobart and Richmond* (ed. 2). Tasmap, Hobart: 1986.
- Laurie, M. 'Nature and City Planning in the Nineteenth Century', in *Nature in Cities*. John Wiley & Sons, Sutton: 1979.
- Lynch, K. *Site Planning* (second ed.). MIT Press, Massachusetts: 1971.
- Martin, M & Allenby, G. *Australia: Environments and People*. Science Press, Marrickville: 1988.
- McHarg, I. *Design with Nature*. Garden City New York: 1969.
- McKain, W. 'The Exurbanite: Why He Moved' in *A Place to Live*. The United States Department of Agriculture, Washington D.C: 1963.
- Medley, K et al. 'Forest-Landscape Structure along an Urban-To-Rural Gradient' in *The Professional Geographer*. Volume 47, No. 2. May 1995: pp 159-165.
- Ministry for Planning and Environment. *Planning Guide for Urban Open Space*. Ministry for Planning and Environment, Melbourne: July 1989.
- Mosley, G. *Landscape Conservation*. Australian Conservation Foundation, Melbourne: 1985.
- Nicholson-Lord, D. *The Greening of the Cities*. Routledge & Kegan Paul Ltd., London: 1987.
- Owen, S. *Planning Settlements Naturally*. Packard Publishing Limited, Chichester: 1991.
- Page, B & Smith, H. *Wildfire Hazard in the Environs of Hobart*. Environmental Studies, University of Tasmania: 1976.
- Parks and Wildlife Service Tasmania. *Nature Conservation on Private Land - Educational Brochure*. Department of Environment and Land Management, Hobart: nd.
- Powell, J. *Environmental Management in Australia: 1788-1914*. Oxford University Press, Melbourne: 1976.
- Pownall, C. 'Care Needed in Hillside Development', in the *Bay City Star*. July 6, 1995 p 2.

- Russell, J & Clark, M. *Making the Most of Urban Streams: Proposal for Humphrey Rivulet as an Open Space System*. University of Tasmania, Hobart: 1977.
- Russell, J.A *Valuing Cultural Landscapes in the USA, Britain, and Australia*. University of Tasmania, Hobart: 1988
- Sandercock, L. *The Land Racket: the Real Costs of Property Speculation*. Silverfish Books, unstated: 1979.
- Spirn, A. W. *The Granite Garden: Urban Design and Human Design*. Basic Books Inc., New York: 1984.
- Solomon, R. J. *Urbanisation: the Evolutions of an Australian Capital*. Angus and Robertson, Sydney: 1976.
- South Australian Urban Land Trust. *Human Services Planning Kit* (2nd Edition). Department of Housing and Urban Development, Adelaide: February 1994.
- Tasmania Department of Mines. *Geological Atlas 1:50 000 Series - Hobart*. Department of Mines, Hobart: 1988.
- Tasmania Fire Service. *Recommendations for Development in Fore Prone Areas*. Pamphlet, Tasmania Fire Service: nd.
- Tasmanian State Government. *Land Use Planning and Approvals Act 1993*. Government Printer, Hobart: 1993.
- Tasmanian State Government. *State Policies and Projects Act 1993*. Government Printer, Hobart: 1993.
- Tasmanian State Strategy Plan. *Working Paper No. 19 Nature Conservation in Tasmania*. Unpublished, Hobart: 1976.
- Thurow, C. et al. *Performance Controls for Sensitive Lands: A Practical Guide for Local Administrators*. U.S Environmental Protection Agency, Washington: 1975.
- Toon, J. 'Environmental Management: Consumers or Custodians', in *Habitat Australia*. Australian Government Publishing Service, Canberra: 1976.
- Vandenbeld, J. *Nature of Australia: A Portrait of the Island Continent*. Collins Australia, Sydney: 1988.
- Waight, S. & Byrne, L. *Future Urban Land Assessment*. Glenorchy City Council, unpublished :1995

Ward, C. *Human Space: Utopia*. Penguin Education, London: 1974.

