Resolved that the local government, in pursuance of Section 75 of the Planning and Development Act, 2005 amend the above local planning scheme by:

1. Amending the Scheme Map by rezoning Lot 2 Coolgardie-Esperance Highway, Monjingup to "Rural Smallholdings" as depicted on the Amendment Map.

Dated this………………..day of……………….2011

………………………………

CHIEF EXECUTIVE OFFICER
# PROPOSAL TO AMEND A LOCAL PLANNING SCHEME

<table>
<thead>
<tr>
<th>LOCAL GOVERNMENT</th>
<th>SHIRE OF ESPERANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESCRIPTION OF LOCAL PLANNING SCHEME</td>
<td>SHIRE OF ESPERANCE LOCAL PLANNING SCHEME NO. 23</td>
</tr>
<tr>
<td>TYPE OF SCHEME</td>
<td>DISTRICT SCHEME</td>
</tr>
<tr>
<td>SERIAL NO. OF AMENDMENT</td>
<td>9</td>
</tr>
<tr>
<td>PROPOSAL</td>
<td>1. Amending the Scheme Map by rezoning Lot 2 Coolgardie-Esperance Highway, Monjingup to &quot;Rural Smallholdings&quot;</td>
</tr>
</tbody>
</table>

---

## SCHEME AMENDMENT REPORT

### 1. INTRODUCTION

Notice of Final Approval of the Shire of Esperance Local Planning Scheme No. 23 ("the Scheme") was published in the Government Gazette on 19 February 2010.

Lot 2 Coolgardie Esperance Highway has an area of 38ha and is a freehold lot zoned 'Agriculture – General' under the Scheme.
The lot is bounded on the West by the Esperance-Coolgardie railway line, on the North by Melijinup Swamp Reserve, on the South by Council Reserve which also houses Six Mile Hill Bush Fire Brigade and communication tower. Four small holdings adjoin the lot on the South side. On the East side the property is bounded by the Coolgardie–Esperance Highway.

The property is primarily used as the family residence incorporating two dwellings, sheds, stables and associated infrastructure. There are currently 40 head of cattle graze on the site.

The proposed rezoning of the site will facilitate the creation of four (4) equal sized ‘Rural Smallholdings’ lots. The proposed lots will allow for the property to be developed on by the family of the owner.

2. STRATEGIC BACKGROUND

2.1 Development Control Policy 3.4 – Subdivision of Rural Land

It is WAPC policy that the subdivision of rural and agricultural land for closer settlement (rural-residential and rural smallholdings) and more intensive agricultural uses should be properly planned through the preparation of regional and local planning strategies and provided for in local planning schemes prior to subdivision.

This Amendment addresses the requirement of the local Planning Strategy and will incorporate provisions into the scheme in relation to the land and is therefore consistent with the intentions of DC 3.4.
2.2 Statement of Planning Policy No. 11 – Agriculture and Rural Land Use Planning

The four key objectives of this policy are:

1. Protect agricultural land resources wherever possible by—
   a. discouraging land uses unrelated to agriculture from locating on agricultural land;
   b. minimising the ad hoc fragmentation of rural land; and
   c. improving resource and investment security for agricultural and allied industry production.

2. Plan and provide for rural settlement where it can—
   a. benefit and support existing communities, and
   b. have access to appropriate community services and infrastructure.

3. Minimise the potential for land use conflict by—
   a. providing adequate separation distance between potential conflicting land uses;
   b. introducing management requirements that protect existing agricultural land uses;
   c. identify areas that are suitable and capable for intensive agricultural pursuits as agricultural priority areas; and
   d. avoid locating new rural settlements in areas that are likely to create conflict with established or proposed agricultural priority areas.

4. Carefully manage natural resources by—
   a. discouraging development and/or subdivision that may result in land or environmental degradation;
   b. integrating land, catchment and water resource management requirements with land use planning controls;
   c. assisting in the wise use of resources including energy, minerals and basic raw materials;
   d. preventing land and environmental degradation during the extraction of minerals and basic raw materials; and
   e. incorporating land management standards and sequential land use change in the land use planning and development process.

This amendment recognises the objectives of this policy and complies with the outlined requirements for ‘Rural Smallholdings’

3. CURRENT ZONING AND RELEVANT SCHEME PROVISIONS

Under the Scheme, Lot 2 Coolgardie – Esperance Highway, Monjingup is zoned ‘Agriculture – General’ and located within Special Control Area No. 5 - Wetlands of Significance and Lake Warden Recovery Catchment.

3.1 Special Control Area No. 5 - Wetlands of Significance and Lake Warden Recovery Catchment

Local Planning Scheme No. 23 introduced Special Control Area No. 5 (SCA 5) to provide guidance for land use and development within the catchments of wetlands of significance.
The provisions for SCA 5 are included in Section 6.9 of the Scheme and are contained below.

6.9  SCA 5 – Wetlands of Significance and Lake Warden Recovery Catchment Special Control Area 5

6.9.1 Purpose

The purpose of SCA 5 is to provide guidance for land use and development within the catchments of wetlands of significance.

6.9.2 Objectives

The objectives of SCA 5 are to –

(a) ensure that the use and development of affected land is compatible with and does not detrimentally affect the SCA 5 wetlands;

(b) encourage retention and planting of native vegetation and properly managed perennial pasture;

(c) encourage fencing and rehabilitation of creek lines; and

(d) discourage subdivision and intensification of development within Department of Environment and Conservation Priority 1 areas due to the risks posed by the shallow water table, flooding, nutrient pollution, domestic animal impact and risks to public health.
6.9.3 Application Requirements

Despite any other provision of the Scheme planning approval is required for all use and development including a single house.

