



Department of
Agriculture and Food



Research Library

Resource Management Technical Reports

1-1-1986

Jandakot groundwater scheme area : a study of land resources and planning considerations

M R. Wells

N L B Richards

A J. Clarke

Follow this and additional works at: <http://researchlibrary.agric.wa.gov.au/rmtr>



Part of the [Hydrology Commons](#), [Natural Resources Management and Policy Commons](#), [Soil Science Commons](#), and the [Water Resource Management Commons](#)

Recommended Citation

Wells, M R, Richards, N L, and Clarke, A J. (1986), *Jandakot groundwater scheme area : a study of land resources and planning considerations*. Department of Agriculture and Food, Western Australia, Perth. Report 48.

This report is brought to you for free and open access by Research Library. It has been accepted for inclusion in Resource Management Technical Reports by an authorized administrator of Research Library. For more information, please contact jennifer.heathcote@agric.wa.gov.au, sandra.papenfus@agric.wa.gov.au.

IMPORTANT DISCLAIMER

This document has been obtained from DAFWA's research library website (researchlibrary.agric.wa.gov.au) which hosts DAFWA's archival research publications. Although reasonable care was taken to make the information in the document accurate at the time it was first published, DAFWA does not make any representations or warranties about its accuracy, reliability, currency, completeness or suitability for any particular purpose. It may be out of date, inaccurate or misleading or conflict with current laws, policies or practices. DAFWA has not reviewed or revised the information before making the document available from its research library website. Before using the information, you should carefully evaluate its accuracy, currency, completeness and relevance for your purposes. We recommend you also search for more recent information on DAFWA's research library website, DAFWA's main website (<https://www.agric.wa.gov.au>) and other appropriate websites and sources.

Information in, or referred to in, documents on DAFWA's research library website is not tailored to the circumstances of individual farms, people or businesses, and does not constitute legal, business, scientific, agricultural or farm management advice. We recommend before making any significant decisions, you obtain advice from appropriate professionals who have taken into account your individual circumstances and objectives.

The Chief Executive Officer of the Department of Agriculture and Food and the State of Western Australia and their employees and agents (collectively and individually referred to below as DAFWA) accept no liability whatsoever, by reason of negligence or otherwise, arising from any use or release of information in, or referred to in, this document, or any error, inaccuracy or omission in the information.



ISSN 0729-3135
August 1986



Jandakot Groundwater Scheme Area - A Study of Land Resources and Planning Considerations

**M.R. Wells
N.L.B. Richards
A.J. Clarke**

Resource Management Technical Report No.48

Disclaimer

The contents of this report were based on the best available information at the time of publication. It is based in part on various assumptions and predictions. Conditions may change over time and conclusions should be interpreted in the light of the latest information available.

© Chief Executive Officer, Department of Agriculture Western Australia 2001

Preface

A land resource study of all rural and undeveloped coastal land within the Perth Metropolitan Region is being undertaken by the Division of Resource Management in recognition of the pressure on those areas for land use change as population increases. The land resource study involves a systematic mapping programme for the Darling Scarp and Foothills region. However, for the bulk of the Metropolitan Rural Area the study will involve the collation and interpretation of existing data, with 'new' land resource mapping being undertaken when specific requests justify it.

This technical report is one of a series of interim documents aimed at collating material which would normally remain within departmental files relating to individual requests for information. It should be noted that the map units employed in this report do not correspond exactly with those used in a previous report in this series (Shire of Rockingham — Technical Report No. 44). It is intended within the next few years, to bring all metropolitan land resource survey data together under a uniform system of map unit nomenclature and to publish a Department of Agriculture Technical Bulletin describing the rural land resources and their capabilities for future use.

NOTE: Copies of the map associated with this report may have been replaced by a microfiche reduction. Dyaline copies of the map are available upon request to the Division of Resource Management, Department of Agriculture.

Table of Contents

Preface	iii
1. Introduction	1
2. Regional Planning – General Considerations	4
2.1 Capability of Land and Land Degradation Hazards.....	4
2.2 Maintenance of water quality	4
2.3 Subdivisions and special rural zone development	4
3. Description of Land Resources and Specific Planning Considerations	6
3.1 Spearwood Dune System	6
3.2 Bassendean Dune System.....	7
4. Land Use Potential	10
4.1 Market Gardening	10
4.2 Equestrian activities	11
4.3 Other land uses.....	11
5. Conclusions	12
6. References	13