Whitelock, D. 'Introduction' in *The Adelaide Hills :Plans for Preservation*.
University of Adelaide, Adelaide: 1974.

Winterbottom, D. 'Our Cities Have Bright Future If...' in *The Weekend Australian*. July 1 1995.

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APPENDIX A

The Tasmanian Parks and Wildlife Service have provided a list of species found in Glenorchy, however the extent of these species on the ground has not been mapped.

Identified Plant Speices of Glenorchy

| Species | Code |
|----------------------------------|------------------------------------|
| <i>Acianthus caudatus</i> | |
| X <i>Agropogon littoralis</i> | i |
| <i>Agrostis</i> sp. | |
| <i>Agrostis stolonifera</i> | i |
| <i>Apium prostratum</i> | |
| <i>Atriplex prostrata</i> | i |
| <i>Bolboschoenus caldwellii</i> | v r1 |
| <i>Caladenia deformis</i> | |
| <i>Calochilus robertsonii</i> | |
| <i>Carpobrotus edulis</i> | i |
| <i>Chiloglottis gunnii</i> | *En |
| <i>Distichlis distichophylla</i> | |
| <i>Diuris palustris</i> | r2 |
| <i>Diuris pardina</i> | |
| <i>Diuris sulphurea</i> | |
| <i>Epilobium</i> sp. | |
| <i>Eucalyptus globulus</i> | |
| <i>Glossodia major</i> | |
| <i>Gnaphalium</i> sp. | |
| <i>Isolepis cernua</i> | |
| <i>Juncus kraussii</i> | |
| <i>Juncus revolutus</i> | |
| <i>Mimulus repens</i> | |
| <i>Phragmites australis</i> | |
| <i>Pterostylis alata</i> | |
| <i>Pterostylis concinna</i> | |
| <i>Pterostylis longifolia</i> | *En |
| <i>Pterostylis nutans</i> | |
| <i>Puccinellia stricta</i> | |
| <i>Rubus fruticosus</i> | |
| <i>Rumex crispus</i> | i |
| <i>Samolus repens</i> | |
| <i>Sarcocornia quinqueflora</i> | |
| <i>Schoenoplectus pungens</i> | |
| <i>Selliera radicans</i> | |
| <i>Spergularia media</i> | Source: Parks and Wildlife Service |

Key to Codes

i -introduced

*En - endemic (in both cases above, the species listed has been split into a number of new ones, none of which is rare)

v - vulnerable

r1 - rare, total range in Tasmania falls within a square 100 x 100 km area

r2 - rare, occurs within fewer than 20 10x10 km map squares

APPENDIX B

Preparing a Soil Erosion and Drainage Management Plan

Introduction

When submitting a Subdivision, Development or Building Application to Council you may be required to include a Soil Erosion and Drainage Management Plan (SEDMP).

A SEDMP must address both the short term (construction) and long-term measures required to minimise both erosion and the quantity of runoff from a site. It must also address measures to protect bushland below the development, minimise the contamination of stormwater and maintain downstream water quality.

Soil erosion and drainage controls must be planned and applied before proposed development activity and maintained in a properly functioning manner throughout the construction period until the site has been fully stabilised.

Specific requirements for a SEDMP will vary according to the physical attributes of each site (e.g. slope, soil type, area, drainage patterns, and proximity to bushland or other sensitive areas) and the nature and scale of the proposed development. The minimum requirements of a SEDMP have been established by Council and will need to be addressed before the application will be considered. These minimum requirements which are to be addressed have been grouped into three categories. The information is to be submitted to Council in the format detailed over.

The use of qualified engineers and environmental scientists to prepare the SEDMP is recommended by Council and may assist to reduce the time necessary to assess the application.

Impact on Bushland

Council is obliged by the provisions of State Environmental Planning Policy No. 19 Bushland in Urban Areas (SEPP 19) to ensure the protection of bushland on areas zoned or reserved for public open space purposes from the adverse effects of development.

