2. STUDY PROCEDURE

Three distinct stages were involved in this study. The first stage involved the compilation of land resource inventory; the second an interpretation or land capability assessment of that inventory; and the final stage, a presentation of the results of both stages 1 and 2 in a form which could be readily understood and used by land use planners and land mangers.

2.1. Land Inventory

The compilation of land inventory of the Tanjil River Catchment was aided by the land systems study[*] being conducted concurrent with this study. A land system is regarded as an area of land, distinct from surrounding terrain, having a recurring pattern of landform, soils and vegetation, such as that variations in these parameters are predictable. Land systems are, however, broad-scale mapping units (usually mapped at 1:100,00 – 1:250,00 scale) which are not sufficiently homogeneous to permit detailed interpretations of land capability for specific land uses to be made. In this study they were used as a base for describing the land and understanding the geomorphological processes operating throughout the catchment. Land systems have been used as the basis for mapping areas of public land within the catchment at a scale of 1:50,000. At this scale it has also been possible to delineate systems and components is included in volume 2 of this report.

Within the areas of freehold land (See Figure 2) mapping of land characteristics was required at a scale more appropriate to the level of planning it was designed to assist. Thus a completely new resource inventory was undertaken for those areas at a scale of 1:25,00. The results are mapped in Volume 2.

The resource inventory survey involved, firstly, the identification of basic mapping units under stereoscopic examination of 1:25,000 scale aerial photographs. These mapping units are areas of land which are assumed to be reasonably uniform with tespect to landform, soil and slope properties. They were identified primarily on the basis of landform and, secondly, on the basis of photo pattern and tone. Boundaries were tentatively drawn around each map unit and sites for detailed field examination were selected.

Field work entailed locating the pre-selected sites for sampling, describing soil profiles from samples hand augered to a depth of 1.2 or 1.5 m and then describing the general terrain in the vicinity of the site. Approximately 210 sites were thus described within the Catchment and of these 33 were sampled for laboratory analyses including, mechanical analysis, liquid and plastic limits, linear shrinkage and dispersion (Emmerson test). Hydraulic conductivity tests were conducted on a range of soils within the Shire of Traralgon using these soils and those of the Tanjil Catchment allowed on extrapolation of some results to this study.

During field work the placement of boundaries on aerial photographs was checked and adjusted where necessary. Soil characteristics including horizon colours, texture, depth, consistence, structure, fabric, pH and stone or gravel comment were described. Soil properties such as permeability and internal drainage were inferred from these data. Landform characteristics including slope angle and length, surface drainage and rock outcrop were also measured or assessed at the site. Vegetation structure and the dominant species were recorded only in areas of public land.

[*] "A Study of the Land in the Catchments to the Gippsland Lakes" by J.M. Aldrick, R.H.M. van de Graaf, R.A. Hook, B.M. Nicholson, D.A. O'Beirne, N.R. Schoknecht Report in preparation.

Soil profile and site data were recorded in abbreviated form on site card developed for this project. The format of the site cards and the abbreviated terminology were compatible with a computer program developed by the Soil Conservation Authority for storage and manipulation of field survey data. Data for all sites within each of the proposed map units were sorted and compared to generate descriptions for each map unit. This process was facilitated by use of the system programmed for a Hewlet Packard 9845B desk top computer. Further details of the field record card and the computerised data storage and manipulation system are given in Appendix 5.

Symbols chosen to identify map units convey information on the geology and topography of the unit. A key to these map unit symbols is presented in Table 1.

