SHIRE OF DENMARK

TOWN PLANNING SCHEME NO. 3

AMENDMENT NO. 122

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Attachment 8.1.1 a)

MINISTER FOR PLANNING

PROPOSAL TO AMEND A LOCAL PLANNING SCHEME

LOCAL AUTHORITY:	**SHIRE OF DENMARK**
DESCRIPTION OF LOCAL PLANNING SCHEME:	**TOWN PLANNING SCHEME No. 3**
TYPE OF SCHEME:	**DISTRICT SCHEME**
SERIAL No. OF AMENDMENT:	**AMENDMENT No. 122**

PROPOSAL:

To rezone Lots 1, 22, Pt 355 and 632 bounded by Mt Shadforth Road and Warham Road, Denmark from the 'Rural' zone to the 'Special Residential' zone and amending the Scheme Map accordingly.

TOWN PLANNING SCHEME No. 3

AMENDMENT No. 122

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March 2011
Revised May 2011
in accord with
Council Resolution 160411
dated 27 April 2011

PLANNING AND DEVELOPMENT ACT 2005

RESOLUTION DECIDING TO AMEND A PLANNING SCHEME

SHIRE OF DENMARK

TOWN PLANNING SCHEME No. 3
AMENDMENT No. 122

RESOLVED that the Council, in pursuance of Section 75 of the Planning & Development Act 2005, amend the above Planning Scheme by:

> *Rezoning Lots 1, 22, Pt355 and 632 Mt Shadforth Road, Denmark from the 'Rural' zone to the 'Special Residential' zone and amending the Scheme Map accordingly.*

Dated this _____day of _____ _____

_____
CHIEF EXECUTIVE OFFICER

SHIRE OF DENMARK

TOWN PLANNING SCHEME NO. 3

AMENDMENT NO. 122

PLANNING REPORT

WARHAM ROAD SPECIAL RESIDENTIAL ZONE

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A Land Capability Assessment – June 2010, Land Assessment Pty Ltd.
Supplementary Advice - 9 November 2010, Land Assessment Pty Ltd.

B Bush Fire Hazard Assessment – September 2010, Great Southern Bio Logic.

1. INTRODUCTION

The purpose of this Amendment is to rezone Lots 1, 22, Pt355 and 632 Mt Shadforth Road from the 'Rural' zone to the 'Special Residential' zone. The subject land is located between Mt Shadforth Road and Warham Road/Millars Creek.

The rezoning will enable the site to be subdivided into lots ranging from 5000m^2. The proposal accords with Council's planning for the area including the endorsed Settlement Strategy for Denmark, the draft Denmark Local Planning Strategy and the West Denmark Local Structure Plan. A number of important outcomes can be achieved, including formalising the tourist route buffer, efficient use of resources and the protection of remnant vegetation.

2. BACKGROUND

A Scheme Amendment Request (SAR) to rezone Lot 22 to Special Rural was submitted to the Shire of Denmark in 2009 for consideration. At its meeting held 23 March 2010 the Council resolved to support the rezoning of the 4 subject lots to Special Residential, to allow the creation of Rural Lifestyle lots (minimum 5000m^2). The decision is conditional upon the preparation of a land capability assessment and Subdivision Guide Plan which addresses matters set out in the 2005 draft Local Planning Strategy.

For the purposes of this Amendment document, reference is made to both the draft Denmark Local Planning Strategy (DLPS) and the October 1998 'Settlement Strategy for Denmark' (SSD). The DLPS will eventually supersede the SSD, however the data, Planning Units and Management which relate to the subject land are consistent. Both strategies contain similar information and recommendations in respect of this proposal. The planning issues, context and capability and servicing opportunities set out in each Strategy are relevant and have been used to guide and inform this proposal.

The DLPS identifies several 'release areas' which are suitable for future population growth and rural living development. West Denmark is one of the areas selected as being capable of providing an opportunity to meet anticipated growth of Denmark. This Amendment fulfils this objective and represents a rounding out of the zoning for the associated Planning Unit.

2.1 Location, Area & Zoning

The land is located approximately 1.5 kilometres west of the Denmark town centre (Refer Attachments - Location Plan) and is comprised of four landholdings. Lots 1, 22, 355, & 632 are bounded to the north by Mt Shadforth Road and to the south by Warham Road. The lots have a total area of approximately 9.5ha.

The subject land is currently zoned 'Rural' under the Shire of Denmark Town Planning Scheme No. 3.

Existing lots range from under 3500m^2 to in excess of 3.6ha. The four (4) existing lots are used as lifestyle lots, more so than traditional farming. The current rural zoning is not appropriate; this anomaly will be rectified through rezoning. This Amendment will enable subdivision and development as advocated by Council's current planning Strategies.

2.2 Site Description

The subject land is currently used for rural living. Much of the site has previously been cleared and used for low intensity rural uses and rural living. The subject land is within the gazetted townsite boundary for Denmark, as depicted on the TPS zoning maps.

Lot 22 contains a dwelling house, which is the home base for a rural contracting enterprise. Historically, the site was used for horticulture and contains a walnut grove of approximately 70 trees, established in the 1940s. Lot 22 is predominantly cleared. A few trees, including yellow tingles remain in the eastern portion of Lot 22 which is divided from the balance of the lot by the unnamed road reserve. Native plantings have been established north of the shed and to screen the property from Mt Shadforth Road. Dams and ornamental lakes have been constructed on site.

Lot 632 contains a dwelling house and cleared, pastured areas used for grazing and agistment. Lots 1 and pt 355 have each been developed with a residence and associated outbuildings and are used for a bush retreat and holiday home, respectively.

All lots have dual road frontage; they are bounded to the north by Mt Shadforth Road and to the south by Warham Road. Although all lots have frontage to Mt Shadforth Road, only limited direct vehicular access is currently available. Topography, sight lines and vegetation restrict options for new access onto Mt Shadforth Rd. Lots 22 and 632 are each serviced by 2 existing crossovers onto Mt Shadforth Road. Alternative access/egress to Lot 22 is also available via the internal driveway and track within the unmade road that traverses the lot. All properties have existing or potential driveways and crossovers connecting directly to Warham Road which intersects with Mt Shadforth Road at the east of Lot 1. (Refer Attachments - Site Characteristics Plan)

2.3 Surrounding Landuse

Warham Rd runs parallel to the vegetated drainage line, most of which is contained in Crown land. The land to the south of Millars Creek is zoned Landscape Protection Area 3, Special Residential Area 2 and Parks and Recreation. Land to the east is zoned Residential R2, while land to the west and south west is zoned Special Residential Area 4.

The West Denmark Structure Plan has been adopted for Unit E. It allows for low density residential subdivision (R20 and R2 500 and 5000m^2 respectively) in the east, through to 2000 and 7000m^2 Special Residential lots, Tourist Nodes and Landscape Protection. Much of the adjacent land within the Planning Unit has been rezoned and developed accordingly.

The land to the north, on the opposite side of Mt Shadforth Rd, is used for rural living, tourist accommodation, and small scale rural purposes including horticultural activities (former vineyard and orchards). Much of this area is cleared, although parts of Lots 351 and 356 are well vegetated.

Rezoning of this area will address the current 'Rural' zoning anomaly and will serve as a rounding out of the existing Residential and Rural Living areas to the south of the creekline.

3. PLANNING CONTEXT

3.1 State Policies

In terms of this proposal, the most relevant State Strategic and Policy documents include:

- SPP 1 State Planning Framework Policy [Variation No 2] (2006)
- SPP 2 Environment and Natural Resources Policy (2003)
- SPP 3 Urban Growth and Settlement (2006)
- SPP 2.5 Agriculture and Rural Land Use Planning (2005)
- DC 1.1 Subdivision of Land – General Principles (2004)
- DC 3.4 Subdivision of Rural Land (2008)
- DC 3.7 Fire Planning (2010)

SPP1 provides the strategic framework and guiding principles for landuse planning in Western Australia. The primary aim is to provide for sustainable use and development of land. The Strategy identifies the five key principles of environment, community, economy, infrastructure and regional development which define and influence decision making. In recognition of the concentration of population between Lancelin and Albany and growth pressures in the south-west, the strategy confirms the need for careful management. SPP1 supports the growth of regional communities to achieve their social, environmental and economic goals. Co-ordination, high standards of development, availability of land and services are required to ensure regional communities area sustainable in the long term.

The objectives of SPP3 most relevant to this proposal include:

- build on existing communities with established local and regional economies
- concentrate investment in the improvement of services and infrastructure and enhance the quality of life in those communities
- manage the growth and development of urban areas in response to the social and economic needs and in recognition of relevant climatic, environmental, heritage and community values and constraints.
- promote a sustainable and liveable neighbourhood form which reduces energy, water and travel demand
- ensure safe and convenient access to employment and services
- provide choice and affordability of housing
- create an identifiable sense of place for each community, and
- coordinate new development with the efficient, economic and timely provision of infrastructure and services.

The proposed Amendment accords with and will assist in achieving these particular objectives as well as the general principles and intent of current Strategies and Policies.

3.2 Regional Planning Strategy - Lower Great Southern Strategy (2007)

The Lower Great Southern Strategy (LGSS) "sets out the strategic direction for planning in the study area for the next 20 to 30 years". It provides "region-wide consistency for local governments when setting priorities for the area through their local planning strategies and schemes". More specifically, the LGSS aims to encourage development around existing nodal settlements and provides a presumption in favour of consolidating settlements. This represents an efficient use of resources such as land, infrastructure and energy and also assists in supporting social services.

Denmark is identified as a sub-regional centre in the Lower Great Southern Strategy (LGSS). Relevant planning issues for rural settlements generally and for Denmark in particular include:

- Managing growth in the town;
- Maintaining the attractive townscapes and rural character;
- Managing environmental qualities;
- Identification and funding of town water resources;
- Ageing infrastructure and cost of upgrades;
- Cost of extending infrastructure;
- Availability of water; and
- Constraints to the supply of residential land.

The LGSS identifies relevant planning issues for rural settlements and infrastructure provision in regional and rural areas. The Strategy also recognises that rural residential development should be consolidated in local planning strategies and located close to existing settlements, rather than being randomly dispersed throughout rural areas. Additional land for rural residential purposes and rural smallholdings should be located in accordance with SPP 2.5.

One of the objectives contained in the strategy is "ensure that the identified settlements develop in a sustainable manner." Specific actions relevant to this proposal include identifying sufficient land for town expansion in local planning strategies, preparation of conceptual structure plans and strengthening of existing towns and centres.

In recognition of the lack of infrastructure the LGSS specifically advocates the following actions:

- development of "innovative approaches to supplying country towns with water";
- promoting water conservation strategies; and
- Identify innovative approaches to supply country towns with water and sewerage services that enhance environmental, social and economic outcomes and performance of current and traditional methods.

The inclusion of this land for rural-residential use, with self sufficient water supply, will assist in achieving both the general objectives and specific recommendations of the LGSS.

3.3 Local Planning Strategy

The key local planning documents that provide the context and guidelines for this proposal are the draft Denmark Local Planning Strategy, Settlement Strategy for Denmark, Shire of Denmark Town Planning Scheme No. 3 (TPS3) and the West Denmark Structure Plan.

The subject land is the most northerly planning portion of Planning Unit D in SSD and, due to re-ordering, Planning Unit E in DLPS. This remaining rural zoned portion of the West Denmark Structure Plan area is a somewhat discrete land parcel. It is separated from the balance of the Planning Unit by Millars Creek and the associated foreshore reserve and Public Open Space. Mount Shadforth Road forms a significant physical barrier between the subject land and Planning Units C and D to the north. (Refer Attachments - Planning Unit E extract from DLPS)

As reported to Council, the draft DLPS identifies the subject land as a 'release area' suitable for future population growth. The strategy recommends that the area be developed for special residential, special rural and/or landscape protection. The various planning matters listed in the Strategy include land capability, visual impact, retention and protection of remnant vegetation, storm water management, fire protection, access and screening and access onto Mt Shadforth Road. The Planning Issues identified in the Strategies are addressed in the West Denmark structure plan and through this Amendment. Where appropriate the outcomes and recommendations are reflected in the specific Provisions applicable in Special Residential Area 15 and the associated Subdivision Guide Plan.

3.4 West Denmark Structure Plan

In 1996 a Structure Plan was prepared for the area bounded by Mt Shadforth Road, South Coast Hwy and Cussons Road. This is the area encompassed by current Planning Unit E. The West Denmark Structure Plan has been adopted by Council. It allows for low density residential subdivision (R2 and R20 being 5000 and 500m^2 respectively) in the east, through to 2000m^2 and 7000m^2 Special Residential lots, Tourist Nodes and Landscape Protection. (Refer Attachments – West Denmark Structure Plan)

Planning Issues identified in the DLPS relevant to this area, and addressed in the structure plan, include:

- Land capability assessment.
- Visual impact, in particular screening from Mount Shadforth Road.
- Minimising access to Mount Shadforth Road.
- Retention and protection of remnant vegetation.
- Stormwater management and Drainage
- Servicing – sewer is not recommended
- Foreshore reserves and Public Open Space Provision.
- A mix of rural residential, landscape protection and special residential lots is recommended subject to detailed assessment, appropriate soil types and in some cases the use of ATUs.
- Designs should maximise views and the varied character of the site.

The endorsed Structure Plan aims to provide for the protection of:

- Important landscape elements including vegetation;
- Creek catchments
- Groundwater (from effluent disposal);
- Visual quality of the landscape; and
- Existing wildlife habitats.

Since its adoption much of the land within the area covered by the Structure Plan has been rezoned and subdivided. The subject land is the balance of remaining rural land in this Planning Unit. The Rural zoning is not appropriate given the existing lot sizes, land uses, site characteristics and attributes of this remaining land. Rezoning is warranted. This process will also provide the opportunity to review and clarify the purpose of the Tourist Road Protection Zone and to reassess non-vehicular access network in this portion of the Planning Unit.

4. SITE ASSESSMENT

Further to the resource mapping and capability assessment undertaken in 1994 in support of the preparation of the West Denmark Structure Plan, a more detailed report has been prepared based on the site inspection and soil survey conducted in June 2010. The Land Capability Report by Land Assessment Pty Ltd forms Appendix A to this document.

The results of the soil testing, permeability, hydrology, vegetation and land capability assessment have been used to guide and inform this Amendment, in particular the Subdivision Guide Plan. The Opportunities and Constraints Plan (Refer Attachments) reflects the planning, environmental and landform characteristics most pertinent to this rezoning.

Key elements of the Land Capability Assessment are discussed below.

4.1 Physical and Geotechnical Factors

The coastal hinterland near Wilson Inlet is characterised by a landscape of hills and valleys formed by dissection of the southern extremity of the Great Plateau of Western Australia. Weathering has produced mainly loamy surfaced duplex soils, with some gravel and sandy areas derived from the formerly extensive laterite mantle. The subject land is described (Churchward et al 1988) as part of the Keystone (Kb) map unit, being broad crests and flanking slopes with hilly terrain; mainly yellow-brown duplex soils and karri-tingle-marri tall open forest vegetation.

The subject land is portion of the valley slope, bounded by Warham Rd to the south which runs parallel to Millars Creek. The creek is seasonal and flows to the east as a tributary to the Denmark River which discharges into Wilson Inlet. The topography ranges from moderate to gently inclined, with gradients of 4 to 20%. The site ranges in elevation from 65m AHD in the east to 135m AHD in the west.

Field determinations of the exact position of Millars Creek were conducted. The results confirm that the "options for the positioning on-site effluent systems within the subject land are not restricted by Millars Creek".

Following the detailed investigation conducted in June 2010, seven (7) soil land units were identified and mapped for the subject land. These are discussed in Part 2 of the Capability Assessment, depicted in the Land Unit Mapping and summarised in Tables 1 and 2. Land Qualities for the Units are shown in Table 3. (Refer Appendix A)

4.2 Vegetation

Much of the vegetation has been cleared from the site. Remaining vegetation is concentrated on the less well drained areas (land Unit Dp), around localised areas of rock outcrop (Sm5) and along sections of Mt Shadforth Rd. Remnant Vegetation is discussed in Part 2.4 of the Land Capability Assessment. The original vegetation is described by Churchward et al (1988) as Karri (E *diversicolor) – Tingle* (E *quilfoylei)* - Marri (Corymbia *calophyla*).

One of the key objectives of the Local Structure Plan for the area is to maximise the retention of the remnant vegetation. The protection of remnant vegetation, together with landscape protection measures are included as matters to be addressed in the SGP. The Land Capability Assessment Report recognises the values of the remaining vegetation in terms of scenic amenity, habitat for native fauna, a barrier to wind and water erosion, and reducing water logging and eutrophication. The Report concludes that, in recognition of these values further subdivision and development of the subject land should, and can, be achieved without the need to clear any significant areas of remaining vegetation.

4.3 Visual Impact

The remnant vegetation within the study area, including within the Mount Shadforth and Warham Road reserves provides valuable landscape backdrop. These areas also act as a useful visual buffer and screen the site from the tourist route.

The existing West Denmark Structure Plan shows a 50m wide 'Tourist Road Protection Zone' along Mt Shadforth Road. The purpose of the Protection Zone is to protect the landscape character from inappropriate clearing of vegetation or construction of buildings, signage or other structures which may have a detrimental effect upon the landscape. As previously reported to Council, it is simply a landscape buffer and represents a small portion of the site.

Retention of remnant vegetation through the designation of a "Landscape Buffer" on the SGP, together with controls on the location of structures will help ensure future development does not detract from the visual amenity of the area.

Clause 5.25 of the Shire of Denmark Town Planning Scheme No.3 affords additional mechanisms by which the Council may require tree preservation and protection of vegetation and amenity.

5. SITE CONTEXT

5.1 Compatibility and Integration with Adjoining Land

The proposed Special Residential subdivision and development is compatible with existing and proposed adjoining land uses.

This portion of the West Denmark Structure Plan area is a somewhat discrete land parcel. It is separated from the balance of the precinct by Millars Creek and the associated foreshore reserve and Public Open Space. Mount Shadforth Road forms a significant physical barrier between the subject land and Planning Unit D to the north.

Notwithstanding the relative isolation of this tongue of land from the balance of the West Denmark Structure Plan Area (Planning Unit E), there is an opportunity to integrate its development with that of the adjoining areas. There is scope, through this proposal, to formalise alternative emergency egress for the developed areas south of Millars Creek through to Mount Shadforth Road.

The nominated 50m Tourist Road Protection Zone shown on the West Denmark Structure Plan is difficult to interpret and apply on the ground. The area marked on the plan is generally a 15m wide strip, measured from the edge of the road reserve, however this is not consistent across the plan. The identified 'zone' is not a constant 50m total width. The road reserve itself also varies from 20m to 40m in width. If the purpose of the buffer is to provide a visual barrier to screen the structures from the tourist route then this could be better achieved using performance based criteria. Sight lines, relative pavement and ground levels, building type and materials, existing vegetation, density and species to be planted should all be assessed when considering landscape screening and protection of the tourist road at the time of development. This rezoning provides the opportunity to clarify and rationalise the "tourist road protection zone" and to consider practical and appropriate mechanisms for achieving its objectives.

Rezoning of this area will address the current 'Rural' zoning anomaly and will serve as a rounding out of the existing Residential and Rural Living areas to the south of the creekline.

5.2 Connectivity/Linkages

The West Denmark Local Structure Plan outlines how the land will be integrated with adjoining property. Mt Shadforth Road forms a common boundary with Planning Unit D to the north. Millars Creek serves as a physical and psychological barrier within the Planning Unit.

None-the-less this rezoning provides an opportunity to formalise the linkages and to complement the existing network of fire tracks and non-vehicular trails. Emergency access/egress is available via existing driveways and crossovers onto both Warham Road and Mt Shadforth Road. These are in addition to the existing Emergency link from Warham Road to the Kerr Close cul-de-sac, thereby providing north-south connections. Existing crossovers are to be retained for added safety and to satisfy Acceptable Solution A2.1 of Planning for Bush Fire Protection Guidelines. Mt Shadforth and Warham Roads provide east-west multi-function connectivity.

The unmade, un-named road reserve which divides Lot 22 contains portion of the existing driveway serving the dwelling on Lot 22. The southern end of the driveway connects to Warham Road. The northern section runs parallel to Mt Shadforth Rd, within private property; it connects to the existing crossover on Mt Shadforth Road and links west with the house and shed. Access from the unmade road reserve onto Mt Shadforth Road is impractical. The sight lines and grade separation at the intersection preclude safe, practical vehicle movement. Closure of this redundant road reserve, together with the un-made western section of the Warham Road reserve is advocated. The procedure for closure is to comply with the requirements of the Land Administration Act 1997and relevant Land Administration Regulations 1998.

6. LAND CAPABILITY

The land capability assessment of the subject land is based on work carried out in 1994, 1998, together with subsequent detailed soil testing and specific site assessment conducted in 2010. As identified in the DLPS, the Planning Unit has an overall 'medium' capability rating for on-site effluent disposal. The more detailed site specific investigation required to support rezoning has subsequently been completed. Part 2.6 of the 2010 Assessment addresses land capability. Table 4 shows the capability for Special Residential development for each of the Land Units. Land at the east of Lot 22 and Lot 1 (Sm1) has a high capability rating. The moderately well drained loam and sands (Sm 2, 3 and 4 and Sg) which make up the majority of the site have fair capability for Special Residential development. The Imperfectly drained shallow soil (Sm5) is rated fair-low and the poorly drained semi wet loamy duplexes (Dp) have low capability rating. (Refer Table 4 of Appendix A)

The capability assessments have been used to inform the SGP. The proposed lot sizes and configuration take account of the recommendations and comments in relation to buffers, setbacks to water bodies, proximity to groundwater, type and location of effluent disposal systems. Development areas, with sufficient land suitable for accommodating an on-site effluent disposal system are available on all the proposed lots.

The portions of the site with low capability generally correspond to areas of remnant vegetation; these are not proposed to be developed and are outside the nominated Building Envelopes.

The Capability Assessment confirms that the majority of the subject land is suitable for Special Residential development serviced by conventional on-site effluent disposal systems (septics), with semi-inverted leach drains. The use of ATUs should be mandatory within areas of land unit Sm5 and within the 30m capture zone of dams. The requirement for ATUs on selected site is reflected in the notations on the Opportunities and Constraints Plan and a specific provision has been included in the Schedule to ensure this is addressed at the development stage.

7. SERVICES & INFRASTRUCTURE

The proposal takes advantage of available infrastructure. Lots will be serviced by mains power, telecommunications and constructed roads.

7.1 Roads and Access

Mt Shadforth Rd and Warham Rd provide dual road frontage to all four lots. Mount Shadforth Road is constructed to sealed standard. Warham Rd is constructed to rural standard.

The SGP utilises existing road reserves, access ways, crossovers and driveways. All proposed lots have frontage to public roads. Shared accessways are proposed in some instances, together with rationalisation of redundant reserves. Subdividers will fulfil all statutory requirements with regard to access, design will satisfy relevant engineering guidelines, whilst ensuring ongoing maintenance obligations for the Shire of Denmark are minimised. The potential creation of seven (7) additional lots across the precinct will not have a significant impact on the local road network, relative to current traffic volumes, assuming 5-6vpd per household. None-the-less, any additional traffic generated by future subdivisions will be equally divided between Mt Shadforth Rd and Warham Rd.

Given the traffic speed, geometry and extent of vegetation within the Mt Shadforth Rd reserve it is not considered suitable for pedestrian access. By comparison Warham road is better suited to non-motorised access and serves as a practical and logical connection to the existing local trails network. Provision of an east-west shared pathway is proposed within a section of the existing constructed Warham road pavement between the western portion of Reserve 1094 and the existing Emergency Accessway/fire management track linking to Kerr Close.