Clause 9 of the policy requires Council and other determining authorities to ensure that any development on land adjoining SEPP 19 bushland will protect and preserve the bushland. This includes consideration of the need to retain vegetation on-site, avoid soil erosion, reduce siltation of flow lines, and the spread of weeds and exotic plants within the adjoining bushland.

Where a proposed development adjoins SEPP 19 bushland, early consultation with the Parks and Landscape Division of Council is recommended.

Further Information:

The following references should be consulted in the preparation of the SEDMP:

Soil Conservation Service. 1989. Soil Conservation Limitations and Solutions to Land Development in the Municipality of Ku-ring-gai.

State Pollution Control Commission. 1989. Pollution Control Manual for Urban Stormwater.

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Preparing a Soil Erosion and Drainage Management Plan



1993

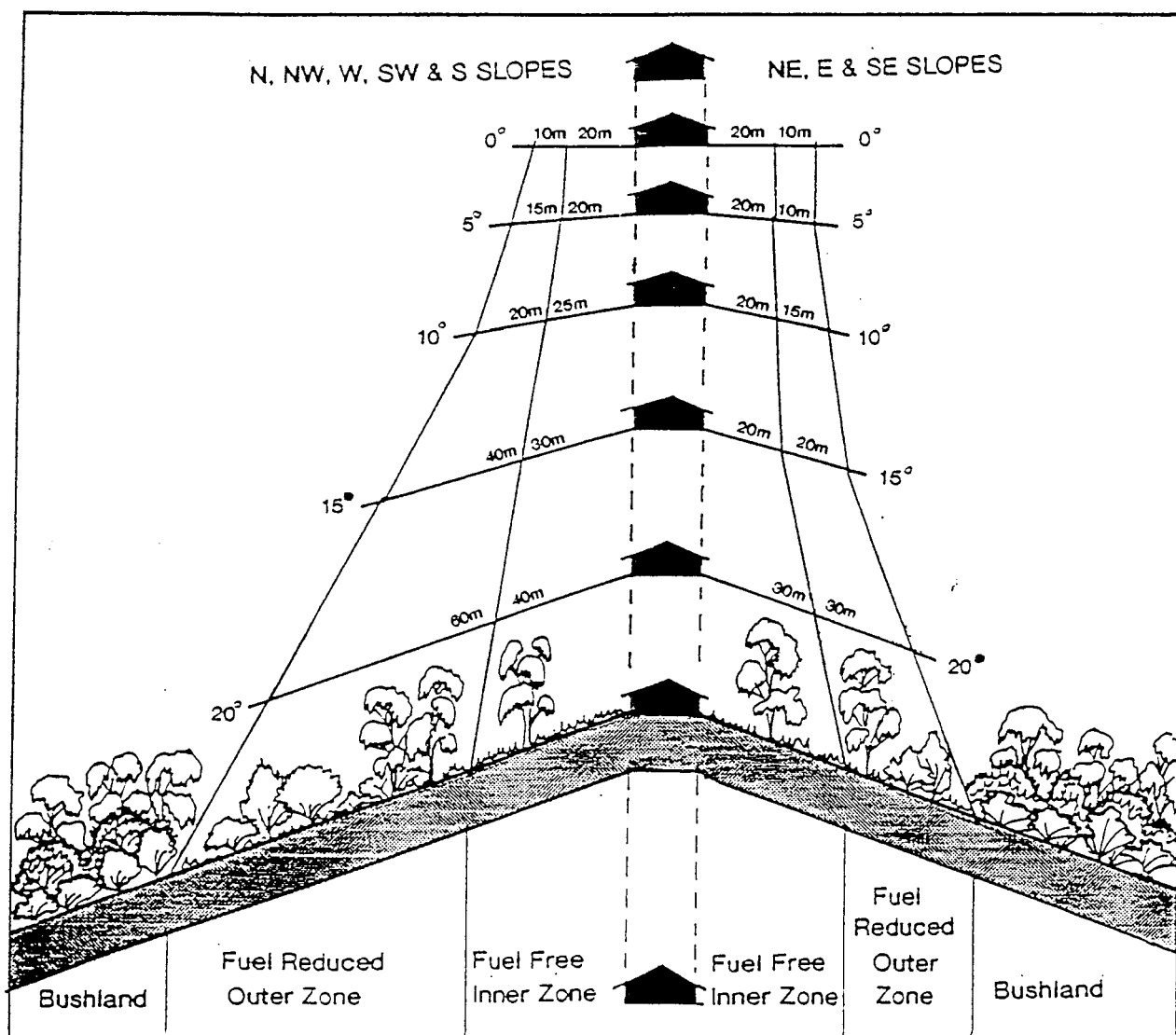
APPENDIX B (continued)