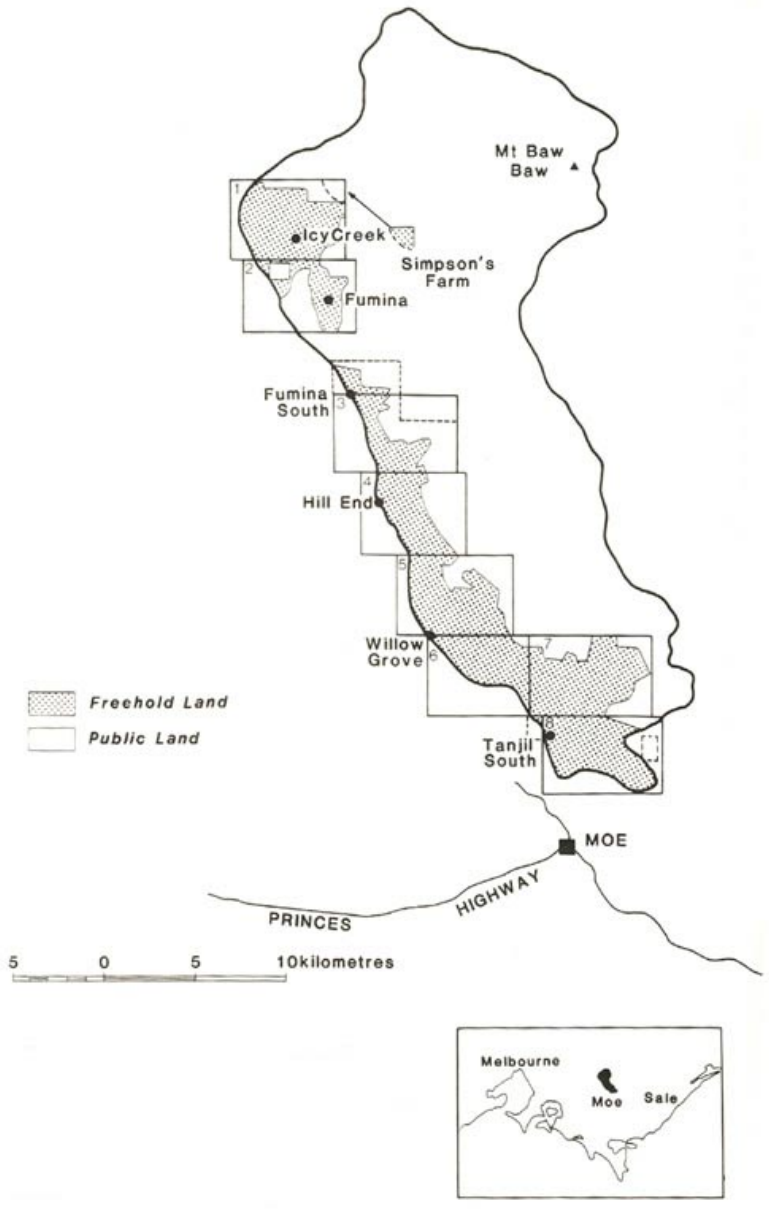

Fig 2 – Tanjil River Catchment – Index to Map Sheets
(covering areas of freehold land)

2.2 Land capability Assessment

The process of assessing the capability of individual map units to support rural residential developments involves consideration of three factors.

1. the capability of the land to support general constructions activities;

2. the capability of the land to accept domestic effluent disposal on-site;

3. the erosion risk to bared soil as a result of development.

For each of these factors there is a limited number of physical parameter (e.g. slope, soil, depth, etc.) which usually determine the capability of land to sustain a specified form of development without deterioration.

Rating tables (See Appendix 4) developed by the Soil Conservation Authority identify those parameters and indicate the extent of the effects of each on land use.

With the aid of computer sorting, relevant physical parameters from generalised descriptions of each basic unit are then compared with the class limits in the rating table for a specified use. The capability of the land for that use is usually determined by the most limiting land feature. Definitions of the classes which describe land capability are given in Table 2.

The assessment system is based on the assumed performance of land under usual or average management inputs. In this study, the rating expresses the degree of physical limitations which will be imposed on development and also the level of special or additional management which will be required to overcome these limitations. This level of management factor can be directly related to a cost of development factor.