6.9.4 Relevant Considerations

In addition to provisions of the Scheme, the local government in considering applications for rezoning, subdivision or planning approval in SCA 5 is to have due regard to—

(a) results of scientific research conducted by Department of Environment and Conservation regarding groundwater and surface water interactions within the Lake Warden Wetland System and recommendations for management of the priority areas;

(b) guidelines of the Environmental Protection Authority for protection of the environment including but not limited to maintenance of water quality;

(c) guidelines of the Department of Water for protection of wetlands and waterways including but not limited to maintenance of water quality;

(d) the potential for adverse environmental impacts and the management of such potential impacts; and

(e) a general presumption against land clearing, further subdivision and intensification of development beyond construction of a single dwelling,\(^1\)

and shall determine applications for planning approval accordingly.

6.9.5 Referral of Applications

(a) The local government may refer applications for planning approval to the Department of Environment and Conservation and the Department of Water and the local government is to have due regard to recommendations and advice received from those authorities when determining applications.

(b) The keeping of horses on lots of less than 4ha (or equivalent stocking rates of other animals) within SCA 5 will be refused or referred to the Department of Environment and Conservation for comment and subsequent determination by the Council.

An amendment is currently being assessed which will allow subdivision when in accordance with an approved Outline Development Plan (ODP). By incorporating Lot 2 within Precinct 30 this new provision would apply to the subject lot as the precinct statement requires an ODP to be prepared prior to subdivision.

4. LOCAL PLANNING STRATEGY

The subject of this amendment is located within Precinct 35 of the Local Planning Strategy which states:

\(^1\) Amendment No. 6 changes this provision to: "a general presumption against land clearing and further subdivision unless in accordance with an approved Outline Development Plan"
Objectives: To ensure that the long term capacity of the precinct for urban expansion (15 years plus) is not prejudiced by subdivision or uncomplimentary development.

Background/Location:
Six Mile Hills (refer to Plans 1 & 2) is largely undeveloped.

Strategy:
• Facilitate a long term land bank for the future urban expansion of the town and ensure the use of the land in the intervening period does not prejudice this aim.

Actions:
➢ Subdivision will generally not be supported, particularly where it may compromise the future development of the area.
➢ Land uses that cannot be serviced by a Council approved on-site effluent disposal system will not be permitted.

This amendment modifies the strategy so that the subject lot falls within Precinct 30 – Bukenerup Rural Smallholdings. The contents of this amendments support the requested modification.

5. PLANNING

5.1 Justification for proposal

Surrounding Land Uses/ Potential Land Use Conflicts

The land is bounded to the west by the rail corridor and to the east by the Coolgardie – Esperance Highway. To the north is a ‘Parks, Recreation and Conservation – Local’ reserve and to the south is a ‘Rural Residential’ subdivision. There is no potential conflict with any of the surrounding land uses as a consequence of this proposal.

Land Capability and Suitability Analysis

A Land Capability Assessment report from South Coast Consulting is appended to this report which deals with land capability and suitability in detail for the rezoning and eventual subdivision of the lot.

Recent Development Approvals/ Applications

A second dwelling has recently been approved on the site.

Movement Networks

Coolgardie-Esperance Highway is the main road linking Esperance to Norseman (access to the Eyre Highway) and Coolgardie which runs the length of the Eastern boundary of the property. This main road also links Esperance to the new industrial area at Shark Lake.

On the western boundary is the railway line which provides the carrier for Iron Ore trains to export iron ore through the port from Koolyanobbing and rail links to Leonora for fuel and Nickel supplies
Safety and Access

Main Roads WA has recently completed an upgrade of approx 3km of the Coolgardie-Esperance Highway over 6 Mile Hill along the Eastern boundary of the property. This upgrade now includes a passing lane on the West side of the highway which has improved access and safety both entering and exiting the highway into the parking area and property.

Main Roads have approved highway access into the property from a site approx mid way along the Eastern fence line.

Landscape, Topography and Visual Impact

Page 8 (2.2, 2.3) of the Land Capability Assessment report details the Topography and Visual Impact aspects of the property.

The property has views to the west over developed farm lands. Given the small scale of the development proposed there will be a minimal visual impact.

Site History

Lot 2 has been the subject of a previous subdivision application to the Shire of Esperance. This application was refused as shown from the following extract of correspondence from the Western Australian Planning Commission:

The reasons for refusal of the subdivision related to non-compliance with the Shire of Esperance Town Planning Scheme No. 22 (TPS 22), and WAPC's Policies Statement of Planning Policy No. 2.5 (SPP 2.5) Agricultural and Rural Land Use Planning and Development Control Policy DC 3.4 Subdivision of Rural Land. These policies require that the subdivision of rural land is to be provided for in a Town Planning Scheme or planned for in a Local Planning Strategy. The reason for this is not only to protect agricultural land, but also for local governments to limit residential development in a rural context to areas that are appropriate for it...

...In support of your application you maintain that, as the land is not viable as a farming enterprise, subdivision should be allowed as it is compatible with developments already in place. You also maintain that the Shire is considering your site for future residential development. The Shire's current Town Planning Scheme No. 22 (TPS 22) zones your land as 'rural' for which subdivision is not supported. The developed areas around you have been appropriately zoned 'Special Rural'. Therefore, approval to your subdivision would create a precedent for other 'rural' zoned land to be subdivided.

The Shire's proposed TPS 23 zones the land 'Rural Smallholdings' and identifies it as being located in Special Control Area 5 - Wetlands of Significance and Lake Warden Recovery Catchment. Subdivision in the 'rural smallholdings' zone and SCA5 require that development should be compatible with the capability of the land and not have an adverse impact on its environmental values. You maintain that subdivision would not have a detrimental effect on the aesthetics of the land. The measures that you have taken to remediate and enhance your property are acknowledged and appreciated. You have identified that there are fragile wetlands and water erosion and flooding issues associated with the land. Development as proposed would create additional stress on the environment. For example on site effluent disposal could result in a level of nutrients that the soils and drainage pattern of the land cannot accommodate and result in pollution of the wetlands. The Department of Environment and Conservation has provided comments on your proposal and it maintains that the information that you have provided does not
provide sufficient detail to indicate that the environmental impacts have been identified and can be managed should your application be approved.