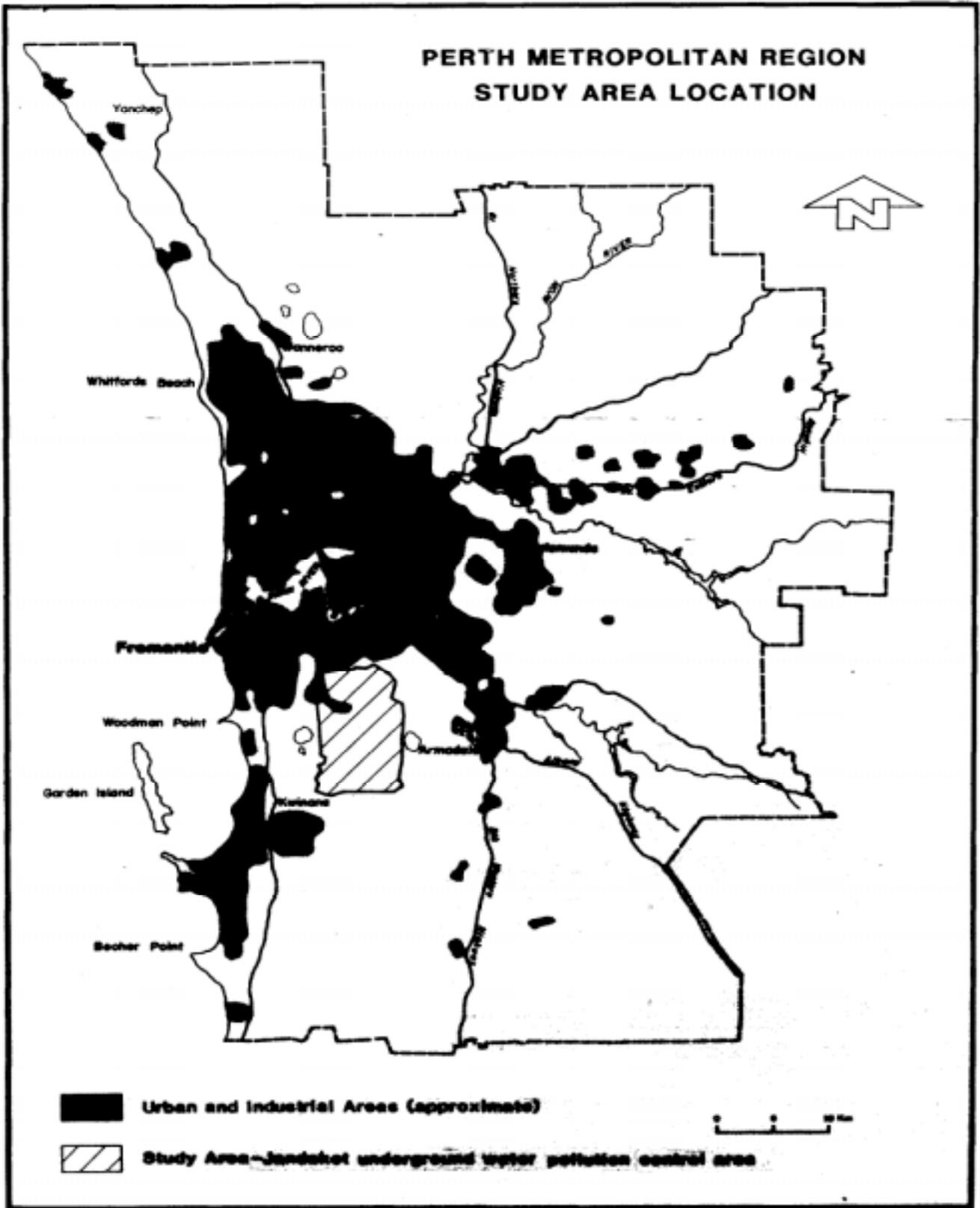
1. Introduction

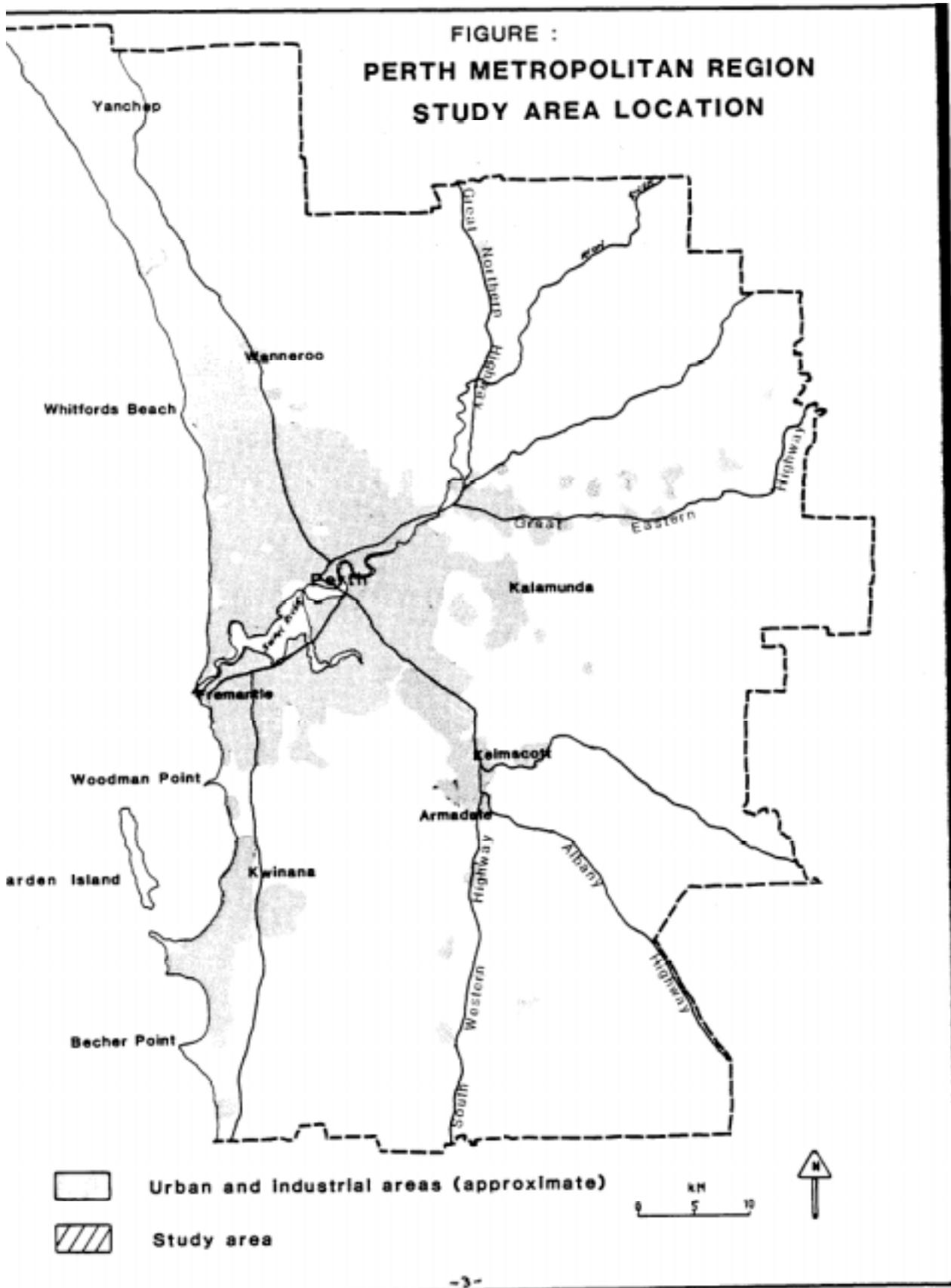
The Division of Resource Management is able to assist regional land use planning through the provision of mapped information on the nature and distribution of land resources. These maps deal principally with soils and landforms and their capability for various land uses. On the coastal plain of the Perth Metropolitan region where pressures for land use change are continual, the Division conducts resource mapping and interpretive work in relation to specific requests from local government authorities or State Government departments involved in planning.

In relation to this report, a request was received in 1975 from the Metropolitan Water Supply, Sewerage and Drainage Board for a survey of the Jandakot groundwater scheme area to assist planning and administration of the area. Various local authorities with land affected by this scheme have also subsequently requested land resource information for this area. This report aims to supply land users and land planners with basic land resource data on soils and vegetation and information on land use potential which was gained from the 1975 survey.

The area of interest lies between Thompson and Forrestdale lakes and stretches from just north of Jandakot airport to Hope Valley Road.

Information from this survey has been previously provided at various times, in unpublished form, to the State Planning Commission, private consultants and relevant local government authorities.





2. Regional Planning – General Considerations

2.1 *Capability of Land and Land Degradation Hazards*

All land developments within the region should aim to be sympathetic to the natural landform and soil conditions, afford protection to sensitive wetland areas, and retain as far as practical, natural vegetative cover. To assist this objective, a land resource map at 1:25000 scale accompanies this report. This provides a framework for the consideration of natural site constraints and opportunities for future land use which are detailed further in section 3.