| Site Plan | Design Criteria | Report |
|--|--|--|
| <p>1. The applicant is to supply a site plan detailing the following:</p> <p>1.1 A plan of the site extending to the boundary of the sub-catchment in which the development is located at a scale of 1:200 or 1:500 will be required;</p> <p>1.2 contours at a maximum interval of 2 metres;</p> <p>1.3 location and identity of all existing vegetation in accordance with Council's Tree Preservation Order (i.e. species of 5 metres height or greater and/or a canopy spread of 4 metres or greater);</p> <p>1.4 indicate and distinguish between permanent and intermittent drainage lines;</p> <p>1.5 location of the nearest permanent water course;</p> <p>1.6 location and spot heights of cliffs, rock ledges;</p> <p>1.7 average and maximum slope angles;</p> <p>1.8 site boundary and dimensions of proposed development and adjoining landuse;</p> <p>1.9 existing stormwater utilities and easements;</p> <p>1.10 areas with the potential for serious erosion problems;</p> <p>1.11 detail the location and type of all proposed temporary (during construction) and permanent erosion, sedimentation and stormwater quality and quantity control measures, including on-site detention systems;</p> <p>1.12 location and quantities of cut and fill activity.</p> | <p>2. The applicant shall supply plans and design criteria, in accordance with Council's stormwater management policy and manual, used in the formulation of the SUDMP. These include:</p> <ul style="list-style-type: none"> • storm return periods; • structure volumes/capacities; • surface areas; • flow rates; • pond retention periods. <p>Criteria are to be detailed for all temporary and permanent erosion, sedimentation and stormwater quantity and quality control measures, as shown on the site plan.</p> | <p>3. The applicant shall prepare and submit a report detailing the following:</p> <p>3.1 the site's physical limitations to development as identified in Soil Conservation Service (1989) "Soil Conservation Limitations and Solutions to Land Development in the Municipality of Ku-ring-gai". (Available from Ku-ring-gai Municipal Council).</p> <p>3.2 the proposed phasing of land disturbing activities so that the area of exposed and disturbed soil is minimised at any one point in time.</p> <p>3.3 the construction schedule for commencement and completion of works including:</p> <ul style="list-style-type: none"> • temporary and permanent erosion, sedimentation and stormwater quality and quantity control measures (e.g., silt fences, catch drains, detention systems, diversion banks, wet retention basins, water pollution ponds, etc.); • vegetation clearance and revegetation; • stabilisation and rehabilitation of the site. <p>3.4 soil erosion and drainage management plan maintenance program, including inspection schedules and provision for the repair of damaged structures.</p> <p>3.5 measures to prevent impact on adjoining bushland and downstream water quality from runoff and weed invasion.</p> <p>3.6 rehabilitation program including seeding, planting and mulching specifications.</p> |