The road and trail network allows for connectivity and emergency access/egress. Any associated upgrading of access ways, fire tracks or trails will be:

- Designed and constructed to minimise impact on significant remnant vegetation;
- Located in a manner that is sympathetic and responsive to the topography;
- Designed to satisfy the requirements and specification of the Shire of Denmark.

7.2 Water

The sub-precinct in not serviced by reticulated water. Residents are self sufficient and rely on individual rainwater harvesting and storage for potable water. This is supplemented by collection of surface and sub-surface water supplied from local soaks. These water sources are fresh, and have been used to support horticulture and small scale aquaculture as well as domestic gardens. Lot 632 contains one dam and Lot 22 contains three dams; these are fresh, spring fed, flow all year and provide a permanent water source. The most recently constructed of these was built following a dry summer; it filled prior to winter rains and has been full ever since.

Based on current average rainfall for the locality, a development with 175m^2 of roof catchment and 50kl storage has 98% reliability of providing 450lt of water per day (sufficient for 3 plus persons). By requiring a minimum roof catchment area of 200m^2 together with rainwater storage tank/s of not less than 92kl per lot, households can be deemed self sufficient in terms of water supply, both at present and into the future. The storage capacity is nearly twice that considered necessary for household use. The roof catchment area and associated storage can be readily accommodated on the proposed lots.

Notwithstanding the general preference for provision of reticulated water for subdivisions of this size, the LGSS specifically provides for innovative solutions for the provision of services. In this instance, it is recommended that the mandatory requirement for reticulated water be waived as provision is not essential, practical or cost effective. This approach is supported by the Shire of Denmark. As recognised in the Water Corporation's Water Forever: Lower Great Southern June 2010" there is a challenge in providing enough water for twice as many people, while striving to reduce environmental impact. Through a range of water efficiency measures, including changes in lifestyle expectation about water, The Water Corporation is preparing a 'portfolio of water source options'. In line with sustainability principles and given the abundance of available water on this site, the development will be self reliant. The mandatory requirement for rainwater tanks negates the need for reticulated water, and the associated burden on scarce public supplies. Based on rainfall, water harvesting and subsurface flows this proposal fulfils local and state objectives for sustainable water supply.

From a sustainability perspective it is also considered that water is more efficiently used when there is a finite supply controlled by the individual. Rainfall levels within the area are well in excess of the minimum needed to provide a sufficient supply from roof runoff especially if complemented with planning scheme requirements for minimum roof area and storage capacity. Potable water can continue to be sourced from roof catchments. This can be supplemented by bores, soaks, dams and surface water harvesting particularly for livestock, irrigation of gardens and emergency/fire fighting.

The scale and nature of proposed rural living development doesn't warrant extension of the water mains. In this case it is considered neither practical nor necessary to require reticulated water to be provided to the sub-precinct. The LGSS supports alternative solutions to infrastructure provision and specifically advocates the use of rainwater tanks. The DLPS supports sustainable self-reliant developments. Dwellings within the precinct have developed over the last 80 years with potable water predominantly provided from on-site sources and roof runoff. As previously demonstrated in this report, given minimum roof catchment of 200m^2 and at least 50kl storage, an adequate water supply can provided to meet the needs of an average household in West Denmark. This proposal recommends minimum storage of 92kl per household, which is more than double the actual needs. Provision of 92kl of storage is also consistent with that required for other Rural Living zones in Denmark.

7.3 Effluent Disposal/Sewerage

Reticulated sewer is not available to service the site. As set out in the DLPS extension of sewer is not recommended because of steep slopes, topographical conditions, larger lot sizes, potential adverse impact on groundwater and vegetation and suitability of soil type for on-site effluent disposal. The Capability assessment confirms that the soils have high and fair capability for on-site effluent disposal. (Refer Table 4 of Appendix A and Opportunities and Constraints Plan in Attachments).

This Amendment proposes lots with a minimum size of 5000m^2, serviced by on-site effluent disposal systems. Alternative Treatment Units may be required in some circumstances.

7.4 Water Management and Drainage

Given the well drained nature of most of the site and the range of lot sizes, stormwater will be retained onsite wherever possible in accordance with water sensitive design principles. This is a relatively small tract of land and water management is not a significant issue. The proposed lots are comparatively large and the density of any future development is relatively low. No additional roads are proposed. The only water to be dealt with through water management will be stormwater runoff from existing roads. Pre-development flows include existing runoff from upstream and the culverts and open drains along Mt Shadforth Road which partially discharge through the subject land.

As set out in the capability assessment, water management measures designed to ensure that post development runoff does not exceed the pre-development situation are expected to be easily achieved. Allowing for six developments, each with a new total roof area of 400sqm, as well as six additional 50m driveways, the increase in impervious area over the whole site is less than 3000sqm (approximately .054% of the subdivisible area). The bulk of the water will be harvested and stored in rainwater tanks. The use of rainwater tanks will slightly reduce the water loading after subdivision (compared to grazed pasture). Drainage and water management will be addressed in accordance with Shire of Denmark Policies and Standards through the use and siting of water tanks, together with the appropriate design and construction of driveways at the development stage.

In the event of a higher order storm, an overland flow path is available. The existing dams are provided with outfall mechanisms.

7.5 Power and Telecommunications

Underground power can be provided to service the proposed subdivision through standard connection and headworks contributions. The existing transmission line which traverses part of the precinct is protected by an access easement in favour of the service provider. All work is to be in accordance with the specifications of Western Power, as set out in the 'Network Asset Technical Document – Distribution Subdivision Policy', or other current document.

Telecommunications infrastructure can be extended to service the proposed development.

7.6 Fire Safety

This Amendment takes into consideration the essential elements of Planning for Bush Fire Protection Guidelines (2010), the Western Australian Planning Commission Planning Policy DC3.7 and the relevant requirements of the Shire of Denmark Annual Fire Regulation Notice.

An independent Bush Fire Hazard Assessment has been prepared for the site and is contained in Appendix B. It has been used to inform the SGP. Elements of the plan are reflected in this proposal and relevant requirements will be implemented through the preparation of a Fire Management Plan at subdivision stages of development.

The following key principles apply:

- Low fuel areas around all dwellings.
- Installation and maintenance of a Hazard Separation zone.
- Maintenance of fuel reduced Building Protection Areas.
- Provision of a communal emergency water supply (the preference is to provide a standpipe or suction point in/adjacent to the Warham road reserve within the existing cleared hardstand (former cattle yards) south to the road pavement and east of the existing emergency accessway.
- The subdivider/s will be required to ensure that intending purchasers are fully aware of the fire management guidelines and requirements in the Shire of Denmark Annual Fire Regulation Notice, and where applicable that buildings are to be constructed in accordance with Australian Standard 3559 “Construction of Buildings in Bushfire Prone Areas”.

Fire safety will be enhanced though the use of Hazard separation zones and Strategic Fire Breaks/emergency access. The road network is permeable and allows for emergency vehicle access as well as emergency egress. Notwithstanding that the existing Warham Rd cul-de-sac is approximately 1km in length, and therefore longer than the 600m maximum nominated in the Guidelines, this proposal will ultimately reduce the overall length of the cul-de-sac. An existing linkage to the Kerr Close cul-de-sac head is provided and the total length of Warham Road servicing stage One is just 500m. When Stage Two proceeds, the Warham Road cul-de-sac head will be linked to Mt Shadforth Road. In this way the SGP represents a significant improvement in fire safety and does satisfy the performance criteria. Six lots currently have access (existing crossovers) to Warham Road. With regard to A2.3, the maximum lots to be serviced is eight, so it is necessary for some lots proposed by this SGP to have access via Mt Shadforth Road. Staging of development and the ultimate provision of an Emergency access linkage between the Warham Road cul-de-sac head and Mt Shadforth Rd satisfies the requirements of the Guidelines. The subdivision design and SGP provide for alternative egress for all lots and give consideration to the network of emergency access/egress via fire breaks, management tracks and driveways.

8. AMENDMENT PROPOSAL

The proposed development will facilitate the implementation of Council's strategy to provide for the future growth of the Denmark townsite.

The essential features depicted and notated in this proposal include:

- A minimum lot size of 5000m^2.
- Remnant vegetation will be retained.
- Protection of significant remnant vegetation within the existing Road reserves.
- Provision for on-site water management of any additional post-development flows through water harvesting and re-use.
- Provision for a hazard separation zone between existing and proposed buildings and remnant vegetation.
- Clarification of the purpose and function of the "Tourist Road Protection Zone" shown on the West Denmark Structure Plan

8.1 Site Suitability

The subject land has a number of attributes in terms of its suitability for development into Special Residential lots. These include:

- logical extension of the existing Special Residential areas in accordance with the adopted Local Planning Strategy;
- proximity to the Denmark townsite and all the associated services and community facilities such as shops, health, educational and recreational services;
- the topography of the site which provides a range of elevated, well drained house sites on gentle to moderate slopes;
- The availability of existing service infrastructure such as roads, telecommunications and power.
- development of the site will not impact on creeklines or wetland areas;

8.2 Water Supply

Given the abundance of water available on this site, and as reported to Council in March 2010, "the use of rainwater harvesting and storage of potable supply is supported as a sustainable alternative to reticulated supply".

In accordance with the advice from the Shire of Denmark, a Notification will be placed on the Titles of all future lots stating that the lots are not connected to a reticulated water supply. In this case the Shire of Denmark concurs that "The provision of rainwater tanks provides a sustainable alternative to Scheme Water given the cost of reticulation and the difficulty in identifying water source areas for Denmark's future water supply."

8.3 Energy Efficient Design & Solar Access

The proposal has been prepared taking into account the aims and principles of the Shire of Denmark Energy Efficient Subdivision Design (TPS Policy 33) and relevant climate response objectives. The proposal addresses efficiency and sustainability criteria.

The design and layout of lots allows for passive solar access, given the terrain and natural bushland. The long boundaries are within the preferred angle range and depth. Where required, building areas provide adequate winter sun access for future house sites and yards with sufficient space for creation of microclimates. The lot sizes are in excess of 5000m^2, which combined with the topography and aspect of the site will enable achievement of energy efficient design objectives at the development stage.

The subdivision allows for a range of lot sizes, affording variety and choice in housing styles. The Lots are aligned to the contour, which combined with lot size minimises the need for retaining walls and earthworks associated with housing and access way construction.

Building Envelopes are identified within existing cleared areas, thereby avoiding the need for tree removal. Thus remnant vegetation is protected and buffers are provided to the adjoining conservation estate. The bushland areas will perform an important ecological function providing valuable habitat for flora and fauna. The vegetated areas also provide an attractive landscape backdrop.

The lot densities, sizes and layout represent orderly and efficient development, consistent with the sustainability objectives. The road network provides safe convenient access, allows for emergency egress and affords adequate fire protection. The subdivisional road provides a hard edge to the vegetated creekline and the development provides for personal safety, traffic safety, property safety and security and contributes to landscape amenity.

8.4 Sustainability

As recognised in the March 2010 Council report on this matter, the proposed development of the land will provide for settlement within close proximity to the Denmark townsite and allow for the efficient use of land where infrastructure is available. Development will be self-sufficient in regard to water supply. Further “There are no known significant social considerations relating to the report or officer recommendation”. The SGP responds to land capability and site characteristics; it takes advantage of the attributes and features of the subject land.

8.5 Subdivision Guide Plan/Development Control

This proposal provides for the creation of Special Residential lots ranging in size from 5000m^2 in the east through to 1.5 ha in the west as reflected in the Subdivision Guide Plan (SGP). (Refer Attachments)

Where necessary Development Exclusion Areas are identified on the Opportunities and Constraints Plan. An indicative Building Envelope is shown on each proposed lot, taking account of existing vegetation, soil type/capability, creekline setbacks, fire safety and access. Future house sites are aligned to the contour to minimise the need for site works associated with the construction of access ways and house pads. The east west layout enables buildings to be orientated to the north to take advantage of passive solar design principles, while still capitalising on the views available from the site.

The sensitive design of future residences is considered to make a significant contribution to the visual amenity of the locality. Consequently it is important that all development is designed and constructed to be sympathetic with the landscape in terms of the location, scale, height, building materials and colour. The use of split level or stepped housing design in response to site features and landscape character is encouraged.

This rezoning provides the opportunity to review the "tourist road protection zone" and to consider practical and appropriate mechanisms for achieving this objective. The vegetation within the Mt Shadforth Road reserve, in particular the Karri trees, serve as an important landscape feature. Wherever possible these should be retained. The semi-rural landscape, when viewed from this entry road, is equally important; it too should be retained. The road reserve varies from 20m to 40m in width and the road geometry provides travellers with a variety of views. The proposed Building Envelopes are concentrated towards the eastern end of Lot 632 and on relatively well screened areas on Lot 22. Where the purpose of the buffer is to provide a visual barrier to screen new structures from the tourist route this can achieved using performance based criteria. Sight lines, pavement height relative to ground levels, building type and materials, existing vegetation, density and species to be planted should all be assessed when considering landscape screening and protection of the tourist road. Rather than prescriptive standards, each development proposal should be assessed on its merits, at the time of application. Where necessary visual screening can be enhanced with supplementary plantings.

The proposed Amendment will utilise zoning and land use categories that already exist within the Shire of Denmark Planning Scheme. Standard mechanisms, including Special Provisions, specific to the Warham Road area will be used to guide and control subdivision and development.

9. CONCLUSION

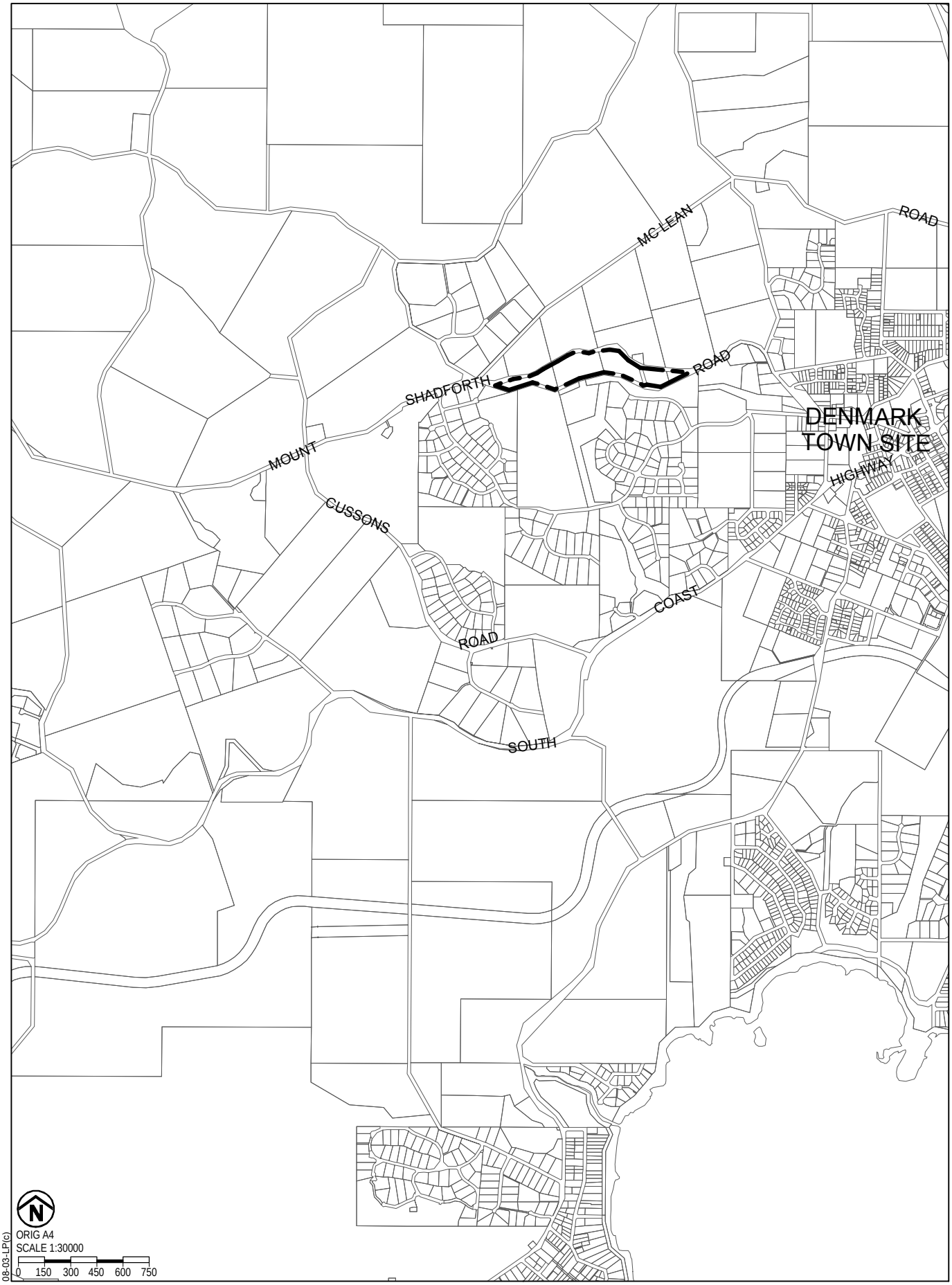
The subject land is identified in the Settlement Strategy for Denmark and the Denmark Local Planning Strategy as being suitable for closer settlement. The Shire of Denmark has given its in-principle support to rezoning for Special Residential. It is intended that the land holdings be rezoned prior to subdivision and appropriate special provisions be incorporated into the Shire of Denmark Town Planning Scheme No. 3 through this Amendment.

All issues identified in the draft LPS have been addressed in this report and through the endorsed Structure Plan. Moreover, as required by Resolution 060310 the Opportunities and Constraints Plan, Subdivision Guide Plan and Special Provisions address the following matters:

- The subdivision pattern reflects the outcomes of the June 2010 land capability assessment;
- A minimum lot size of 5000m^2 is achieved for all proposed new lots;
- Coordination of vehicular access to lots and limited access to Mount Shadforth Road;
- Stormwater management;
- Landscape protection measures along Mt Shadforth Rd;
- Protection of remnant vegetation;
- Identification of building envelopes;
- Protection of Millers creek and associated riparian vegetation is achieved through Special Provision iii) a and identification of Development Exclusion Areas;
- Vegetation protection is achieved through Special Provision iv) a);
- A Fire Hazard Assessment has been completed and has been used to inform the SGP.
- Pedestrian trails and linkages are identified on the SGP.
- Special Provision x) requires installation of rainwater storage of not less than 92kl as a condition of development approval.

ATTACHMENTS

Location Plan
Site Characteristics Plan
Planning Unit Plan, extract from DLSP
West Denmark Structure Plan
Opportunities and Constraints Plan
Subdivision Guide Plan



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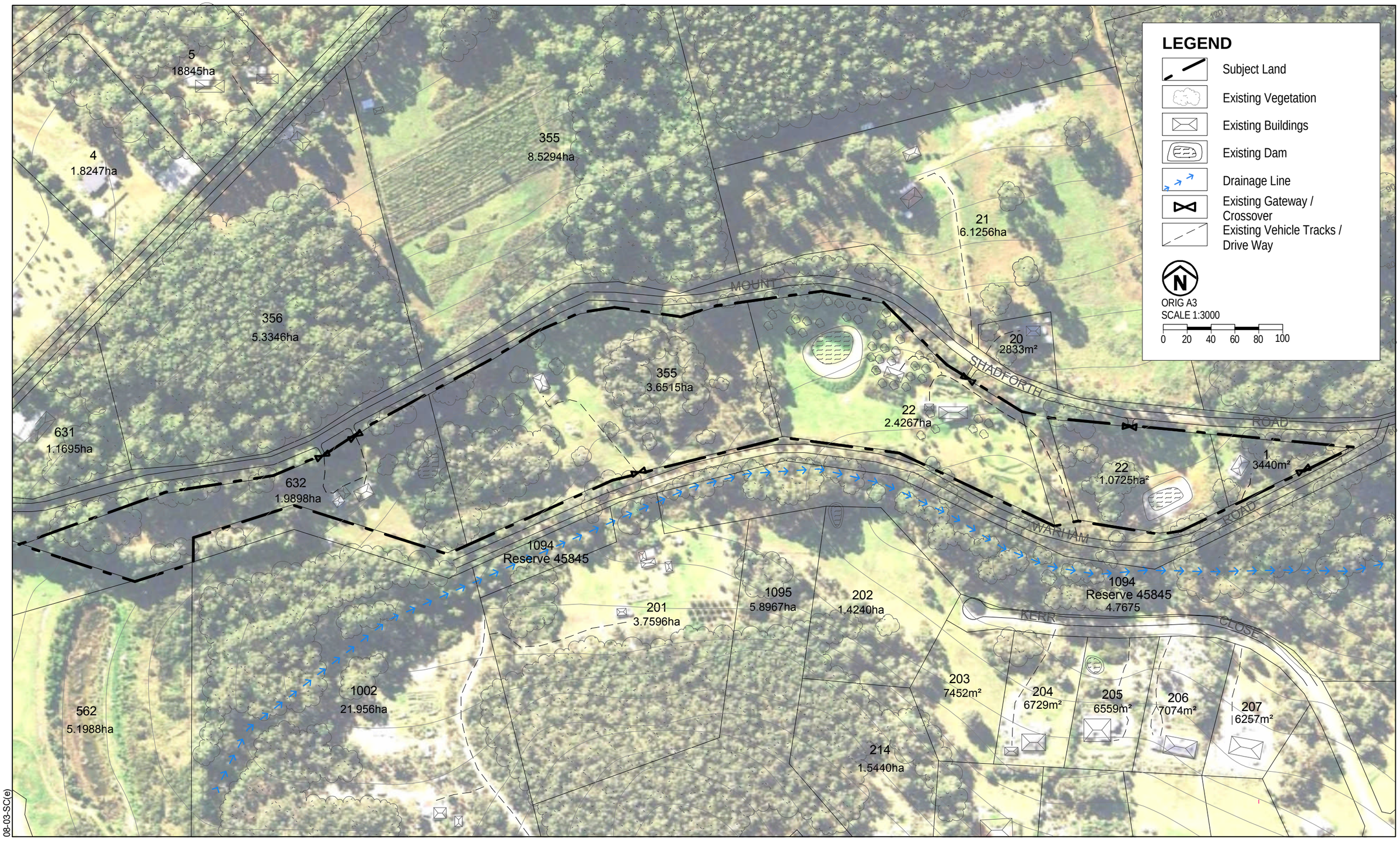
LOCATION PLAN
Lots 1, 22, Pt. 355 & 632
Mount Shadforth Road
Shadforth, Shire of Denmark



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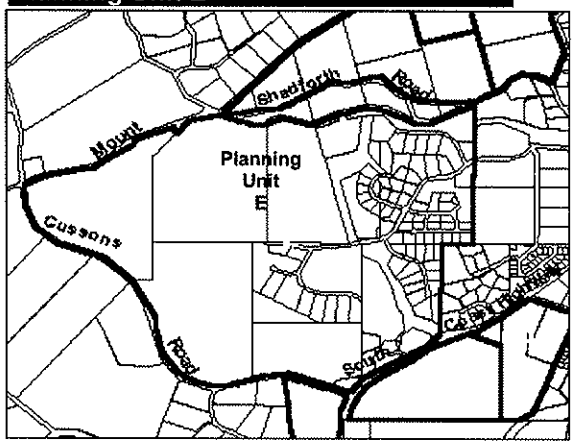
SITE CHARACTERISTICS

Lots 1, 22, Pt. 355 & 632
Mount Shadforth Road
Shadforth, Shire of Denmark

Planning Unit E



Natural Features

- Slopes of 2 to 8% exist along ridgelines with slopes of 15 to 30% evident along creeklines.
- The site slopes to the south and south-east, south-east and north-east and south-east from three low hill tops of 201m, 143m and 128m respectively.
- The site is predominantly cleared; however, significant stands of remnant vegetation exist in the south, centrally and toward the east. These stands are dominated by tall dense Karri and Jarrah forest. Variable understorey conditions exist with some areas having an excellent understorey while others have been degraded by stock.
- Three defined drainage lines exist on site which drain toward the east into Millars Creek, Denmark River and the Wilson Inlet.
- Foreshore vegetation for the two most significant creeks is in a generally good condition. An area of surface granite is evident toward the centre of the site.
- Eastern portions are visible from the Denmark townsite whilst southern and northern portions are visible from South Coast Highway, Cussons Road and Mt Shadforth Road. Roadside vegetation and the remnant vegetation on site reduces site visibility.

