

An aerial photograph of a rural landscape featuring a large, irregularly shaped pond in the center-right, a smaller pond below it, and a large, light-colored building with a gabled roof in the upper-left. The area is surrounded by dense green trees and grassy fields. The text is overlaid on the lower half of the image.

# **'MELLIODORA'**

**HEPBURN PERMACULTURE GARDENS**

**A CASE STUDY IN COOL CLIMATE PERMACULTURE 1985 - 2005**

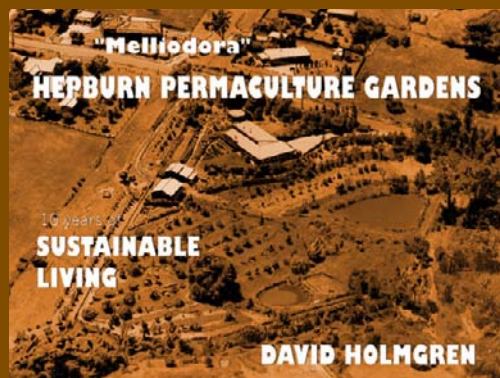
**DAVID HOLMGREN**



# SUSTAINABLE LIVING AT 'MELLIODORA' HEPBURN PERMACULTURE GARDENS A CASE STUDY IN COOL CLIMATE PERMACULTURE 1985 - 2005 DAVID HOLMGREN

*eBook Version 1.0*

*Combining family home, design consultancy office, self reliant small farm  
and demonstration site, Melliodora shows the best of cool climate permaculture design,  
relevant to both small rural properties and larger town blocks.*



## Book Credits 1995

Copyright © David Holmgren  
Published by Holmgren Design Services  
16 Fourteenth St, Hepburn, Victoria 3461

Editing: Ian Lillington & Su Dennett

Plans & Diagrams: Kerry Wise

Illustrations: Greg Holland

Typesetting: Greg Holland, Su Dennett

Photographs: David Holmgren &  
Su Dennett

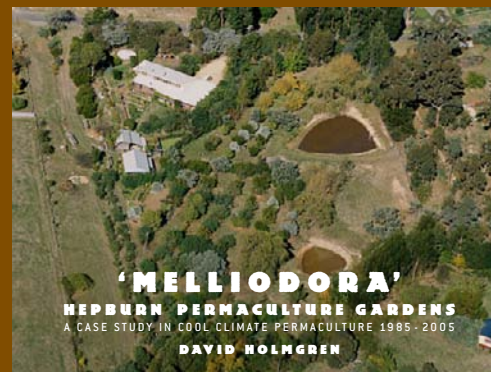
Cover illustration: Greg Holland  
(from photo by Bruce Hedge Dec. '93)

Printing: Australian Print Group,  
Maryborough, Victoria

National Library of Australia,  
cataloguing in publication  
Original book ISBN - 0 646 26990 9

## Dedication

Since beginning work on this book in 1991, the memory of Doug Swing keeps coming up. Doug became a close friend while helping to build our home. Like his tireless efforts in local community affairs and issues, Doug's contribution to this project and the people involved was greater than his paid job as builder's labourer. Doug Swing's death in August 1989 strongly affected our whole family.



## 2005 eBook Credits

**eBook prototype production:** Richard Dent

**eBook design, editing and production:**  
Richard Telford

**eBook editing:** Ian Lillington

**Image Scans:** Christian Wild

**Cover photo:** Bruce Hedge

**Virtual tour design and HTML production:**  
Oliver Holmgren

**Project management:** Su Dennett

National Library of Australia,  
Cataloguing in publication  
CD-ROM ISBN 0-9750786-0-7

This eBook and pdf & html files are  
copyright. Apart from any fair dealing for  
the purposes of private study, research,  
criticism or review, as permitted under the  
Copyright Act, no part may be reproduced  
by any process without written permission.

Copyright © David Holmgren

Published by Holmgren Design Services  
16 Fourteenth St, Hepburn, Victoria 3461  
Website: [www.holmgren.com.au](http://www.holmgren.com.au)

## Acknowledgements

Christian Wild for his expert and excessively  
generous donation of time and the best  
technology to convert all of the original  
colour slides, prints, plans and artwork into  
digital format.

Richard Dent for his enthusiastic and  
foundational work on the virtual tour  
concept and in converting the original book  
into the prototype eBook.

Richard Telford for his creativity and  
dedication in the design and production of  
the eBook.

Others who contributed to the project were  
our neighbours Ewan McEoin, Joe Cummins,  
Fran Woodruff & Isolde Maranti

## Dedication

The development and documentation of  
Melliodora over the last seventeen years  
reflects that of our son Oliver Holmgren who  
was born in Hepburn in May 1986. From the  
toddler on the building site, to the boy in the  
garden, to his creative contribution and  
technical support in producing this  
electronic update of the original book,  
Oliver's experience and memory of this  
place is another recording of Melliodora.



Virtual Tour

*Links to a visual tour of Melliodora in your web browser. Buttons throughout the eBook link to relevant pages within the Virtual Tour.*



Seasonal Cycles

*Links to a series of images that focus on the changes of seasons on the property.*



More recent photo

*Used throughout the eBook, this button links to photographs in the Second Decade chapter that have been taken from a similar angle.*



More recent text

*Used throughout the eBook, this button updates information by linking to new related text in the Second Decade chapter.*



HDS resources

*This opens your browser and links to Holmgren Design Services website. (Elsewhere this button links to related articles by David Holmgren).*

PROLOGUE

INTRODUCTION

THE LOCAL ENVIRONMENT

- Land Use History
- Development Patterns
- The Natural Environment
- Site Evaluation

PREPARATORY WORKS

- Site Planning
- House Site Selection
- Earthworks - House Site
- Earthworks - Dams

HOUSE

- House Design
- Solar Design Features
- Bushfire Resistant Design
- House Construction
- Building Materials

INFRASTRUCTURE

- Outbuildings
- Fuel Management
- Water Systems
- Access & Fencing

THE GROWING ENVIRONMENT

- Soil Development
- Perennial Planting Strategy
- Planting Zones
- House Garden
- Orchard

LIVESTOCK

- Poultry
- Other Animals
- Aquaculture

BEYOND THE BOUNDARIES

- Public Land

APPENDICES

- Development Timeline
- Perennial Species Index
- Herbarium List (Wild Plants)
- Bushfire Safety Procedures
- Inputs & Yields at Melliodora
- References & Resources

THE SECOND DECADE

- Development Timeline
- Livestock Update
- House Update
- Looking at Melliodora

CATALOGUE

*"The question which must be addressed, ...  
is not how to care for the planet, but how to care for each of the  
planet's millions of human and natural neighborhoods, each of its  
millions of small pieces and parcels of land, each one of which is in  
some precious and exciting way different from all others"*

*Wendell Berry 1989*

## THE CASE STUDY APPROACH

Writing a book about permaculture (or any other subject for that matter) is normally about generalities; general principles, strategies and techniques which readers can apply in their own ways. Many books make use of examples to illustrate and maybe inspire but rarely are whole projects documented in their detail. To do so would be to reduce the universal or general value of the book for a wide readership. Consequently case studies with limited applicability (and therefore market) are of little interest to most book publishers.

There is now an increasing number of books available on permaculture which explain principles and provide a "toolkit" of design systems and elements which readers might apply. However, these books don't show how the constraints and prospects of a real situation have been tackled by real people. Videos and magazine articles can provide a glimpse but only a book can cover the nitty gritty details of interesting projects.

The widely acknowledged shift in electronic media from broadcasting to "narrowcasting" is paralleled by a fragmentation of the print media providing more detailed and specific information to smaller numbers of readers. Combined with the technology of desktop publishing this will lead to an increasing role for case study publications.

Melliodora is now well established as a permaculture demonstration site, documented in a variety of ways. The idea of this book, and a video currently in production, is to provide more detailed information about the project, its development and the lessons learned in the first decade. The long gestation period has allowed substantial revision (1995), of text first written in 1991.

**Most importantly, I have been able to include some retrospective assessments of some of the elements of the property development, where significant lessons have been learned.**

In encouraging readers to adapt and make use of what we have done to their own situations, I would like to emphasise the danger in attempting to transplant our design or parts of it to another site. Every place, context and person is unique, as should be every permaculture design. Similarly, just because we don't have a herb spiral, swales or chicken tractor doesn't mean these or many other elements are inappropriate in other sites and situations. My greatest fear from the success of Melliodora is that other equally creative examples of permaculture are ignored or undervalued.

A further note of caution is appropriate. Although Melliodora is clearly an example of my work, the degree to which I can design a similar system for clients as a design consultant is limited.

I can design, or help design the skeleton or framework within which clients may develop permaculture as a living evolving system. However, I cannot apply myself to someone else's design, the way I have to our own. Clients could not afford the cost and I would not be prepared to devote the time and creative energy required. The living, evolving system which we call permaculture can only come about as a result of the continuous interaction between the client as designer/practitioner and the elements of climate, soil, plants, animals, buildings and people.

*David Holmgren May 1995*

## ORIGINAL ACKNOWLEDGEMENTS

The production of this book has been like the building of the house and development of the land, an effort by family and friends.

Kerry Wise's graphics accurately depict so much of what we have done, some of it redrawing my own drawings, much of it mapping for the first time a system which kept changing as she drew it.

Greg Holland has also made a major contribution to the look and feel of the book through his artwork as well as computer typesetting and layout.

Ian Lillington's editorial role and his gentle but persistent encouragement and management through the writing and production stages of the book has been very important.

Su Dennett, my partner in life, has done many tasks both from the practical to the inspirational in bringing this book to life. Trying to label Su's diverse role makes me realise how difficult it is for me to separate the writing and production of this book from the project itself, our own lives, and all the influences and contributions which lay behind the subject of this book.



## HOW TO USE THIS eBook

This eBook is based on the A3 sized book of the same name published in 1995 and reprinted in 2001. The following notes about how to use the book also apply to this eBook version.

The book can be read section by section, working logically from the historical and environmental features of the area, through design of the property, to implementation of the design. The contents and their sequence are intended to provide an understanding of the conscious planning and design process I use in approaching any project. This provides a structured balance to the strong impressions gained by visiting the property in a particular season or stage of development (or viewing the Virtual Tour).

Alternatively, the reader may choose specific sections which are currently interesting or relevant to his or her own situation.

The notes on the land use history of the locality and site, the land systems of the area and development context are necessary to set the scene, especially for the reader not familiar with the locality. My attention to this detail is to emphasise that no permaculture project exists in isolation and the significance of things depends on their context. This information is not simply taken from published sources but is largely derived from my own "readings" of the natural and cultural landscape.

As well as the formal documentation, the book provides an insight into the personal stories, idiosyncracies, organic evolution and open ended nature of the project. I often tell clients that they are their land's greatest asset and greatest liability. With us it is no different.

Most sections outline general principles and strategies first, and then give detailed information on the design and its implementation. However, a full explanation of the principles of permaculture which underlie the design is beyond the scope of this book.

Explanation of technical terms and cross references to other sub-systems are given on the relevant page. Generally, common names for plants are used in the main text, with botanical and common names in the Perennial Species Index.

Because of the different nature of the media used, this eBook lacks some of the qualities of the book, most notably the A3 landscape format with text, plans and photos laid out in thematic presentation. On the other hand the eBook provides many advantages;

- All original colour photos
- Plans, graphics and photos zoom-able to see a higher level of detail than possible in the book
- Additional information and photos to update the book

Thus the eBook can be considered as both a complimentary update and an alternative to the original book. Any comments on the format and content of this eBook are welcome including bug reports: please email us (with *Melliodora eBook v1.0 Feedback* as the subject).

## HELP

The easiest method of navigating to different parts of the eBook is by returning to the Contents page. Different coloured bars indicate chapters and the text below the bars indicate sections within the chapters. Clicking on these will link you to the relevant page.

Chapters begin with a menu page, sections are listed in capital letters and articles within the section are listed below in lower case. Click on the topic of interest to link to that page.

Return to the chapter menu by clicking on chapter heading in the top right hand corner.

There are also links within the text that link you to related pages elsewhere in the document.

Click on text to view at full screen width, continue clicking the mouse to move to the next section of text, alternatively you can use the scroll wheel or the up and down arrow keys.