APPENDIX C

HIGH HAZARD AREAS

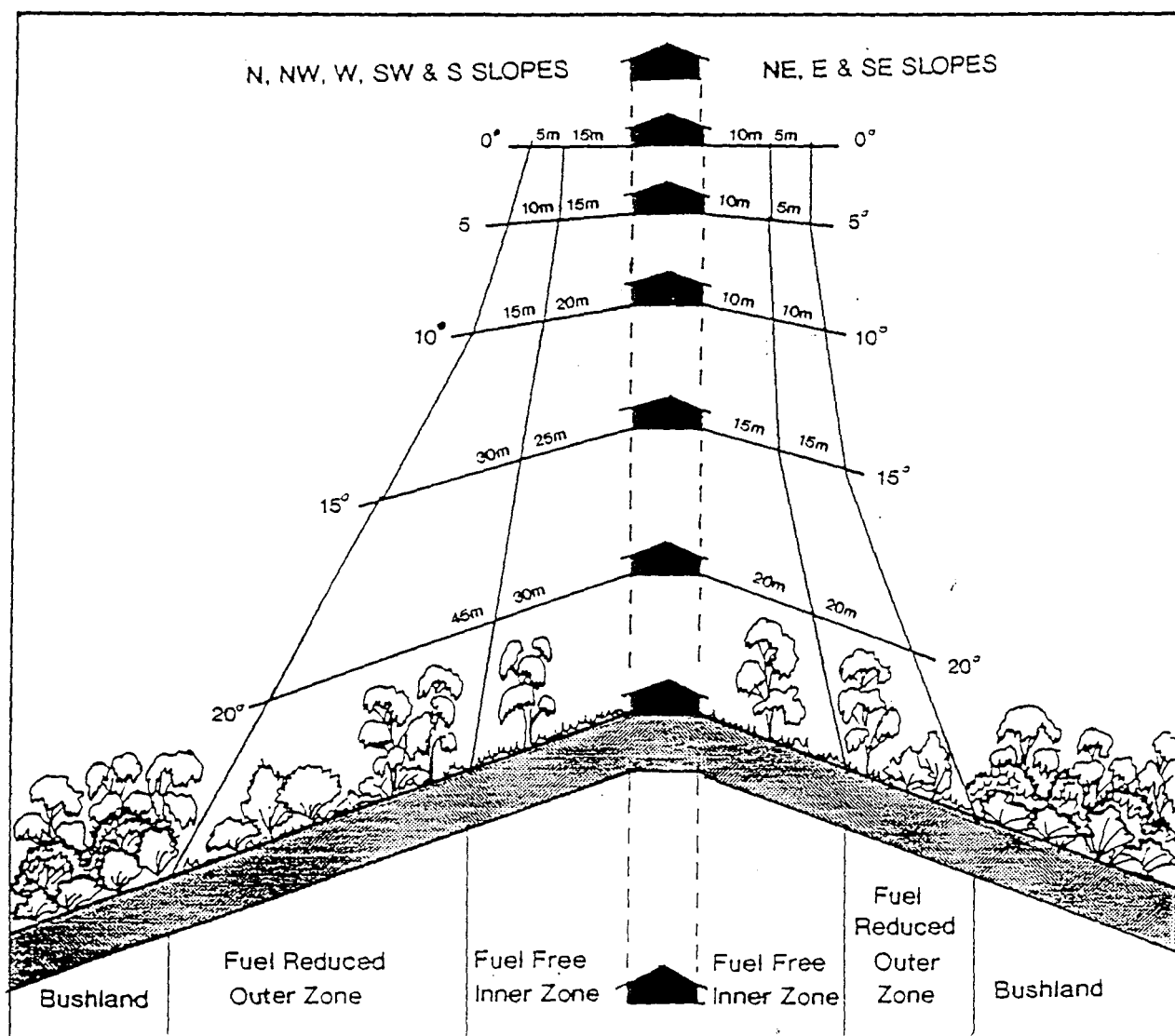
The following table indicates the distances required for the Fuel Reduced Outer Zone and Fuel Free Inner Zone in High Bushfire Hazard Areas.



APPENDIX C (continued)

MEDIUM HAZARD AREAS

The following table indicates the distances required for the Fuel Reduced Outer Zone and Fuel Free Inner Zone in Medium Bushfire Hazard Areas.



APPENDIX C (continued)

LOW HAZARD AREAS

The following table indicates the distances required for the Fuel Reduced Outer Zone and Fuel Free Inner Zone in Low Bushfire Hazard Areas.