The proposed Local Planning Strategy locates your land in the Six Mile Hills precinct which is identified for future residential development but within a 15-20 year timeframe. Investigation is required of the suitability of the land in the Precinct for subdivision and appropriate standards for development need to be formulated. Subdivision before this is completed may prejudice the desired outcome.

This Amendment modifies the zoning to ‘Rural Smallholdings’ which removes the issue of precedence. The amendment also modified the Local Planning Strategy to take into account the movement of Lot 2 into the adjacent precinct which better reflects the development potential of the lot.

All the proposed changes are supported by the appended Land Capability Report.

**Cultural Significance (Aboriginal, Environmental, European)**

There are no sites listed in the Municipal Heritage Inventory or found in the State register in relation to the subject site.

The subject site is located within an Aboriginal Heritage Site as recorded with the Department of Indigenous Affairs. The site - reference W01548 is shown as a Camp and is named Bukenerup Road. The site is reference by a large square which reflects the sites reliability status as unreliable.

Development will take into account the requirements of the Aboriginal Heritage Act 1972.

**Design/Planning Response to Constraints**

There are a number of surrounding ‘Rural Residential’ subdivisions in the Six Mile Hill Precinct. These are:-

- Six Mile Hill sub division (1989/1990)
- Island View sub division (2002)
- Melijinup Heights subdivision (1992)

All these sub divisions were prepared under different planning or health regulations than would currently be applied to the lot the subject of this proposal. These would have been assessed under Town Planning Scheme No 21 (prior to September 1991) or No 22 (after 27 September 1991).

Lot 2 is bounded to the west by a rail line and to the east by the Coolgardie – Esperance Highway. The proposed development is consistent with that proposed to the west and exists to the south.

As identified in the Land Capability Assessment appended to this report the site is not suitable for intensive residential development as proposed under the Local Planning Strategy. The development of the land as ‘Rural Smallholdings’ reflects the site constraints that a present.

By applying the ‘Rural Smallholdings’ zone to Lot 2 the issue of a precedent for the subdivision of rural land is addressed and is not an impediment to this proposal.
5.2 Services and Infrastructure

Roads

The Coolgardie Esperance Highway bounds the eastern boundary of the site.

Power

Western Power has an overhead electricity supply on the South boundary of the property. An application has been made to Western power for electricity connection and a quote received for the work to commence when the sub division is approved.

Water

There is abundant on site potable water on the site both from an open soak and underground sources. It is also noted that in accordance with Clause 5.18.1 of the Scheme that a water tank is required with a minimum capacity of 120,000 litres.

Effluent disposal

Property Soil types support septic tank type effluent disposal. Refer to the Land Capability Assessment report Sections 3.1, 3.2, 3.3 and 3.4.

The proposed 9.5 ha average lot size compliments installation of septic tank type effluent disposal systems.

Fire

The property is adjacent to the Six Mile Hill Bushfire Brigade Fire station that houses three (3) Fire appliances. The property owner is an active member of the Six Mile Hill Bush Fire Brigade.

Telecommunications

The site is currently serviced by Telstra.

Community facilities

No community facilities exist close to the property. All services are located in the Esperance townsite which is 10 km from the property gate to the Post office. Other services are located at Gibson some 16 km North of the property

Public Open Space

A Council Reserve – Reserve 14545 (originally the Lions Lookout Park) is located on the Southern boundary of the property. There are limited services one this reserve other than those associated with the Bushfire Brigade.
6. SCHEME AMENDMENT PROPOSAL

This amendment seeks to apply the ‘Rural Smallholdings’ zone to Lot 2 Coolgardie-Esperance Highway, Monjingup. The extent of development that will be facilitated by the rezoning is four (4) rural smallholding lots.

As outlined through this report and the attached Land Capability Assessment report from South Coast Consulting the proposed extent of development can be supported by the land whereas the proposed ‘urban’ development proposed in the longer term under the Local Planning Strategy cannot be realised.

The proposed development is consistent with the adjoining subdivision and can be easily incorporated into the adjoining precinct within the local planning strategy as outlined in the next section.

The proposed development will not have any off site impact being surrounded by road and rail on its eastern and western boundaries and reserve to the North.

7. STRATEGY AMENDMENT PROPOSAL

7.1 Existing Precinct Boundary

The current precinct boundary separates Precinct 30 and Precinct 35 by the rail line as shown below.
Precinct 35 is dissected by the Coolgardie – Esperance Highway with Lot 2 being located to the west of this road.

7.2 Proposed Precinct Boundary

This amendment takes into account the physical separation of Lot 2 from the rest of Precinct 35 by the Coolgardie – Esperance Highway.

It is proposed to modify the precinct boundary to make the Coolgardie – Esperance Highway as the precinct boundary rather than the rail corridor as shown below.

7.3 New Provisions Applying to Lot 2 as a Result of Strategy Modification

Precinct 35 prevented subdivision from occurring as the lot was identified as part of a long term residential land bank. As demonstrated in the Land Capability Report the land is unsuitable for residential development and as such ‘Rural Smallholding’ as the most suitable form of development for the subject site.

Precinct 30 requires an outline development plan to be prepared for the precinct. Given that Lot 2 is separated from the remainder of the precinct and that an ODP has been prepared for the current Precinct 30 the level of detail for one lot will be diminished.
A plan has already been prepared showing the subdivision of Lot 2 into 4 parcels. As can be seen one access point is proposed for the 4 lots and they all exceed the minimum lot area of 8ha stipulated under the Local Planning Strategy.