Land Use/Surrounding Uses

- Four large landholdings have been rezoned and subdivided.
- Current land use on the Rural zoned land is predominantly grazing with some retreat living.
- Surrounding land use comprises a vineyard to the north, grazing and tourist to the west, special rural to the east and south and residential. A disused timber mill abuts the site on its southern boundary.
- Abuts Units D, F & G.

Land Capability on-site Disposal

- Site comprises the Keystone Kb. unit.
- Overall a medium capability.
- Areas of low and very low capability exist in connection with the creeklines and areas of granite.

Servicing Opportunities/Constraints

- The northern catchment is approximately 1km upstream of the existing sewer and the southern catchment about 500 metres upstream of its main outfall sewer. The four landholdings developed to date are not connected to sewer.
- Sewers are not recommended to be extended to this area because:
  - steep slopes do not suit small lots or sewer construction due to excessive length of sewer per lot, varying depths of construction, greater number of manholes and need for rock excavation.
  - deep trenches would alter the ground water movement of the area and adversely impact on large areas of vegetation.
  - soil types mostly suit on-site effluent disposal.
- The majority of this area (above RL65) could not be supplied by the existing water headworks. A new tank, together with supply main and pump station, was located near lot 340 off Mt Shadforth Road.
- Need for alternative access to minimise access from South Coast Highway and Mt Shadforth Road. Peace Street is now constructed.
- Visual impact of development on prominent slopes and adjacent to South Coast Highway needs to be addressed.
- A comprehensive fire protection plan is required with appropriate emergency access.
- Lot sizes and design should respond to topography, soils and visual impact considerations.

- Provision of reticulated water is required.
- Design should maximise the views and varied character of the site.
- A mix of rural residential, landscape protection and special residential lots is recommended subject to detailed assessment, appropriate soil types, the use of alternative treatment units in some areas.
- Drainage to be managed on site with appropriately located sedimentation basins.
- Creeklines and significant areas of vegetation to be protected.
- Potential yield – 200 unsewered lots.

Planning Unit E Planning Recommendations/Policy

- A structure plan was prepared which provided for special residential/rural residential development and addresses a range of issues including:
  - land capability assessment
  - visual impact
  - screen development and minimise access to South Coast Highway and Mt Shadforth Road
  - retention and protection of remnant vegetation
  - stormwater management
  - foreshore reserves and POS provision
  - fire protection
- Development/rezoning must be in accordance with the structure plan for lots which are yet to be rezoned.
- Development/rezoning of Lot 342 must address impacts and buffers for the vineyard to the north.

NOTE 1 Building envelopes (maximum area < 3000m²) shall be selected and delineated on-site by the landowner and approved by Council. All building envelopes shall be located such that it does not:

- Necessitate the removal of significant vegetation for house construction;
- Warrant the removal of overhanging trees in the interest of the longer term safety of residences;
- Detract from the environmental quality of the locality;
- Detract from the amenity of adjoining residences;
- Detract from the visual quality of the subdivisional roads

NOTE 2 Strategic firebreaks shall take the form of roads and specifically allocated firebreaks as shown on this plan or as revised by the bushfire management plan adopted at the time of subdivision.

NOTE 3 Battleaxe legs will be delineated on-site by the subdivider and approved by Council prior to construction.

NOTE 4 Catchment area management at the headwaters of Millers Creek will be required to the satisfaction of Council in consultation with the Wilson Inlet Management Authority.

NOTE 5 No private access from lots will be permitted onto Mount Shadforth Road or South Coast Highway unless specifically approved by Council.

Adopted by resolution of the Council of the Shire of Denmark at the .....meeting of the Council held on the .....day of .....19.....

SHIRE CLERK .....

Client

Mountford, Coleman, Ricketts, Robertson, Cussons, Reika And Preston

Scale	Date	Plan No.
1:5 000	June, 1996	93/75/19

N

Taylor

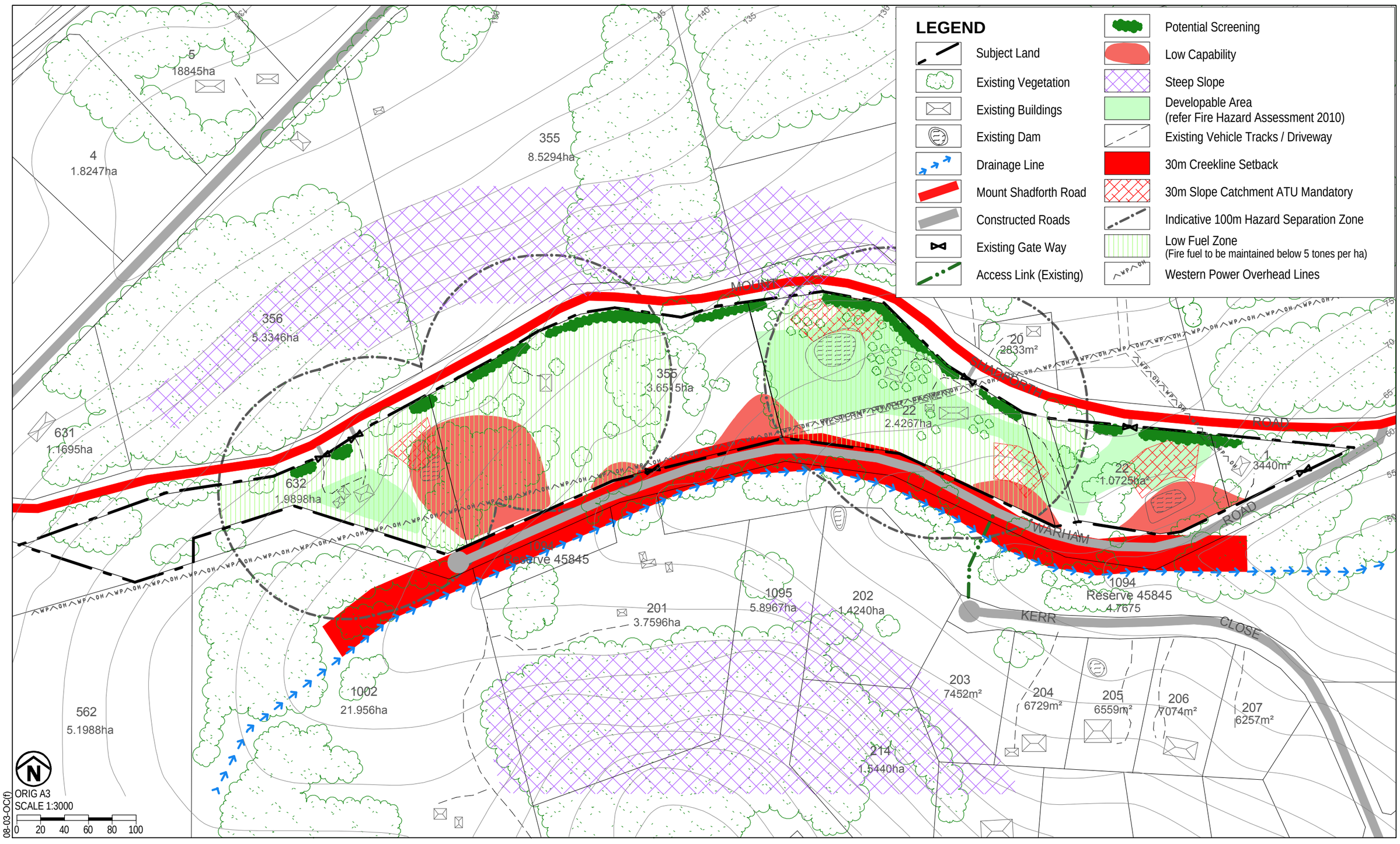
Town plannir

187 Roberts R
PO Box 503 V
Western Aus
Telephone (
Facsimile (

WEST DENMARK STRUCTURE PLAN

SPECIAL RESIDENTIAL DEVELOPMENT

Approx 200 Lots - Overall Area 71ha approx.
P.O.S. indicated 26.6ha approx.



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OPPORTUNITIES AND CONSTRAINTS

Lots 1, 22, PT. 355 & 632
Mount Shadforth Road
Shadforth, Shire of Denmark

LEGEND

- Subject Land
- Existing Vegetation
- Existing Buildings
- Existing Dam
- Existing Lot Boundaries
- Proposed Lot Boundaries
- Drainage Line
- Existing Gateway / Crossover
- Indicative Building Envelope
- Shared Crossover
- Walk Trail
- Existing Driveways / Emergency Egress
- Multipurpose (Shared) Access and Emergency Egress
- Standpipe / Hardstand
- Pedestrian Link
- Potential Screening

NOTES

- Minimum lot size 5000m².
- Habitable buildings to comply with AS 3959.
- The Envelopes nominated on the SGP are indicative and subject to survey.
- Applications to vary Building Envelopes are to give consideration to the Opportunities and Constraints Plan.
- Pt Lot 355 subject to detailed survey and assessment (soil, vegetation, fire & capability) prior to subdivision.
- Reticulated water and sewer is not available. All lots to be self sufficient.
- ATU's are to be supplied on all lots with a minimum setback of 30 from upstream from all dams and watercourse.

Area Not Assessed
Existing Lot D (Pt 355).
Site subject to detailed assessment of land capability, soils, hydrology, vegetation, fire safety and visual amenity prior to consideration of subdivision.

355
8.5294ha

356
5.3346ha

355
3.6515ha

631
1.1695ha

632
1.9898ha

562
5.1988ha

21
6.1256ha

20
2833m²

22
2.4267ha

22
1.0725ha

1094
Reserve 45845
4.7675

203
7452m²

206
7074m²

207
6257m²

6729m²

6559m²

3440m²

A
1.3900ha

B
5000m²

C
5300m²

D
3.6500ha

E
1.0300ha

F
5000m²

G
6100m²

H
5200m²

I
5000m²

J
5100m²

K
3400m²

MOUNT SHADFORTH ROAD

WARHAM ROAD

KERR CLOSE

Preferred location for standpipe (existing cleared hardstand)

No subdivision potential.
Existing lot is below the required minimum for this zone

Stage 2
Install Strategic Fire Break / Multiuse Access Emergency Egress

Closure of western section of redundant, un-made road subject to the requirements of the Land Administration Act 1997 and relevant Land Administration Regulations 1998.

Stage 1
Utilise existing Emergency Access / Egress link.

NOTES

a. Retention of crossovers onto Mount Shadforth Road only where it provides access to existing development.
b. All new lots to gain access off Warham Road (lot frontage).
c. Restricted access onto Mount Shadforth Road for newly created lots for emergency purposes only in order to comply with Element 2.3 Cul-de-sacs of Planning for Bush Fire Protection Guidelines (May 2010). This criterion requires a maximum length of 200 metres and where emergency access is provided between cul-de-sac heads, maximum length can be increased to 600 metres provided no more than 8 lots are serviced.
d. The upgrade of Warham Road to the satisfaction of the Council's Director of Infrastructure Services.
e. The upgrade of the intersection of Mount Shadforth Road and Warham Road.
f. The subdivision layout as currently provided for on 632 may alter depending on the outcome of the road closure process.

08-03-SGP(j)
ORIG A3
SCALE 1:3000
0 20 40 60 80 100

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SUBDIVISION GUIDE PLAN

Lots 1, 22, Pt. 355 & 632
Mount Shadforth Road
Shadforth, Shire of Denmark

APPENDIX A

Land Capability Assessment

Land Assessment Pty Ltd
June 2010

Supplementary Advice

Land Assessment Pty Ltd
9 November 2010

LAND CAPABILITY ASSESSMENT

MT SHADFORTH – WARHAM RD AREA

SHIRE OF DENMARK

prepared for

AYTON BAESJOU PLANNING

on behalf of

Mssrs S & A Young and D Warne

by

LAND ASSESSMENT PTY LTD
5/27 York Street
SUBIACO WA 6008

Tel: (08) 9388 2427

Report No. 1013

JUNE 2010

CONTENTS

PHOTOS

FIGURES

TABLES

1.0 INTRODUCTION

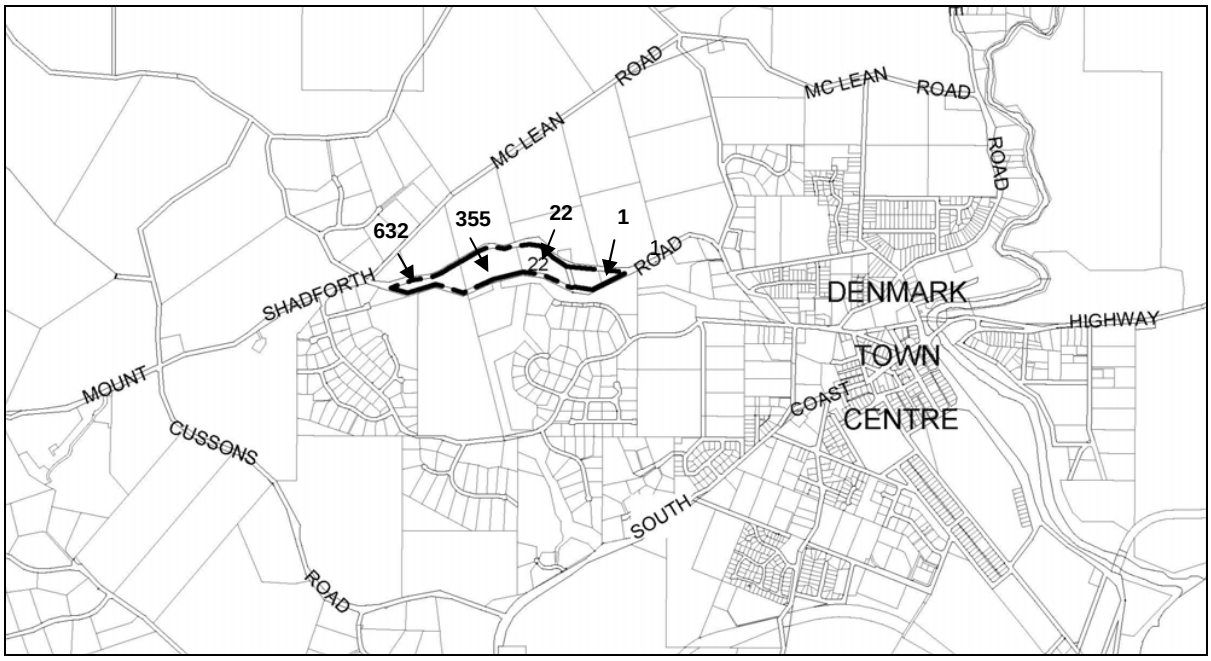
This report has been prepared for Ayton Baesjou Planning on behalf of two of the owners of land in the area located between Mount Shadforth and Warham Roads in the Shire of Denmark. The subject land covers an area of approximately 9.5 ha located about 1.5 km west of the Denmark town centre and comprises Lots 1, 22, portion of 355, and 632 (Figure 1).

In December of 2009 the owners of Lot 22 submitted a Scheme Amendment Request for the rezoning of their land from the 'Rural' zone to the 'Special Rural' zone Although this 'spot rezoning' was not supported, Council have advised it does supports the rezoning of the greater area of land bounded by Mt Shadforth and Warham Roads, being Lots 1, 22, and portions of 355 and 632 to the 'Special Residential' zoning category subject to a number of matters being addressed including; *a land capability study to assess suitability for Special Residential development and onsite effluent disposal.* The purpose of this report is to address that requirement.

This report is based on a site inspection and soil survey conducted by Martin Wells of Land Assessment Pty Ltd during the period from the 2nd to the 4th of June 2010, and an associated review of land resource and environmental policy documents.

The capability for this form of rural residential development (including on-site effluent disposal) has been assessed in accordance with the methodology outlined in Department of Agriculture and Food publications (van Gool et al 2005, Wells and King 1989) and with due consideration of the requirements of the Draft Country Sewerage Policy (Government of Western Australia 1999).

Figure 1. Location Plan



2.0 NATURE AND CAPABILITY OF THE LAND

2.1 Overview

The Denmark locality of the coastal hinterland near Wilson Inlet is characterised by a landscape of hills and valleys formed by dissection of the southern extremity of the Great Plateau of Western Australia.

Within this dissected landscape, weathering of the plateau's predominantly granitic basement rocks has produced mainly loamy surfaced duplex soil types with occasional areas of more gravelly or sandy soils derived from remnants of the plateau's formerly extensive laterite mantle. Broad-scale mapping by CSIRO (Churchward et al 1988) describes the subject land as part of the Keystone (Kb) map unit representing areas of broad crests and flanking slopes within hilly terrain of greater than 60 m local relief and with mainly yellow-brown duplex soils and karri-tingle-marri tall open forest vegetation.

The subject land is a 9.5 ha elongated portion of a valley slope bounded on the northern side by the well used tourism travel route of Mt Shadforth Road and, for most of its length on the southern side, by Warham Road. It comprises four properties ranging in size from 3440 m^2 to 3.65 ha that are currently used for rural living / rural retreat purposes, although historically portions have been used for low intensity grazing and some perennial horticulture (walnuts).

The topography ranges from moderate to gently inclined lower slopes, with gradients of 4 to 20%. A number of small dams have also been established within these slopes, being soaks associated with localised areas of hillside seepage. Maximum elevation of 135 m AHD occurs at the western end of Lot 632, and minimum elevation of 65 m AHD occurs at the eastern end of Lot 1.

The southern boundary of the subject land is formed by Warham Road which runs parallel to Millars Creek contained within Crown land. Millars Creek is a seasonally active, easterly flowing, watercourse and a tributary of the Denmark River. Thereafter the Denmark River flows southwards and discharges into Wilson Inlet approximately 3.5 km east south east of the subject land.

Unless captured within the existing dams, surface runoff from the subject land can be expected to flow in a south easterly direction into Millars Creek, although only after being intercepted by Warham Road and the creek's dense fringe of riparian vegetation. The catchment area for Millars Creek is not used or proclaimed for public drinking water supply purposes.

2.2 Broad-scale Capability Assessment

The Shire of Denmark's Local Planning Strategy identifies the subject land as occurring within Planning Unit E where the Keystone Kb unit has an overall 'medium' capability rating for on-site effluent disposal although it notes that areas of low and very low capability exist in connection with the creeklines and areas of granite outcrop.

The capability statements in the Local Planning Strategy relate back to earlier land resource mapping and assessment the capability of land for rural residential forms of development within the West Denmark Structure Plan area (Environmental Capability 1994 for Taylor Burrell 1996). However given the inherent variation within the scale of soil / landform mapping conducted for structure planning, more detailed, site-specific investigation is necessary to support individual Scheme Amendments.

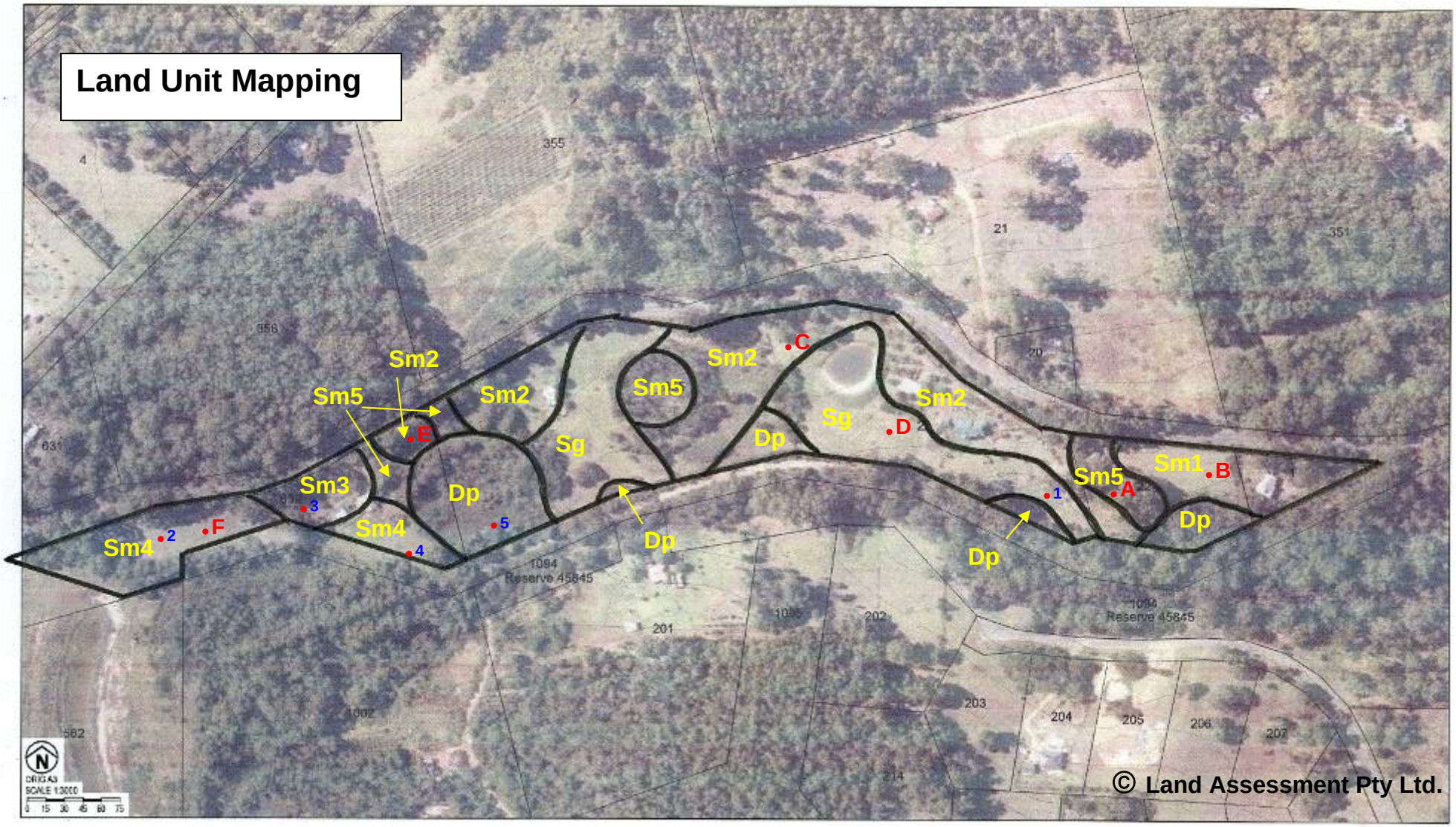
2.3 Detailed Land Unit Mapping

The soil and landform conditions within the subject land were examined from aerial photos followed by field survey work with soils examined at six pits (A – F) excavated by backhoe and a further five soil hand auger observation sites. Slope gradients were measured using a hand-held inclinometer correlated with 5 m interval contour mapping, and site positions, as well as key portions of the creek alignment, were accurately located using a hand held GPS unit.

The resultant more detailed mapping of land units (soil-landform types) is shown overleaf in Figure 2. The seven delineated land units are briefly described in the Table 1, and a summary of site results presented in Table 2. Further appreciation of site conditions can be gained by reference to the photographs following Figure 2, and those accompanying the soil profile descriptions in Appendix A.

Soil profile descriptions contain an estimated permeability (for the nominal 60 – 90 cm depth layer within the soil where, under natural conditions a leach drain would be installed). The estimated permeability is based on consideration of soil texture and soil structure in accordance with indicative rates listed in the National Standards document (AS/NZS 1547) for On-site Domestic Wastewater Management (Standards Australia & Standards New Zealand 2000).