Pictures can be enlarged. In Acrobat 5 click once to enlarge and again to reduce. Acrobat 6 is not recommended (update [www.adobe.com](http://www.adobe.com)), but you can click on the image followed by the Previous button. In Acrobat 7 hold the mouse button down to enlarge and release to reduce. 'Preview' (the default pdf reader on Mac OSX) is not recommended, download Acrobat Reader.

Five buttons on the contents page, and used throughout the document link to new content.



**Virtual Tour** - a visual tour of Melliodora in your web browser. Throughout the eBook this button links to relevant views within the Virtual Tour.



**Seasonal Cycle** - a series of images that show the changes of seasons on the property.



**More recent photo** - updated photographs in Second Decade chapter which updates this information.



**More recent text** - links to new related text in the Second Decade chapter which updates this information.



**HDS resources** - related articles by David Holmgren (on contents page, this button opens web browser and links to Holmgren Design Services website).

You will notice a menu bar at the bottom of the screen.



**QUIT** (rollover - bottom left) - will quit Acrobat and leave the eBook.



**FULL SCREEN** (rollover - bottom left) - The eBook automatically starts in full screen mode but this button allows you to switch between Full Screen and Acrobat Window mode.

- **SEARCH** - find a word or series of words to match your query.
- **HELP** - brings you back to this page.
- **CONTENTS** - returns you to the contents page.
- **PREVIOUS** - returns you to your previous view.
- **BACK** - go back one page in the document.
- **FORWARD** - go on to the next page in the document.



PERSONAL HISTORY

In 1985 Su and I purchased a one hectare block of land on the edge of Hepburn, Victoria to build a family home and develop a self reliant lifestyle which reflected our values.

For me, after several years in inner city Melbourne it was a return to a more rural location and another phase in the practical application of the permaculture concept and principles which I had developed with Bill Mollison in the mid 1970's. More specifically, the plan to owner-build a passive solar house drew on my experience of building my mother's new rural property in



Jody with new born brother, Oliver May 1986 at Melliodora

southern N.S.W. a few years earlier<sup>1</sup>. In Hepburn I was also able to apply cool climate experience from Tasmania, New Zealand and other parts of Victoria and focus my permaculture consultancy work in the region of my new home.

For Su, life in a small country town was a new beginning with our blended family of Kimon (13), Jody (11) and Oliver, born in May 1986 at home in Hepburn.

As we loaded our truck with our possessions to leave North Carlton, a new Mercedes moved into the street, perhaps a suitable symbol of Australia in the mid 1980's obsessed with material wealth and fast money entrepreneurs. In joining the small rural community of Daylesford and Hepburn (about 7,000 people) we were arriving at a time when many of the previous "back-to-the-land" ex-urbanites were returning to the city in search of money, social acceptance or simply excitement.

1. Holmgren, D. Permaculture in the Bush, Nascimanere, 1993



Family photo 1991; David, Kimon (19), Oliver (5) and Su.

SELF RELIANCE

For us, the principle of self reliance and personal responsibility has been central to everything we have done from being owner builders and growing our own food to home birth and home schooling. This is not driven by a desire to separate ourselves from society but a strong belief that it is through citizens taking more, not less, responsibility for their own needs that the necessary social revolution to a sustainable society can be best initiated.

COMMUNITY DEVELOPMENT

Commitment to our local community has paralleled our increasing self-reliance and wider role in permaculture education. We believe the subtle and sometimes invisible integration of environmental alternatives into the local community which emphasises shared local values and understandings is one of the effective means of social change. Community self regulation and governance is a natural extension of the principle of self reliance. The local ratepayers' association, LETSystem and community management of public land have been some areas of our most active involvement in our local community.



## PERMACULTURE DEVELOPMENT & EXTENSION

After the first wave of public interest in permaculture in the late 1970's I believed one of the weakest links in the spread and adoption of permaculture was the lack of demonstration sites which were:

- inspired by and consciously designed using permaculture principles,
- documented and accessible to the public in some way.

Private properties reflect personal responsibility, skills, and idiosyncracies and have a special value in permaculture extension because they show how real people have integrated the ideas into their lives.

The role of Melliodora as a demonstration site of cool climate permaculture was a natural consequence of my involvement in permaculture consultancy and education. We began to respond to a word-of-mouth demand for guided tours. In 1990, the house was featured in Bill Mollison's Global Gardener program on ABC television and the Owner Builder magazine in 1991. Since then over 1000 people, mostly Victorians, have participated in formal guided tours for groups.

Our Visitors' Guide, published in 1992, provides some basic information. A wider audience has seen at least some aspects of the project through magazine articles (Permaculture International Journal, Soft Technology, Your Garden, the Weekly Times), a geography school text, regional television and many slide presentations, (including through the European permaculture network in 1994).

The severity of the manifold crises facing humanity can hardly be overstated. Su and I believe the most effective way we can contribute to a positive future is through personal change and example. We aim to provide information and inspiration to other people most likely to make productive changes in their own lives but have no interest in providing yet another lifestyle curiosity for jaded consumers.

## LAND SELECTION CRITERIA

While living in Melbourne we decided to move to the Daylesford-Hepburn area because we liked:

- the cool moist climate,
- the socially cosmopolitan nature of the community, and
- the prospects for work within the region.

As we investigated the area we developed the following criteria to select a block of land.

1. In, or close to, town to give easy access to school and town facilities, especially for teenage children. Though not a high priority, availability of town water, sewerage and electricity follow from this choice.
2. A large building block between 0.3 and 1 ha (0.75 - 2.5 acres), capable of development as an extensive permaculture garden to provide most fresh food needs of a family, but not so large as to require major capital investment and time to develop and manage.
3. Good solar exposure with minimal risk of being overshadowed by future tree planting or development on neighbouring land. Preferably north sloping for easy solar orientation of house and maximum heat gain to plantings.
4. On the Hepburn side of town for the more sheltered microclimate.
5. Soil of good depth and drainage. Preferably volcanic soil.
6. Side or rear boundary to road reserves, gullies or other undeveloped public land.
7. Low to moderate fire hazard.
8. Low cost of service connections.
9. Opportunities for independent water supplies from dams, wells, bores or springs.

Compromises are always involved in buying land, but the property does meet most of the above criteria. Perhaps the most substantial compromise was the predominantly west facing rather than north facing slopes. The ways in which we have dealt with this less than ideal situation for permaculture in a cool climate is one of the important lessons in this case study. There were also some financial advantages from our choice. Blocks of land the size we were seeking outside towns were so much in demand that prices were actually higher than serviced blocks in town. In addition, the fact that this particular block was covered in "weeds", had a drainage line through it, and was relatively steep, substantially reduced its market value.



# THE LOCAL ENVIRONMENT

## LAND USE HISTORY

- Hepburn Local History
- Melliodora Site History

## DEVELOPMENT PATTERNS

- Local Context
- Community and Transport Services
- Locality Map
- Reticulated Services

## THE NATURAL ENVIRONMENT

- Climate
- Land Systems
- Microclimate and Soils
- Soil Types

## SITE EVALUATION

- Natural Characteristics
- Intended Land Use





## HEPBURN LOCAL HISTORY

Little is known about the pre-European history of the area, but from early accounts and interpretation of the natural environment, it appears that the volcanic areas provided diverse animal and vegetable foods and were more open than the denser forests of the sedimentary country. Abundant springs would have made the area favourable for occupation in summer. Aboriginal populations would not have been as permanent or large as those on the extensive volcanic landscapes to the west of the Wombat Forest around Mt.Kooroocheang, where Captain Hepburn settled in 1838.

Following the discovery of gold in 1851 at Hepburn Springs, the area was quickly transformed (in a few decades) from a relatively pristine indigenous landscape to a moonscape of felled forests, gullies with flumes and sluices, mullock heaps and boom town development. The immediate locality of our property, known as Hepburn to the locals, became the focus of mining and settlement.

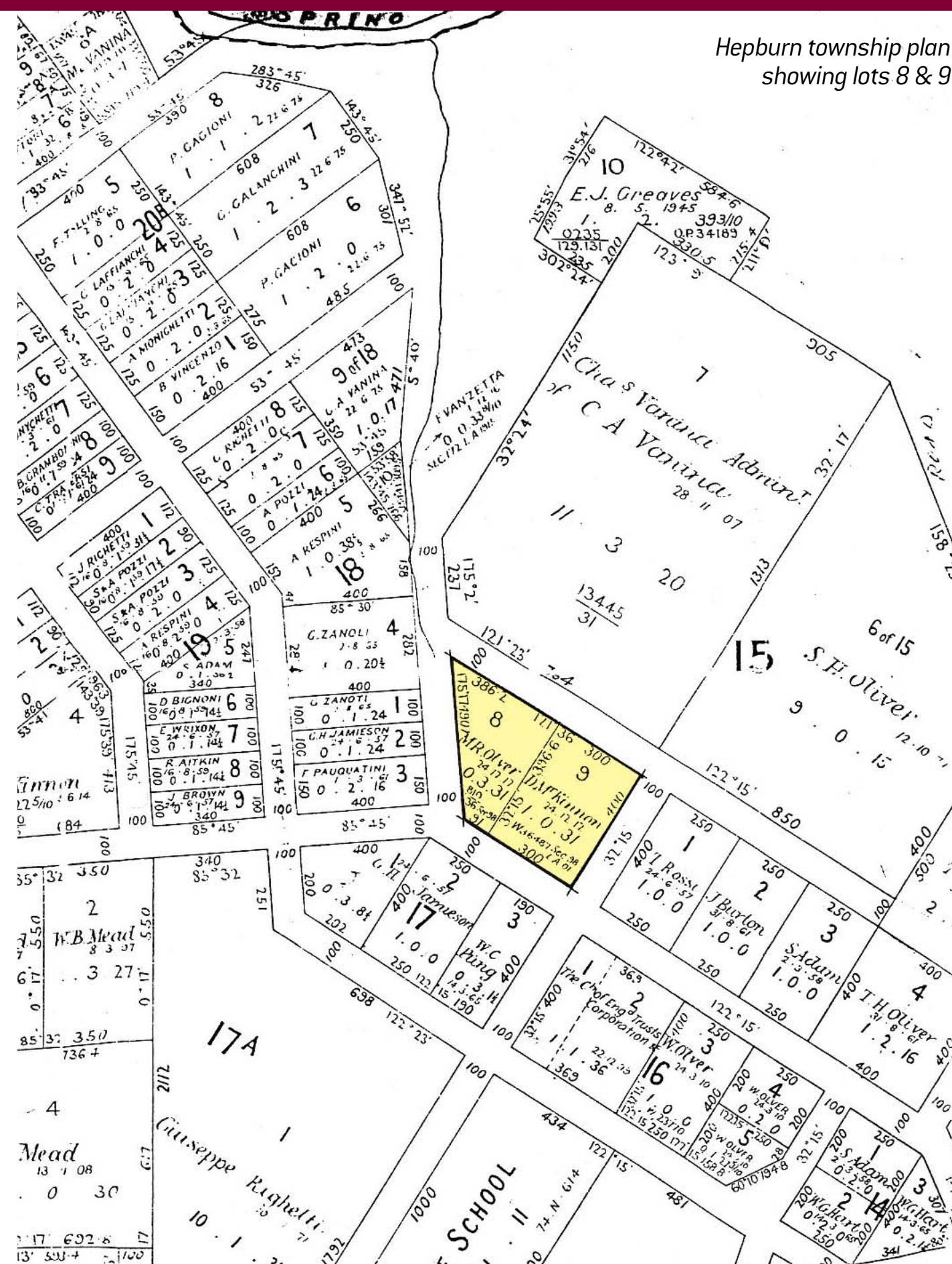
By 1880 most of the alluvial gold<sup>1</sup> had been worked out and small scale agricultural activities including wine making and market gardening became important land uses drawing on the peasant traditions of the Swiss Italian and Chinese miners. Agriculture is likely to have been concentrated on the basaltic landscapes not covered by mullock from mine shafts, but the Chinese managed to make market gardens on turned over gully floors such as the present Springs Reserve.

Deep lead<sup>2</sup> mining continued to demand large amounts of timber for shoring of shafts, and by the end of the century much of the sedimentary country had lost its top soil. The broad drainage lines had become massive erosion canyons with tree cover reduced to a few scattered remnants.