It is considered that this plan can form the basis of an ODP for Lot 2 Coolgardie - Esperance Highway to be prepared once the strategy amendment has been finalised.

8. CONCLUSION

The proposed rezoning of Lot 2 Coolgardie-Esparance Highway will facilitate the creation of four (4) equal sized ‘Rural Smallholdings’ lots.

This amendment also modifies the Local Planning Strategy to include Lot 2 within the adjoining precinct which caters for Rural Smallholding development.
The fact that Lot 2 was located within Precinct 35 – Six Mile Hills and not Precinct 30 – Bukenerup RSH was not based on a detailed land capability assessment. The Land Capability assessment shows that Lot 2 is only suitable for Rural Smallholdings development and hence the Scheme and Strategy need to be amended.
Appendix 1 – Land Capability Assessment
LAND CAPABILITY ASSESSMENT

LOT 2 DAVIS ROAD, MONJINGUP

November 2010

Client: Looranah Pty Ltd
PO Box 169, ESPERANCE 6450
Ph: 90761200

Prepared by:
Catherine Field
South Coast Consulting
PO Box 1993, ESPERANCE WA 6450
Ph: 96783232 or 0424853108
E: cathfield@gmail.com
TABLE OF CONTENTS

1.0 THE SITE 4
  1.1 CURRENT LAND USE 4
  1.2 SURROUNDING LAND USE 4
  1.3 SUBDIVISION AND LOCAL PLANNING HISTORY 5

2.0 PHYSICAL ENVIRONMENT 8
  2.1 CLIMATE 8
  2.2 TOPOGRAPHY 8
  2.3 VISUAL IMPACT 8
  2.4 SOILS 8
  2.5 SURFACE WATER HYDROLOGY 8
  2.6 HYDROGEOLOGY 9
  2.7 VEGETATION 9

3.0 BACKGROUND INFORMATION 12
  3.1 ONSITE EFFLUENT DISPOSAL SYSTEMS 12
  3.2 CONVENTIONAL SEPTIC SYSTEMS 12
  3.3 ANAEROBIC TREATMENT UNITS 12
  3.4 WASTEWATER DISPOSAL REGULATORY REQUIREMENTS AND PROPOSED DEVELOPMENT 13

4.0 ONSITE INVESTIGATIONS 15
  4.1 SOIL PROFILES 15
  4.2 PHOSPHORUS RETENTION INDEX 15
  4.3 SOIL LANDSCAPE UNITS 17
  4.4 LAND CAPABILITY 19
  4.5 ASSESSMENT OF LAND CAPABILITY CHARACTERISTICS 19
    4.5.1 EASE OF EXCAVATION 19
    4.5.2 FLOOD HAZARD 20
    4.5.3 LAND INSTABILITY 20
    4.5.4 MICROBIAL PURIFICATION ABILITY 20
    4.5.5 SOIL ABSORPTION 20
    4.5.6 WATERLOGGING/INUNDATION RISK 20
    4.5.7 WATER EROSION HAZARD 20
  4.6 LAND CAPABILITY CLASSES AND MAPPING 21

5.0 CONCLUSIONS AND RECOMMENDATIONS 24
  5.1 ABILITY TO SUSTAIN SUBDIVISION 24
  5.2 BASIS FOR REZONING 24
  5.3 OVERALL CONCLUSIONS AND RECOMMENDATIONS 25

REFERENCES 26

APPENDIX 1: SOIL PROFILE LOGS 27
List of Figures

Figure 1: Location of Site__________________________________________________________ 6
Figure 2: Proposed Subdivision for Lot 2 Davis Road______________________________ 7
Figure 3: Surface Water Features, Vegetation and Buffer Zones____________________ 11
Figure 4: Location of Test Holes on Lot 2 Davis Road______________________________ 16
Figure 5: Soil Landscape Units of Lot 2 Davis Road_______________________________ 18
Figure 6: Land Capability Map for Septic Tanks for a Rural Smallholdings Subdivision_ 23

List of Tables

Table 1: Meeting of Regulatory Requirements for Waste Disposal____________________ 13
Table 2: Phosphorus Retention Index (PRI) Results for Various Test Holes___________ 15
Table 3: Soil-Landscape Units for Lot 2 Davis Road_________________________________ 17
Table 4: Rating of Various Land Capability Characteristics for Lot 2 Davis Road______ 19
Table 5: Land Capability Classes for Given Land Use Types________________________ 21
Table 6: Land Capability Rating Table for Soil-Landscape Units_______________________ 21
1.0 THE SITE
Lot 2 Davis Road, Monjingup (Esperance Location 391, Lot 2) is located approx 10kms north of the main Esperance town on Six Mile Hill (Figure 1). It is situated on the western side of the Coolgardie-Esperance Highway, south-west of Melijinup Road and 1.5kms north of the main Lake Warden wetland. It covers an area of 38 hectares and is presently zoned Rural. It is proposed that Lot 2 Davis Road be subdivided into 4 lots of 9.5 hectares each and rezoned from Rural to Rural Smallholdings. The site has been surveyed by Graham Gath Surveys and shows the proposed subdivision (Figure 2).

This report has been commissioned by the owners, Looranah Pty Ltd, as requested by the Shire of Esperance planning officers, to demonstrate the land capability of Lot 2 Davis Road to be rezoned to Rural Smallholdings and to sustain effluent disposal systems onsite.

1.1 Current Land Use
Owners of Lot 2 Davis Road have been owner-occupiers on the property since 1977. There is one established residence on the property (with a septic tank system), built in the 1930's, cattle yards and two sheds.