It should be noted that the assessments of land use potential herein are based on landform and soil characteristics only and not on water availability. Water availability must be determined on a site by site basis, and extraction permits sought from the Water Authority of Western Australia.

The effects of, or potential for land degradation in most areas can be minimized through the consideration of basic soil conservation principles and the nature of the land resource itself during any development. Notes on the selection of land for special rural zones and development guidelines for small rural lots are given in Appendices 1 and 2.

2.2 *Maintenance of water quality*

Due to the importance of groundwater resources for irrigation use and possible domestic and industrial consumption, great care should be taken to avoid their pollution. In addition, the maintenance of the lakes and wetland areas as biological and recreational resources are dependent on water quality, which relates to activities on adjacent land. Nutrients and pollutants from agricultural fertilizers or from industrial or residential wastes may be detrimental to these areas. Consideration needs to be given to the ability of soils to accept and purify liquid wastes when required, and to the need for creating buffer zones separating conflicting land uses from water bodies and their recharge areas.

2.3 *Subdivisions and special rural zone development*

To prevent speculative subdivision and alienation of rural land from potentially productive agricultural uses, a policy of staged development of subdivision for special rural zones should be required. Subdivision should be permitted only after a certain occupancy or development level is achieved within existing small rural lots.

Within the Jandakot Groundwater Scheme Area, most areas are generally capable of supporting subdivision and small lot residential development (lots generally greater than 1.5 ha) providing due consideration is given to buffer zones from adjacent waterbodies and to the specific development factors discussed in appendix 1.