With the cessation of surface mining and the gradual decline in population the landscape began to heal. Small scale farming continued on the better land but the introduction of the Phylloxera aphid and poor seasons are reputed to have destroyed the local wine industry. However, local varieties of grapes from Swiss Italian stock are still grown in the area. Exotic weeds such as blackberry and gorse joined native species in recolonising eroded gullies.

With the popularity of the mineral springs early this century, guest houses and associated tourist development concentrated on the steeper slopes and ridges around the Springs Reserve. A good market developed for produce from small scale mixed farming. By the 1940's regrowth forests also provided increasing work for firewood, sleeper and post cutters.

The resurgence in mineral water based tourism, improved services and the rural resettlement movement of the 1970's and 80's has resulted in infill development within the township area and maintenance and renovation of existing dwellings.



Hepburn township plan showing lots 8 & 9

1. alluvial gold: gold deposited by rivers and streams in gravels and sands along existing stream courses
2. deep lead (pronounced 'leed'): geologically ancient stream courses buried under valley lava flows



## MELLIODORA SITE HISTORY

Earliest use of the site by Europeans was probably the dairy cows of Maurizio Bolla in the 1850's. Shortly afterwards mining along the gully below the property would have transformed the landscape.

None of the details of what happened on the site during the gold rush have come to light, but at some stage late in the 19th century, a small hut was constructed and a well dug just above the old pear tree. From its great size and girth we assume the pear was planted about the same time.

Old locals recall the place being spoken of as the home of the Pinner (or Pinna) family although nothing else is known about these people. It is probable that the occupation of the site was based on a miners right as no title for the land in this period can be traced. In 1906 a bushfire swept through Hepburn. We presume the hut burnt down during that fire as older locals recall nothing more than a pile of stones by the early 1930's.

In December 1912 crown allotments 8 and 9 were created and the title documents show Duncan McKinnon, the postmaster and shoemaker of Hepburn as being granted lot 9 while Margaret Rose ("Rosie") Olver was granted lot 8 (for a price of 6 pounds each). Locals remember Duncan McKinnon as the sole owner, the property being fenced as a whole and grazed by Duncan's cows.

In 1947 Duncan died and in 1951 George Rodgers purchased the property from Duncan's widow and son. Over the next seven years Rodgers ran free range poultry on the property. In 1957 he set up a sawmill on the present housesite, initially to cut palings but sold the property the following year to Val Wallace. Val continued to operate the mill, mostly cutting box and red gum. In 1963 a crop of potatoes was grown on the red soil slope of lot 8 as much a fire break to the sawmill as for the harvest.

In 1964 the title of allotment 8 was finally transferred from Rosie Olver and in 1966 the land and mill were transferred to Val's son, Johnny Wallace who continued to operate the sawmill.

In 1968, Fourteenth St, then nothing more than a goat track, was constructed by the council to give better access to the new subdivision to the south east of the property. Because of the hard sandstone reef which was struck in grading off the top of the hill, extra fill for the drainage line crossing was excavated from the Olver Street reserve creating a level access track in the process.

Through the sixties, Jack Monaghan, our neighbour to the east, ran a long campaign to have the sawmill closed due to nuisance created by smoke, ash and sawdust. The mill was finally closed in 1970. In over two decades the impact on the land had been substantial. In some spots, dumping of sawdust, bark and ash resulted in highly enriched soil, in others,



*Pear tree on the lower slopes of the property. 18m tall and probably 100 years old, it is a living monument to the Swiss-Italian pioneers and for us a symbol of the persistence and abundance of nature.*



machinery had compacted and inverted it. Trees, mostly yellow box surrounding the mill had been progressively cut down.

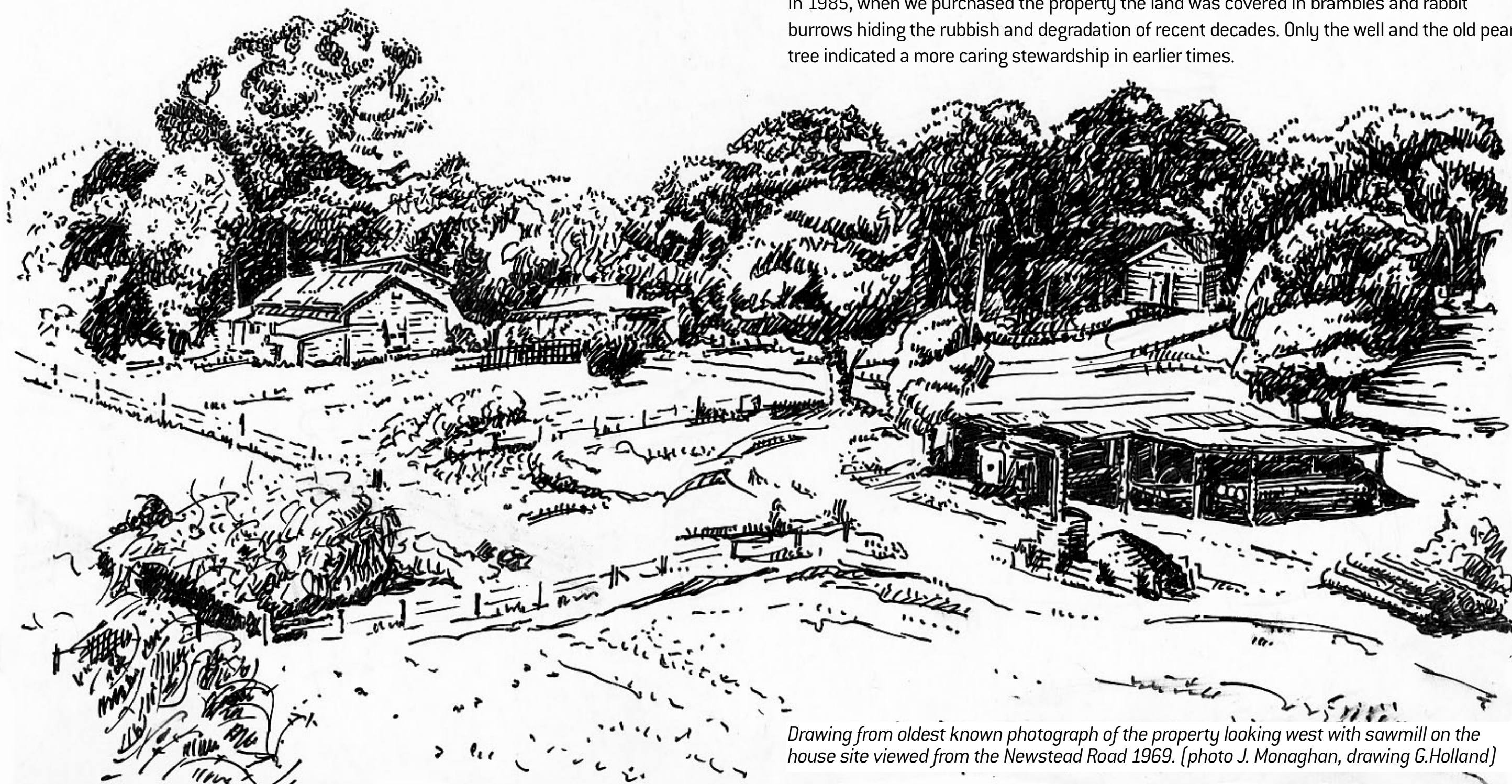
The property was “cleaned up” for sale with a bulldozer. A small bench was cut into the hillside as a housesite and in the process sawmill waste, old blackberry covered fences, truck parts and other hard rubbish were buried in the fill slope. The eroded drainage line in the lower part of the property was filled with similar material. In the process topsoil was stripped from some areas.

In 1975 the property was sold to the Stracks from Melbourne. Over the following years,

blackberry, gorse and cape broom grew back, covering the scars of earthworks.

In 1982 the installation of the town sewerage system was another major impact on the land. The laying of the trunk main along Olver Street and the branch main along the boundary between the two lots resulted in clay and shale being spread over a significant area of the property and topsoil being buried in the sewer trenches. On the other hand, the predominance of the indigenous wallaby grass on the steep slope beyond the pear tree indicated there had been very little, if any, earth moving or digging on this part of the property since settlement.

In 1985, when we purchased the property the land was covered in brambles and rabbit burrows hiding the rubbish and degradation of recent decades. Only the well and the old pear tree indicated a more caring stewardship in earlier times.



*Drawing from oldest known photograph of the property looking west with sawmill on the house site viewed from the Newstead Road 1969. (photo J. Monaghan, drawing G.Holland)*



The location of the land and its relationship to both town services and the surrounding natural and community environment affect its potential as much as the natural characteristics of the land. On the other hand it is important to understand these influences as constantly changing.

## LOCAL CONTEXT

The urban-rural fringe is an edge where the resources of both the city and the country are accessible. The preference of people to live in a rural environment but as close as possible to town services is a reflection of this. A mosaic of development maximises the edge, but the costs of providing reticulated services of roads, water, sewerage, power and telephone and the additional adverse effects on the environment can be substantial. Planning authorities use zoning controls and rates to encourage infill development.

In Hepburn, infill development is occurring on titles created last century as well as recent subdivision of larger allotments, but the Hepburn Regional Park and road reserves on steep gullies and slopes between developed ridges ensure a patchwork fabric of development. For the shire council the undeveloped road reserves represent weed and fire hazard management problems as well as potential demand for future road construction to service existing titles or proposed subdivisions. For us the public land represents a sense of "wild hinterland" for exploration, especially exciting for children.

Subdivision and development of private land to the NE of the property may involve construction of the first section of McKinnon Road in the future, while construction of Oliver Street to service much smaller parcels of land to the SW is less likely. The gully road reserve is never likely to be developed. Property owners sometimes take responsibility for maintenance of adjacent road reserves since the council is unable to maintain all areas of public land within the town. This represents an opportunity to develop the road reserves to suit private interests within the informal constraints of neighbours and council officers. In the future we may see the unused road sold off or, alternatively, more formal planning and management for them.

## COMMUNITY AND TRANSPORT SERVICES

Kindergarten and primary school are within walking distance. General Store, Post Office and bank agency, hotels as well as mineral springs reserve and bath house are all within 1km, while Daylesford (4km) provides most town services including the centre for recently amalgamated local government. City services including government regional offices are mostly available in Ballarat, 50km distant.