A study of property size and commercial agricultural businesses in the Lake Warden Catchment found that commercial agricultural businesses tended to hold land parcels greater than 300 hectares; hybrid properties (some commercial, some non-commercial) ranged from 40 to 300 hectares and lifestyle farms were predominately from 2 to 150 hectares (Wilkinson, 2007).

The owners of Lot 2 Davis Road fall into the lifestyle farm category with the majority of their income made off the property. The size of the property and the constraints on the land use means this property is not viable for the rural purpose it is currently zoned for.

The owners run 3 horses and between 20-40 head of cattle on the land. This is an active breeding flock and the numbers vary during the year depending on whether there are calves on the property or not. Some of these cattle are then either sold or slaughtered each year to ensure the property is not overstocked. The cattle enterprise is run mostly for the purposes of family food supply rather than for commercial profits.

The pastures on the property are predominately kikuyu grass with a small amount of couch grass. Kikuyu is one of the recommended perennial pastures for landholders to establish under the Esperance Regional Forum’s (ERF) catchment management program to assist in water uptake and protection of the Lake Warden Wetlands. Kikuyu is recognized as the one of the most water efficient pastures suited to the Esperance sandplain soils. Pastures are fertilized annually with 4 tonnes of Superphosphate to assist their growth and feed potential for the livestock on the property.

1.2 Surrounding Land Use
There are over 45 small rural holdings within 1km of Lot 2 Davis Road, with the majority zoned Rural Residential contained with the Six Mile Hill Precinct (Shire of Esperance, 2006). The small blocks (<2ha) are mostly located in a southerly direction between the property and the Lake Warden wetland and nearby on Melijinup Road there is also a rural residential subdivision. To the north and north east of the site is industrial zoned land including the Shark Lake Abattoir (owned by the Shark Lake Food Group) and the Shark Lake Industrial Park (owned by the Shire of Esperance). On the western side across the railway line (called the Bukenerup Precinct) the land is zoned Rural or proposed Rural Smallholdings. On the eastern side of the Coolgardie-Esperance Highway the land is zoned Rural. The land use in the area is therefore not uniform.
1.3 Subdivision and Local Planning History

The Shire of Esperance local Planning Scheme No 23 came into effect on 19th February 2010 and its supporting document the Local Planning Strategy (LPS) was adopted in January 2006. The Shire of Esperance Local Planning Strategy is a document designed to guide and set future direction for the long–term development of the Esperance region. The Scheme provides the statutory framework to achieve the vision and strategies of the LPS. The LPS therefore does not form part of the Scheme and can be reviewed and amended. Lot 2 Davis Road is listed under the LPS as proposed Rural Residential in the Six Mile Hill precinct (Shire of Esperance, 2006).

The owner of Lot 2 Davis Road is proposing to rezone the land from its current zoning of Rural, to Rural Smallholdings rather than Rural Residential. It is intended that the property will be subdivided into a four lots with a lot size of 9.5ha each. Whilst the area is contained with the Six Mile Hill precinct no studies or site assessments have been undertaken to determine the property's suitability for Rural Residential development and this is why this report has been commissioned.

Lot 2 Davis Road has been the subject of a previous subdivision application to the Shire of Esperance. This previous application was not approved, but was assessed under the 18 year old Shire of Esperance Town Planning Scheme No 22 which did not allow for Lot 2 Davis Road to change its zoning from Rural to Rural Smallholdings.

There are however a number of surrounding Rural Residential subdivisions in the Six Mile Hill Precinct. These are:-

- Six Mile Hills subdivision (done in 1989/1990)
- Island View subdivision (done in 2002) and;
- Melijinup Heights subdivision (done in 1992)

All of these subdivisions were done under different planning or health regulations than would currently be applied to Lot 2 Davis Road. They would have been assessed under the Shire of Esperance’s Town Planning Scheme Number 21 (prior to September 1991) or Number 22 (after 27th September 1991) and prior to the Draft Country Sewerage Policy (DoH, 2003).

Since the previous Rural Residential subdivisions in the Six Mile Hill Precinct there has also been increased awareness and environmental studies undertaken concerning hydrogeology of the area and the impact of small lot develop on the Lake Warden wetland system especially those in close proximity to the wetland that was not a significant factor 10 to 20 years ago.
Figure 1: Location of Lot 2 Davis Road, Monjingup, Esperance, Western Australia.
Figure 2: Proposed Subdivision for Lot 2 Davis Road

ALL AREAS SUBJECT TO SURVEY

GRAHAM GATH SURVEYS - ESPERANCE W.A.

PROPOSED SUBDIVISION OF LOT 2 PT LOC 391
COOLGARDE - ESPERANCE HIGHWAY.

GRAHAM GATH SURVEYS - ESPERANCE W.A.

PO BOX 100, 6459.
PHONE (08) 9071777.
FAX (08) 90717777.

DATE 1/12/2008

7
2.0 PHYSICAL ENVIRONMENT

2.1 Climate
Lot 2 Davis Road is situated approximately 6km north of the Bureau of Meteorology station at Esperance and experiences a Mediterranean climate with mild to warm, dry summers and cool, wet winters. The average annual rainfall is 619mm with over 68% of the rainfall falling between May and October with the wettest month being July. The average maximum summer temperature is 26°C and the average maximum winter temperature is 18°C (BOM, 2008). Recent trends in rainfall patterns suggest that Esperance is experiencing an increase in summer rainfall.

The dominant wind direction in summer is from the southeast and afternoon sea breezes occur from October to March. During winter, southwest winds prevail and northwest storm events occur (BOM, 2008). Wind directions and speed could have some impact on intensive subdivision of this property. The residence of Lot 2 Davis Road is located within 1.5 to 2km from the Esperance Abattoirs. Owners are aware of the smell of the abattoirs' operations a few of times each year when a northerly or north-easterly wind is blowing, specifically on a Monday when the bone digester operates after being ideal on the weekend (B. Wilioughby, pers comm., 2010). The present owner is not concerned by this odour.