Soils were classified in accordance with the Department of Agriculture and Food's current WA Soil Group nomenclature (Schoknecht 2002) and Table 3 lists the generic land quality values relevant to the land units and determined by reference to methodology outlined in Department of Agriculture and Food publications (van Gool et al 2005, Wells and King 1989).



	Slopes; moderate gradients (10 – 20%)	Sm3	Moderately well drained landscape with shallow yellow brown gravelly sands; laterite at > 50 cm.		Slopes; gentle gradients (< 10 %)
Sm1	Well drained landscape with brown loamy earths; dense clay at > 150 cm depth	**Sm4**	Moderately well drained landscape with pale shallow sand over weak hardpan at > 50 cm.	**Sg**	Moderately well drained landscape with brown loamy earths with gravel & laterite.
Sm2	Moderately well drained landscape with brown loamy earths; dense clay at 50 –150cm	**Sm5**	Imperfectly drained landscape with yellow brown shallow loamy duplex soil; dense clay at < 50 cm.		**Drainage depression or seepage area**
. A - F	**Pit Sites** – soil profile description and photo	**. 1- 5**	**Hand Auger Sites** – soil description only	**Dp**	Poorly drained landscape with semi wet soils (loamy duplexes).

Photo 1: Land unit Sg – near site 1, looking west across central lower portion of Lot 22.

Photo 2: Dam within land unit Dp in central lower portion of Lot 22. Terrace at left is fill material

Photo 3: Land unit Sm1 with dam - in land unit Dp in lower eastern portion of Lot 22.

Photo 4: Land unit Sg with dam – near site C in central upper portion of Lot 22.

Photo 5: Land unit Sm1 (foreground) **and Sm5** (background) - above site A in eastern portion of Lot 22.

Photo 7: Warham Road – separates southern portion of subject land from Millars Crk reserve

Photo 6: Northern edge of Lot 22 with walnut trees - viewed from Mt Shadforth Rd.

Photo 8: Dense riparian vegetation along Millars Creek - acts as nutrient filter for runoff.

Photo 9: Land unit Sm2 - looking east near site E within north eastern portion of Lot 632.

Photo 10: Land unit Sm3 - looking east near site 3 within central northern portion of Lot 632.

Photo 11 Land unit Sm4 – below existing house central northern portion of Lot 632.

Photo 12: Land unit Sm4 – looking east near site 2 in western portion of Lot 632.

Photo 13: Soakage dam within land unit Dp - in eastern portion of Lot 632.

Photo 14: Dense vegetation within unit Dp - in south eastern portion of Lot 632 below soakage dam.

Photo 15: Land unit Sg - view into central portion of Pt Lot 355 from near Mt Shadforth Rd.

Photo 16: Dense vegetation within unit Dp – in south western portion of Pt Lot 355.

TABLE 1: LAND UNIT DESCRIPTIONS

Land unit	Description
Slopes; moderate gradients (10 – 20%)	
Sm1	Well drained landscape with brown loamy earths; dense clay at > 150 cm depth
Sm2	Moderately well drained landscape with brown loamy earths; dense clay at 50 –150cm.
Sm3	Moderately well drained landscape with shallow yellow brown gravelly sands; laterite at > 50 cm.
Sm4	Moderately well drained landscape with pale shallow sand over weak hardpan at > 50 cm.
Sm5	Imperfectly drained landscape with yellow brown shallow loamy duplex soil; dense clay at < 50 cm.
Slopes; gentle gradients (< 10 %)	
Sg	Moderately well drained landscape with brown loamy earths with gravel & laterite.
Drainage depression or seepage area	
Dp	Poorly drained landscape with semi wet soils (loamy duplexes).

TABLE 2: SITE RESULTS SUMMARY

Site	Unit	Soil Group	Other Comment.
A	Sm5	Yellow brown shallow loamy duplex (greyish clay subsoil at 25 cm)	Eastern part of Lot 22 - on 12 % slope with scattered granite/gneiss outcrop. Poor internal soil drainage
B	Sm1	Brown loamy earth (over sand and then grey clay at 150 cm)	Eastern part of Lot 22 - on 10 % slope at the outer edge of catchment area to dam recently constructed within unit Dp. Good internal soil drainage.
C	Sm2	Brown loamy earth (grey clay at 55 cm)	Western part of Lot 22 - on 14 % slope beyond outer edge of catchment area to dam. Imperfect internal soil drainage.
D	Sg	Brown loamy earth (with gravel and laterite 'floaters', and grey clay at 90cm)	Western part of Lot 22 - on 3 - 4 % slope below small orchard. Imperfect internal soil drainage.
E	Sm2	Brown loamy earth (with grey clay at 130 cm)	North eastern part of Lot 632 – 17 % slope within catchment area to soakage dam. Imperfect internal soil drainage.
F	Sm4	Pale shallow sand (over weak hardpan -Podzol)	Western part of Lot 632 – 15 % slope. Good internal soil drainage.
1	Sg	Brown loamy earth (with laterite 'floaters' at 60 cm).	Central part of Lot 22 – 5% slope at outer edge of catchment area to dam and beyond a terraced area of fill material). Imperfect internal soil drainage.
2	Sm4	Pale shallow sand (over weak hardpan -Podzol)	North western part of Lot 632 – 15% slope. Good internal soil drainage.
3	Sm3	Shallow yellow brown gravelly sands (over laterite at > 50 cm and then most likely clay.	Northern central part of Lot 632 near existing residence – 12% slope. Moderate internal soil drainage. An intergrade between soils of Sm4 & Sm2.
4	Sm4	Pale shallow sand (over weak hardpan -Podzol)	Southern central part of Lot 632 below existing residence – 13% slope. Moderate internal soil drainage
5	Sm2	Semi wet soil (yellow brown shallow loamy duplex) –	South western corner of Lot 355 below soakage dam. Poor internal soil drainage.

TABLE 3. LAND QUALITIES FOR LAND UNITS

LAND QUALITIES	Sm1	Sm2	Sm3	Sm4	Sm5	Sg	Dp
Water erosion risk (e)	Low	Low	Low	Low	Moderate	Low	Moderate
Wind erosion risk (w)	Low	Low	Low	Low - Moderate	Very Low	Very Low	Very Low
Microbial purification ability (p)	High	Moderate	Moderate	Low - Moderate	Low - Moderate	Moderate	Low-Very Low
Ease of excavation (x)	High	High	Moderate	High	Moderate	Moderate	Moderate
Waterlogging/inundation risk (i)	Very Low	Low	Low	Low	Moderate - High	Low-Moderate	High
Foundation soundness (b)	Good	Good	Good	Good	Fair	Good	Poor
Slope instability risk (c)	Very Low	Very Low	Very Low	Very Low	Low	Very Low	Low
Soil absorption ability(a)	Moderate - High	Moderate	Moderate	High	Low	Moderate	Low
Water pollution risk* - by overland flow(o) - by subsurface drainage (s)	 N/A N/A	 N/A N/A	 N/A N/A	 N/A N/A	 N/A N/A	 N/A N/A	 Low-Moderate Low-Moderate
Nutrient(P) retention ability (n)	High	High	Moderate	Low	Moderate	Moderate	Low

* Water Pollution risk assessed only for land units that form a functional part of the drainage network. N/A means Not Applicable.

2.4 Remnant Vegetation

As shown in the aerial photo background to Figure 2, much of the subject land has been cleared and used for low intensity agricultural activities. The remaining native vegetation is concentrated around;

- the more poorly drained area of land unit Dp,
- the localised areas of rock outcrop in unit Sm5, and
- along the portions of the subject land fringing Mt Shadforth Road.

The original natural vegetation of the study area is broadly described by Churchward et al (1988) as a Karri (*E diversicolor*) - Tingle (*E guilfoylei*) - Marri (*Corymbia calophylla*) tall open forest with an understorey dominated by *Acacia pentadenia, Trymalium floribundum, Hovea elliptica, Pimelea clavata, Chlorilaena quericifolia* and *Bossiaea aquifolia*.

Dense clumps of predominantly *Agonis parviceps* occur within the more poorly drained terrain associated with areas of land unit Dp. A few rows of introduced Walnut trees also occur within the upper portion of the valley slope in the north western portion of Lot 22 adjacent to Mt Shadforth Road, and there is a more recently established small orchard within the central portion of that same lot.

Within the context of future development within this portion of the West Denmark area the remaining vegetation is of value in terms of;

- contributing to scenic amenity
- providing habitat for native fauna
- providing a barrier against wind and water erosion
- reducing waterlogging and stream nutrient build-up (eutrophication)

In recognition of these values further subdivision and development of the subject land should, and can, be achieved without the need to clear any significant areas of remaining vegetation.

2.5 Depth to Groundwater

Council's March 2010 response to the earlier Scheme Amendment request indicates depth to groundwater, specifically the likely maximum winter watertable level, is a matter of potential concern within the subject land in relation to the suitability for onsite effluent disposal systems associated with Special Residential development. Specifically, Council require the capability assessment to include an assessment of the maximum winter groundwater level to ensure there is adequate vertical separation to groundwater for the effective operation of onsite effluent disposal systems.

In accordance with Health Department regulations (Government Printer 1985) leach drains associated with septic tank systems require a minimum of 1.2 m clearance between the base of the leach drain and the highest watertable level. Whilst this clearance can be achieved through the use of partially or fully inverted leach drain systems (i.e. site engineered to enable leach drains to be encompassed within soil fill material added to the natural land surface) under the draft Country Sewerage Policy (Government of Western Australia 1999), a maximum winter watertable level within 50 cm of the natural land surface can preclude the use of that land for onsite effluent disposal irrespective of the type of system proposed. Accordingly, the potential for a maximum winter watertable level to come within 50 cm of the natural land surface is a key issue.

The *South West Hydrological Information Package* (Tille et al 2003) provides an overview of hydrological issues for the south-west of WA and places the subject land within the 'Forested Hills Hydrological Zone' where groundwater resources within fractured rock aquifers and the crystalline granitic/ gneissic geology characteristic of the 'Keystone' soil landscape system are described as 'small' and with groundwater movement 'dominated by local flow systems'. Geological survey work by Muhling and Brakel (1985) also reports that numerous unsuccessful bores have been sunk in the area (southern portion of the Great Plateau) and that most groundwater sources are confined to areas away from the crystalline basement rocks.

Essentially this means, in contrast to low-lying coastal plain terrain, that a regionally extensive and continuous watertable is not present within the hilly terrain at the southern edge of the Great Plateau (and in the vicinity of the subject land) where the landscape is formed by weathering of the underlying crystalline basement rocks. As a result, rather than being a manifestation of a regionally extensive watertable, the surface or near-surface occurrence of wet soil conditions in winter is most commonly a localised expression of temporary perched groundwater or one of four groundwater discharge mechanisms described by Tille et al (2003), these being;

- Discharge over bedrock highs;
- Discharge over dolerite dykes;
- Discharge over shear zones, or
- Break of slope seeps

Perched groundwater occurs when rainfall percolating through the soil profile temporarily sits on top of materials of low permeability such as clays which restrict the downwards flow of water. Whilst this can temporarily inhibit the efficient function of an effluent disposal area, it is not as significant as the occurrence of a regionally extensive watertable – due to the likely extent of the period of waterlogging caused.

In either case, perched groundwater or localised discharge, one of the purposes of a professional evaluation of site and soil conditions as outlined within Australian Standards document AS/NZS 1547:2000 is to enable an informed assessment to be made on site suitability for onsite effluent disposal, including the probability of waterlogging to occur within near surface layers.

Assessment of waterlogging risk is outlined in capability assessment procedures (Wells and King 1989; van Gool et al 2005) and is based on standardised descriptions of morphological properties such as texture, colour and degree of mottling – properties that are observable regardless of the time of year an examination is made.

This risk assessment has been made for each of the mapped land units as shown in Figure 3, with the result that it is concluded that groundwater (saturated soil conditions) should not come within 50 cm of the natural land surface for a significant period of time in any of the land units apart from unit Dp where break of slope seepages occur. Within unit Sm5 (see Appendix A, Pit profile A) the shallow depth of dense mottled clay indicates that temporary perching of groundwater or localised discharge of groundwater over a bedrock high is occurring. Accordingly, if this area is to be used for onsite effluent disposal, it is recommended that an Aerobic Treatment Unit (ATU) be used as an alternative to conventional septic tank and leach drains.

Elsewhere in the subject land, partially inverted leach drains should be used, as utilised for existing residences within the subject land, and appears to be common practice in the West Denmark area.

Not withstanding the assessment of waterlogging risk based on evaluation and mapping of site and soil conditions, a number of piezometer tubes (slotted PVC pipes) were inserted into some of the excavated soil pits ((A,C,D and E) prior to backfilling to enable subsequent examination of watertable levels under mid to late winter conditions. While this information will assist in the determination of the amount and height of soil material required to encompass partially inverted leach drains within various parts of the landscape – it is not considered likely to change the overall assessment of the suitability of the land (apart from areas of unit Dp) for special residential development with onsite effluent disposal.

2.6 Capability Assessment of the Subject Land

2.6.1 Soil landscape assessment approach

Within the soil landscape mapping and landuse assessment discipline ‘land capability’ is a term used to express the ability of land to support a proposed change in use with minimal risk of degradation to its soil and water resources.

For the subject land between Mt Shadforth and Warham Roads, the proposed change in land use is from 'Rural' to unsewered rural residential development under a 'Special Residential' zoning category. This new zoning category for the subject land dictates minimum lot sizes of 5000 m^2 with the primary land use activity with potential to affect soil and water resources being the location and ongoing use of additional residences and their associated onsite effluent disposal systems. If permitted under the new zoning category, a continuation of small-scale rural pursuits, such as grazing of livestock or small areas of orchard or tree crops, does not represent a change in land use and would be incidental to the primary use of the land for residential purposes.

Using the land capability assessment methodology developed by the Department of Agriculture (Wells and King 1989, and more recently van Gool et al 2005) 'land qualities' have been determined (Table 3) and matched against a land use rating tables (for housing and on-site effluent disposal) to determine a capability rating for each of the land units shown over the subject land in Figure 2.

A five class rating system from 'very high' capability (class one) to 'very low' capability (class five) is used. Land of 'very high' capability is considered to have few inherent physical land use limitations and minimal associated risk of land degradation. At the other end of the scale, 'very low' capability land is severely constrained by the inherent soil or landform conditions and there is a high risk of land or water degradation associated with its use.

The assessment results for the subject land in relation to the proposed form of rural residential development are shown in Table 4 overleaf.

TABLE 4. LAND CAPABILITY ASSESSMENT FOR UNSEWERED SPECIAL- RESIDENTIAL DEVELOPMENT

Land Unit	Capability Rating*	Comment
Sm1 (photos 1, 5 and Pit B)	High	Lot 1 and eastern potion of Lot 22. Landform and soils are capable of supporting special -residential development with on-site effluent disposal subject to consideration of appropriate setback requirements from dams. Well drained, nutrient retentive soil although partially inverted leach drains (up to 50 cm pad height) recommended to achieve minimum 1.2 m separation from base of leach drains to highest watertable levels.
Sm2 (photo 9 and Pits C & E)	Fair	Landform and soils are capable of supporting special -residential development with on-site effluent disposal subject to consideration of appropriate setback requirements from dams. Moderately well drained landscape with nutrient retentive soils. Internal subsoil permeability class is 'imperfectly drained' and leach drains need to be installed above the dense clay layer as well as highest watertable levels. This will mean partially inverted leach drains within a soil pad of up to about 1 m depth. Piezometer tubes have been installed in Pits C and E in Lots 22 and 632 respectively to enable determination of maximum winter watertable levels and hence actual pad heights, although conditions at these sites would not be prohibitive (i.e. watertable not within 50 cm of natural surface).
Sm3 (photo 10)	Fair	Landform and soils are capable of supporting special-residential development with on-site effluent disposal subject to consideration of appropriate setback requirements from dams. Minor area within Lot 632 already containing a residence and onsite effluent disposal system. Moderately well drained landscape with moderately nutrient retentive sandy gravel soils. Partially inverted leach drains required to achieve separation from underlying laterite but this unit is sufficiently elevated in landscape to negate concern over a depth to watertable limitation.

Land Unit	Capability Rating*	Comment
Sm4 (photos 11,12 and Pit F)	Fair	Landform and soils are capable of supporting special -residential development with on-site effluent disposal subject to consideration of appropriate setback requirements from dams. Moderately well drained landscape within western and southern portions of Lot 632. Weakly nutrient retentive sandy soils but located well away from seasonal watercourse. Internal subsoil permeability class is 'well drained' and land unit is sufficiently elevated in landscape to negate concern over a depth to watertable limitation.
Sm5 (photo 5 and Pit A)	Fair - Low	Landform and soils are capable of supporting special-residential development with on-site effluent disposal subject to consideration of appropriate setback requirements from dams. Imperfectly drained landscape with nutrient retentive loamy duplex soils and some areas of rock outcrop. Internal subsoil permeability class is 'poorly drained' and leach drains would need to be installed above the dense clay layer (which is within 50 cm of surface) as well as above highest watertable levels. **ATUs recommended for this land unit.** Piezometer tube installed in Pit A to enable determination of level of winter watertable – (likely to be perched).

Land Unit	Capability Rating*	Comment
Sg (photos 1,4,15 and Pit D)	Fair	Landform and soils are capable of supporting special -residential development with on-site effluent disposal subject to consideration of appropriate setback requirements from dams. Similar to land unit Sm2 but on lesser gradient and with scattered areas of subsoil laterite. Moderately well drained landscape with nutrient retentive soils. Internal subsoil permeability class is 'imperfectly drained' and leach drains need to be installed above the dense clay layer as well as highest watertable levels. This will mean partially inverted leach drains within a soil pad of up to about 1 m depth. Piezometer tube installed within Pit D to enable determination of maximum winter watertable level and hence pad height, although conditions at this site would not be prohibitive (i.e. watertable not within 50 cm of natural surface).
Dp (photos13,14,16)	Low	Landform and soils are considered **unsuitable for special-residential development with on-site effluent disposal.** Seasonal watertable levels below natural surface and extent of waterlogging likely to be prohibitive for onsite effluent disposal regardless of type of system. Remnant vegetation or existing dams established over much of these areas.

* Rating for rural-residential development using conventional septic tank and leach drain systems based on consideration of soil and landform factors according to DAFWA land capability assessment methodology (Wells and King 1989, van Gool et at 1998). Note: Setback requirements and conservation value of remnant vegetation are not directly taken into account and must be considered separately.

** If a building envelope is located within 30 m (and more than 6 m) from a dam then use of an ATU should be mandatory and dam precluded from use of water for animal or human consumption. Positioning of effluent disposal irrigation areas should be outside of the catchment to such dams.

2.6.2 Environmental Health Considerations

The capability assessment process for land units mapped in Figure 2 embodies consideration of the public health and environmental protection requirements of the Draft Country Sewerage Policy (Government of Western Australia 1999) in relation to the required vertical separation from seasonal groundwater levels (as discussed in section 2.5). Other setback requires relating to watercourses and dams need to be considered separately

Millars Creek, to the south of the subject land is a seasonally flowing watercourse. The *Draft Country Sewerage Policy* (Govt of WA 1999, with amendments to 2003) prescribes minimum requirements for onsite wastewater disposal including;

- a minimum setback of 30 m from any well, stream or private water supplies intended for consumption by humans; and

- a minimum setback of 6 m from any subsoil drainage system or open drainage channel.

Environmental requirements, cited in Appendix 2 of the Draft Country Sewerage Policy, also support a 30 m minimum in the situation of a seasonally flowing watercourse in an area with loamy nutrient retentive soils.

Field determinations of the exact position of Millars Creek at a number of points, and therefore the position of its 30 m minimum setback, were made using a GPS device and tape measurements. These results indicated that options for the positioning of onsite effluent disposal systems within the subject land would not be restricted by Millars Creek.

In relation to dams within the subject land, the Draft Country Sewerage Policy prescribes no specific setback distance where the use of dam water is not for human consumption, although it might be inferred from the second bullet point above that a 6 m distance is applicable.

In relation to systems other than conventional septic tank systems, the Draft Country Sewerage Policy defers to particular requirements of specific systems. For Aerobic Treatment Units the Department's Code of Practice document (DoH 2001) reiterates a minimum 30 m setback from wells, bores, dams or watercourses used or available for human and animal consumption, and a minimum 6 m setback otherwise.

The Code of Practice is not clearly worded however in relation to application of the 6 m setback and both Local Government and Department of Heath staff commonly defer to the conservative 30 m minimum.

The Shire of Denmark's Town Planning Policy No 37 *Dams and Water Features* requires planning consent for dams constructed within 30m from any on-site effluent disposal system (i.e. enabling site-specific consideration of environmental health issues).

Discussion with the Shire (G Harwood pers comm) indicates a strong preference for any onsite effluent disposal system to be located at a distance greater than 30 m from the direct catchment area to a dam. If this horizontal separation was not possible, and in areas greater than 6 m from a dam, consideration might be given to approval subject to a number measures including;

- mandatory use of ATUs (with preference for those systems having irrigated soil areas for disposal of treated effluent rather than leach drains lined with amended soil, and

- appropriate mechanisms in place to specifically preclude the use of water from a dam for human and or animal consumption, and,

- an engineered solution whereby drainage downslope from an ATU system's irrigated disposal area was intercepted and directed away from the dams, or

- location of an ATU system's irrigated disposal area (but not the whole system) outside of the direct catchment to the dam.

3.0 CONCLUSIONS

3.1 Land Capability and Onsite Effluent Disposal

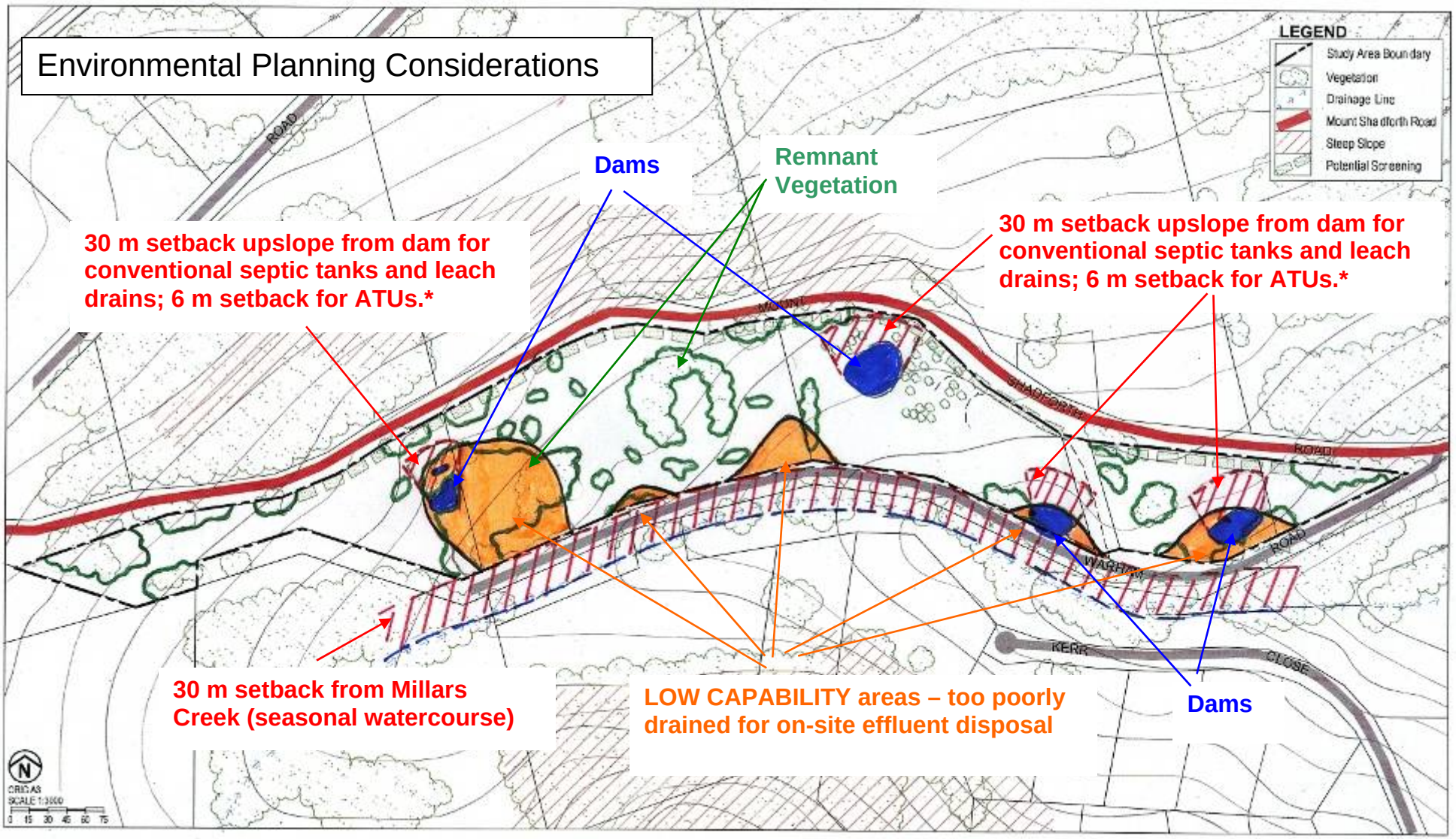
Figure 3 overleaf summarises the key environmental planning considerations relating to the capability assessment of the subject land in the context of the proposal to rezone the land for Special Residential development and with specific attention to the suitability for onsite effluent disposal.