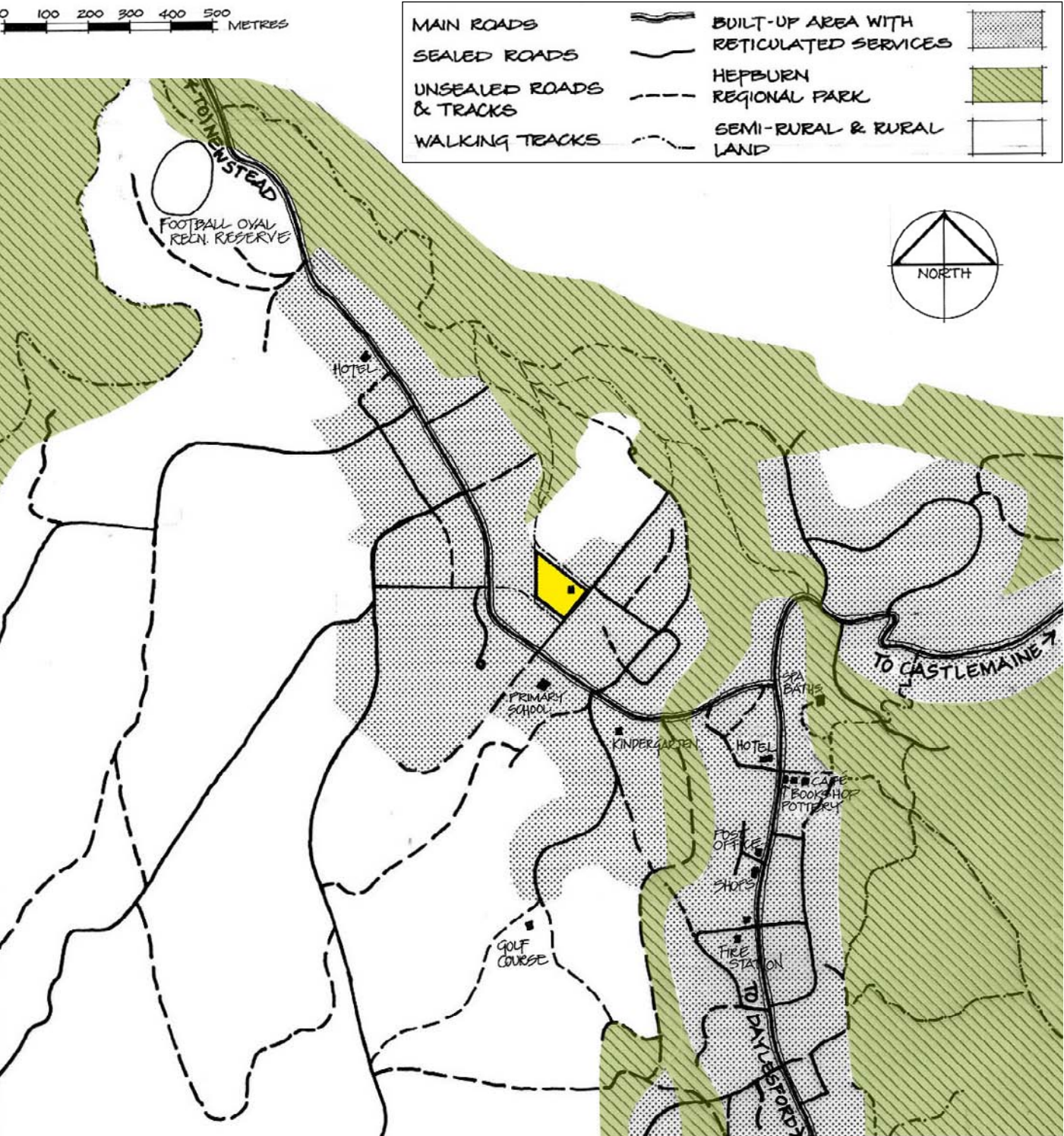


Aerial view of locality autumn 1989, showing Melliodora at the centre. Newstead Road lower right to centre left, Hepburn Primary School lower right, new subdivision estate lower left. Spring Creek and Elevated Plain in background.



Some local residents commute to Melbourne. Public transport from Hepburn to Daylesford and on to Melbourne and regional centres is poor and reducing. This relative isolation has accounted for the moderate real estate values and development pressure compared to areas such as Woodend/Kyneton. Recent rapid expansion of tourism is leading to steeper rises in values and larger numbers of houses not occupied by permanent residents. Continued tourist expansion could erode the very strong rural community.

## LOCALITY MAP



## RETICULATED SERVICES

### WATER

The town water supply is generally reliable high pressure water of reasonable quality. Rapid growth is likely to increase the incidence of water restrictions in dry years and potential failure of supply during major bushfires. Grazing and cultivation in water supply catchments occasionally result in sediment and possibly biological contamination in the supply. Connection costs for lot 9 were low but for lot 8 would be substantial.

Rates are high and allocation fell from 400kl (1988) to 250kl (1994) and has now switched to the user pays system with each kilolitre (tonne) of water costing more than A\$1. This pattern has shown the good sense of the self reliant approach of making use of existing services while developing on-site systems.

### SEWERAGE

Pollution of local streams by septic systems led to sewerage of the town in the last ten years. This involved expensive capital works and ongoing costs for pumping stations. The high cost led to strong pressure for connection within the serviced area so in 1986 we felt any attempt to get approval for alternative on-site recycling of human waste and greywater would not succeed. Connection costs for lot 9 were moderate but rates are high. Waste water use fees (75% of metered water use) are now being charged making effective water supply costs over A\$1.60 / kl.

Secondary treated effluent is used for the irrigation of lucerne pasture at the Shepherds Flat sewerage farm but in winter excess effluent is discharged to the Jim Crow Creek. Mounting concerns over nutrient pollution of streams and greater acceptance of composting toilets would make an independent approach more likely to succeed<sup>1</sup>.

### GAS

Reticulated gas is available in most of Hepburn and Daylesford but our gas usage is so low that we could not justify connection.

### ELECTRIC POWER

Overhead lines run up 14th Street Connection cost for lot 9 was minimal though lot 8 would now be quite expensive. Rates can be expected to rise in the future due to financial and environmental pressures, making grid-connected photo-voltaics an economic option to provide our power needs from the sun.

1. In September 1995 our neighbours M.Wilson and F. Buining gained approval from Central Highlands Water for their composting toilet and reed bed (greywater) as an alternative to sewer connection - a real victory for the environmental and economic logic of on-site recycling.



Melliodora is located in the ecotone<sup>1</sup> where climate, soils and vegetation change between the montane uplands and the sub-humid inland slopes of Central Victoria. On the bioregional scale this means we have some of the advantages and disadvantages of both regions for living and growing.

CLIMATE

“Mediterranean with maritime and continental influences”.  
Cold wet winters with most rain from the north ahead of south west changes which tend to bring scattered showers. Summers are mild to warm and moderately dry with occasional heavy thunderstorms generally from the north. Hot dry winds (generally from the N W) bring severe plant stress and extreme fire danger most summers. Frosts number about 20 p.a. with November to April generally frost free. Light snowfalls are recorded some years.  
Average Rainfall 825mm. July mean temperature 7°C. February mean temperature 17°C. This is substantially wetter than the dry Central Goldfields to the north but warmer than the cold, wet top of the Great Divide to our south.

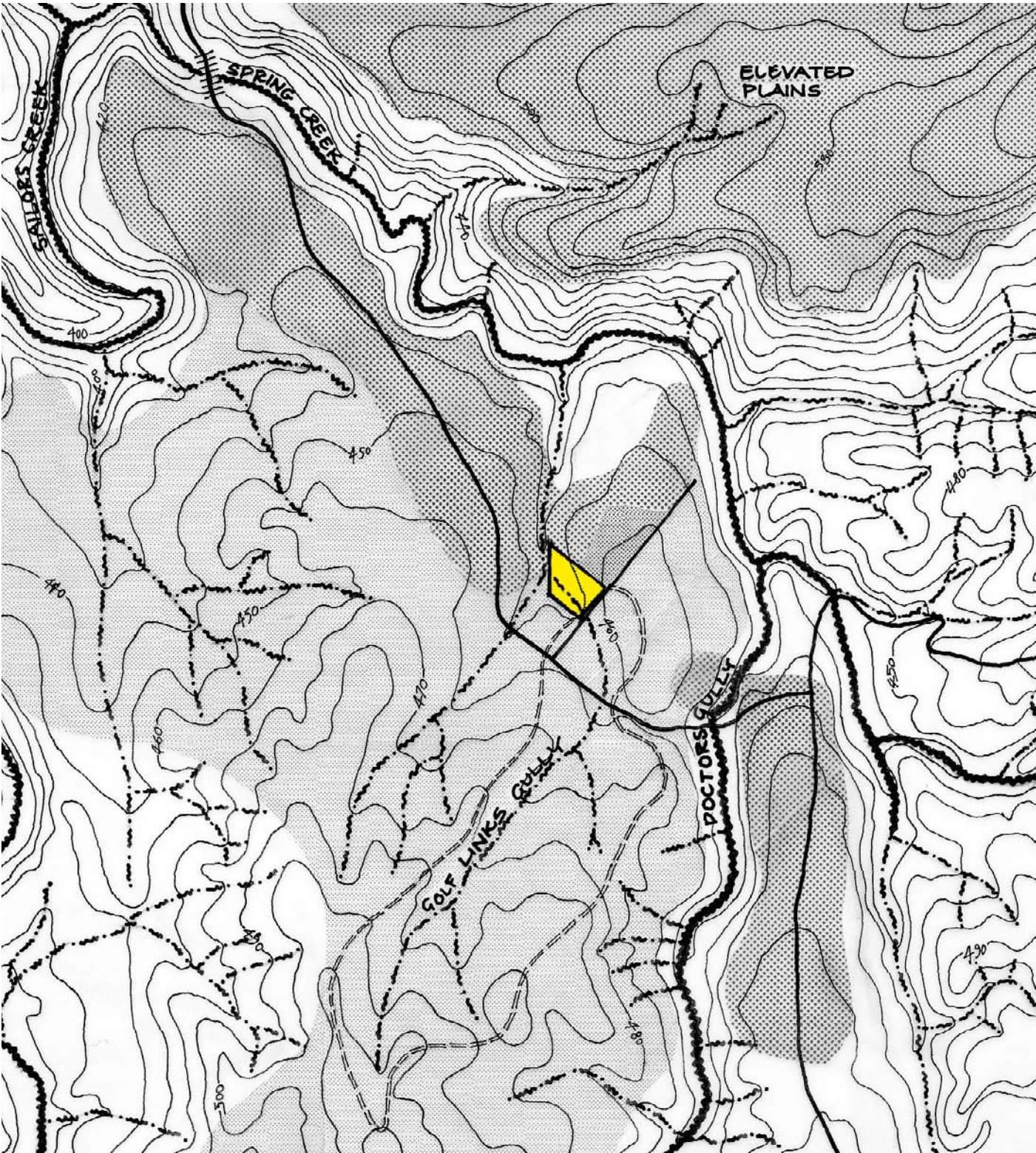
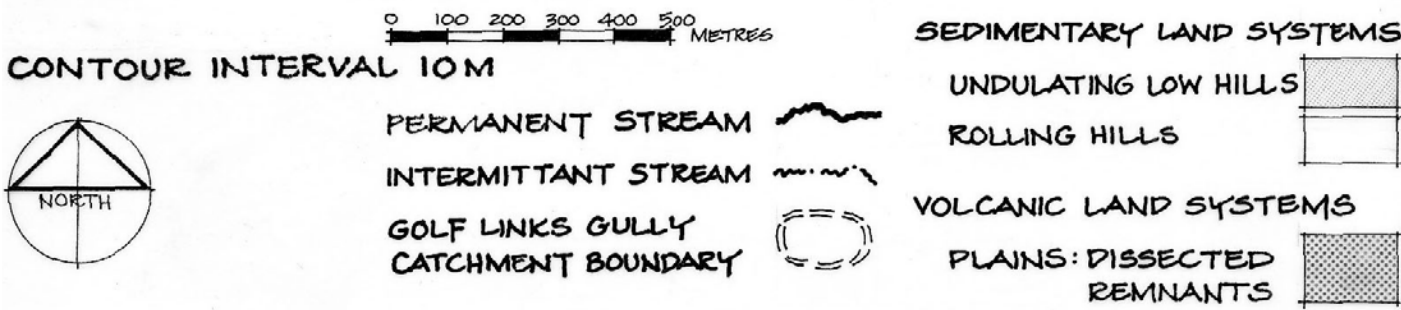
LAND SYSTEMS<sup>2</sup>

Sedimentary Landscapes

These are predominant in the region and the locality and are formed from an Ordovician (400 million year old) geology of near vertical strata of shales, fine sandstones and slates which run north/south.  
These have been dissected by the various tributaries of the Jim Crow Creek, including Spring Creek, to form a series of gullies and ridges. The degree of dissection by these streams has been controlled by the lava flow a few million years ago. Spring Creek cut a new course around the north side of the lava through the softer shales and sandstone allowing it to rapidly downcut to form Breakneck Gorge and create a deeply dissected “rolling hill” landscape in its catchment to the east of Hepburn. The smaller north flowing tributaries such as the Golf Links Gully and Doctors Gully were prevented from downcutting by the resistant rock of the lava flow, thus forming a “low undulating hill” landscape to the south and west of the site.  
The soils of these low undulating hills are predominantly gradational and duplex soils of moderate depth with loamy topsoil and deep yellow clays, while steeper slopes and crests have shallow gradational soils.

1. ecotone: an edge or transitional zone between major ecosystems or bioregions  
2. land systems: a way of classifying land which integrates climate, geology, landform, soils, vegetation and fauna

LAND SYSTEMS AND TOPOGRAPHY





In the sedimentary landscapes, the dominant vegetation on the ridges is a moderate height dry sclerophyll<sup>1</sup> forest of *Eucalyptus gonicalyx*, *E. macrorhyncha*, *E. dives* and *E. polyanthemos*. The gullies and southern slopes have a tall moist sclerophyll forest of *E. viminalis*, *E. rubida*, *E. obliqua* and *E. radiata*. The gentler north facing slopes and drainage lines are characterised by an unusual association of *E. radiata* and *E. melliodora*.