2.2 Topography
The block is characterised by a moderately inclined granitic outcrop locally known as Six Mile Hill. The slope of the land varies from 2 to 8 % slope. The slope of the property causes water to shed off the land and be deposited into the two waterways that exist on the property that can become waterlogged and experience some flooding at peak rainfall events. There has also been a small amount of water erosion in the past (B. Wilioughby, pers comm., 2010).

2.3 Visual Impact
The property is on the lee side of Six Mile Hill and whilst is has a pleasant view down the Melijinup Creek valley, it is certainly not as picturesque and appealing as the neighbouring subdivision on the other side of Six Mile Hill or the Melijinup Road subdivision that both overlook the wetlands of the Lake Warden System and in some areas have a view to the ocean.

2.4 Soils
The property is located in the Stirling Province of Western Australia on the Esperance Sandplain Zone (254). An investigation was undertaken on the soils as part of the land capability assessment and full details of the soil types are to be found in section 4.1, section 4.3 and Appendix 1.

2.5 Surface Water Hydrology
Lot 2 Davis Road is located in the Esperance Western Lakes Catchment and is in the Melijinup sub-catchment. The main waterway of this sub-catchment is the Melijinup Creek that runs through the property (Figure 3). It is the intention of the owner to completely fence the Melijinup Creek on the property from livestock as part of this process.

The upper reaches of the Meljinjup Creek start at Shark Lake near Shark Lake Road. Shark Lake occasionally overflows during flood conditions and drains into the Melijinup Creek that then drains in a south-easterly direction across Esperance-Coolgardie Highway onto the Shark Lake Abattoir site, then back across the highway into Melijinup Lake (Figure 3). Melijinup Lake is contained in an unallocated crown land reserve that abuts Lot 2 Davis Road on its northern boundary. The lake then overflows into the Melijinup Creek system (on Lot 2 Davis Road) and traverses 2.0km downstream to enter the Lake Warden Wetland (Landform Research, 2003).

Hydrological studies of the nearby Lake Warden wetland has found that it is primarily groundwater fed with small inflows of surface water from the Melijinup and Bukenerup Creeks and the lake water levels decline only through evaporation. The groundwater system under the lakes is
complex, with two main aquifers present: the shallow, perched Pallinup aquifer, and the deeper Werrijup aquifer.

Melijinup Creek is known as a eutrophic waterway with very high levels of both nitrogen and phosphorus (SCRIPT, 2004). This is partly thought to be due to surrounding industrial uses in the catchment. Various studies and monitoring by DEC and the Shire of Esperance have shown that Shark Lake is also highly eutrophied.

2.6 Hydrogeology
Lot 2 Davis Road has two distinctive geological features. The smallest being the alluvial sands that run from the Melijinup Swamp north of the property and carry through under and surrounding the Melijinup Creek. These sands are also present in the north-east corner of the block. The most obvious geological feature is the visible outcrops of granitoid rock that occur in the south west corner of the block and are expressions of the wider Six Mile Hill. This basement rock forms part of the regional Albany Fraser Orogen and on this property is overlain with variable superficial sediments predominately sand over sandy loam and gravel soils (Johnstone and Baddock, 1998).

Lot 2 Davis Road is situated in the Lake Warden Fractured Rock Aquifer of the Esperance Groundwater Area but outside the Esperance Water Reserve and priority protection areas that have limitations for subdivision and land use (Department of Water, 2007). Generally groundwater in the Fractured Rock Aquifer is low yielding and of poor water quality, although it is not thought to be the case on this property (Department of Water, 2007). Yields from the known aquifers in the area is variable and can range from a few cubic metres per day (<10m3/day) in the localised perched aquifers, to more than 100m3/day in the sedimentary and weathered basement rock aquifers (Johnson and Baddock, 1998).

An unconfined aquifer or perched aquifer is present on the property that supplies the landowners with their water supply and these are expressed as fresh water seeps that have been turned into soaks. It is thought that this aquifer is high yielding but measurements have not been taken.

The property presently has 3 soaks and a 1 bore on the property (Figure 3). Soak 1 is used for the existing house water drinking supply, has never had any water quality issues and has never run out in 30 years. Soak 2 is used for stock water, but would be suitable for human consumption and has the potential to be used by another household. Soak 3 is a natural soak or spring that does dry out in summer, but could be made permanent if excavated. There is an uncased, unused bore (Bore 1) on the property that is approximately 3-5m metres deep. Water quality for all soaks and the bore was not tested, but likely to be fresh as it is used for human consumption and stock water. It is known that the some nearby rural residential lots of the Melijinup Heights development have issues regarding access to potable water as does the Department of Agriculture and Food office (DAFWA). The majority are solely reliant on rainwater with some saline borewater used for ablations only (B. Nicholas, pers comm., 2010).

2.7 Vegetation
There is presently about 6 hectares of Saltwater Paperpark (Melaleuca cuticularis) Swamp vegetation plus a further 3.2ha of Pale Rush (Juncus pallidus) on the property. The majority of the remnant vegetation is situated along Melijinup Creek and some along the other small drainage line that comes out of a fresh water soak. It is in Degraded to Good condition but dominated by Melaleuca species overstorey and rush/sedge understorey due to grazing by livestock. The occasional WA Christmas Tree (Nuytsia floribunda) occurs as isolated paddock trees along with a few planted Eucalyptus species.
The landowners have revegetated an area of 2ha of *Melaleuca cuticularis* (Saltwater Paperbark), *Eucalyptus occidentalis* (Flat Topped Yates) and other species and fenced it from stock in the north western corner of the property adjoining Melijinup Creek. This has been undertaken as part of the Esperance Regional Forum’s Lake Warden Catchment program to increase water use across the catchment and protect the waterways.