2.3 Presentation of Results

Two level of land inventory mapping have been undertaken in this study. Areas of public land within the catchment have been mapped at 1:50,000 scale, whilst areas of freehold land have been studied in more detail and mapped at 1:25,000 scale. For the broad-scale public land study, land systems and their components have been described and mapped. For the detailed freehold land study, a number of 'basic mapping units' have been described and delineated on separate maps. These basic map units are considered sufficiently homogeneous with respect to many soil and landform parameter to permit a reliable assessment of land capability to be made.

The results of the studies of public and freehold land are presented in both volumes 1 and 2 of this report. Descriptions of map units employed for both studies are given in section 4 of this volume. For the basic mapping units (freehold areas only) the assessment of limitations and subsequent land capability ratings are presented in a table at the base of each description.

Volume 2 of this study is a map atlas containing 1:25,000 scale land inventory and interpreted land capability maps for freehold land and a 1:50,000 scale land inventory (land systems) map of public land. For freehold land, the results of the inventory process are superimposed on a series of eight aerial photomosaic map sheets covering the relevant areas of the catchment (Refer Figure 2). For each of these map sheets there are four corresponding 'intercept' map sheets showing land capability ratings for each of general construction activities, on-site effluent disposal and erosion risk, as well as the overall rating for rural residential subdivision.

In addition to these map sheets relating to freehold land, volume 2 contains the scale map showing the land systems and components of the areas of public land. Interpretations of land capability were not required for these areas.

Section 6 of this volume describes how the land capability assessment ratings can be used.

Table 1 Descriptions of basic Mapping Units

Breakdown of nomenclature: Refer to section 4 for more complete descriptions, limitations and capability ratings for each map unit.

First 'landform' component	Second descriptive component	Third descriptive component (not always used)
CR Crests	1. on Devonian sediments 2. on Tertiary volcanics 3. on 'fine' Tertiary sediments, with somewhat poorly drained soils 4. on ;coarse' Tertiary sediments, with well drained soils 5. on Devonian metamorphics	a. with gradational yellow soil variants. b. With shallow stony soil variants.
SS Sideslopes to hills	1. Steep, 25 – 50% 2. Moderately steep, 10 – 25% 3. Moderate, 5 – 10% 4. Gentle, 2 - 5%	a. on Devonian sediments b. on Tertiary volcanics c. on Tertiary sediments d. on Devonian metamorphics
DC Drainage channels	1. Major, areas of sediment deposition 2. Minor, areas of sediment removal	
TR Alluvial terraces	1. Lower, soils somewhat poorly drained 2. Higher, soils well drained	
DF Drainage flats (below terraces)	1. Lower, adjacent river 2. Higher	

Table 2. Land Capability Rating Classes

Class Capability	Degree of limitation to Development	General Description and Management Guidelines
1. Very Good	The limitations of long term instability, engineering difficulties or erosion hazard do not occur or they are very slight.	Areas with high capability for the proposed use. Standard designs and installation techniques, normal site preparation and management should be satisfactory to minimise the impact on the environment.
2. Good	Slight limitations are present in the form of engineering difficulties and/or erosion hazard.	Areas capable of being used for the proposed use. Careful planning and the use of standard specifications for site preparation, construction and follow-up management should minimise developmental impact on the land.
3. Fair	Moderate engineering difficulties and/or moderately high erosion hazard exists during construction.	Areas with fair capability for the proposed use. Specialised designs and techniques are required to minimise development impact on the environment.
4. Poor	Considerable engineering difficulties during development and/or a high erosion hazard exists during and after construction.	Areas with poor capability for the proposed use. Extensively modified design and installation techniques, exceptionally careful site preparation and management are necessary to minimise the impact on the environment.
5. Very poor	Long term, sever instability which cannot be practically overcome with current technology.	Areas with poor capability for the proposed use. Severe deterioration of the environment will probably occur if development is attempted in these areas.