In combination with the land unit mapping (Figure 2) and associated capability ratings table (Table 4), Figure 3 provides a basis from which a subdivision pattern can be developed which enables location of onsite effluent disposal systems on each lot in a manner which avoids the clearly identified low capability areas and takes appropriate consideration of setback requirements from dams.

As predicted in the Shire's Local Planning Strategy, most of subject land is of fair or 'moderate' capability for unsewered rural-residential development. On the basis of site-specific field investigations Figure 2 refines earlier, more broad-scale, mapping of the soil landscape units and more accurately delineates the lower capability areas which need to be avoided in order to satisfy environmental health requirements for onsite effluent disposal. Elsewhere on fair to high capability land, the assessment concludes that maximum winter watertable levels will not come within 50 cm of the natural land surface for any significant period of time, and hence conditions for onsite effluent disposal would not be prohibitive. Not withstanding this, the following comments are made;

- The use of ATU systems should be mandatory within areas of land unit Sm5 and within the 30 m setback capture zones of dams, and

- In accordance with common practice in the West Denmark area, partially inverted leach drains should be used with conventional septic tank systems in order to achieve a 1.2 m vertical separation from the underlying slowly permeable (white) clay layers that occur within the most common soil types and result in temporarily perched groundwater, particularly in lower slope positions, and



- Millars Creek is a seasonally flowing watercourse. The *Draft Country Sewerage Policy* (Gov't of WA, 1999) prescribes a minimum setback of 30 m from any well, stream or private water supplies intended for consumption by humans; and a minimum setback of 6 m from any subsoil drainage system or open drainage channel. No specific setback distance is prescribed for dams where the use of water is not for human consumption.
- For Aerobic Treatment Units the Department's Code of Practice document (DoH 2001) reiterates a minimum 30 m setback from wells, bores, dams or watercourses used or available for human and animal consumption, and a minimum 6 m setback otherwise. The Code of Practice is not clearly worded however in relation to application of the 6 m setback and deference to the conservative 30 m minimum setback is commonly made.
- Setback areas shown above represent direct catchment areas extending up to 30 m from each dam. Where building envelopes are positioned within these areas, it is suggested the use of ATUs be mandatory, irrigated disposal areas are not permitted to drain into the dams and drawing of any water from those dams for human and or animal consumption be specifically precluded.

- The height of soil pads required to encompass partially inverted leach drains is expected to vary with landscape position but range from about 0.5 m to 1.2 m above the existing land surface. The results of perched (winter) groundwater level determinations from piezometers installed at a number of sites within the subject land should assist this design aspect.

3.2 Stormwater Management

Protection against soil erosion is an integral part of the strategy to reduce nutrient additions to natural watercourses and, ultimately, the Wilson Inlet. This is because nutrients, particularly phosphorus, can be bound to soil particles which are subsequently carried into natural drainage systems as suspended sediment within surface runoff. The key to erosion control is effective management of stormwater drainage.

With the exception of land contained within the steeper portions of land unit SM5 and the seepage prone areas within land unit Dp, the study area is not particularly susceptible to soil erosion. Therefore stormwater management measures designed to ensure that post development runoff does not exceed the pre-development situation, are expected to be easily achieved with appropriate engineering advice.

3.3 Landscape Protection along Mt Shadforth Road

Mount Shadforth Road is a significant tourist travel route. The frontage to this road is extensive although tangential views into the property are masked in part by intervening roadside vegetation. Areas where potential additional vegetation cover could be established to increase screening are shown within Figure 3 (Environmental Planning Considerations).

3.4 Protection of Remnant Vegetation

The aerial photo background to Figure 2 shows the extent and location of remaining vegetation cover. This is reiterated in the environmental planning considerations in Figure 3.

Further subdivision and development of the subject land should, and can, be achieved without the need to clear any significant areas. This can be emphasised through the designation of building envelopes within existing cleared areas and a requirement for Council approval for any clearing outside of these areas.

3.5 Protection of Millars Creek

The catchment area for Millars Creek is not used or proclaimed for public drinking water supply purposes. Nevertheless protection of water quality and stream habitat values is important.

For most of its length, Millars Creek is separated from development within the subject land by Warham Road, as well as the physical extent of the vegetated reserve in which it occurs. Photos 7 and 8 illustrate conditions between the subject land and this watercourse with its significantly dense fringing (riparian) vegetation able to act as a filter for any sediment and nutrients contained within any runoff entering the creek.

Not withstanding the buffering effect of the fringing vegetation, all portions of the subject land occur at greater than 30 m from Millars Creek, with this distance being the appropriate minimum setback for effluent disposal systems from a seasonal watercourse. Actual setback distances for additional future onsite effluent disposal systems within the subject land will be greater, and in combination with the loamy nutrient retentive soils (land unit Sg), and appropriate stormwater management measures, will ensure there are no detrimental impacts on Millars Creek arising from the proposed form of development within the adjacent land.

4.0 REFERENCES

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APPENDIX A

SOIL PIT DESCRIPTIONS

Site Number: A 50530848E; 6131699N	**Soil landscape - unit** Keystone brown phase (Sm5)	**Landform:** Saddle between rocky knolls; 12 % gradient.

WA Soil Group: ***Yellow brown shallow loamy duplex***

Depth (cm)	**Description**
0 – 8	Very dark greyish brown (10YR 3/2) **loam,** massive with earthy fabric; clear boundary to
8 – 25	Yellowish brown (10YR 5/4) **light sandy clay loam**; massive with earthy fabric; few sub-rounded medium sized ferruginous gravels; gradual boundary to
25 – 45	Light yellowish brown (2.5Y 6/4) **light clay**; with few distinct orange mottles, moderate polyhedral structure with rough ped fabric; gradual boundary to
45 - 190	Light grey (10YR 7/2) **medium clay**; with common prominent orange and brown mottles, strong polyhedral structure with smooth ped fabric.

Indicative subsoil permeability and drainage class: 0.06 – 0.12 m/day (Poorly drained).

Site Number: B 50530600E; 6131801N	**Soil landscape - unit** Keystone brown phase (Sm1)	**Landform:** Valley side-slope; 10 % gradient.

WA Soil Group: ***Brown loamy earth*** *(over sand and then clay at 150 cm)*

Depth	Description
0 –10cm	Dark brown (10YR 3/3) **sandy loam**; massive with earthy fabric; gradual boundary to;
10 – 25	Dark brown (7.5YR 3/4) **sandy loam**; massive with earthy fabric; clear b'dary to;
25 – 75	Brown (7.5YR 4/4) **light sandy clay loam**; massive with earthy fabric; clear b'dary to;
75 – 100	Light yellowish brown (10YR 6/4) **clayey sand**; apedal with sandy fabric; clear boundary to;
100 -115	Very pale brown (10YR 7/3) **sand;** apedal with sandy fabric; clear boundary to;
115 -130	Brownish yellow (10YR 6/6) **sandy clay loam;** massive, earthy fabric; gradual to;
130-150	Very pale brown (10YR 7/4) **sandy clay loam;** with few faint grey mottles; massive with earthy fabric; gradual boundary to;
150- 180	Light grey (10YR 7/1) **medium clay**; with few faint brown mottles; moderate polyhedral structure with smooth ped fabric

Indicative subsoil permeability and drainage class: 1.4 – 3 m/day (Well drained).

Site Number: C 50530933E; 6131713N	**Soil landscape - unit** Keystone brown phase (Sm2)	**Landform:** Valley side-slope; 14 % gradient

WA Soil Group: ***Brown loamy earth***

Depth	Description
0 –15 cm	Dark brown (7.5YR 3/2) **loam,** moderate crumb structure with rough ped fabric, clear boundary to
15 – 32	Dark reddish brown (5YR 3/3) **sandy clay loam**; weak subangular blocky structure with rough ped fabric; gradual boundary to
32 – 55	Light yellowish brown (10YR 6/4) **clay loam to light clay**; with common medium sized distinct orange mottles; moderate subangular blocky structure with rough ped fabric; clear boundary to
55- 120	Light grey (10YR 7/1) **medium clay**; with common medium sized distinct orange mottles; moderate polyhedral structure with smooth ped fabric.

Indicative subsoil permeability and drainage class:
0.12 – 0.5 m/day (Imperfectly drained).

Site Number: D 50530669E; 6131755N	**Soil landscape - unit** Keystone brown phase (Sg)	**Landform:** Valley side-slope; 3 - 4 % gradient.

WA Soil Group: ***Brown loamy earth*** *(with gravel)*

Depth	Description
0 – 15	Dark brown (10YR 3/3) **loam,** moderate crumb structure with rough ped fabric; gradual boundary to
15 – 25	Brown (7.5YR 4/3) **sandy clay loam**; moderate crumb structure with rough ped fabric; clear boundary to
25 – 50	Strong brown (7.5YR 4/6) **gritty clay loam**; strong subangular blocky structure, rough ped fabric; common subrounded medium ferruginous gravels; gradual to
50- 90	Yellowish brown (10YR 5/8) **light clay**; with few faint orange or red mottles, strong subangular blocky structure, rough ped fabric; few subrounded large ferruginous gravels or lateritic cobbles; (boulders within part of pit); clear boundary to
90-120	Light grey (10YR 7/2) **medium clay**; with common prominent orange mottles, moderate polyhedral structure; smooth ped.

Indicative subsoil permeability and drainage class: 0.12 – 0.5 m/day (Imperfectly drained).

Site Number: E 50530276E; 6131725N	**Soil landscape - unit** Keystone brown phase (Sm2)	**Landform:** Valley side-slope; 17 % gradient.

WA Soil Group: ***Brown loamy earth***

Depth	Description
0–10 cm	Dark brown (10 YR 3/3) **sandy loam,** weak crumb structure with rough ped fabric, gradual boundary to;
10 - 25	Brown (7.5YR 4/4) **light sandy loam**; weak crumb structure with rough ped fabric, clear boundary to:
25 – 50	Yellowish red (5YR 4/6) **sandy clay loam**; weak subangular blocky structure with rough ped fabric; gradual boundary to;
50 – 75	Strong brown (7.5 YR 5/6) **clay loam**; with few faint red mottles, weak subangular blocky structure with rough ped fabric; few medium ferruginous gravels; gradual to;
75–130	Yellowish brown (10YR 5/6) **light to medium clay;** with common disticnct orange and red mottles; moderate subangular blocky structure with rough ped fabric; clear boundary to;
130-150	Light grey (10YR 7/1) **medium clay** with common prominent yellow and red mottles; moderate polyhedral structure; smooth ped.

Indicative subsoil permeability and drainage class: 0.12 – 0.5 m/day (Imperfectly drained).

Site Number: F 50530126E; 6131659N	**Soil landscape - unit** Keystone brown phase (Sm4)	**Landform:** Valley side-slope; 15 % gradient.

WA Soil Group: ***Pale shallow sand*** *(over weak hardpan -Podzol)*

Depth	Description
0– 25cm	Very dark grey (10YR 3/1) **loamy sand**; apedal, sandy fabric; clear boundary to;
25– 45	Light grey (10YR 7/2) **sand**; apedal, sandy fabric; gradual boundary to;
45 - 60	Pale brown (10YR 6/3) **clayey sand,** massive with earthy fabric; gradual boundary to;
60 - 100	Dark yellowish brown (10YR 4/4) **light sandy clay loam**; weakly cemented hardpan; massive with earthy fabric; gradual boundary to;
100-125	Dark yellowish brown (10YR 3/4) **sandy clay loam**; weakly cemented hardpan; massive with earthy fabric; abrupt boundary to competent laterite.

Indicative subsoil permeability and drainage class: 1.4 – 3 m/day (Well drained).

Soils, Environmental Planning, Natural Resources
Management Consultants
ABN No. 30 759 556 427

9 November 2010

Mr Gregg Harwood
Director of Community & Regulatory Services
Shire of Denmark
P.O. Box 183
DENMARK WA 6333

Dear Gregg

RE: LAND CAPABILITY ASSESSMENT - MT SHADFORTH-WARHAM RD AREA - SUPPLEMENTARY DATA

As you may remember in June of this year we undertook a joint inspection of soil pits evcavated within various lots off Mt Shadforth Road for the purpose of assessing land capability for on-site effluent disposal. This work was conducted in relation to a Scheme Amendment request through Ayton Baesjou Planning.

As part of that field assessment a number of peizometer tubes were installed to enable a subsequent likely seasonally high watertable levels to be determined. I have recently received the results of those measurements from the landholder and present them here as a supplement to our earlier report.

I understand that as a result of various other planning issues that have had to be addressed, you may have not yet received a copy of our original report through the normal planning referral process. Accordingly, I have also attached here a copy of that earlier document.

The peizometer results from the landholder (Mr Stuart Young) are as follows;

"*The following info is the depth to the water table at the 4 sites on our block(s). The dates of the readings were October 13th and then again on October 26th. There had been 22 mm of rain at our place in the 10 days prior to the first reading and a further 22.5 mm in the 4 days prior to the second check. (unofficial readings from our own rain gauge). The reading is from the top of the pipe to the water level - Martin has the measurement of the height of the pipe above the ground*."

Suite 5, 27 York Street - P.O. Box 117 SUBIACO WA 6008
Telephone: (08) 9388 2427 Web www.landassessment.com.au Email: landass@iinet.net.au

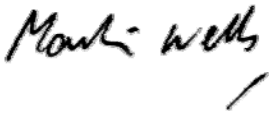
Site No (refer Figure 2 and Appendix A of June report)	**Peizometer 'Stick up' height**	**Oct 13 Depth to water reading**	**Depth from surface**	**Oct 26 Depth to water reading**	**Depth from surface**
Site A.		No water in hole		No water in hole	
Site C.	95 cm	148 cm	53 cm	149 cm	54 cm
Site D.	79 cm	181.5 cm	102.5 cm	184 cm	105 cm
Site E.	47 cm	172.5 cm	125.5 cm	173 cm	126 cm

The recorded depths (adjusted for peizometer 'stick up') support the predictions in the June 2010 report (No 1013) that seasonally high water levels should not come within 50 cm of the natural land surface and hence site conditions, although requiring fill material, are not prohibitive for effluent disposal using either inverted leach drain systems or alternative treatment systems.

It is noted that the clearance at Site C is by only a narrow margin. Given the landscape position and soil profile observation (see Appendix A of report) this result is interpreted as likely to be due to localised perching of infiltrating rainwater over the slowly permeable deeper white subsoil clay, rather than a manifestation of a longer-term regional watertable level.

At the other sites the results suggest the 50 cm criteria can be comfortably met

Yours faithfully

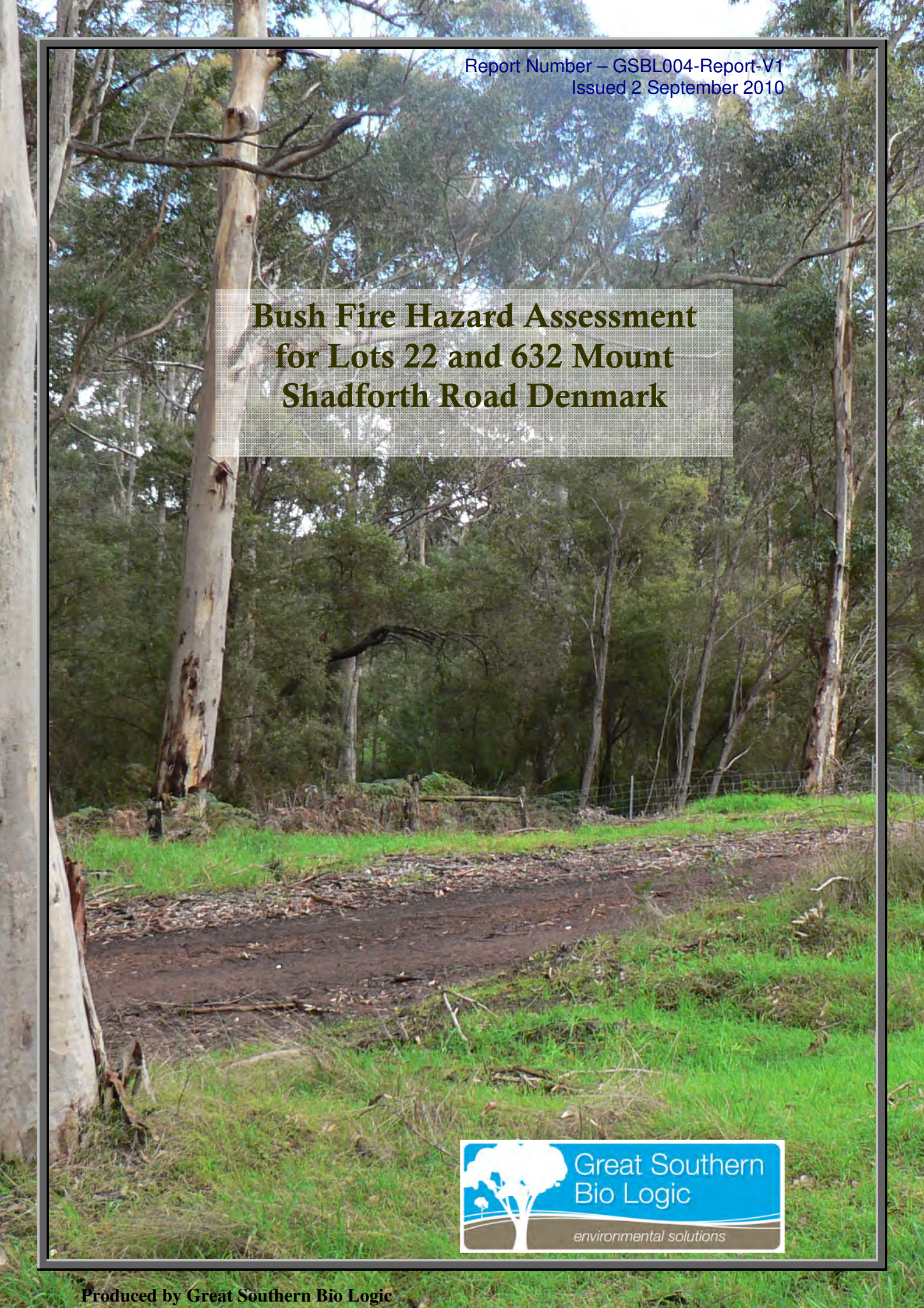


MARTIN WELLS
Principal Consultant
Land Assessment Pty Ltd

APPENDIX B

Bush Fire Hazard Assessment

Great Southern Bio Logic
September 2010



Report Number – GSBL004-Report-V1
Issued 2 September 2010

Bush Fire Hazard Assessment for Lots 22 and 632 Mount Shadforth Road Denmark

Great Southern Bio Logic
environmental solutions

Produced by Great Southern Bio Logic

Great Southern Bio Logic

environmental solutions

Bush Fire Hazard Assessment

Lots 22 and 632 Mount Shadforth Road Denmark

Prepared for:
Ayton Baesjou Planning
11 Duke Street
ALBANY WA 6330

Report Date: 3 September 2010

Project Ref: GSBL004-Report-V1

Written and Submitted By

Jeremy Spencer
Senior Environmental Scientist

RECORD OF DISTRIBUTION

No. of copies	Report File Name	Report Status	Date	Prepared for:	Initials
1	GSBL004-report-V1	V1	3 September 2010	Ayton Baesjou Planning	JS
2	GSBL004-report-V1	V1	3 September 2010	Stuart Young	JS
3	GSBL004-report-V1	V1	3 September 2010	Great Southern Bio Logic	JS

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LIST OF ATTACHMENTS

Tables

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1 INTRODUCTION

Lots 22 and 632 Mount Shadforth Road, Denmark are included in a current Scheme Amendment Request with a view to rezone to Special Residential. This concept of Special Residential zoning with a minimum size of 5000m^2 has been supported by the Shire of Denmark. As a part of the assessment to determine the suitability of this re-zoning, a fire hazard assessment in accordance with the Planning for Bushfire Protection Guidelines (WAPC et al, 2010) is required. The bushfire hazard assessment is required to inform the Subdivision Guide Plan and determine suitable locations for building envelopes within the proposed lots.

Both Lots are located on the southern side of Mount Shadforth Road approximately 2km to the north west of the Denmark CBD (see Figure 1).

1.1 Site Characteristics

Both lots lie to the South of Mount Shadforth Road and are separated by Lot 355 which is included in the rezoning application but was not incorporated in the formal bushfire hazard assessment. Both properties have a southerly aspect with slopes varying between five and ten degrees. Warham Rd, a small gravel, road lies to the south of Lot 22 but terminates east of Lot 632 with the uncleared road reserve continuing to the south of Lot 632.

To the south of Warham Rd is an un-named creek in Reserve 45845. The creek consists of dense vegetation dominated by *Taxandria parviceps* and numerous *Melaleuca* species under fringing *Eucalyptus diversicolor* (Karri) and *E.guilfoylei* (Yellow Tingle). The head of the creek lies to the south of Lot 632 and it flows in an easterly direction.