Although quite capable of subdivision, it is generally desirable to resist pressure for subdivision in these rural areas in order to ensure that the demand is not speculative and that bona fide rural land users are not adversely affected by increasing land values and rates. Maintenance of larger sizes also retains flexibility for future planning of rural areas.

3. Description of Land Resources and Specific Planning Considerations

Development of the soils of the Swan coastal plain is described by McArthur and Bettenay (1974) and the soil associations described and delineated by Bettenay, McArthur and Hingston (1960). Within the study area, the soil associations encountered are the Cottesloe, Karrakatta and Bassendean associations. The Cottesloe association is characterised by aeolianite limestone outcropping on the soil surface. This aeolianite is present under the Karrakatta association but beneath greater depths of yellow sand in dunes. The Cottesloe and Karrakatta associations together form the Spearwood Dune System which is more recently deposited than the adjacent Bassendean Dune System. Occurring inland to the east of the Spearwood's Karrakatta soils, the Bassendean association consists of grey sand in dunes of low relief, many swamps, and intervening flat areas with shallow depth to groundwater.

The vegetation of the area has been classified by Beard (1979) as part of the Bassendean System. He points out that the type of plant community present is controlled by the depth to watertables.

3.1 Spearwood Dune System

The Spearwood system comprises a core of sandy aeolianite with a capping of secondary limestone overlain by yellow brown siliceous sands with weak podzol development. The system has an undulating surface, with some higher ridges and hills, and hollows representing dune swales. Differential wind erosion has resulted in some areas being stripped of sand to expose the limestone capping or pinnacles. Flat to gently undulating areas within or fringing the Spearwood system represent hind dune flats. The sands may develop a leached, grey surface horizon of variable depth and can integrate with soils of the Bassendean system to the east.

The boundary between the Karrakatta and Bassendean associations may thus be somewhat arbitrary or it may be marked by the chain of lakes and swamps. Furthermore, the depth of grey surface differs according to the topographic situation and is deeper in the hollows. The crests of the dunes in the Karrakatta association may have yellow sand to the surface but change gradually to a grey surfaced sand in the valleys.

The natural vegetation on the Karrakatta association is woodland with Jarrah Eucalyptus marginata, Tuart E. gomphocephala and i4arri E. calophylla present. Associated with these are Banksia attenuata, B. menziessi and Allo Casuarina fraseriana, which become more important until they dominate on the Bassendean dunes.

Only one mapping unit has been identified within this study:

- K Karrakatta sands. Deep, leached, yellow siliceous sands. The soil consists of a grey—brown surface which passes into bright yellow sand. Limestone usually occurs within 2 m of the surface.

PLANNING CONSIDERATIONS: -

1. The Spearwood Dune System is in demand for rural—residential and hobby farm uses as well as for dryland farming and irrigated market gardening. Within the groundwater control area irrigated agriculture is feasible but likely to be restricted due to water extraction limits.
2. Most areas of the Spearwood dunes are capable of supporting either urban or rural—residential development. The underlying limestone is an adequate foundation for most structures and with compaction, the sands are also suitable. The soils are sufficiently deep and permeable to permit on—site effluent disposal.

3.2 Bassendean Dune System

This system consists of low to very low relief Pleistocene sand dunes, intervening sandy and clayey swamps and gently undulating sand plain. Within the dunes (Bd), the deep grey sands may become pale yellow within 1.5 m depth and are marginally coarser and more leached than the sands of the Spearwood system. In the low lying areas (Bw) , adjacent to swamps (Sw), the watertable is relatively shallow in winter being between only one to two metres of the surface. Drainage here is often restricted by an iron/organic hardpan. The scattered, rounded, shallow lakes and swamps contain water, coloured brown by organic material, of low salinity and high acidity.

Five mapping units have been identified here as follows:

Bd Low relief dunes with deep grey siliceous sands.

The soils of this unit are deep sands which are grey at the surface over pale to white sand becoming yellow at variable depth (from 0.5 — 4 metres). There may be an iron organic hardpan present below the white sand.

The vegetation is low banksia woodland with the main species being Banksia attenuata, B. menziessi, Allo Casuarina fraseriana and occasional B. ilicifolium, Jarrah Eucalyptus margiriata and Nuytsia flor ibunda.

Bl Bassendean sands in low flat plains

This unit is characterised both by its topography and by depth to the watertable. It consists of the Bassendean sands that occur, not as dunes, but as reasonably flat areas with comparatively shallow watertables. These may be between one and three metres below the soil surface in winter. Soils are greyish brown surface sands with pale or white sand above an iron organic hardpan or an enriched zone with soft ferro and organic concretions.

Depths to watertables and also to the iron/organic zone of enrichment in the profile vary over this unit. There is no clear distinction between this unit and the two units higher and lower in the landscape, there being a continuum of variation.

The vegetation here is similar to that on the dunes although the banksias are usually more dense and not quite as tall.

Bw Bassendean wet areas

Flat topography often surrounding swamps; bleached grey sands over an iron/organic hardpan, usually at less than 1 in depth; watertable is shallow during winter.