These associations of trees delineate soil, microclimate and fire frequency differences within the Hepburn Springs landscape. Of particular significance is the severe frost that occurs over this last land type due to cold air ponding dammed by the Elevated Plain escarpment to the north.

Volcanic Landscapes

Olivine basalt lava flows and their rich chocolate soils are characteristic of the district. Springs, both fresh and mineral, commonly occur on the sedimentary slopes and gullies immediately below the lava flows. At Hepburn the lava flow has been dissected to the point where only small erosional remnants are left along the main road ridge.

The soils in these areas range from shallow stony loams to deep gradational loams but all are free draining, and well structured. The common name ‘chocolate soils’ reflects their colour and desirable richness.

The original vegetation on the chocolate soils was a tall grassy forest dominated by *E. viminalis*. Today gardens of cool climate exotics such as oaks, rhododendrons, cornelian cherry, walnut and chestnut are noticeably more vigorous and healthy than on nearby sedimentary clays.

MICROCLIMATE AND SOILS

The site straddles the Golf Links Gully, a north facing drainage line with deep clay soils. Beyond the property the gully dissects the basaltic remnant before it drops down to Breakneck Gorge. The edge of the remnant with its shallow soils runs across the northern end of the property while deeper chocolate loams overlay the sedimentary clays on about one third of the property.

This combination of land and soil types provides a diverse potential for food production and a favourable microclimate for human habitation. The greatest limitation of the site is probably frost, the severity and frequency of which was not fully realised for some years. The lowest parts of the property (with deep chocolate soil) are subject to spring frost as late as December.

The Original Site Condition plan shows the features of the site at the time of purchase in 1985.



Aerial view of Melliodora December 1993 showing dominantly westerly slope and minor north east slope of property either side of gully. Note the leaking dam (top) in the paddock built on the free draining stony volcanic soils. (Photo B. Hedge)



Frost hollow in orchard block 3 below old pear tree. Regular light frosts make this site with deepest, most fertile soil unsuitable for many tree crops including walnut.

1. sclerophyll: thick skinned, drought resistant leaves; dry sclerophyll forest: forest dominated by sclerophyll leaved trees (ie eucalypts) and with sclerophyll understory species



SOIL TYPES

1. Shallow Chocolate Loam

Friable red/brown uniform<sup>1</sup> loam 0.2 - 0.5m over highly fractured and weathered basalt:

- very free draining
- prone to leaching and acid condition
- shallow depth leading to rapid drying off of annual pastures
- highly resistant to erosion
- fractured and weathered rock giving minerals and good root access for deep-rooted perennial pasture and trees.

2. Deep Chocolate Loam

Friable red/brown gradational<sup>2</sup> clay-loam 0.5 - 2m over high fractured and weathered basalt:

- very free draining
- highly resistant to erosion
- good rooting volume for perennials and trees
- prone to leaching but relatively high mineral fertility from weathered rock

3. Transitional Soil

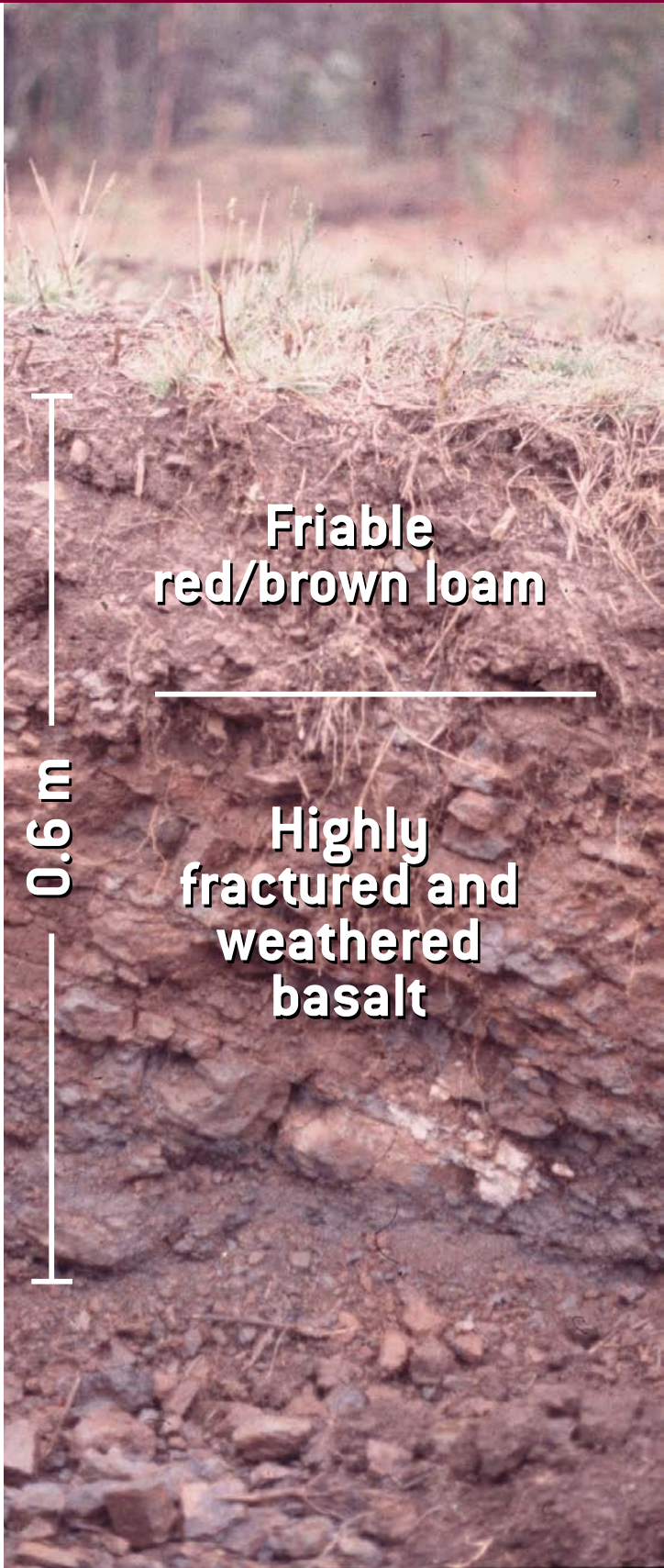
Friable red/brown loam over deep yellow clay:

- moderately well drained
- resistant to erosion
- deep soils with good moisture retention in subsoil
- reasonable fertility from mixed mineral origins

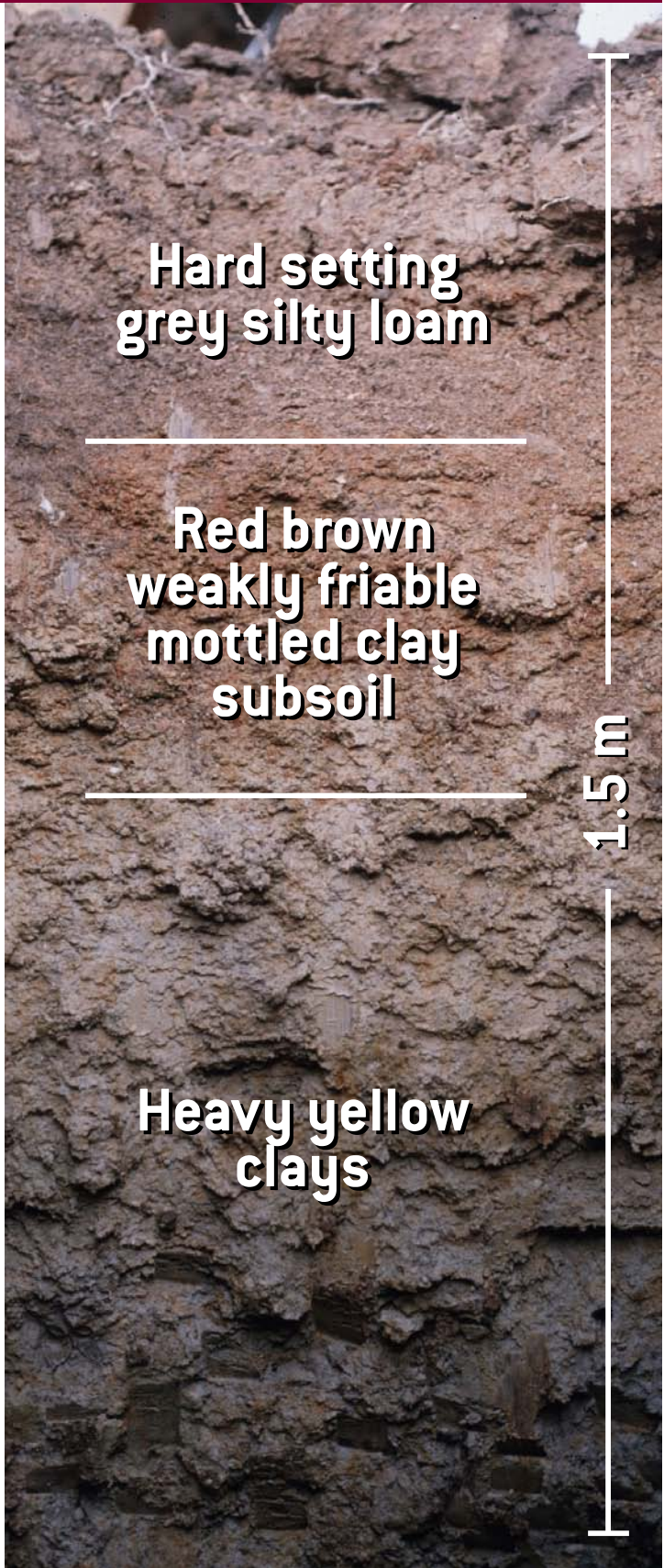
4. Grey Loam over Clay

Gradational and duplex<sup>3</sup> soils over shales and interbedded fine sandstones. Topsoils: hard setting to weakly friable grey silty loams 0.1 - 0.4m deep. Subsoil: yellow clay with moderately developed pan<sup>4</sup> over friable yellow clay with red/brown mottles:

- drainage moderate to slow with intermittent waterlogging
- cultivation can lead to hard setting surface with high runoff
- moderately erodable
- good moisture retention where subsoil is deep
- moderate fertility



Shallow chocolate loam over weathered basalt (0.6m) similar to red soil garden natural profile



Grey loam over clay (1.5m) at sewer connection point in Orchard Block 2

1. uniform soil: one with uniform distribution of clay down the profile  
2. gradational soil: one with a gradual increase in clay down the profile  
3. duplex soil: one with a distinct clay subsoil  
4. pan: a hard less permeable layer usually in the top of the clay subsoil



NATURAL CHARACTERISTICS

Despite the degradation of the site by previous use, the underlying potential of the property for intensive agricultural development is high:



Yellow box (*Eucalyptus melliodora*) growing on Olver Street reserve, 0.6m diameter, 20m tall which is typical of regrowth from early this century on deep sedimentary clays of Hepburn. It indicates the lower rainfall and greater heat during growing season than in nearby Daylesford.

- 1. The north facing gully and adjacent slopes form a sun trap which produces a relatively warm microclimate.  
The majority of the block has a WNW aspect which is as hot as a north aspect in summer. Inland of the Great Divide, heat build up in the afternoon, with no sea breezes, makes westerly aspects far warmer than easterly ones.  
Westerly slopes which don't catch the first rays of the morning sun are also less subject to frost damage.
- 2. The gentle midslope position of the property produces deep clay subsoils capable of storing moisture and supporting extensive tree roots.  
(In a local context yellow box (*E. melliodora*) can be considered a totem species<sup>1</sup> reflecting these first two factors.)
- 3. The gully running through the property is suitable for dam construction and has a catchment of about 40 hectares, which yields about 50 Megalitres in runoff.
- 4. The high quality reliable groundwater tapped by the well is an asset but the yield rate is low.
- 5. The small area of chocolate soil at the NW end of the site will support species of trees needing free draining subsoils.
- 6. The acidic and leached nature of the soils due to the high rainfall is a natural restriction on the range of food plants which will thrive without substantial modification.