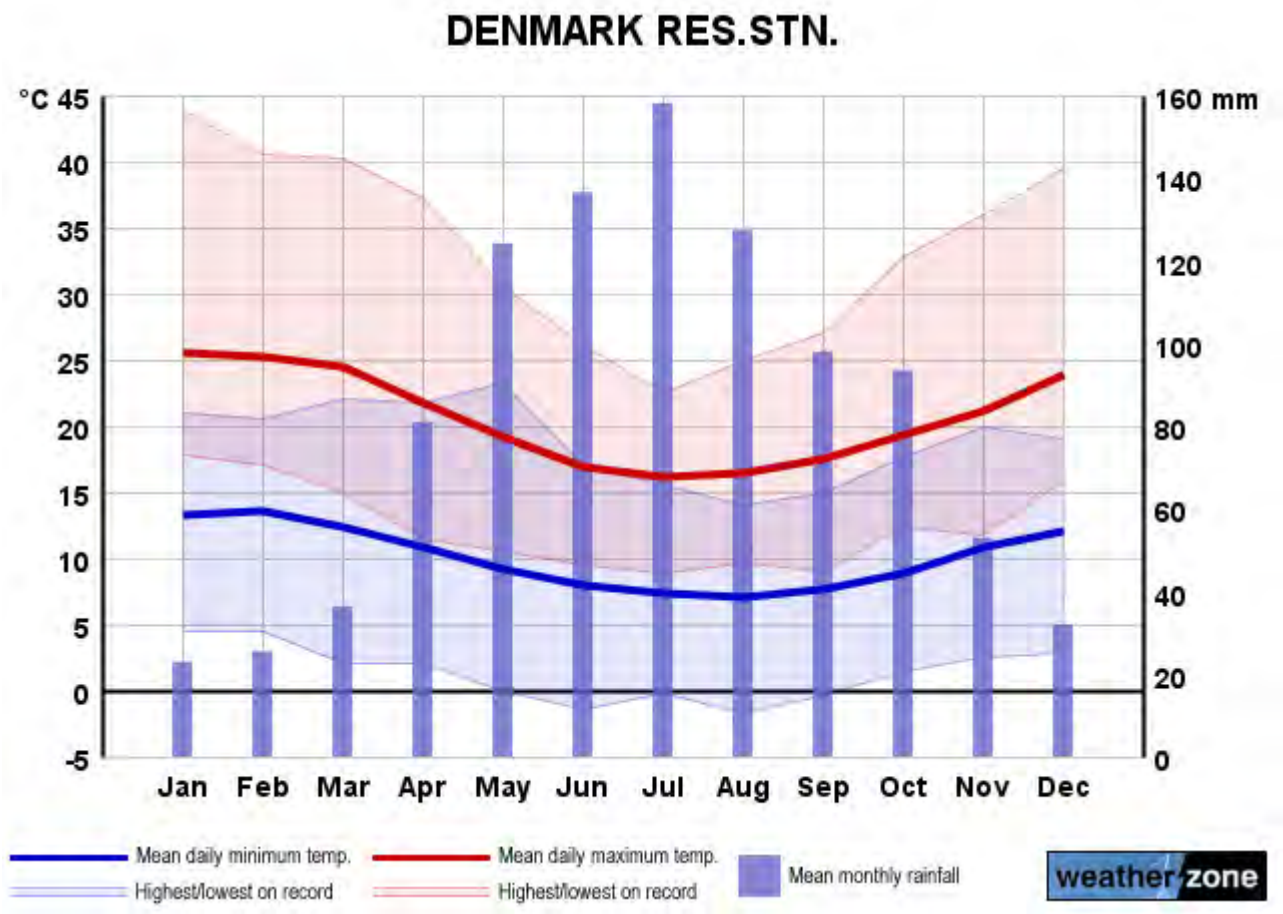
As shown in Figure 2, Lot 22 is divided into two sections along a north/south axis by a partially formed road reserve. The entire lot is predominantly cleared with one area of parkland cleared Karri and Tingle in the eastern section. There is some dense native vegetation that has been modified as a native garden to the north of the existing house, and an area of native forest in the Mt Shadforth Road Reserve to the North of the road reserve that divides the block. In the North western portion of the lot there is an orchard of large mature Walnut trees over cleared paddock grasses. Lot 632 consists of a central cleared area that is surrounded by dense remnant vegetation, being wetland/creek species to the east, with Karri forest to the west.

The land to the north is upslope of both lots. Vegetation to the North of Lot 22 is predominantly cleared with some remnant forest trees. Vegetation to the north of Lot 632 is dense Karri forest.

1.2 Climate

The nearest meteorological station is located at the Denmark research centre approximately 5km to the south east. A summary on data from this station is presented below (weatherzone, 2010).

Demarks climate is characterised by a warm dry summer and cool wet winter. On average there is over 1mm of rainfall every month with maximum rainfall usually in July.



1.3 Objectives

The objectives of the bush fire hazard assessment are to:

- Determine the appropriate bush fire hazard ratings for the subject land in accordance with Planning for Bushfire Protection Guidelines (WAPC et al, 2010);
- Use the results of the bush fire hazard assessment to identify suitable locations for building envelopes and determine appropriate construction standards for the buildings within the envelopes.

1.4 Scope of Works

Great Southern Bio Logic has consulted with planning officers from the Shire of Denmark. The required scope of works to achieve the above objectives can be performed in a two stage assessment:

- **Stage one** to involve a desktop assessment and site visit to determine vegetation classes within the area and to calculate the associated bush fire hazard ratings for these areas. The stage one assessment will include production of a bush fire hazard level map of the two lots.
- **Stage two** to analyse the information from stage one and apply prescribed vegetation setbacks and allowance for slope. Completion of stage two will allow for the identification of suitable locations for building envelopes compliant with Planning for Bush Fire Protection and Australian Standard (AS) 3959.

2 METHOD

The bush fire hazard assessment was performed with reference to the Planning for Bush Fire Protection Guidelines (WAPC et al, 2010). A two stage approach was undertaken involving an initial desktop assessment followed by a site visit.

2.1 Desktop Assessment

The desktop assessment was undertaken using aerial photography and design figures supplied by Ayton Baesjou Planning. A 100m buffer was applied to the area subject to the scheme amendment request and these combined areas have been considered as the subject land.

- Average slopes were determined using contour data from the supplied Figures. Slope calculations identified slopes as a percentage ratio which was converted to degrees using an inverse Tan conversion formula.
- Desk top assessments of vegetation types, condition and extent were undertaken using the provided aerial photography. Vegetation hazard ratings were applied as per the Planning for Bush Fire Protection Guidelines (WAPC et al, 2010).

2.2 Site Visit

Great Southern Bio Logic visited the subject land, gaining access to Lots 22 and 632 on Friday August 13, 2010. Assessments of vegetation were ground truthed and photographic evidence n and associated field notes were made to support and refine the results of the desktop assessment.

2.3 Bush Fire Hazard Rating and Associated Building Envelope Locations

The Planning for Bush Fire Protection Guidelines (WAPC et al, 2010) and AS 3959 were applied to the results of the desktop assessment and site visit to determine minimum setbacks from building envelopes and relevant construction standards.

NB: A Vegetation Hazard Rating defines vegetation types only. This is separate to an area's Hazard Level Rating, which is defined by assessing a range of performance criteria including location, access, water, siting and design.

3 ASSESSMENT CRITERIA

The document Planning for Bushfire Protection Guidelines (WAPC et al, 2010) defines three bushfire hazard levels for strategic planning. These are low, moderate and high.

- Areas of low fire hazard do not require specific bush fire planning controls.
- Areas of moderate fire hazard are required to meet five performance criteria that address location, vehicle access, water, siting of development and design of the development.
- Areas of high hazard do not meet the performance criteria defined for moderate hazard. Development should be avoided in areas of high fire hazard.

The performance criteria for areas with a moderate fire hazard rating define a requirement of a building protection zone and hazard separation zone to surround each building envelope. The building protection zone must be within the lot boundaries containing the building envelope and also extend a minimum distance of 20m surrounding that envelope. It is required to be maintained to the following specifications:

- Fuel loads must be maintained below 2 t/ha;
- Must be fully contained within the lot boundaries;
- Trees to have crowns a minimum of 10m apart, limbs are not to overhang the building, no dead material within the crown or on the bole.and limbs to be low pruned to a minimum of 2m;
- Shrubs to be free from dead material and not planted in clumps closer than 3m, or as individuals 2m from the building; and
- All sheds and fences to be constructed of fire resistant material.

The hazard separation zone must be contained within the lot boundaries and is to extend from the perimeter of the building protection zone for a minimum distance of 80m. It must be maintained to the following specifications:

- Fuels loads to be maintained below 15 t/ha for Karri dominated forest; and
- Tree crowns to be a minimum of 10m apart with no dead material within the crown or on the bole.

The performance criteria also address the need for suitable onsite water that can comprise of on-site dams with a minimum capacity of 200m^3 for every 25 lots during the driest time of the year. These dams are to be vested with the Shire of Denmark or have a caveat placed upon them to ensure fire service access. The additional performance criteria are to be addressed in the design of the development.

Further, in areas where land has been designated by a relevant authority such as local government as being subject, or likely to be subject, to bush fires AS 3959 is to be enforced.

AS 3959 defines minimum setbacks from vegetation with increasing construction standards applied as the vegetation setbacks are reduced.

The minimum setbacks from vegetation are described as Bush Fire Attack Levels (BAL), which are a measure of heat flux that a building is likely to be exposed to, measured in kW/m^3. The BAL and associated minimum setbacks are defined in AS 3959 and is also included in Planning for Bushfire Protection Guidelines (WAPC et al, 2010). This table is included as Appendix A.

It is understood that the subject land is within an area that has been designated by the Shire of Denmark as being likely to be subject to bushfire (pers comm, Shire of Denmark, 2010).

4 RESULTS AND DISCUSSION

4.1 Vegetation Classification

The predominant vegetation within the subject land was tall Karri forest however there were also areas of creek and wetland vegetation, garden and cleared land. Figure 2 shows the vegetation classifications across the subject land, determined using relevant tables and figures within Planning for Bushfire Protection Guidelines (WAPC et al, 2010). The relevant tables and figures are attached as Appendix B of this report.

The vegetation classifications and a summary of the associated information is presented in Figure 2 and Table 1 below.

Vegetation Type	Vegetation Classification	Hazard Rating	Location
Karri Forest	Forest	Extreme	Mt Shadforth Rd reserve, Warham Rd reserve, Reserve 45845, Lots 1, 632, 631 and 356 (Nth Lot 632)
Taxandria/Melaleuca swamp and creek head	Scrub	Extreme	Lots 355 & 632 and Res 45845
Modified Native Vegetation Garden	Woodland	Extreme	Lot 22
Cleared land (with some trees and shrubs)	Grassland	Low	Lots 1, 22, 355 & 632

Table 1 – Vegetation Classifications and associated Hazard Rating

Notes: Original source of Vegetation Classifications is AS 3959 and Hazard Ratings are sourced from Planning for Bush Fire Guidelines.

These vegetation classifications and associated hazard ratings are based on visual observations made from aerial photography and during the site visit. They assume that the properties will be maintained to conform to the Shire of Denmark Fire Regulations Notice and that appropriate fire breaks and cleared areas will be maintained. A visual record of the vegetation on the day of the site visit are provided in Appendix C.

4.2 Slope

Slope calculations along selected transects as shown in Figure 2 were completed using contour information on the provided Figures. Slopes across the subject land ranged from four degrees along the creek in Reserve 45845 to nine degrees in both Lots 22 and 632. A summary of the slopes across the site is provided in Table 2 below.

Location	Slope in degrees
Lot 362 west	9
Lot 362 east	6
Lot 355	8
Lot 22 west	6
Lot 22 east	9
Head of creek	5
Main creek (Res 45845)	4

Table 2 – Subject land slopes in degrees

While areas to the north of the subject land have greater slope, these areas are considered to have a neutral slope value of 0 degrees for the purpose of this assessment because fire risk is reduced through slower rates of spread down slope (WAPC et al, 2010).

4.3 Application of the Assessment Criteria

Application of the assessment criteria to Lots 22 and 362 Mount Shadforth Road indicates that the entire area of subject land does not meet the criteria for moderate bush fire hazard rating. The width of the properties do not allow sufficient separation distances between the surrounding extreme fire hazard rated vegetation and the location of any building envelopes.

Application of the BAL setbacks to vegetation provided in AS 3959 and Appendix A identifies suitable areas that would support building envelopes on both properties. Due to the proximity of vegetation with extreme fire hazard to these areas, the construction of any buildings would require specific construction standards as defined by AS 3959. Figure 3 shows the appropriate setbacks for the relevant bushfire attack levels. Building envelopes subject to the corresponding construction specifications can be situated within these setbacks.

Depending on the location of the building envelopes, the entire area of Lot 22 is suitable for buildings with construction specifications associated with BAL19 through to BAL FZ. There may a requirement for the removal of a small number of trees from the eastern portion of Lot 22 to meet the conditions of a suitable building protection zone. This would require application to the Department of Environment and Conservation requesting the appropriate approvals to clear.

Due to the proximity of existing vegetation with an extreme fire hazard in Lot 632, it is only possible to place a building envelope that would be subject to construction specifications associated with BAL 29 through to BAL FZ in the eastern portion of the lot.

In the western portion of Lot 632, it would only possible to place a building envelope with construction specifications associated with BAL FZ because of the proximity of existing vegetation with an extreme fire hazard and the linear nature of that Lot.

It is important to note that FZ stands for Flame Zone and any building constructed in this zone is likely to be exposed to direct flame attack in a bush fire event. Construction to the appropriate specifications for BAL FZ will improve the chances of a building surviving this level of attack, but is not a guarantee that the building or occupants taking shelter in the building would survive. Construction of residential buildings in this zone is not recommended.

It may be possible to alter the vegetation on Lot 632 to enable the placement of building envelopes with lower BAL's on Lot 632. Such alterations would require the removal of understorey vegetation and some of the large trees. This would require application to the Department of Environment and Conservation requesting the appropriate approvals to clear. Due to the proximity of vegetation with an extreme fire hazard outside the property boundary, it would only be possible to place a building envelope with a minimum BAL of BAL 29 on the western portion, should the appropriate clearing be approved.

4.4 Water

There are three dams situated on Lot 22. While detailed volume calculations have not been performed on these dams it is estimated that the combined volume of water is in excess of 1500m^3 based on an assumed average depth of 1.5m with maximum depths in excess of 3m. It is understood that these dams are fed from localised sub surface drainage and remain at a constant level year round despite losses from seepage and evaporation.

There is an additional dam on Lot 632 that is estimated to hold approximately 600m^3 with an assumed average depth of 1.5m. It is understood that this dam is also fed from localised sub surface drainage and remains at a constant level year round despite losses from seepage and evaporation.

The performance criteria presented in Section 3 defines the minimum water requirements which include on site dams with a minimum capacity of 200m^3 per 25 lots. Based on the conservative estimate of 2100m^3 held within all the existing onsite dams year round, there is sufficient water available to satisfy this requirement.

5 SUMMARY

Great Southern Bio Logic conducted a desktop bush fire hazard assessment of Lots 22 and 632 Mount Shadforth Rd, Denmark. The results of the desktop assessment were verified during a field visit to the site on the 13th of August 2010 during which time photographic records of current vegetation were collected.

The information collected during the desktop assessment and field visit were subject to the criteria presented in Planning for Bushfire Protection Guidelines (WAPC et al, 2010) including AS 3959. The results showed:

The dominant Karri forest vegetation with an intact understorey has an extreme fire hazard;

- The creek line and swamp vegetation to the south of the properties and on lots 632 and 355 have an extreme fire hazard;
- Areas of native garden have a moderate fire hazard;
- Cleared and maintained areas have a low fire hazard;
- The slope across the properties varies from 6 degrees to 9 degrees; and
- The slope in the creek to the south is approximately 4 degrees.

The Planning for Bushfire Protection Guidelines (WAPC et al, 2010) define five performance criteria that must be satisfied in order for an area to be classified as either low or moderate fire hazard. These criteria include a minimum setback from extreme fire hazard vegetation of 100m which comprises a 20m building protection zone and an 80m hazard separation zone. If an area cannot meet this minimum setback then the setback can be reduced with the application of increased fire resistance building standards as defined in AS 3959.

There are no areas within the subject land that allow the minimum setback from vegetation of 100m so the criteria from AS 3959 have been applied.

- Depending on the location of the building envelopes, the entire area of Lot 22 is suitable for buildings with construction specifications associated with BAL19 through to BAL FZ.
- Due to the proximity of existing vegetation with an extreme fire hazard in Lot 632, it is only possible to place a building envelope that would be subject to construction specifications associated with BAL 29 through to BAL FZ in the eastern portion of the lot.
- In the western portion of Lot 632, it would only possible to place a building envelope with construction specifications associated with BAL FZ because of the proximity of existing vegetation with an extreme fire hazard and the linear nature of that Lot.
- It may be possible to alter the vegetation on Lot 632 to reduce the potential exposure to bush fire and accordingly apply lesser building standards however relevant permits and approvals would be required.

- There are a total of four dams across the two properties with a combined volume of 2100m^3 and anecdotal evidence is that these dams hold water all year. This volume satisfies the minimum water requirements of 200m^3 per 25 lots to service the proposed subdivision.

.

6 REFERENCES

Standards Australia 2009: *AS 3959 Construction of Buildings in Bush Fire Prone Areas*, Standards Australia 2009

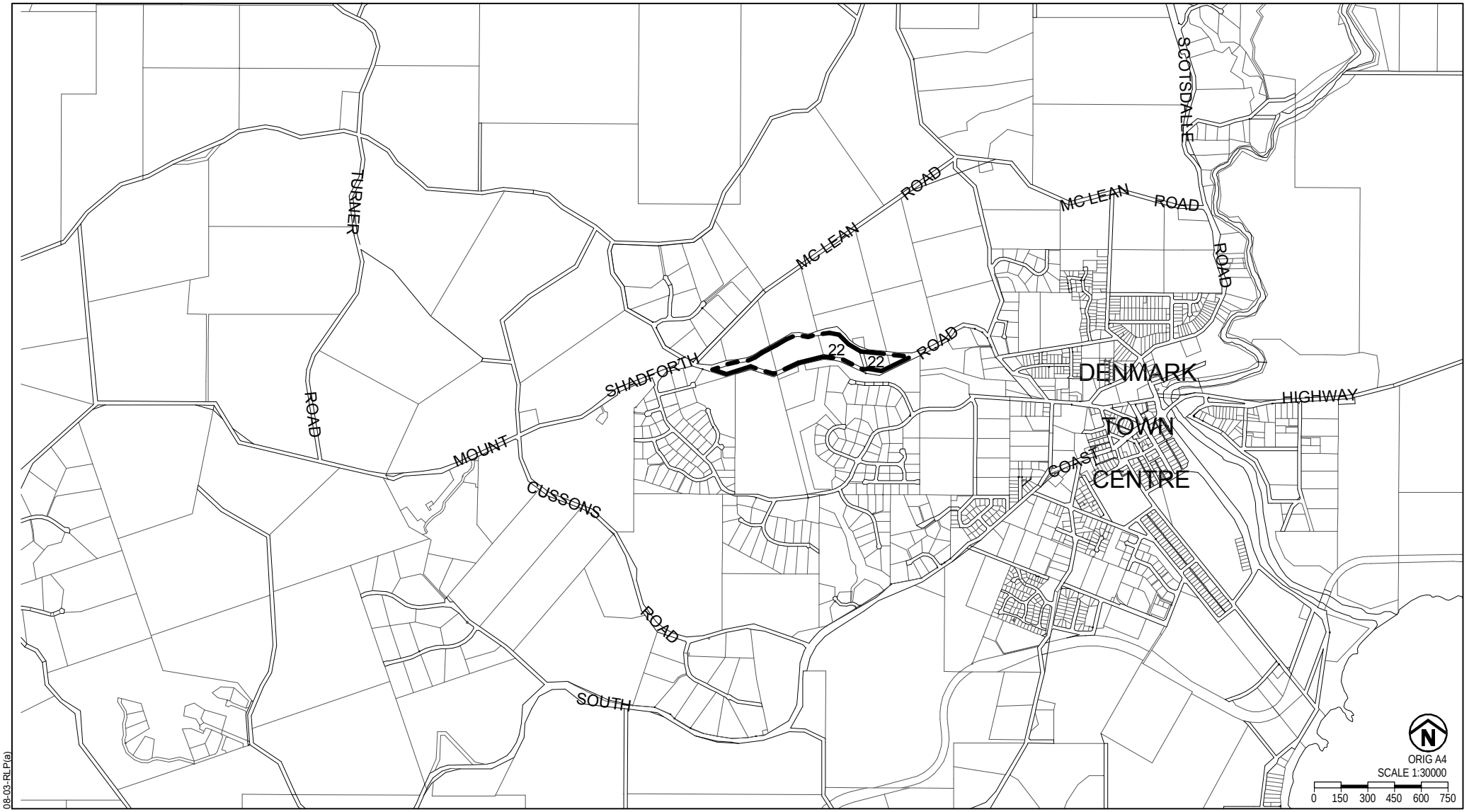
WAPC, FESA and Department of Planning 2010: *Planning for Bushfire Protection Guidelines*, WAPC and FESA May 2010

Weatherzone: http://www.weatherzone.com.au/climate/station.jsp?lt=site&lc=9637

Figures

Bush Fire Hazard Assessment

Lots 22 and 632, Mt Shadforth Road, Denmark



08-03-RLP(a)

REGIONAL LOCATION PLAN

Lot 22 Mount Shadforth Road
and Surrounds
Shadforth, Shire of Denmark

Figure 1

AYTON BAESJOU
PLANNING
11 Duke Street
Albany WA 6330
Ph 9842 2304 Fax 9842 8494

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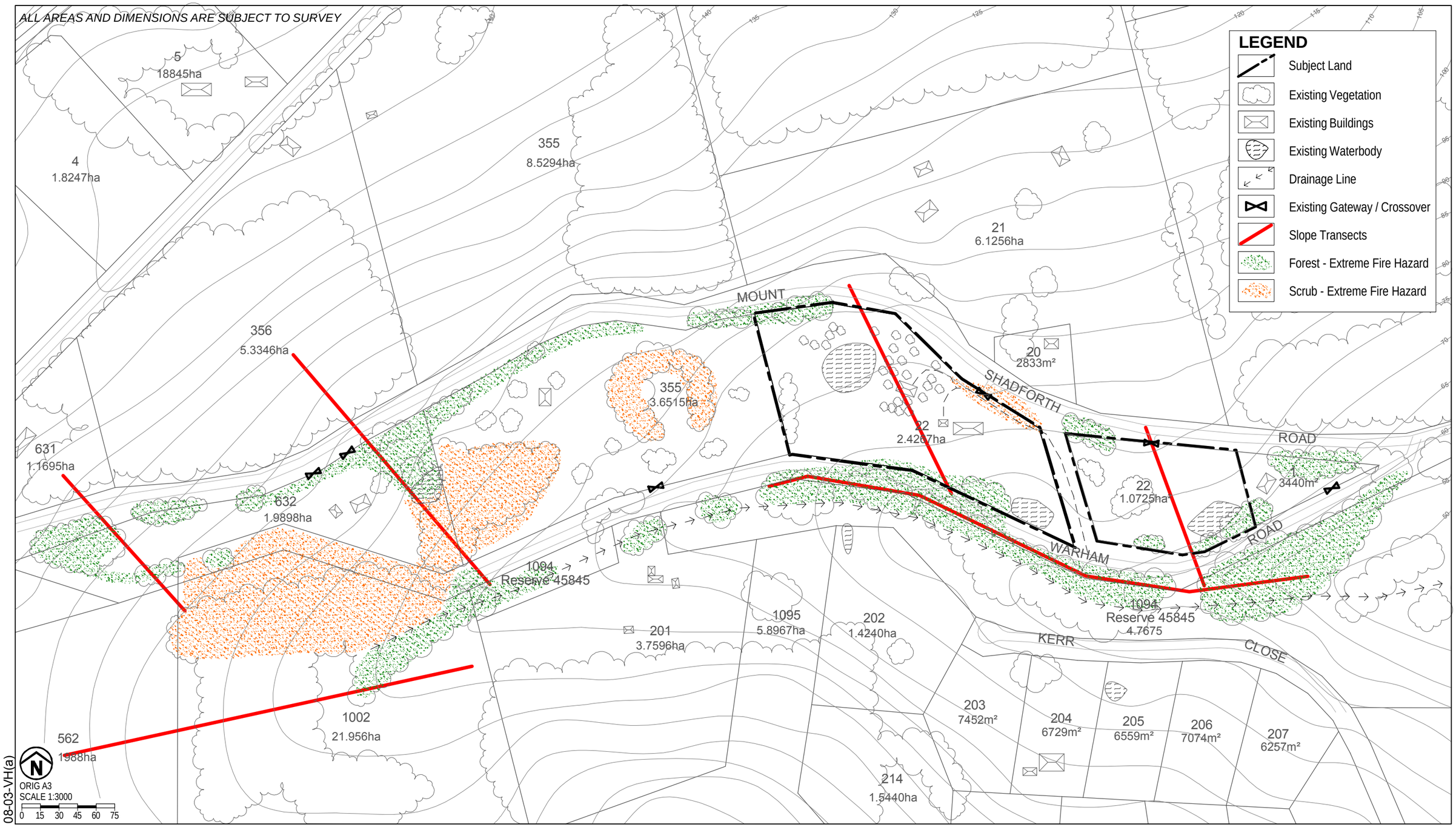
ALL AREAS AND DIMENSIONS ARE SUBJECT TO SURVEY