This unit includes the land that is not quite wet enough to be classified as swamp in this report and which has a shallower winter watertable than that of the previously described unit. The land would be likely to have watertables at or close to the surface for periods in winter.

The soil surface tends to be more peaty than other Bassendean sands due to winter wetness. Below the dark grey surface would be found light grey sand above an organic hardpan, approximately a metre below the surface.

Vegetation is more variable but is generally of low heathland or low sedgeland type. A frequent characteristic is the presence of Melaleuca parviflora trees.

Sw Swamps; permanent and seasonally inundated.

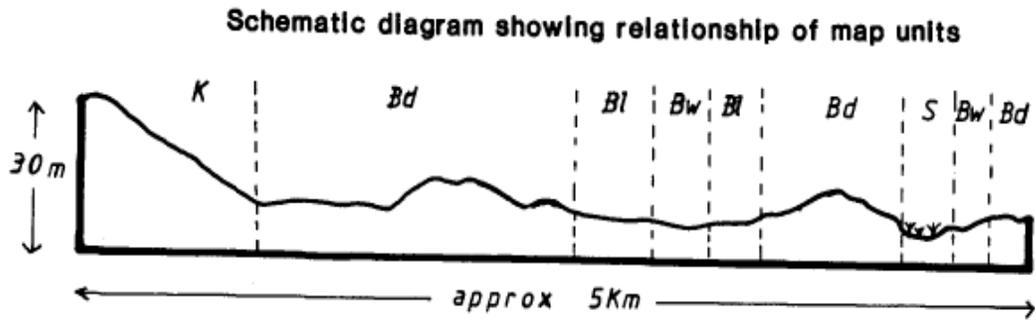
The areas range from depressions of slightly more frequent waterlogging potential than the previous unit, through to the lakes of more permanent water. There is considerable variation in vegetation types also, with sedgelands, heathlands and various trees such as Melaleuca spp, Banksia littoralis and Flooded Gum Eucalyptus rudis.

L Lakes and Lens.

This unit refers to the wettest areas which have almost permanent water or free water for major parts of the year. It includes the lakes such as Bibra Lake and also fens which can be closed communities of plants such as bullrush (Typha orientalis). They vary in their littoral vegetation with similar trees to those occurring in and around the swamps.

Planning Considerations:

1. There is potential for wind erosion of the dry, loose sands, particularly within unit Bd if areas are denuded of vegetative cover by overgrazing or clearing.
2. Seasonally inundated swamps within the Bassendean system are often too wet for market gardening but some are useful as summer pastures for grazing.



3. Given sufficient compaction, soils of unit 3d provide a good housing foundation base and are sufficiently deep and permeable to permit on—site effluent disposal. Seasonal watertable levels within unit Bw are likely to require house construction on sand pads and limit the use of on—site effluent disposal systems.

4. Land Use Potential

4.1 Market Gardening

Much of the Jandakot groundwater scheme area is low—lying and waterlogged in winter. This restricts land use potential considerably because market gardening, being a year—round occupation, ideally requires freedom from such problems. Swamps were, at one stage, the most important areas for market gardening in the metropolitan area, but this was prior to the general use of irrigation. Once this became common, market gardening moved onto the drier yellow sands, particularly those of the Cottesloe association, also called the Spearwood sands. The expansion of the industry and the urbanisation of traditional market gardening areas has caused movement onto Karrakatta sands and in recent years many gardens have been opened up successfully on Bassendean sands.

Market gardening in the Perth area requires a high input of fertiliser as all the sands are naturally infertile. There are slight differences in water—holding capacity and nutrient retention between some soils, but these are not very significant and there is no reason why suitable areas of Bassendean sands cannot be used more for market gardening in the future.

In this scheme area there are large areas of such soils which are topographically suitable for such a pursuit. There are only a small number of market gardens in the bulk of the area, but virtually any area of sand of suitable topography and freedom from waterlogging could be used for market gardening, given suitable irrigation water.

Market gardeners have a high use of water for irrigation as they can often apply double the daily evaporation rate on vegetables in times of heat stress, or when germinating seeds, or transplanting. Crops follow closely after each other and irrigation would be applied to most of the cropped area from spring to autumn. To give a figure of annual water use on market gardens, these factors, the variety of crops and different growing periods have to be considered. A general figure only can be given, but this would be 1.5 metres as the annual irrigation water application onto a market gardening area.

It is not possible to estimate the potential for increasing market gardening in the scheme area. Water restrictions may keep out bona—fide commercial market gardeners, along with the high prices of land that have ensued from the rapid subdivision of much of the area in recent years. Although there are many market gardens on lots of 2 or 4 hectares, technological advances and mechanisation are requiring larger lot sizes and this Department recommends 20 hectares¹ as the minimum size of land subdivision for market gardening purposes.

¹ This figure includes an allowance for future expansion and for house and shed areas.

4.2 Equestrian activities

There are many horse properties in the area and recent subdivisions have created many more lots which are most appropriate to this activity, or to rural residential use. It would seem likely that equestrian activities will increase in the scheme area.