In total, excluding treelines and isolated paddock trees, there is an estimated 11.2 hectares (29% of property) under existing or planted vegetation.
Figure 3: Surface Water Features, Vegetation and Buffer Zones on Lot 2 Davis Road
3.0 BACKGROUND INFORMATION

3.1 Onsite Effluent Disposal Systems
Over the last few decades there has been vast improvements in the technology associated with wastewater treatment. In regional areas, where a deep sewer is not available, the traditional method of dealing with onsite wastewater treatment and disposal has been to install septic tank systems with a subsurface leach drain or soakwell. Other options are Anaerobic Treatment Units (ATU) or Alternative Treatment Systems (ATS).

3.2 Conventional Septic Systems
Conventional septic systems known as septic tank systems generally consist of a watertight septic tank designed to hold wastewater. The waste in the septic tank is treated by the heavier solids sinking to the bottom and undergoing a anaerobic process whereby bacteria, in the absence of oxygen, breakdown the solids changing their composition to a sludge like form, which then builds up in the bottom of the tank. Lighter waste such as oil and grease float to the top of the liquid and form a crust. The remaining liquid, called effluent flows out of the tank into the drainage system where it soaks into the surrounding soil and is broken down by the surrounding soil microbes. When new wastewater enters the tank it pushes out the treated effluent water into a drain. The drain is often made of a perforated pipe buried in a trench that is backfilled with gravel or similar porous material (leach drains or soakwells).

Septic tanks are generally cheaper to install than other effluent disposal systems, but they do require routine maintenance to stop accumulation of fats and soils from flowing into the drainage system. Soil surrounding the drainage system can also become over loaded when used for many years and less permeable. This is when effluent builds up in the drainage system and can back up into household pipes. Septic tank systems are a common and practical method of wastewater treatment provided the site characteristics are suitable and the system is maintained regularly.

3.3 Anaerobic Treatment Units
Anaerobic Treatment Units (ATU) work on similar principles to septic systems except they use microbes to breakdown the waste in an aerobic process (in the presence of oxygen) as opposed to the anaerobic process used by septic tank systems. ATU’s tend to break down the waste matter more efficiently and achieve quicker rates of decomposition of the nutrient-rich wastewater. ATU’s are becoming more popular in environmentally sensitive areas (ESAs) due to the higher quality of effluent coming out of the system compared to traditional septic tank systems. The higher quality of the effluent minimises health risks, greatly reduces the environmental impact on surrounding areas and any potable water supplies.

ATU’s generally consist of a series chambers plus a disposal system. The first chamber resembles a septic tank system where the solids settle, undergo anaerobic digestion and a sludge layer is formed. The wastewater then flows into the second chamber where air is added to the process to assist in the bacterial breakdown of the nutrients through aerobic digestion. The third chamber is used to clarify the effluent and remove phosphorus through the process of adding flocculants e.g. alum, and a fourth chamber may be added to introduce chlorine as well. To ensure optimum operation and a high quality of effluent is maintained ATU’s need to be serviced regularly, about every three months.
### 3.4 Wastewater Disposal Regulatory Requirements and Proposed Development

The health and environmental requirements for wastewater treatment and disposal for developments not serviced by deep sewerage systems are contained in the *Draft Country Sewerage Policy* (Department of Health, 2003).

Lot 2 Davis Road is situated in an area that does not have deep or reticulated sewerage. The closest deep sewerage is located approximately 4kms south of the property on Norseman Road which is the northern boundary of the extent of the Water Corporation’s operating licence for the Esperance region.

Lot 2 Davis Road has the Melijinup Creek watercourse on the property, neighbours the Melijinup Swamp on crown land to the north and the RAMSAR listed Lake Warden Wetland is located 1.5kms directly south or 2km via streamflow. The property is however outside the 1km up-gradient capture zone for the Lake Warden Wetland and the Melijinup Swamp is not listed in the directory of important wetlands, conservation category wetlands, resource enhancement wetlands or part of the RAMSAR list of wetlands. These factors mean that the property is not required to meet the criteria for the Environmentally Sensitive Areas (ESA) section of the *Draft Country Sewerage Policy*.