Some important factors restrict or threaten the productive potential of the site:

- 1. Frost, especially on the lower part of the site, from May to November, and often in April and December.
- 2. Northerly winds which funnel up the property through the gully. In summer the north winds increase water demand and cut back growing tips in most food trees and crops. During extreme conditions the threat from wildfire is substantial and accentuated by the relatively steep and predominant N W aspect.
- 3. Exposure to southerly wind has also become a problem, since the felling of mature forest on the other side of Fourteenth Street
- 4. The moderately steep slopes ( 10 - 25%) restrict access and movement of materials.
- 5. The heavy clay subsoils impede drainage which results in waterlogging during winter in areas receiving runoff.
- 6. The acidic and leached nature of the soils due to the high rainfall is a natural restriction on the range of food plants which will thrive without substantial modification.

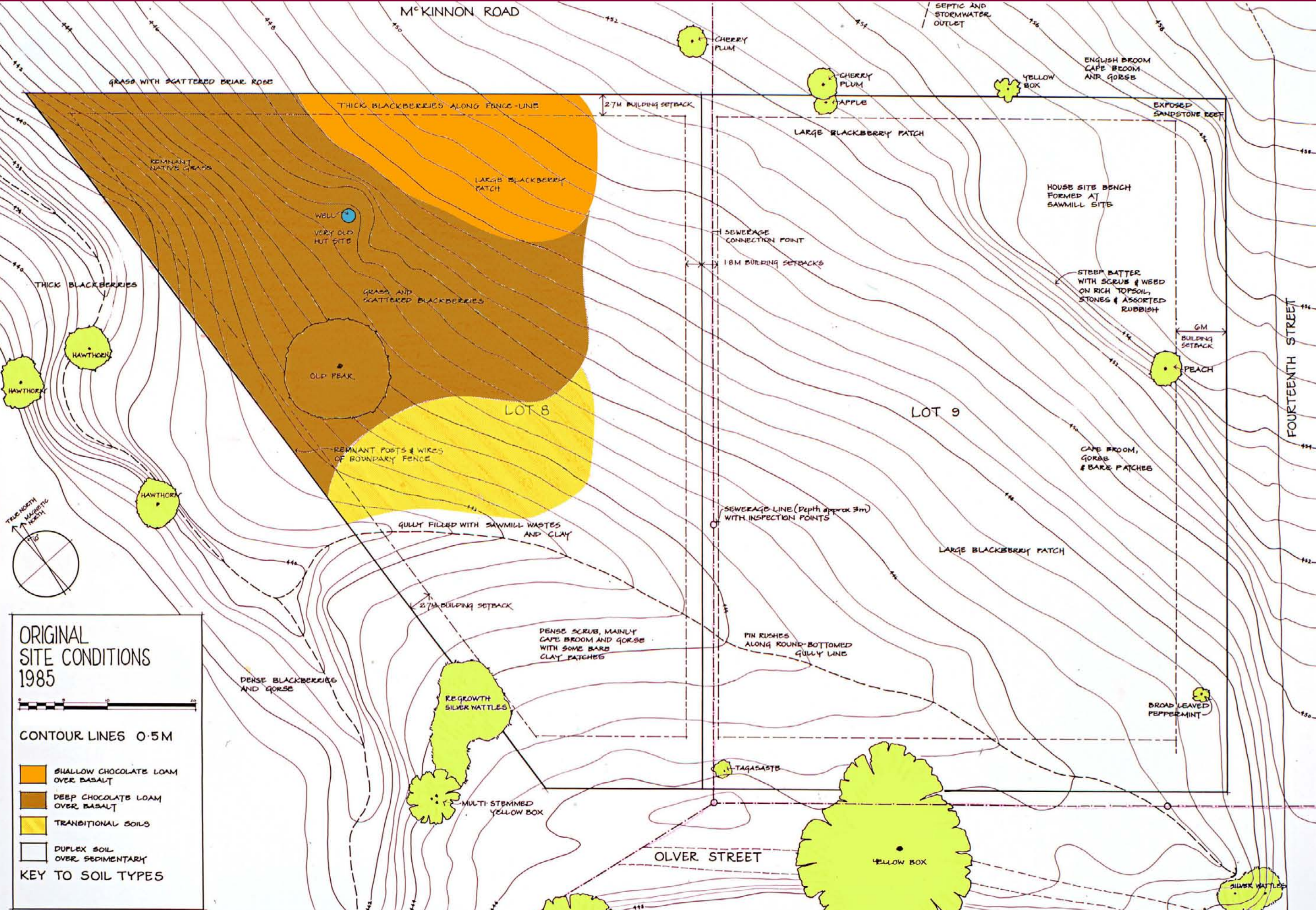
INTENDED LAND USE

The main aim of developing the land was to produce most of the food needs of a family and, over time, some tradeable surplus. There is a special emphasis on tree crops and providing as much of the inputs needed for food production from the on-site system such as irrigation water, mulch, nutrients and animal fodder to create a good example of permaculture principles applied in a cool temperate climate. Other land within the local area and wider region is better suited to producing our grain and fuel needs.

Many permaculture systems are designed following the biological model of the rainforest with a high density of evergreen trees, vines and understorey. While very successful in moist tropical and subtropical regions, lack of light, moisture competition and fungal diseases limit productivity of cool climate (mostly deciduous) tree crops in such systems. The traditional European orchard, when properly understood, is a better model for permaculture in this area.

1. Totem species: A concept common to indigenous peoples including Australian aborigines. The natural range of a plant or animal can be used to define a particular territory or land type and generally represents some characteristic quality important to the people.