Horse properties generally import hay, although some can produce their own lucerne hay, as happens on some Karrakatta sands. The Bassendean sands have not been used for lucerne production, but it may be possible in the future, with the development of establishment techniques on these soils. Lucerne requires roughly 1.5 metres of water as irrigation over a year on the Karrakatta sands. If they could be established on some of the lower—lying Bassendean sands, it is possible they could utilise more of the groundwater than occurs at present.

Perennial grasses can be usefully grown with irrigation for horse grazing. The requirement for irrigation water would be similar to that for lucerne; 1.5 metres.

To what extent the demand for irrigation water for these purposes will occur, is impossible to predict. It is quite probable that there will be an increase, however, as more properties are developed for horses.

Summer pastures are possible in some of the swamps and the wetter sands. These provide useful and productive summer grazing for stock and are particularly useful for horses. There are large areas that have potential for this land use, although areas still holding natural vegetation should probably be preserved as wetlands.

4.3 Other land uses

Pig and poultry keeping are intensive agricultural activities that would be possible in these areas. Lot sizes of 10 hectares are required for piggeries, whether extensive or intensive, to provide room for all the necessary functions, e.g. effluent disposal.

Although poultry farms can be run profitably on four hectares at present, it is felt that technological advances and market forces will dictate that poultry farms become larger units, and therefore an area of 10 hectares would be a more suitable figure for consideration in subdivisions or future demands of the industry.

In comparison to irrigated horticulture, water requirements are not high for any intensive stock holding operation. Although poultry sheds require the use of sprinklers on their roofs to keep temperatures down in summer, this is usually for a limited period and much of this water would presumably be returned to the ground.

5. Conclusions

It is difficult to assess the extent to which land uses such as market gardening could be expanded in the groundwater scheme area, if there were no water restrictions. Market gardeners are moving more onto Bassendean sands, but there are not a large proportion of them on these soils at present, there being a traditional preference for yellow sands. There is the further complication of the extensive subdivision of this area into small lot sizes, smaller than is recommended as necessary for a commercial market garden. The size of lots and also the cost of the land could themselves deter the movement of market gardening into this area, to some extent.

As has been pointed out, lot sizes being created in the scheme area are appropriate mainly to equestrian activities and rural residential purposes. Various other uses such as nurseries and dog kennels are also possible on these lot sizes. Some of these uses may normally require more irrigation water than is desirable in the scheme area. Irrigated pastures for horses and irrigation for nurseries are examples. This could lead to conflict over water supplies.

6. References

- Bettenay, E. McArthur, W.M. and Hingston, F.J. (1960). "The Soil Associations of Part of the Swan Coastal Plain, Western Australia". CSIRO Division of Soils, Soil and Land Use Series No. 35.
- McArthur, W.M. and Bettenay, B. (1974). "The Development and Distribution of the Soils of the Swan Coastal Plain, Western Australia". CSIRO Soils Publication No. 16.
- Beard, J.S. (1979) Vegetation Survey of Western Australia. 1:1,000,000 Vegetation series. Explanatory notes to Sheet 7. Swan. UWA Press.



Development guidelines for small rural lots

By Martin Wells, Research Officer, Division of Resource Management

These notes list briefly a number of aspects which should be considered before, and during, development of small rural lots. Further precise requirements or techniques for the minimization of land degradation at particular sites should be determined in consultation with appropriate Department of Agriculture staff.

When an area is selected by planners for small rural lot development a 'special rural' zoning category is usually applied to the land. (Refer Town Planning Board Policy Statement P4). Through this zoning category planning authorities are able to apply land use and management controls aimed at minimising potential for land degradation and retaining as far as possible, the rural character of the area. Such planning controls are generally necessary due to the more intensive nature of the land use and greater likelihood of site disturbance under special rural uses compared to rural farming activities. Increased land disturbance is associated with the provision of access, housing and outbuilding sites, water supply and effluent waste disposal, and in hobby farming situations, generally high stocking rates.

The following aspects of conservation land use should be considered for small lot developments:

- need for soil conservation structures,
- provision of adequate water supply,
- subdivision design,
- lot sizes,
- access,
- development envelopes and set-back distances,
- fire management,
- stocking limitations,
- vegetation protection,
- effluent disposal ability, and
- existing water rights and controls.

Soil conservation structures

The impact of changes in land use on soil erosion and local hydrologic conditions must be considered. Soil conservation structures may be required and it may be better to install them before subdivision is completed. Covenants may have to be placed in titles to ensure maintenance of conservation structures.

Water supply

Where a reticulated water scheme is not available it is recommended that the developer provide a reliable and adequate water supply for each lot. The subsequent costs of bore sinking or dam construction could be apportioned amongst all lots within a Special Rural Zone development before sale.

Where surface runoff water is to be collected, suitable sites should be available to permit the construction of dams of adequate capacity, and catchment areas available

to individual properties must be sufficiently large. The dams and outlets should be constructed so that they will not create an erosion hazard.

Where bore water is to be used, the Western Australian Water Authority should be contacted to ascertain permit requirements and water extraction restrictions.