08-03-VH(a)

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VEGETATION HAZARD PLAN AND SLOPE TRANSECTS

Lot 22 Mount Shadforth Road
Shadforth, Shire of Denmark

Figure 2

ALL AREAS AND DIMENSIONS ARE SUBJECT TO SURVEY

LEGEND

- Subject Land
- Existing Vegetation
- Existing Buildings
- Existing Waterbody
- Drainage Line
- Existing Gateway / Crossover
- Forest - Extreme Fire Hazard
- Scrub - Extreme Fire Hazard
- BAL 19
- BAL 29
- BAL 40 & BAL FZ

5
18845ha

4
1.8247ha

355
8.5294ha

21
6.1256ha

356
5.3346ha

355
3.6515ha

20
2833m²

MOUNT SHADFORTH ROAD

22
2.4267ha

22
1.0725ha²

1
3440m²

631
1.1695ha

632
1.9898ha

1094
Reserve 45845

WARHAM ROAD

1094
Reserve 45845
4.7675

1095
5.8967ha

202
1.4240ha

201
3.7596ha

KERR CLOSE

203
7452m²

204
6729m²

205
6559m²

206
7074m²

207
6257m²

1002
21.956ha

214
1.5440ha

562
1988ha

ORIG A3
SCALE 1:3000
0 15 30 45 60 75

08-03-BFAS(b)

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REQUIRED BUSH FIRE ATTACK SETBACKS

Lot 22 Mount Shadforth Road
Shadforth, Shire of Denmark

Figure 3

Appendix A
Determination of Bush Fire Attack Levels

Bush Fire Hazard Assessment

Lots 22 and 632, Mt Shadforth Road, Denmark

Table: 2 Determination of bush fire attack level (BAL)

Vegetation classification	Bush fire Attack Levels (BALs)				
	BAL—FZ	BAL—40	BAL—29	BAL—19	BAL—12.5
	Distance (m) of the site from the predominant vegetation class				
	Vegetation is upslope and flat land (0 degrees)				
A. Forest	<16	16–<21	21–<31	31–<42	42–<100
B. Woodland	<10	10–<14	14–<20	20–<29	29–<100
C. Shrubland	<10	10–<13	13–<19	19–<27	27–<100
D. Scrub	<7	7–<9	9–<13	13–<19	19–<100
E. Mallee/Mulga	<6	6–<8	8–<12	12–<17	17–<100
F. Rainforest	<6	6–<9	9–<13	13–<19	19–<100
	Vegetation is downslope (building is upslope) >0 to 5 degrees				
A. Forest	<20	20–<27	27–<37	37–<50	50–<100
B. Woodland	<13	13–<17	17–<25	25–<35	35–<100
C. Shrubland	<11	11–<15	15–<22	22–<31	31–<100
D. Scrub	<7	7–<10	10–<15	15–<22	22–<100
E. Mallee/Mulga	<7	7–<9	9–<13	13–<20	20–<100
F. Rainforest	<8	8–<11	11–<17	17–<24	24–<100
	Vegetation is downslope (building is upslope) >5 to 10 degrees				
A. Forest	<26	26–<33	33–<46	46–<61	61–<100
B. Woodland	<16	16–<22	22–<31	31–<43	43–<100
C. Shrubland	<12	12–<17	17–<24	24–<35	35–<100
D. Scrub	<8	8–<11	11–<17	17–<25	25–<100
E. Mallee/Mulga	<7	7–<10	10–<15	15–<23	23–<100
F. Rainforest	<11	11–<15	15–<22	22–<31	31–<100
	Vegetation is downslope (building is upslope) >10 to 15 degrees				
A. Forest	<33	33–<42	42–<56	56–<73	73–<100
B. Woodland	<21	21–<28	28–<39	39–<53	53–<100
C. Shrubland	<14	14–<19	19–<28	28–<39	39–<100
D. Scrub	<9	9–<13	13–<19	19–<28	28–<100
E. Mallee/Mulga	<8	8–<11	11–<18	18–<26	26–<100
F. Rainforest	<14	14–<19	19–<28	28–<39	39–<100
	Downslope >15 to 20 degrees				
A. Forest	<42	42–<52	52–<68	68–<87	87–<100
B. Woodland	<27	27–<35	35–<48	48–<64	64–<100
C. Shrubland	<15	15–<21	21–<31	31–<43	43–<100
D. Scrub	<10	10–<15	15–<22	22–<31	31–<100
E. Mallee/Mulga	<9	9–<13	13–<20	20–<29	29–<100
F. Rainforest	<18	18–<25	25–<36	36–<48	48–<100

Notes:

1. Siting of residential development in the BAL-FZ and BAL-40 zone is not recommended.

2. The separation distances in the table align with the tables within AS 3959.

Source: "AS 3959 - 2009 Construction of buildings in bushfire-prone areas" published by Standards Australia, Sydney.

Appendix B
Vegetation Type and Class Descriptions

Bush Fire Hazard Assessment

Lots 22 and 632, Mt Shadforth Road, Denmark

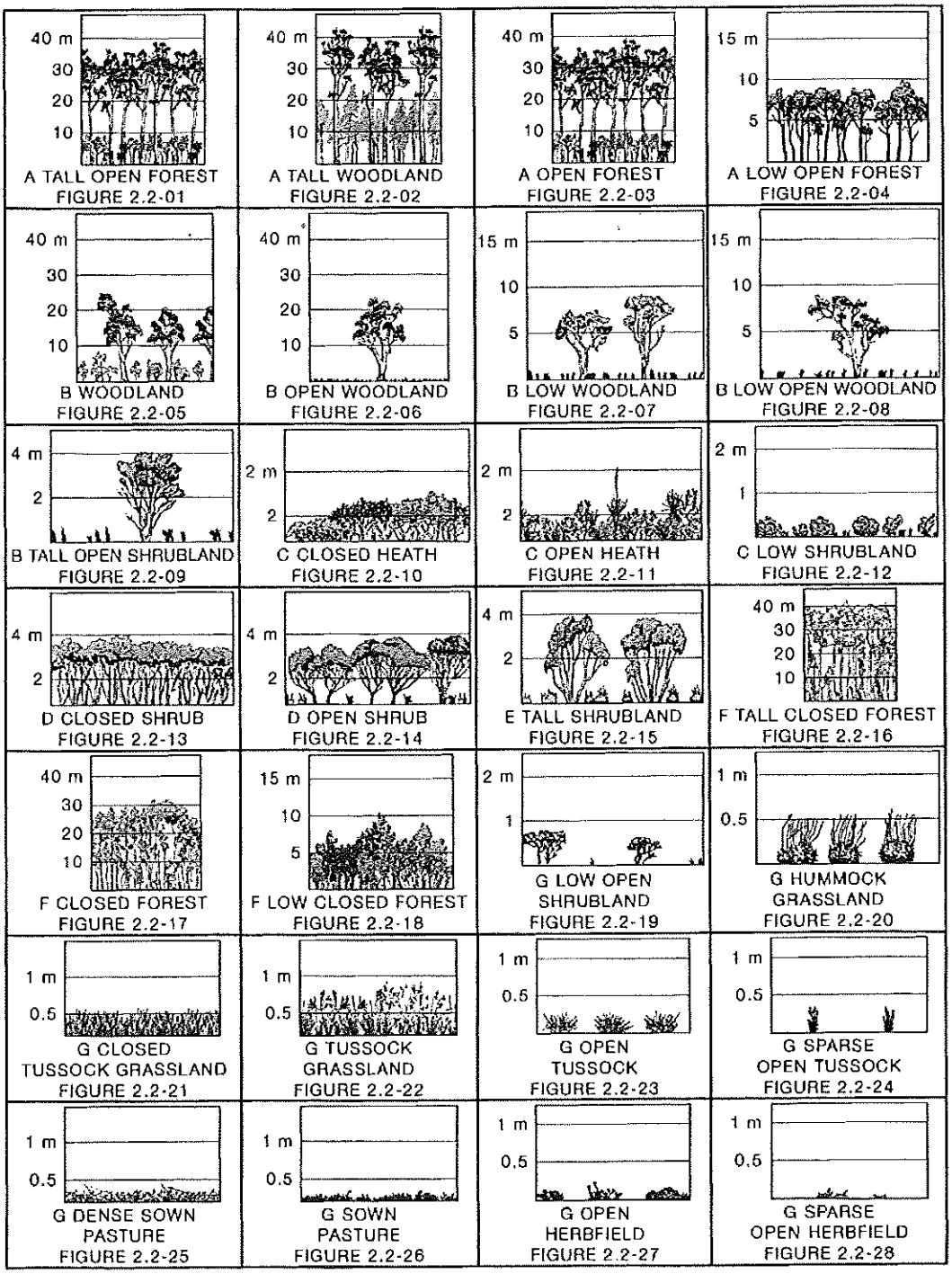
Table 1: Vegetation type and class (text description)

Vegetation classification (See tables 2.4.1 – 2.4.4)	Vegetation Type	Figure No. in Fig 1	Description
A Forest	Tall open forest Tall woodland	01 02	Trees over 30 metres high; 30-70% foliage cover; (may include understorey ranging from rainforest and tree ferns to low trees and tall shrubs). Found in areas of high reliable rainfall. Typically dominated by eucalypts.
	Open forest Low open forest	03 04	Trees 10-30 metres high; 30-70% foliage cover; (may include understorey of sclerophyllous low trees and tall scrubs or grass). Typically dominated by eucalypts.
	Pine Plantation	Not shown in Figure 2.3	Trees 10-30 metres in height at maturity generally comprising Pinus species or other softwood species, planted as a single species for the production of timber.
B Woodland	Woodland Low woodland	05	Trees 10-30 metres high; 10-30% foliage cover dominated by eucalypts; understorey low trees to tall shrubs typically dominated by Acacia, Callitris or Casuarina.
	Low woodland Low open woodland Open shrubland	06 07 08 09	Low trees and shrubs 2-10 metres high; foliage cover less than 10%. Dominated by eucalypts and acacias. Often have a grassy understorey or low shrubs. Acacias and Casuarina woodlands grade to Atriplex shrublands in the arid and semi-arid zones.
C Shrubland	Closed heath Open heath	10 11	Found in wet areas but which are affected by poor soil fertility or shallow soils. Shrubs 1-2 metres high often comprising Banksia, Acacia, Hakea and Grevillea. Wet heaths occur in sands adjoining dunes of the littoral (shore) zone. Montane heaths occur on shallow or water-logged soils.
	Low shrubland	12	Shrubs <2 metres high; greater than 30% foliage cover. Understoreys can contain grasses, Acacia and Casuarina often dominant in the arid and semi arid zones.
D Scrub	Closed scrub	13	Found in areas wet enough to support eucalypts trees, which are affected by poor soil fertility or shallow soils. >30% foliage cover. Dry heaths occur in rocky areas. Shrubs 1-2 metres high. Often coastal wetlands.
	Open scrub	14	Trees greater than 2 metres high, 10-30% foliage cover. Dominated by eucalypts or co-dominant melaleuca and myoporum with a mixed understorey
E Mallee/ Mulga	Tall shrubland	15	Vegetation dominated by shrubs (especially eucalypts and acacias) with a multi-stemmed habit; usually greater than 2 metres in height <30% foliage cover. Understorey of widespread to dense low shrubs (Acacia) or sparse grasses.
F Rainforest	Tall closed forest Closed forest Low closed forest	16 17 18	Trees 10-40 metres in height; >90% foliage cover; understorey may contain a large number of species with a variety of heights.
G Grassland (unmanaged) (Appears in table 2.4.3 FDI 50, only – See Note 1)	Low open shrubland Hummock grassland Closed tussock grassland Tussock grassland Open tussock Sparse open tussock Dense sown pasture Sown pasture Open herbfield Sparse open herbfield	19 20 21 22 23 24 25 26 27 28	All forms including situations with shrubs and trees if the overstorey foliage cover is less than 10%.

Notes:
Grassland, although classified as unmanaged, is not considered in the category of bush fire attack, except in Tasmania see Clause 2.4.2.
Overstoreys of Open Woodland, Low Open Woodland, Tall Open Shrubland and Low Open Shrubland should be classified to the vegetation type on the basis of their understoreys, others to be classified on the basis of their overstoreys.
Vegetation height is the average height of the top of the overstorey.

Source: "AS 3959 - 2009 Construction of buildings in bushfire-prone areas" published by Standards Australia, Sydney.

Figure 1: Vegetation type and class (graphic description)



Source: "AS 3959 - 2009 Construction of buildings in bushfire-prone areas" published by Standards Australia, Sydney.

Appendix C
Visual Record of Vegetation

Bush Fire Hazard Assessment

Lots 22 and 632, Mt Shadforth Road, Denmark

1: Karri trees on Lot 22 east

2: Vegetation on the southern boundary of Lot 22

3: Road reserve dividing Lot 22

4: Native vegetation in garden north of house on Lot 22

5: Western end of Lot 22 with Walnut tree in foreground

6: Unmaintained regrowth on cleared area eastern boundary of Lot 355

7: Vegetation on boundary between Lots 355 and 632

8: Eastern portion of Lot 632 showing existing house and clearing

9: Western portion of Lot 632 with fringing Karri vegetation

10: Karri Forest on Warham road

PLANNING AND DEVELOPMENT ACT 2005

SHIRE OF DENMARK

TOWN PLANNING SCHEME No. 3
AMENDMENT No. 122

The Denmark Council under and by virtue of the powers conferred upon it in that behalf by the Planning and Development Act 2005 hereby amends the above Local Planning Scheme by:

a. Rezoning Lots 632, 22 and 1 Mount Shadforth Road and Pt. Lot 355 Warham Road, Denmark from the 'Rural' zone to the 'Special Residential' zone;

b. Amending Appendix XIV – Special Residential Zone Provisions Relating to Specified Areas, by including Special Residential Zone Area No. 15 as follows;

APPENDIX NO. XIV - SPECIAL RESIDENTIAL ZONES

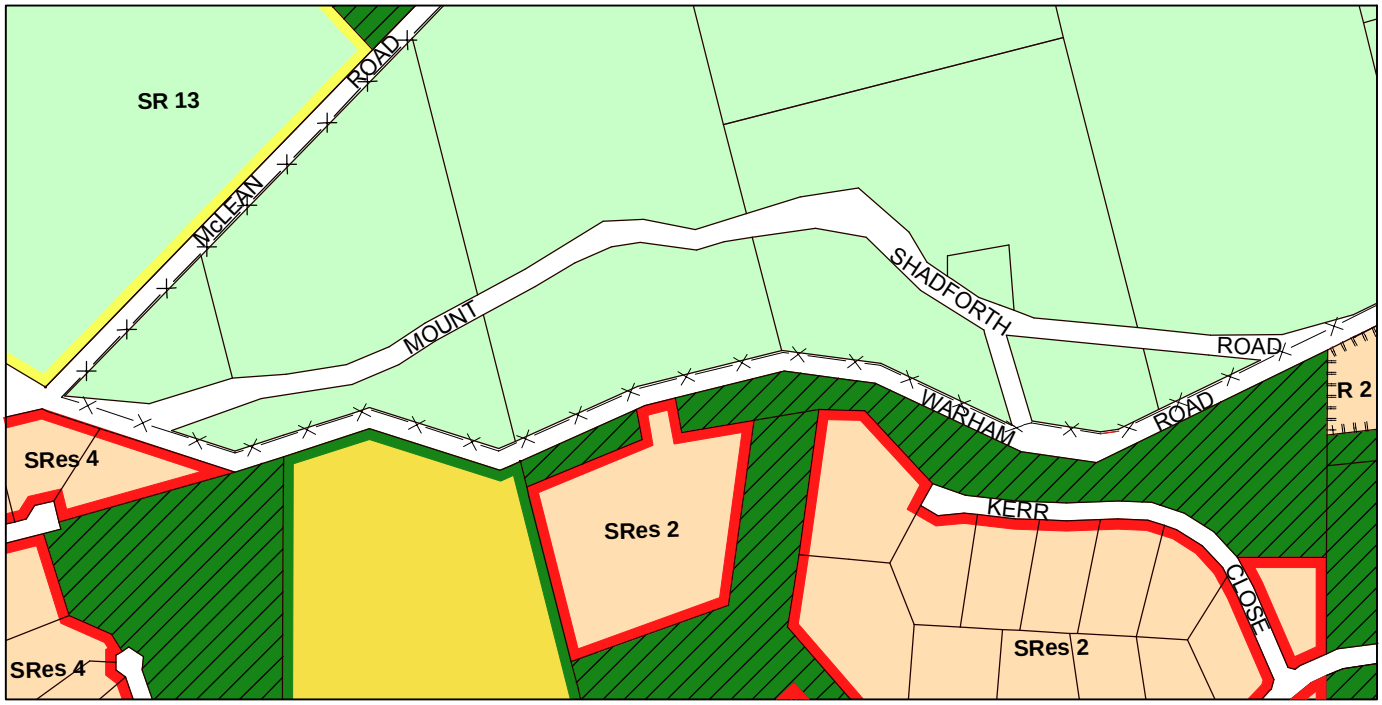
PROVISIONS RELATING TO SPECIFIED AREAS

PARTICULARS OF THE LAND	PROPOSED USES	SPECIAL PROVISIONS	
SRes 15. WARHAM ROAD SPECIAL RESIDENTIAL ZONE Lots 632, 22 and 1 Mount Shadforth Road and Pt. Lot 355 Warham Road, Denmark.	Permitted Use (P): Single House Home Occupation Permitted at Council's Discretion (AA): Cottage Industry Home Business	i)	The minimum size for new lots is 5000m^2.
		ii)	Subdivision shall generally be in accordance with the endorsed Subdivision Guide Plan.
		iii)	All buildings shall be located as follows: • 8m from the Warham Road lot frontage;; • 10m from the rear of the lot/Mt Shadforth Road; • 5m from the side of the lot; and • development (excluding fences) to be setback 30m from Millars Creek.
		iv)	No clearing of remnant vegetation shall occur except for: • clearing to comply with the requirements of the Shire of Denmark Annual Fire Regulation Notice; • removal of trees that are diseased or dangerous; • clearing required to establish/maintain a fuel reduced Building Envelope; • clearing to gain vehicular access to an approved dwelling; or • any other clearing which may be approved by the Council.
		v)	If boundary fencing is utilised, it shall be of rural construction such as pine posts/ steel posts and strand to the satisfaction of Council.
		vi)	On-site effluent disposal shall be the responsibility of the individual landowner and shall involve the use of on-site disposal systems approved by Council in accordance with Health Department of WA regulations and guidelines.
		vii)	Council shall request the WAPC to impose conditions at the subdivision stage requiring the subdivider to advise prospective purchasers of the land of the following; • fire management guidelines and responsibilities; and • that sewer and reticulated water are not available.
		viii)	Council shall request the WAPC to impose a condition at the time of subdivision for additional tree/shrub planting for screening purposes along Mount Shadforth Road.
		ix)	Council shall request the WAPC impose a condition at the time of subdivision for Warham Road to be upgraded to the satisfaction of Council.
		x)	Provision of potable water shall be the responsibility of the individual landowner at the time of development and shall involve the installation of a water storage tank of not less than 92kl capacity and provision of a minimum roof catchment of 200m^2.

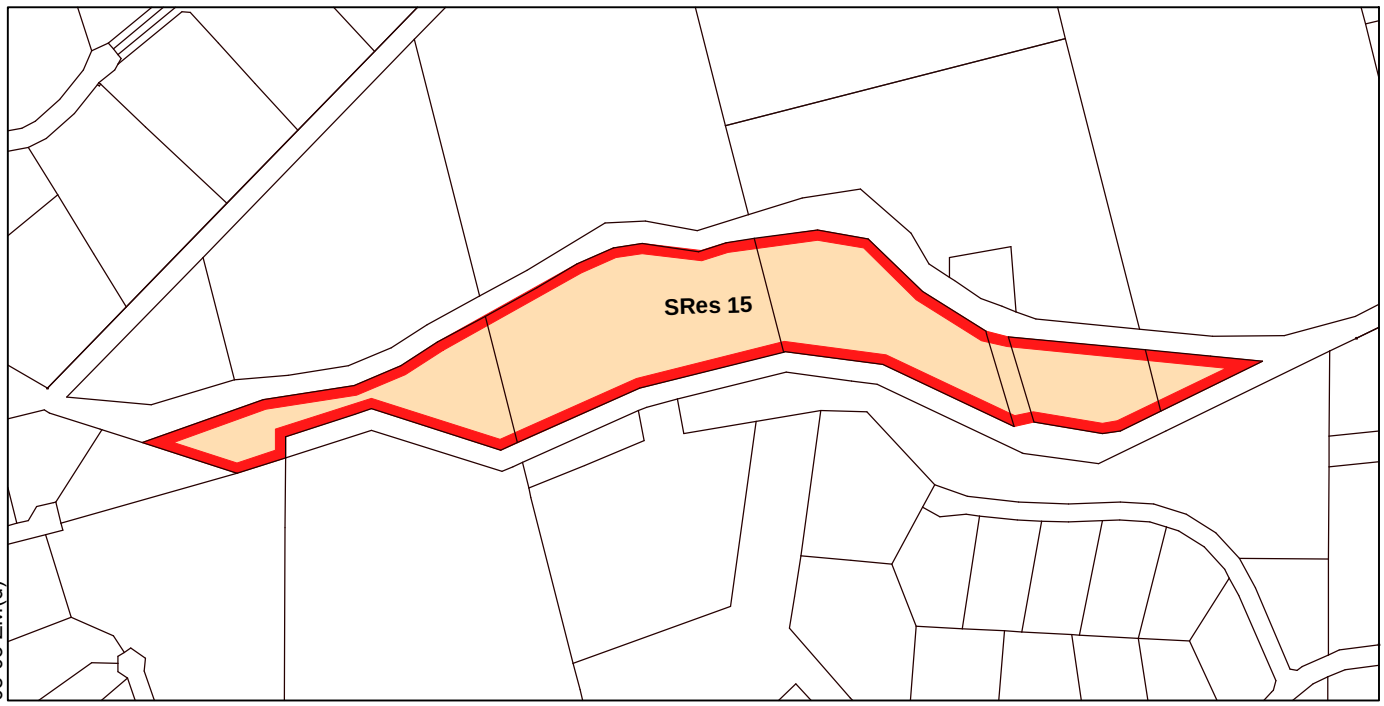
c. Amend the Scheme Maps accordingly.