# PREPARATORY WORKS

## SITE PLANNING

- Key Planning Principles
- Development Objectives
- Key Planning Tools

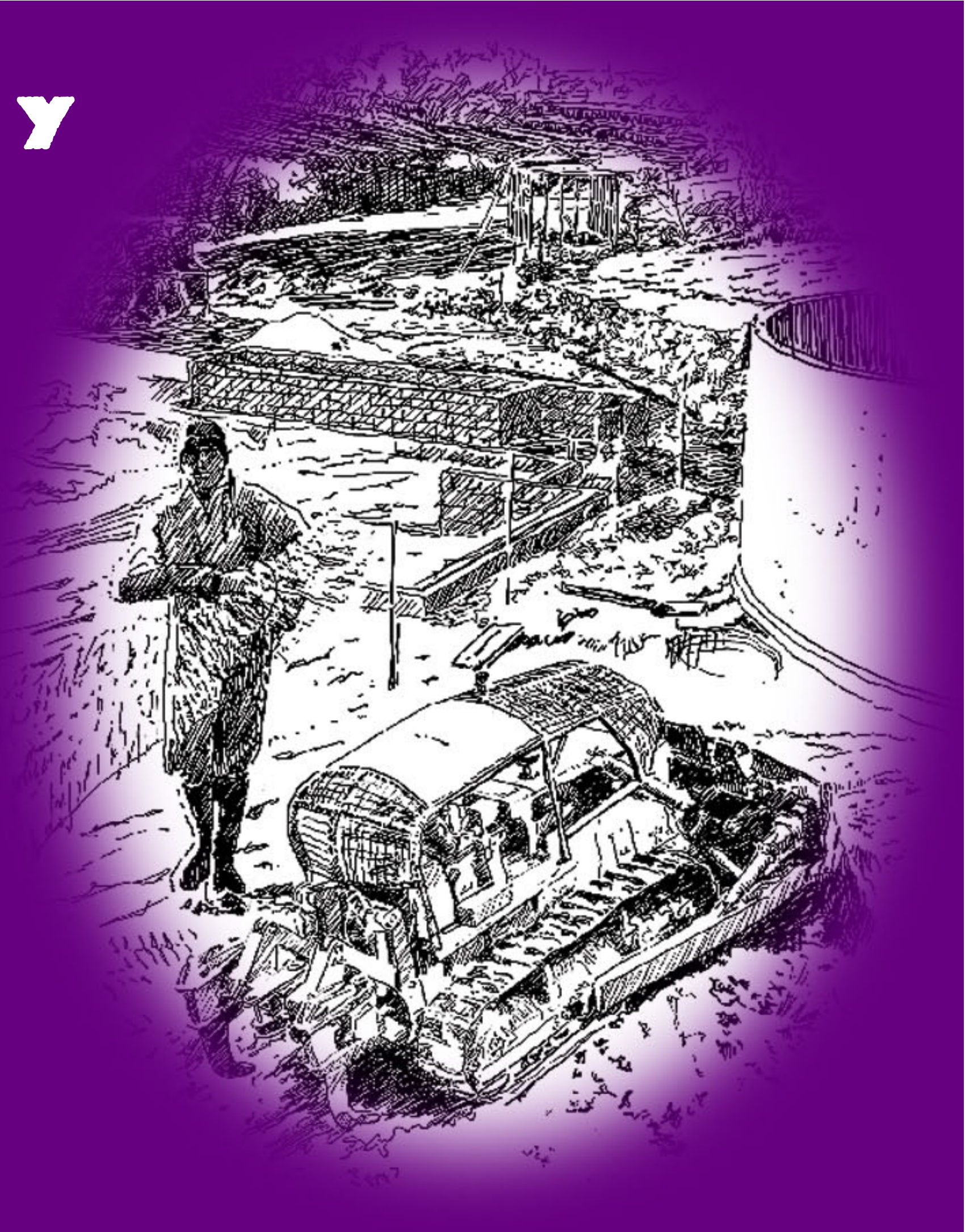
## HOUSE SITE SELECTION

## EARTHWORKS - HOUSE SITE

- Design Principles
- Practice
- Housesite Landscaping

## EARTHWORKS - DAMS

- Dam Siting
- Dam Design
- Dam Construction and Maintenance





# HOUSE

## HOUSE DESIGN

House Design Process

Design Criteria

Workspaces and Functions

Office

Workshop

Kitchen

Greenhouse

## SOLAR DESIGN FEATURES

## BUSHFIRE RESISTANT DESIGN

## HOUSE CONSTRUCTION

Structural Features

## BUILDING MATERIALS

Mudbricks

Joinery Timber

Structural Timber

Industrial Materials

Retrospective





# INFRASTRUCTURE

## OUTBUILDINGS

- The Planning Process Revisited
- Barn Construction

## FUEL MANAGEMENT

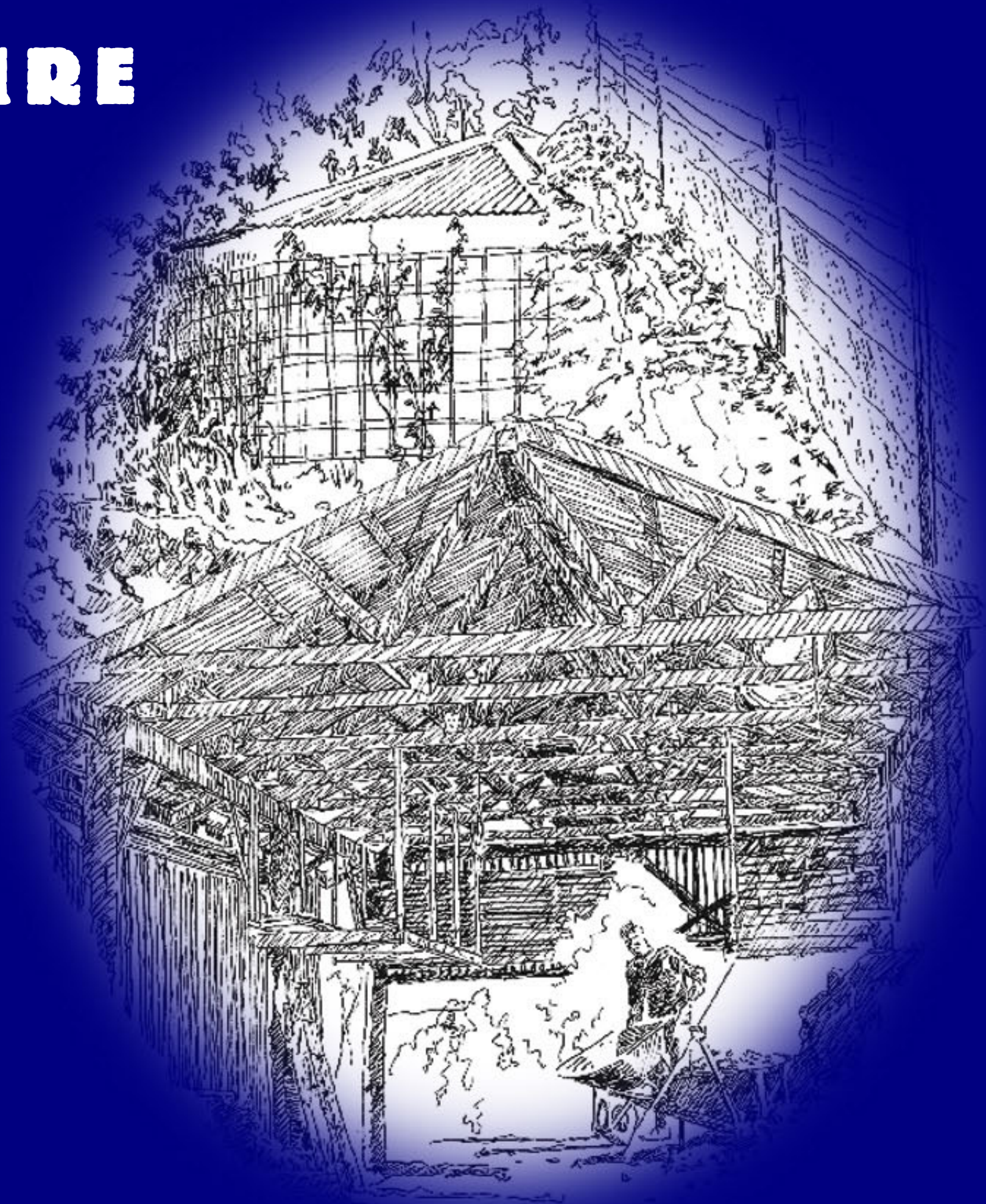
- Fossil Fuel
- Firewood
- Gathering, Processing and Storage

## WATER SYSTEMS

- Strategy
- Design Principles
- System Description

## ACCESS & FENCING

- Strategy
- Vehicle Access Design
- Fence Design





# THE GROWING ENVIRONMENT

## SOIL DEVELOPMENT

- Strategies
- Techniques
- Results of the First Decade

## PERENNIAL PLANTING STRATEGY

- Perennial Plant Functions and Uses

## PLANTING ZONES

- Cut Slope of Housesite
- Fill Slope of Housesite
- Barn Surrounds
- Second Housesite
- Drainage Lines

## HOUSE GARDEN

- Site and Soil Conditions
- Design Concept

## ORCHARD

- Site and Soil Conditions
- Strategies
- Orchard Design
- Treeform
- Tree Stock
- Varieties
- Leguminous Shrub Interplants





# LIVESTOCK

## POULTRY

- Animal Strategy
- Poultry Design
- Management of Birds

## OTHER ANIMALS

- Strategy
- Future Scenarios

## AQUACULTURE

- Strategy
- Management Issues





# BEYOND THE BOUNDARIES

## PUBLIC LAND

Strategy

Road Reserves

Gully Reserve





# APPENDICES

DEVELOPMENT TIMELINE

PERENNIAL SPECIES INDEX

HERBARIUM LIST (WILD PLANTS)

BUSHFIRE SAFETY PROCEDURES

INPUTS & YIELDS AT MELLIODORA

REFERENCES & RESOURCES





# THE SECOND DECADE

## DEVELOPMENT TIMELINE

## LIVESTOCK UPDATE

Milking Goats

Geese

Rabbits and Guinea Pigs

Lessons Learnt from the Increased  
Numbers and Types of Livestock

## HOUSE UPDATE

Cool Cupboard

Heating and Passive Solar Design

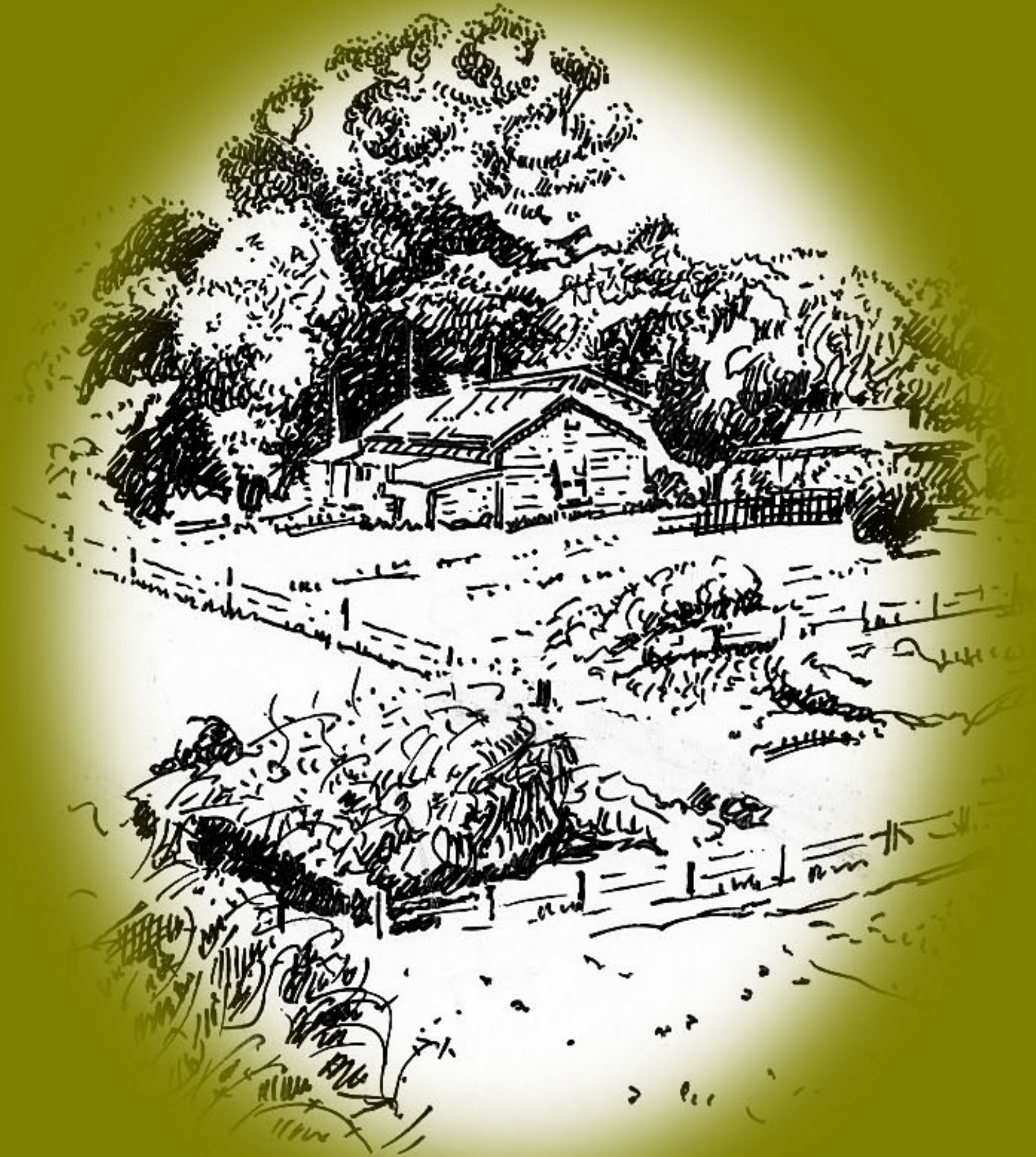
## LOOKING AT MELLIODORA





# CATALOGUE

[Current Titles in Print](#)  
[Forthcoming Title](#)  
[Out of Print Titles](#)  
[How to Order](#)





## CURRENT TITLES IN PRINT

We publish a limited number of permaculture books authored by David Holmgren, the co-ordinator of the internationally acclaimed Permaculture concept of sustainability, first presented in Permaculture One (published 1978).

- Permaculture: Principles and Pathways Beyond Sustainability (Now available)
- David Holmgren: Collected Writings 1978-2000
- 'Melliodora' Hepburn Permaculture Gardens

## PERMACULTURE: PRINCIPLES & PATHWAYS BEYOND SUSTAINABILITY

This book uses permaculture principles as a framework for an empowering but challenging vision of creative adaptation to a world of energy descent. David Holmgren builds on the extraordinary success of the permaculture concept (which he co-originated with Bill Mollison 25 years ago) and the global permaculture movement, to provide a more cerebral and controversial contribution to the sustainability debate.

- 320 pages, graphics and design principle icons
- Available from the publisher and selected bookshops

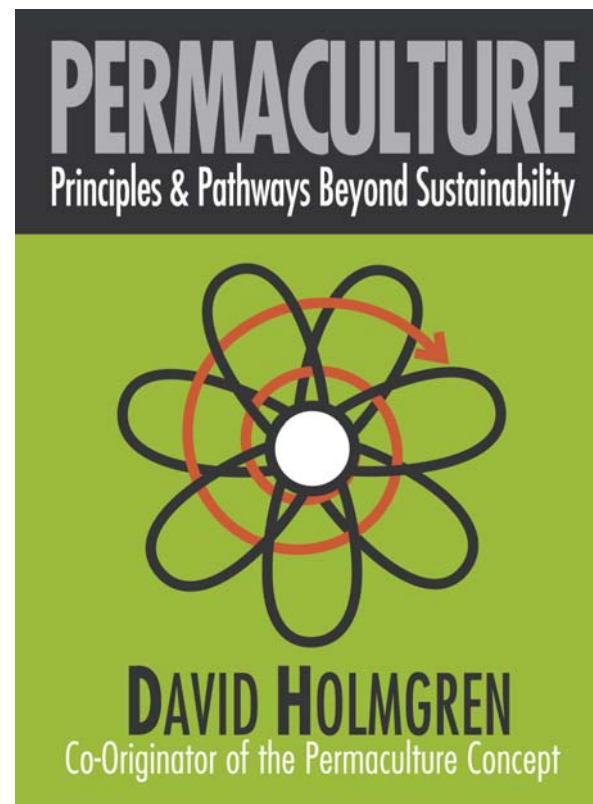
***"If the 'Permaculture Principles that David Holmgren discusses in this extremely important book were applied to all that we do, we would well on the road to sustainability, and beyond." Professor Stuart B. Hill***

### CONTENTS:

**Introduction** • What Is Permaculture? • Popular and academic reactions • Ethical and Design Principles

**Ethical Principles** • Care of the Earth • Care of People • Distribute Surplus and Set Limits to Consumption and Reproduction

**Design Principles** • Observe and Interact • Catch and Store Energy • Obtain a Yield



- Apply Self Regulation and Accept Feedback
- Use and Value Renewable Resources and Services
- Produce No Waste
- Design From Patterns To Details
- Integrate Rather Than Segregate
- Use Small and Slow Solutions
- Use and Value Diversity
- Use Edges and Value The Marginal
- Creatively Use and Respond To Change

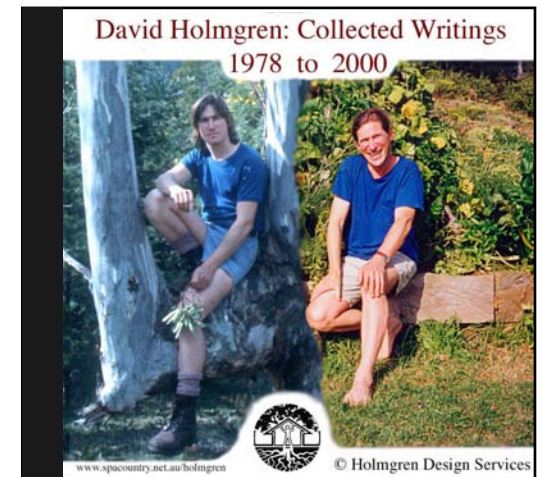
## DAVID HOLMGREN: COLLECTED WRITINGS 1978-2000

This collection of magazine articles, conference papers, public lectures, book reviews and other work by David Holmgren provide a deeper insight into the thinking behind the Permaculture concept and its many applications. The publication of the Collected Writings on CD provides source material from the co-ordinator of the Permaculture concept. Together they trace the ongoing evolution and explanation of the permaculture concept to a wide range of audiences by its lesser known author.