Subdivision design

Subdivision should be planned to enable each block to be developed and managed in a practical and feasible way. For example, the location of boundaries on natural features such as drainage lines, ridges or contours ensures practical access both to and within the lot, to building sites and water supply points as well as for fire management. Boundaries diagonal to slopes or along intermittent flow lines are not recommended.

Lot sizes

Lot sizes should be related to the practical needs of the land use and to the natural attributes of the land in each case. Small lot sizes and closely spaced property boundaries may create difficulties for design and maintenance of soil conservation structures. They may also limit options for effluent disposal.

As a general rule for hobby farm situations, large lots will be required for steeper sites because:

- of stock feed requirements, due to the lower carrying capacity of steep slopes and the limited potential for fodder cropping,
- erosion of stock tracks and firebreaks has to be prevented,
- there must be adequate scope for safe access to building and yard sites, and
- the capacity of the soil to handle effluent wastes is often lower.

Access

The planned alignment, construction and maintenance of subdivisional roads and internal tracks should consider existing landforms, water supply points, fire management needs and the proposed land uses. Specific attention may be required for:

- location,
- road grade,
- surface material,
- surface drainage,
- table-drains,
- relief culverts,
- drainage line crossings,
- road batters,
- topsoil management,
- revegetation, and
- maintenance.

Continued overleaf

Development envelopes and setback distances

In order to limit site disturbance to the most capable areas within a rural-residential lot, all buildings and traffic circulation areas may need to be contained within an envelope defined by measurement to the lot boundaries. All lots should therefore be designed around adequate building envelopes. Clearing outside that envelope should be restricted to that required only for access and fire control. A general recommended set-back distance from boundaries and streams is 20 metres. Boundary set-backs may, however, need to be varied where topography and block shape dictate.

Fire management

Fuel reductions, firebreaks and fire trails may be required as part of a fire management strategy. These may pose considerable erosion hazards and require appropriate erosion control measures. See comments on 'Access' for specific areas of attention.

Stocking limitations

In many small hobby farm situations land holders are prepared to hand-feed animals more than would be practical under general farming situations and hence high stocking levels are common. To prevent overgrazing and subsequent erosion of topsoil it may be necessary to ensure that suitable summer grazing or housing facilities for stock are available to reduce stock impact on well-grazed paddocks.

In larger farming situations where hand feeding is minimal, the number of stock should be limited in accordance with the land's carrying capacity. The carrying capacity is the ability of pastures to carry grazing animals, and is usually expressed as the number of dry sheep that can be run on a year-round basis with minimal hand feeding.

Stocked at its carrying capacity, a pasture sustains grazing animals in a healthy condition, without the land being denuded of ground cover, particularly towards the end of summer. The carrying capacity of pastures is usually sustained only by regular applications of the correct fertiliser.

Advice on fertiliser requirements and carrying capacity of specific soil and land types is available from the metropolitan or country offices of the Department of Agriculture.

Retention and protection of natural vegetation

In general, subdivision design should mean minimal disturbance to existing natural vegetation and drainage systems. It may be desirable for Councils to incorporate specific vegetation protection measures within Special Rural Zones where land use and soil conditions pose an erosion hazard. In addition, set-back distances from drainage lines, or foreshore reserves for larger streams and rivers, should be considered as a means of protecting against erosion and sedimentation of streams.

Effluent disposal ability

In most Special Rural Zones, disposal of septic effluent will be provided through on-site septic tanks and soil absorption fields. Special design considerations will be required to ensure efficient septic effluent disposal in seasonally waterlogged areas, or those with either shallow soils or very slow subsoil permeabilities. Effluent absorption fields should also be kept well back from drainage lines to minimise risk of pollution. For specific set-back distances from drainage lines, underlying watertables and suitable soil permeabilities, the Department of Health should be consulted.

Existing water rights and controls

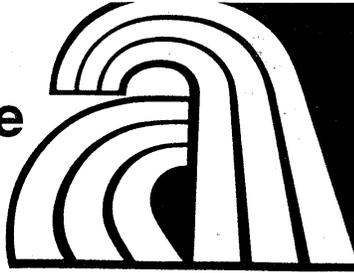
Special rural developments may be proposed in, or nearby, areas affected by existing water rights and controls. This includes riparian rights for nearby horticultural properties or within water supply catchments for irrigation purposes. The effect of proposed developments on runoff quantity and quality should be considered.

Note: In December, 1985 the Town Planning Board, Town Planning Department and the Metropolitan Region Planning Authority were amalgamated to form the State Planning Commission.

This material may be freely reprinted provided that both the article and the author(s) are acknowledged. Edited and published by the Information Section, Department of Agriculture, Baron-Hay Court, South Perth, 6151.

Farmnote

No. 18/86



Western Australian Department of Agriculture

Agdex 063

Selection of land for Special Rural Zones in W.A.

By Martin Wells, Research Officer, Division of Resource Management

The following notes describe the broad principles which need to be employed when selecting land for 'special rural' purposes, in order to manage and develop the State's rural land resources responsibly. For further information on regional planning policy matters for rural areas, the Town Planning Department or the Department of Agriculture's Division of Resource Management should be consulted.