SHIRE OF DENMARK
TOWN PLANNING SCHEME 3
AMENDMENT NUMBER 122

Existing Zoning



Proposed Zoning



08-03-ZM(d)

LOCAL SCHEME RESERVES
- Parks And Recreation

OTHER
- Townsite - Land Act
- R 2 — R Codes
- SRes 2 — Special Residential Area (see scheme text)
- SR 13 — Special Rural Area (see scheme text)

ZONES
- Residential
- Special Residential
- Landscape Protection
- Rural
- Special Rural

AYTON BAESJOU PLANNING
11 Duke Street
Albany WA 6330
Ph 9842 2304 Fax 9842 8494

ORIG A4
SCALE 1:7500
0 40 80 120 160 200

PLANNING AND DEVELOPMENT ACT 2005

SHIRE OF DENMARK

TOWN PLANNING SCHEME No. 3
AMENDMENT No. 122

ADOPTION

Adopted by resolution of the Shire of Denmark at the meeting of the Council held on the _____day of _____ 20__

_____
Shire President

_____
Chief Executive Officer

FINAL APPROVAL

Adopted for final approval by resolution of the Shire of Denmark at the Meeting of the Council held on the _____day of _____ 20___ and the Common Seal of the Shire of Denmark was hereunto affixed by the authority of a resolution of the Council in the presence of:

_____
Shire President

_____
Chief Executive Officer

Recommended/Submitted for Final Approval

_____
Delegated Under Section 16
of the PD Act 2005

_____
Date

Final Approval Granted

_____
Minister for Planning

_____
Date

Schedule of Submissions: Town Planning Scheme No. 3 Amendment No. 122

Ref No.	Name	Verbatim Submission	Planning Services Comment
1	Fire & Emergency Services Authority 5 Hercules Crescent Albany WA 6330	Thank you for your letter dated 09 August 2011 regarding the above referral. FESA has no objections to the rezoning of the subject land however the following comments should be noted. In relation to the ongoing development of this application, bush fire risk must be considered in planning decisions to avoid increasing the risk through inappropriately located or designed land use and development. The Planning for Bush Fire Protection document and WAPC Policy DC 3.7 cover the requirements for subdivisions to address on ground fire protection issues. Australian Standard 3959 cover the Standard for Construction of Buildings in Bushfire-Prone Areas. The requirements of all 3 documents need to be considered in total when dealing with any subdivision development.	• The preparation of a Fire Management Plan is generally a condition imposed on a subdivision in accordance with *Planning for Bush Fire Protection Guidelines*. To ensure that this is undertaken it is recommended that this be added as a special provision. • It should be noted that WAPC Policy DC3.7 has been superseded with the introduction of the *Planning for Bush Fire Protection Guidelines (Edition 2)*. <u>Recommendation</u> Insert new Special Provision to read as follows: *Council shall request the WAPC to impose conditions at the subdivision stage requiring the preparation of a fire management plan and implementation of the specific fire protection measures set out in such plan.*
2	Western Power Locked Bag 2520 PERTH WA 6000	Western Power wishes to advise the following in respect to TPS No. 3 Amendment 122. To the best of my knowledge, there are no objections to the changes you propose to carry out for the abovementioned project. Please Note: a) Perth One Call Service (Freecall 1100 or visit dialbeforeyoudig.com.au) must be contacted and location details (of Western Power underground cabling) obtained prior to any excavation commencing. b) Work Safe requirements must also be observed when excavation work is being undertaken in the vicinity of any Western Power assets. Western Power is obliged to point out that any change to the existing (power system; if required is the responsibility of the individual developer.	Noted.
3	Department of Health PO Box 8172 Perth Business	Thank you for your letter of 9 August 2011 regarding the above. The Department of Health (DOH) has no objection to the rezoning proposal, subject to:	Noted – current notations on Subdivision Guide Plan and/or Special Provisions address these issues adequately.

Attachment 8.1.1 b)

	Centre WA 6849	• The recommendations from the land capability assessment (*Land Capability Assessment Mt Shadforth – Warham Rd Area, Shire of Denmark* prepared by Lands Assessment Pty Ltd, June 2010) being considered by the Shire during subdivision stage, specifically in regards to the use of approved Aerobic Treatment Units for onsite effluent disposal in the areas of low capability; and • A minimum 30 metre setback being achieved between effluent disposal and any waterbodies on or near the site.	
4	Department of Environment and Conservation Locked Bag 122 MANJIMUP WA 6258	Thank you for the letter received on 9 August 2011 seeking comment on the abovementioned Town Planning Scheme Amendment. The Department of Environment and Conservation (DEC) provides the following comments. DEC supports maximizing the protection of the remnant vegetation on the lots. In particular, the protection of areas containing yellow tingle and protection of creek lines and any riparian vegetation associated with them. The designation of building envelopes within existing cleared areas is also supported. DEC would like to advise that under the *Environmental Protection Act 1986* that clearing of native vegetation can only be done under the authority of a permit, unless the clearing is for a purpose exempt in accordance with Schedule 6 or regulation 5 (Clearing of Native Vegetation Regulations 2006). Given the proximity of the lots to the Denmark River, all storm and waste water management should be carried out on-site and designs need to demonstrate that potential impacts on the Denmark River have been considered. Planning for bushfire protection guidelines edition 2 (FESA and WA Planning Commission May 2010) requires rezoning, subdivision and development proposals be accompanied by information on how the proposal will meet the requirements of this subdivision and development design in terms of access, fire services access, hazard separation and building protection zones, water supply, building envelope location and size. The plan should outline fire protection measures.	Noted – current notations on Subdivision Guide Plan and/or Special Provisions address these issues adequately, noting that an additional Special Provision is proposed to be added addressing the requirement for a Fire Management Plan condition to be imposed at the time of subdivision.
5	Water Corporation PO Box 100 LEEDERVILLE WA 6902	I refer to your letter dated 9 August 2011, seeking the Corporation's comments in respect of the abovementioned scheme amendment, which seeks to rezone the subject land from 'Rural' to 'Special Residential'.	Noted.

		The amendment report states that water and wastewater services for future lots are to be accommodated by on-site means, therefore the proposal presents no implications to the Corporation's services. Given the above, the Corporation has no concerns with the proposed amendment.	
6	Department of Water PO Box 525 ALBANY WA 6331	Thank you for the opportunity to comment on the above proposal. The Department of Water has no objection to the proposal and provides the following comments: <u>Waterways</u> Millars Creek, a tributary to the Denmark River, is located in close proximity to the subject site. However, the physical barrier of Warham Road and the location of the proposed building envelopes should provide adequate separation to protect the values of the waterway. <u>Effluent Disposal</u> The land capability study appears to argue the suitability of the bulk of the site for use of septic tanks. However, given the site constraints – proximity of building envelopes to dams, watercourses, depth to groundwater, imperfectly draining soils and the slope of the land – it may be more suitable for all effluent disposal systems built on land units other than Sm1 to require alternative treatment units.	The Subdivision Guide Plan and/or Special Provisions require the installation of Alternative Treatment Units on all lots with a minimum setback of 30m from dams and watercourses (NB: advertised version of Amendment 122 document did not update Special Provision vi) to reflect use of ATU's on all sites as per Council resolution of 160411 – this is to be amended prior to referral of the Scheme Amendment documentation to the WAPC/Minister for Planning for final approval.
7	Michael Price 73 Warham Road DENMARK WA 6333	It has come to my attention by the erection of a large sign opposite my driveway & a few days later by a letter from yourselves that a new subdivision has been approved between Shadforth Road and Warham Road which fronts the whole of my property. I would like to know why wasn't I informed of this when the first application of Lot 22 started back on 2009, it's no use telling me after the fact, I don't spend my spare time reading small print articles in the Denmark Bulletin. I came to your office last year as I was told from a third party that the owners of Lot 22 where applying to subdivide, the lady from Planning told me it might not even go ahead & she didn't know much about it & to read it on the council website, which didn't mention any of the surveying which has been going on, or the approval of such applications going through. I have been reading your 100's of pages of Amendments with all the	• This is a Scheme Amendment proposal to rezone the subject land from "Rural" to "Special Residential" which will ultimately result in the land being subdivided if the Scheme Amendment is approved. Part of the Scheme Amendment process includes public consultation and this is the opportunity for public input into the Scheme Amendment proposal. • Planning Services received the initial Scheme Amendment request (SAR) on 23 December 2009 and this was considered at the Ordinary Meeting of Council held on 23 March 2010. No public consultation took place at this time as Council was requested to provide its position on the proposal prior to a formal request to initiate a Scheme Amendment being submitted (which was received of 4 January 2011). • From a land capability perspective the subject land has been identified as being capable and suitable for special residential development, noting the use of alternative

		nice coloured pictures, which bring up many questions for extra subdivisions not being suitable: i.e. – No mains water, sewage septics so close to Millar's Creek, Warham Road being extended to Shadforth Road turning a quiet dead end into a busy bypass, which is already in a poor state with little or no proper drainage & light traffic & heavy winter rains constantly washing it away. It is not suitable for heavy building trucks & contractors vehicles, & we don't want the traffic disturbance for years to come either, Wildlife habitats – many kangaroo's, Bandicoots, Possums and water birds live in the area, Electricity supply to extra homes, which as I speak is presently cut off from our house & is a constant occurrence, as Synergy can't supply the present population. Trees are in the plan to hide the new Urban sprawl from Shadforth Road - no mention of Trees for our side of Warham Road when we will be losing our privacy & don't want to see it either. This will have a huge impact on our unique block & rural lifestyle, which is why we moved there in the first place, from the overcrowded & subdivided blocks of Perth, not for the greedy subdivisions of land owners & Councils alike who will of course approve such applications so as to reap in many more rates notices, & increase present rates. I will be visiting your office in the near future to speak to someone & find out how this approval has been slipped in, the same as Living Waters which no one on Peace Street knows about or will want either.	treatment units for effluent disposal purposes given the proximity to Millar's Creek. • Warham Road is not proposed to extend to Mt Shadforth Road. The subdivision guide plan and Special Provisions require Warham Road to be upgraded to a standard appropriate for special residential development (i.e. road to be two coat sealed – noting that the actual width of the road in certain sectors may need to be less than 6.0 metres wide in recognition of the need to ensure maximum retention of existing vegetation within the road reserve). • The subdivision guide plan and Special Provisions only reference tree planting along Mount Shadforth Road as this is a tourist route and the existing West Denmark Structure Plan that covers the area provided for such landscape buffer area. It is considered that no additional tree planting is required along Warham Road, noting that the road upgrading will need to ensure maximum retention of existing vegetation within the road reserve and Special Provision iv) only allows for limited clearing of remnant vegetation on-site.
8	Sam Williams PO Box 69 DENMARK WA 6333	I am a resident of the Walnut Grove subdivision and frequently utilise Mt Shadforth Road and Peace Street for pedestrian and bicycle access to the Denmark Town Centre. On numerous occasions I have came close to being 'clipped' by vehicles on these roads. I constantly lament that Council did not impose a condition on the developer of Walnut Grove subdivision that prior to initiation of the amendment to rezone the land comprising the subdivision for Rural to Special Residential that a shared pathway be constructed on Mt Shadforth Road into the Denmark Town Centre. I note Amendment 122, which is currently being advertised, proposes to rezone a portion of land on Mt Shadforth Road from Rural to Special Residential. This will facilitate additional residents who will contribute additional traffic on Mt Shadforth Road and may desire the ability to safely walk or cycle into town. I hereby make submission that I am in favour of the rezoning, However, I respectfully request Council place a stipulation that final approval of	At the subdivision stage, the developers will be required to pay a road infrastructure contribution charge per lot that is currently provided for in Council's operative Fees & Charges Schedule. These funds will assist with the construction of the footpath/dual use path that is planned to be provided from the Kearsley Road subdivision through to town.

		Amendment 122 only be grated in the landowner enter into a deed with Council, at the landowners expense, that prior to the clearance of any titles resultant from any subdivision the landowners are to construct a shared pathway along Mt Shadforth Road from the western extent of the rezoned land to the Denmark town centre, to the satisfaction of Council. I do not consider this would be an onerous requirement. I have been advised by a suitable civil construction company that a pathway could be constructed in the Mt Shadforth Road Reserve and would not require the removal of vegetation, nor impede on vehicle traffic. I look forward to Council's favourable consideration of Amendment 122 with the above inclusion.	
9	ML Gooch PO Box 105 DENMARK WA 6333	1. Post boxes to be removed or relocated along Warham Road. 2. The upgrade of the intersection of Warham Road and Mt Shadforth Rd is important. At present turning on to Mt Shadforth Rd from Warham is unsafe. Note E - land from Lot K may have to be used to create this intersection. 3. Turning area at the end of Warham Rd should be big enough for trucks and vehicles with caravans.	• As the area 'urbanises' it is considered that post boxes will be associated with each individual property – this is not a Council issue and needs to be discussed further with Australia Post in due course, noting that the subdivider may undertake this consultation if the road upgrading works result in the location of such post boxes needing to be re-considered. • Acknowledged – the current Subdivision Guide Plan and Special Provisions reference that the intersection upgrade is required, with detailed engineering plans required to be lodged for approval by the Shire (Infrastructure Services). From a preliminary review it is considered that a modified intersection can be provided for within the current road reserve, however this will be further considered at the time of detailed engineering plans. • Acknowledged – a cul-de-sac head in accordance with the Shire's Guidelines for Development and Subdivision of Land will be required to be provided, noting that generally is to be big enough to cater for rubbish trucks to manoeuvre.
10	Ron & Laureen Watkins PO Box 968 DENMARK WA 6333	*1)* The plan makes reference to "Stage 1 – Utilise existing Emergency/Access Egress link? If this Emergency/Access Egress were to be upgraded to allow access to vehicles other than emergency vehicles, it could change Kerr Close from a cul-de-sac to an access road to vehicles coming from Warham Road. We strongly object to this occurring. 2) We would suggest that a sign be erected to both sides of the Emergency/Access link to the effect that the link is for emergency access only.	• From a preliminary review of the existing emergency access/egress link, it is considered that there is minimal upgrading required. This however will be reviewed when the fire management plan is prepared for the site, noting that the issue of access by other vehicles as a short-cut will need to be addressed as this is not the intention of this link. • Noted – the specific details of addressing the issue of other vehicles using this link as a short-cut will need to be

		3) We note that the proposed residential lots would gain access to Warham Road rather than Mount Shadforth Road. (Refer Note d.) With the proposed residential lots resulting in more vehicles using this road, what does the Shire mean by "*upgrade* of Warham Road to the satisfaction of Council's Director of Infrastructure Services"? If the road is to take more traffic, we submit that it should at the very least be sealed to reduce dust, a speed limit imposed and possibly passing bays established to the north of the road as the width of the existing road is not sufficient for two lanes. *4)* The intersection of Warham Road and Mount Shadforth Road is presently constructed so that it is very difficult to make a left-hand turn. Referring to Note *e* on the plan, would the upgrade of the intersection of Mount Shadforth Road and Warham Road enable vehicles to turn left easily? If this were not done, owners/occupiers of the proposed properties fronting onto Warham Road would use Kerr Close as an access way, **as is currently the position**. 5) We submit that Kerr Close should be marked "NO THROUGH ROAD" at its intersection with Peace Street. 6) It is hoped that the removal of trees on the proposed lots would be kept to a minimum so as to maintain the visual barrier from any residence erected on the proposed new lots, to and from occupiers of residences on Kerr Close.	considered at the time the fire management plan is prepared. • References to upgrade means the road is to be two coat sealed, road alignment and pavement width being designed such that remnant vegetation retention within the road reserve is maximised (i.e. reduced pavement widths with use of passing bays where required) and an appropriately sized cul-de-sac head/turn-around area being provided. • The intersection of Warham Road and Mount Shadforth Road will need to be modified such that it provides for full turning movements. • Noted however this is not directly related to this proposal. The reference to 'Close' should indicate that it is a 'No Through Road', however this issue will be referred to Infrastructure Services for their consideration. • The current Special Provisions provide for vegetation being retained unless there is a need for purposes such as fire management, building and/or if specifically approved by Council. <u>Recommendation:</u> Amend Special Provision ix) such that it includes reference to the minimum requirements for upgrading of Warham Road.
11	John & Kerrie Davies PO Box 926 DENMARK WA 6333	Same as Submission 10.	Refer to comments provided against Submission 10.
12	GM & MJ Bowley PO Box 219 DENMARK WA 6333	• The plan makes reference to "Stage 1 – Utilise existing Emergency/Access Egress link? o If this Emergency/Access Egress were to be upgraded to allow improved access to emergency vehicles, it could have the practical effect of changing Kerr Close from a cul-de-sac to an access road to vehicles coming from Warham Road. We strongly object to this occurring; and o Request that signage be erected to both sides of the Emergency/Access link to the effect that the link is for emergency access only. • Query the preferred location for standpipe. a) There is already a hydrant point at the end of Kerr Close (approx 150m from the proposed standpipe) and if a standpipe is required another location may be appropriate. The 'existing	• From a preliminary review of the existing emergency access/egress link, it is considered that there is minimal upgrading required. This however will be reviewed when the fire management plan is prepared for the site, noting that the issue of access by other vehicles as a short-cut will need to be addressed as this is not the intention of this link. • Noted – the specific details of addressing the issue of other vehicles using this link as a short-cut will need to be considered at the time the fire management plan is prepared. • Noted – the final location of the standpipe will be determined with the preparation of a fire management plan for the area.

		cleared hardstand' appears at present to be basically rough cleared bush subject to water-logging and unlikely to be sufficient for 2.4 and above fire appliances to safely turn around. b) We note that the proposed development will be required to prepare a fire management plan and supply its own standpipe however the proposed standpipe location would be of more practical use if located at a greater distance from the existing Kerr Close hydrant (e.g. at the western end of Warham Road). • We note that the proposed residential lots would gain access to Warham Road rather than Mount Shadforth Road. (Refer Note d.) a) With the proposed residential lots resulting in more vehicles using this road, what does the Shire mean by "*upgrade* of Warham Road to the satisfaction of Council's Director of Infrastructure Services"? As the road is to take more traffic, we submit that it should at the very least be sealed to reduce dust, a speed limit imposed and possibly passing bays established to the north of the road as the width of the existing road reserve seems insufficient for two lanes. b) It is accepted that the specific engineering requirements will be determined at subdivision stage however we would expect that Warham Road would be sealed to match the standards of other similar subdivisions in close proximity to the Denmark townsite. • The intersection of Warham Road and Mount Shadforth Road is presently constructed so that it is very difficult to make a left-hand turn. a) Referring to Note *e* on the plan, would the upgrade of the intersection of Mount Shadforth Road and Warham Road enable vehicles to turn left easily? If this were not done casual traffic and owners/occupiers of the proposed properties fronting onto Warham Road would use Kerr Close as an access way, as is currently the position. • We submit that Kerr Close should be marked "NO THROUGH ROAD" at its intersection with Peace Street. • It is hoped that the removal of trees on the proposed lots would be kept to a minimum so as to maintain the visual amenity to Mt Shadforth for occupiers in the vicinity of Kerr Close and the Highland Park locality. While fully supporting regular ground level fuel reduction in accordance with the annual fire regulation notice this does not necessarily require mature tree removal.	• References to upgrade means the road is to be two coat sealed, road alignment and pavement width being designed such that remnant vegetation retention within the road reserve is maximised (i.e. reduced pavement widths with use of passing bays where required) and an appropriately sized cul-de-sac head/turn-around area being provided. • The intersection of Warham Road and Mount Shadforth Road will need to be modified such that it provides for full turning movements. • Noted however this is not directly related to this proposal. The reference to 'Close' should indicate that it is a 'No Through Road', however this issue will be referred to Infrastructure Services for their consideration. • The current Special Provisions provide for vegetation being retained unless there is a need for purposes such as fire management, building and/or if specifically approved by Council. <u>Recommendation:</u> • Amend the Subdivision Guide Plan and Special Provision ix) so as to include reference to the minimum requirements for upgrading of Warham Road. • Amend the Subdivision Guide Plan so as to include reference to the location of the standpipe and/or the emergency access/egress links may be modified when the fire management plan is prepared.
13	G & G Moore PO Box 459 DENMARK WA	Clarification required to following aspects of Subdivision Guide Plan: • What is meant by "Stage 1 – Utilise existing Emergency/Access Egress link?	• The reference to 'Stage 1 – utilise existing emergency/access egress link' references that this is an option for fire management purposes until such time as

	6333	○ Is this to be upgraded to allow access to vehicles other than emergency vehicles? If so, this would change Kerr Close from a cul-de-sac to an access road to vehicles coming from Warham Road. • Query the preferred location for standpipe. ○ There is already a hydrant point at the end of Kerr Close (approx 150m from the proposed standpipe) and if a standpipe is required another location may be appropriate. The 'existing cleared hardstand' appears at present to be basically rough cleared bush subject to water-logging and unlikely to be sufficient for 2.4 and above fire appliances to safely turn around. • Is Warham Road to remain 2-way? Refer Note d. ○ With the proposed residential lots resulting in more vehicles using this road, what does the Shire mean by "*upgrade* of Warham Road to the satisfaction of Council's Director of Infrastructure Services"? As the road is to take more traffic, it should at the very least be sealed to reduce dust, a speed limit imposed and possibly passing bays established to the north of the road as the width of the existing road reserve seems insufficient for two lanes. Note: south of the road is a reserve. No trees should be removed from this reserve. • Referring to Note e – ○ Would the upgrade of the intersection of Mount Shadforth Road and Warham Road enable vehicles to turn left easily? With the present intersection this is not possible. • Referring to Lots A, B and C on the proposed Subdivision Guide Plan – how would residents on these lots gain access to Warham Road or is it proposed those residents have access to Mount Shadforth Road? • Referring to Lot K – as this is below the required 5000 sq metre size, how would this block be utilised? Public open space including a redesigned entry onto Mt Shadforth Road may be an option? Following clarification of the above points, issues we would wish to raise would be – • Removal of trees on the proposed lots should be kept to a minimum. • Establishment of a Green Belt similar to that along the southern boundary of Mount Shadforth Road should be established along the north side of Warham Road. • All owners of the proposed new lots should not be allowed to gain vehicle access via Kerr Close. This would mean an increase in	subdivision occurs on Lot 632 and/or suitable arrangements are made with that landowner to provide the strategic firebreak on this lot. It should be noted that the fire management plan will determine the appropriateness of such links as indicatively provided for on the Subdivision Guide Plan. • From a preliminary review of the existing emergency access/egress link, it is considered that there is minimal upgrading required. This however will be reviewed when the fire management plan is prepared for the site, noting that the issue of access by other vehicles as a short-cut will need to be addressed as this is not the intention of this link. • Noted – the final location of the standpipe will be determined with the preparation of a fire management plan for the area. • References to upgrade means the road is to be two coat sealed, road alignment and pavement width being designed such that remnant vegetation retention within the road reserve is maximised (i.e. reduced pavement widths with use of passing bays where required) and an appropriately sized cul-de-sac head/turn-around area being provided. • The intersection of Warham Road and Mount Shadforth Road will need to be modified such that it provides for full turning movements. • As per the Subdivision Guide Plan, Lots A and B are to have access to Mount Shadforth Road, with Lot C to have access off Warham Road. • Lot K (which is existing Lot 1) will continue to be used for residential purposes, noting that the zoning of 'Special Residential' is more appropriate for this lot than the current 'Rural' zoning given its lot size and context. • The current Special Provisions provide for vegetation being retained unless there is a need for purposes such as fire management, building and/or if specifically approved by Council. • The issue of vehicles using Kerr Close to access properties will need to be addressed at the subdivision stage (generally as part of the fire management plan) as this is not the intention of this link.

		traffic using Kerr Close and Peace Street (NB: Peace Street has already had one MVA fatality and several near misses because of the speed some vehicles are driven on this road. Peace Street should be sign-posted 50 KPH and perhaps also some Slow Down Signs erected for vehicles travelling down the hill). A "No Through Road" sign should be added to the street sign Kerr Close located at the east end of the Close in Peace Street.	<u>Recommendation:</u> • Amend the Subdivision Guide Plan and Special Provision ix) so as to include reference to the minimum requirements for upgrading of Warham Road. • Amend the Subdivision Guide Plan so as to include reference to the location of the standpipe and/or the emergency access/egress links may be modified when the fire management plan is prepared.