They will be of particular interest to permaculture teachers and practitioners and provide a glimpse of some of the ideas which have contributed to the long-awaited major new book, Permaculture: Principles and Pathways Beyond Sustainability.

The CD also contains some biographical photos which relate to the articles and some further references to the Holmgren Design Services and other websites.

This CD is Windows and Mac compatible and requires a web browser and a pdf reader such as Acrobat Reader (already installed on most computers and available free over the internet from [www.adobe.com](http://www.adobe.com)).





## 'MELLIODORA' HEPBURN PERMACULTURE GARDENS

**Melliodora: Ten Years of Sustainable  
Living Book Review by Ian Lillington,  
Permaculture International Journal**

When I first heard about Permaculture I thought it was for large acreages in the sub tropics. My first visit to David Holmgren's and Su Dennett's place in 1989 entirely changed my thinking. Here was a passive solar house and a food production system on one hectare, in a cool climate, in a town. It worked: the house was warm in winter, cool in summer and the land provided all the vegetables and most of the fruit for the family!

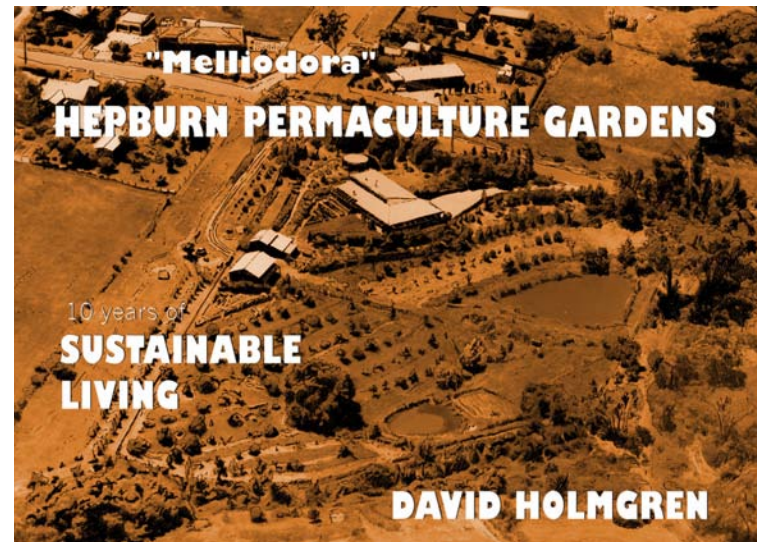
Throughout the 10 year history of the project, David has kept detailed records and photos, which have been collated into a very unusual book. It has A3 size landscape pages, so at a single opening it covers your desk! Each spread has a theme - such as house design, orchard, or animals with maps, plans photos and text.

The book was written inside the property it is describing - it's a kind of autobiography. It was written over a five year period, and with property now "established", the text has been revised with the benefits of hindsight. It is ideal for anyone seriously interested in sustainable living - both at a practical level and with a good dose of Holmgren holistic thinking.

The meticulous detail allows the reader to trace the development of the property from the purchase of a steep weed-infested site, through the early stages of blackberry slashing, dam construction and tree planting to the "finished" product of family home, office, workshop, greenhouse, and integrated living systems with perennial plants and a range of animals fulfilling many functions.

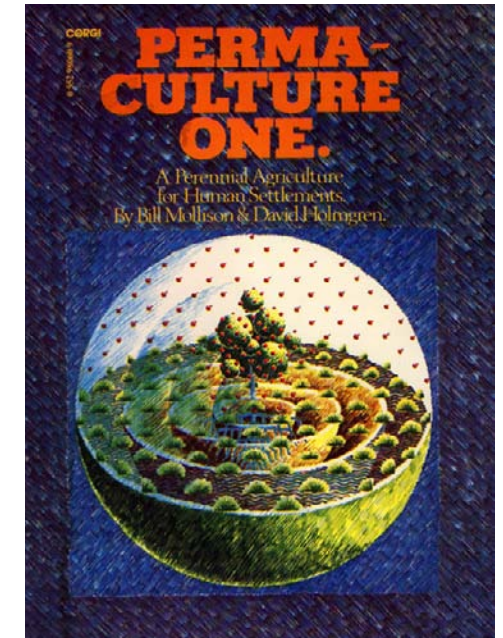
Hepburn is in central Victoria, 470 metres above sea level, in the Great Dividing Range, north of Melbourne. It is an arboretum for cool climate Permaculture and the book has an extensive species list (over 170 listings)

Twenty years on from the first draft of "Permaculture One", this book shows that Permaculture works...."



## PERMACULTURE ONE: A Perennial Agriculture for Human Settlements. By Bill Molison and David Holmgren

This seminal work first published in 1978 and translated in 7 languages, was the book that launched the Permaculture concept and movement. It is both the original statements of the theory by the co-authors and a useful text on cool climate self reliant land use and living. Includes an extensive species index of plants for cool temperate regions.



## FORTHCOMING TITLE

### WEEDS OR WILD NATURE: Migrant Plants and Animals in Australia

#### NEW BOOK IN THE PIPELINE PROMISES TO BE CONTROVERSIAL

For over twenty years David Holmgren has observed, researched, discussed and debated the controversial issue of what is an environmentally progressive response to weeds and pests. Over the last five years he has been working on a book (WEEDS OR WILD NATURE: Migrant Plants and Animals in Australia) which gives a positive and empowering portrait of our relationship to nature and lays out a clear challenge to the emerging environmental orthodoxy about the evils of plant and animal naturalisations.

For an introduction to David's perspective on this subject, the article Weeds or Wild Nature is a good start (published in the Permaculture International Journal issue 61 in 1997). Articles 1, 18 and 20 in the Collected Writing CD also explore this subject while the theoretical foundations for these perspectives are explained in Permaculture: Principles & Pathways Beyond Sustainability

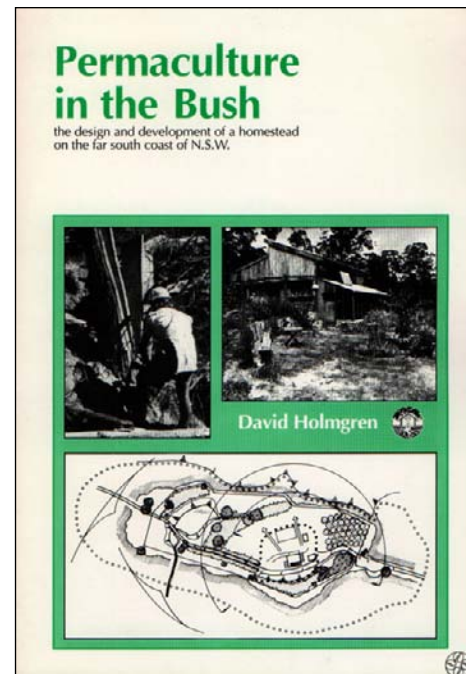
For an example of the application of these ideas to practical management of mixed urban fringe streamside vegetation see report by David Holmgren Upper Spring Creek Restoration Project Management Report on Daylesford Regional Landcare Group web site.



## OUT OF PRINT TITLES

### PERMACULTURE IN THE BUSH: The Design and Development of a Homestead on the Far South Coast of NSW

For those familiar with the basic concepts of permaculture, this case study design show how the principles have been applied to the inevitably unique conditions of a particular site and locality by permaculture's foremost practitioner. It provides information about a permaculture site, otherwise only accessible through local residential permaculture design courses. This small book is packed with technical information on land assessment, earthworks, water supply, soil improvement, passive solar and fire resistant design adaptable to a range of situations but especially for people developing bush properties.

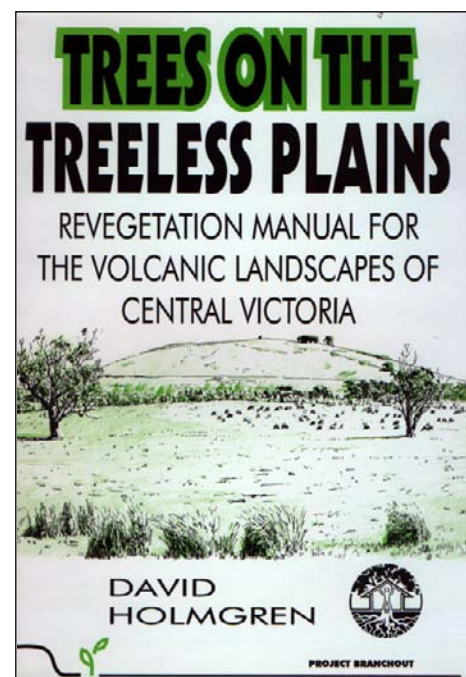


### TREES ON THE TREELESS PLAINS: Revegetation Manual for the Volcanic Landscapes of Central Victoria

#### Soon to be an eBook

This design manual is a result of years of research and observation into the role and potential of trees and shrubs on farms. It addresses the transformation of broader farm landscapes through the application of permaculture principles to revegetation. The manual includes revegetation strategies and design solutions relevant to increasing and diversifying farm productivity while stabilising the landscape. It also address the public land on roadsides, stream sides and reserves.

The case study approach of the manual uses the volcanic landscapes as a focus to describe land types, local native species and to provide strategies, design solutions and species lists. It is directly relevant to some of the most valuable agricultural land in Victoria including the extensive Western Districts. A comprehensive species index of native and introduced trees and shrubs with proven performance provides a ready guide to species selection for



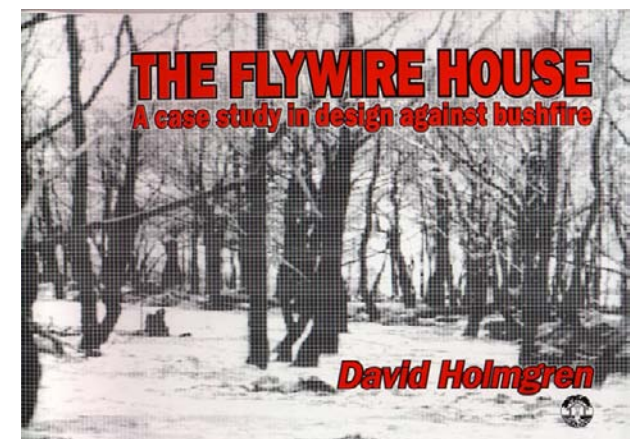
different situations and purposes. For private and public land managers of the volcanic landscapes this manual is an essential reference.

For a wider audience concerned with revegetation, this book provides a design system approach and principles applicable everywhere to assist in the development of local strategies and design solutions.

### THE FLYWIRE HOUSE: A Case Study in Design Against Bushfire

This small book is packed with information about the principles and practice of fire resistant, landscape and house design in ways in which are energy efficient, sustainable and productive: the essence of permaculture. It takes the form of a case study design for a property burnt out in the catastrophic Ash Wednesday fires of 1983 in the Dandenong Ranges of Victoria. This work has been applied in many designs by Holmgren Design Services including Melliodora. The ideas are applicable to all fire prone regions.

*Please let us know if you are interested in out-of-print titles by emailing us at [info@holmgren.com.au](mailto:info@holmgren.com.au) as this will help us plan re-prints.*



## HOW TO ORDER

Check our website for pricing and payment options [www.holmgren.com.au](http://www.holmgren.com.au)

Cheque or money orders can be made out to:

Holmgren Design Services

16 Fourteenth Street, Hepburn, Victoria 3461, Australia

Email us for inquiries about discounts on bulk orders: [info@holmgren.com.au](mailto:info@holmgren.com.au)

#### N.Z. distribution

- Living Lightly: Principles & Pathways, Melliodora, Collected Writings CD

#### U.S.A. distribution

- Chelsea Green: Principles & Pathways, Melliodora
- Permaculture Activist: Collected Writings CD, Principles & Pathways

#### U.K. distribution

- Permanent Publications: Principles & Pathways, Melliodora, Collected Writings CD





# THE SEASONAL CYCLE

'MELLIODORA' HEPBURN  
PERMACULTURE GARDENS

**SUMMER**

**SPRING**

**AUTUMN**

**WINTER**