The purpose of the special rural zoning category is to facilitate, within areas of predominantly rural character, the creation of lots suitable for specific purposes such as hobby farms, rural-residential living and rural-retreat blocks. (Refer Town Planning Board Policy Statement P4). It provides land for low density residential use but ensures retention of the rural character of an area.

Special Rural Zones provide for a variety of rural-residential situations requiring 'smaller than farm size' lots in a rural environment. 'Hobby farms' is a term used to describe a rural-residential situation involving some form of agricultural enterprise which is undertaken as secondary activity to the owner's principal line of business. The size of such holdings will depend on factors such as the scale of farming activity, the price and nature of the land, and the water catchment areas required for any dams for stock watering or irrigation. In general however, hobby farm blocks in Special Rural Zones are between 2 and 40 hectares. At the other end of the scale, rural-retreat land holders generally do not engage in agricultural production and usually require holdings of between 2 and 4 hectares.

Because most Special Rural Zones occur on land previously zoned 'rural', and the small lots created are designed for purposes other than full time farming, the selection of areas suitable for rezoning needs to be based on a consideration of:

- Agricultural quality of land - is the subject land particularly well endowed with respect to its soil types, land features, climate or water supply, so that it is currently or potentially highly productive for agricultural use? Such areas of 'prime agricultural land' are a limited resource in most regions of the State.
- Natural hazards and land degradation - do the existing site features pose significant limitations or hazards to the types of land use likely to occur under the special rural zoning? Will the area be more susceptible to any form of land degradation under those uses?

In this consideration, selection of land with limited potential for agricultural use should be balanced against minimising adverse impacts on the environment through any proposed development.

Agricultural quality of land

What constitutes high quality or 'prime agricultural land' may vary from one district to another as dominant forms of production change with climatic, social and marketing conditions. In general however, land with the

highest farming potential is land which is capable of regular cultivation and, carefully managed, has little risk of degradation. It consists of land which is relatively free of limitations (arising from moisture or nutrient stress, excess water, shallow soil depth, unsuitable topography, susceptibility to soil degradation processes, or climatic factors) and thus has favourable agricultural production characteristics.

In certain localities, intensive forms of agricultural production such as poultry farms, or some horticultural enterprises have established on relatively small land parcels, largely because of favourable socio-economic or infrastructure conditions rather than due to the nature of the land *per se*. Such areas of productive land may also be considered as prime quality.

In the absence of published maps delineating areas of highest capability or suitability for agriculture, the relevant district office of the Department of Agriculture is in the best position to indicate to Council and planners those areas which best fit the 'prime land' category within a particular farming region.

Because creation of Special Rural Zones may remove rural land from existing or potential agricultural production, it is important that prime agricultural land be specifically considered during the preparation of planning schemes and the consideration of applications to rezone rural land. Planners at both State and Local Government level need to be aware of:

- the extent and availability of prime land,
- the options for replacement of prime land,
- the future needs of other alternate land uses (such as urban),
- existing socio-economic development constraints with respect to all types of rural land use, and
- relevant regional and State environmental and land use policy matters.

Natural hazards and land degradation

Natural hazards or limitations to special rural land uses may include excavation or house construction difficulties due to excessive rock outcrop or shallow soils, on-site effluent disposal problems due to relatively impermeable soils, and flooding problems due to poor drainage or poor location. Whilst most natural hazards can be overcome to some degree by additional construction or development costs, or by continuous management, it is better to avoid or 'design around' these areas where possible.

Land degradation is defined as the decline in quality of natural resources, caused through improper use of the land by man. It encompasses soil degradation and the deterioration of natural landscapes and vegetation.

The major detrimental effect of small-lot or special rural developments on natural resources results from large scale clearing. Other deterioration is caused by new

Continued overleaf

land holders failing to limit stock numbers. Stock numbers are determined by the nature of soils, vegetation and the available water supply.

Removal or overgrazing of the soil's protective surface of vegetation renders it susceptible to the erosive influence of wind, water, or both. On steeper slopes and on poorly structured, weakly coherent or dispersible soils, serious sheet or gully erosion may occur. Excessive clearing may significantly affect the soil's hydrologic balance, producing a rise in ground water levels, and possible soil salinisation.

Other occasional problems of special rural developments include control of noxious plants and animals, domestic pests, rubbish accumulation, and bush fires. These are most likely to occur on unoccupied small rural lots with little or no maintenance. These problems are best avoided by planners maintaining the supply of lots just ahead of anticipated demand.

Natural hazards and the land degradation effects of special rural developments can generally be minimised through an evaluation of land resources at the planning stage, and by consideration of soil conservation principles during development. In extreme cases however, the hazards or land degradation risk for a proposed 'special rural' development may mean other land with less limitations needs to be chosen.

Note: In December, 1985 the Town Planning Board, Town Planning Department and the Metropolitan Region Planning Authority were amalgamated to form the State Planning Commission.

This material may be freely reprinted provided that both the article and the author(s) are acknowledged. Edited and published by the Information Section, Department of Agriculture, Baron-Hay Court, South Perth, 6151.

ISSN 0726-934X