#### Table 1: Meeting of Regulatory Requirements of Waste Disposal on Lot 2 Davis Road

<table>
<thead>
<tr>
<th>Site and Wastewater Requirements</th>
<th>Regulatory Requirements</th>
<th>Proposed Development and Meeting of Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lot Size &amp; Number</strong></td>
<td>Reticulated sewerage is a requirement for lots less than 2000m². No more than 25 lots in unreticulated areas.</td>
<td>The proposed development will be 4 lots with a lot size of 9.5ha.</td>
</tr>
<tr>
<td><strong>Groundwater Levels</strong></td>
<td>Needs to be a minimum 0.5m separation between the natural ground surface and the highest known groundwater level.</td>
<td>Soil Profile logs (Appendix 1) show that there were no groundwater levels above 0.5m but test holes in wet areas were not undertaken as these areas are not proposed for development.</td>
</tr>
<tr>
<td></td>
<td>The depth to the highest known groundwater level from the underside of a septic tank drainage receptacle shall be a minimum of 1.2 metres.</td>
<td>Drilling to this depth was not possible in some rocky areas and definite depths to watertables have not been determined.</td>
</tr>
<tr>
<td><strong>Slope</strong></td>
<td>Natural land slope shall not exceed a 1:5 gradient where wastewater systems will be installed.</td>
<td>The natural land slope ranges up to 8% and does not exceed 20% (1:5).</td>
</tr>
<tr>
<td><strong>Soil Characteristics</strong></td>
<td>Soil characteristics that are capable of receiving all wastewater generated on the site.</td>
<td>Soils in the E2 soil-landscape unit are best suited and capable of receiving all the wastewater generated on site.</td>
</tr>
<tr>
<td><strong>Environmentally Sensitive Areas (ESA)</strong></td>
<td>ESA with a soil PRI of: &lt;5 need a minimum buffer distance from watercourse or wetlands of 100m; &gt; 5 need a minimum buffer distance from a watercourse of 30m.</td>
<td>The lot is located outside the 1km up gradient catchment area from the ESA of Lake Warden. Deep sandy soils (with PRI &lt;5) on the property are not the first choice areas for the location of septic systems.</td>
</tr>
<tr>
<td>Public Drinking Water Source Areas</td>
<td>Buffer zones of a minimum 100 metres and other requirements for Priority 1, 2, 3 &amp; 4 areas</td>
<td>The lot is located outside the Public Drinking Water Source area and therefore does not require these buffers</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Buffer Distances</strong></td>
<td>Wastewater systems need to be discharged more than 30m from any well, stream or water supply used for human consumption</td>
<td>30m buffers have been left around existing soaks on the property and the adjoining water sources on the neighbours property (shown as red dotted line in Figures 3 and 6)</td>
</tr>
<tr>
<td><strong>Wastewater Systems</strong></td>
<td>No wastewater system shall be constructed so effluent of liquid waste is discharged into the ground within 6 metres of any subsoil drainage system or open drainage channel</td>
<td>All existing drainage channels and subsoil drainage systems have been excluded in the buffer zone and won't be subject to effluent disposal</td>
</tr>
<tr>
<td><strong>Inundation or Flooding</strong></td>
<td>Wastewater disposal site should not be subject to inundation of flooding more often than once in 10 years</td>
<td>There have been three, 1 in 100 year flood events in 1999, 2000 and 2007 and none of the proposed sites was subject to flooding or inundation due to the slope of the land.</td>
</tr>
</tbody>
</table>
4.0 ONSITE INVESTIGATIONS

4.1 Soil Profiles
On the 22nd of June 2010 15 test holes (H1 to H15) were drilled using a geoprobe to ascertain soil types and characteristics. The test holes were distributed across the site in order to determine changes in soil type (texture) and topography (Figure 4). Soil pH measurements were also taken of each soil horizon. A descriptive summary of each soil profile and a photograph is shown in Appendix 1 and fully described in Section 4.3 Soil Landscape Units.

4.2 Phosphorus Retention Index
The Phosphorus Retention Index (PRI) provides a measure of the phosphorus-holding capacity of a soil. PRI is important as it provides an indication of whether phosphorus discharged in the effluent (e.g. from septic tanks) will be bound to soils and held in the soil profile or leached into the underlying groundwater. High PRI results above 20 indicate a moderate phosphorus retention capability and those above 100 as High (Van Gool, Tille and Moore, 2005).

Samples were collected from a number of test holes at depths into which wastewater treatment and disposal units would be installed. Those that had clay or loam characteristics along with a few sand sample were sent to CSBP Laboratory for PRI testing. Laboratory results of the PRI sampling results are included in Appendix 1 soil profile logs, with the results summarised in Table 2.

<table>
<thead>
<tr>
<th>Hole</th>
<th>Phosphorus Retention Index (PRI) Value</th>
<th>Phosphorus Adsorption Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>31.90</td>
<td>Moderate (M)</td>
</tr>
<tr>
<td>2</td>
<td>0.60</td>
<td>Very Low (VL)</td>
</tr>
<tr>
<td>3</td>
<td>0.30</td>
<td>Very Low (VL)</td>
</tr>
<tr>
<td>4</td>
<td>191.20</td>
<td>High (H)</td>
</tr>
<tr>
<td>8</td>
<td>247.60</td>
<td>High (H)</td>
</tr>
<tr>
<td>9</td>
<td>535.40</td>
<td>High (H)</td>
</tr>
<tr>
<td>10</td>
<td>111.50</td>
<td>High (H)</td>
</tr>
<tr>
<td>11</td>
<td>60.50</td>
<td>Moderately High (MH)</td>
</tr>
<tr>
<td>12</td>
<td>120.90</td>
<td>High (H)</td>
</tr>
<tr>
<td>14</td>
<td>39.50</td>
<td>Moderately High (MH)</td>
</tr>
</tbody>
</table>

rated using Van Gool, Tille and Moore, 2005
Figure 4: Location of Test Holes on Lot 2 Davis Road
4.3 Soil Landscape Units

A description of soil landscape units of the area has been broadly documented in the Esperance Land Resource Survey (Overhue et al., 1993) and this along with soil data, landform and topography data collected was used to determine the specific soil landscape units on Lot 2 Davis Road (Figure 5).

Table 3: Soil-Landscape Units for Lot 2 Davis Road

<table>
<thead>
<tr>
<th>Land Units</th>
<th>System</th>
<th>Landform, Topography and Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E2b</td>
<td>Esperance</td>
<td>Gently undulating plain, slopes 1-3%; relief &lt;9m; Shallow Sandy/loam duplex soils with subsurface gravel</td>
</tr>
<tr>
<td>E2d</td>
<td>Fleming Series</td>
<td>Undulating rises to low hills, slopes 3 – 10%; relief &gt;9m; Shallow sandy/loam duplex soils with subsurface gravel</td>
</tr>
<tr>
<td>E3b</td>
<td>Esperance</td>
<td>Gently undulating plain; slopes 1 – 3%; relief &lt; 9m; Pale Grey Deep Sands</td>
</tr>
<tr>
<td>E3c</td>
<td>Corinup Series</td>
<td>Undulating plain; slopes 3 – 10%; relief &lt; 9m; well drained; Pale Grey Deep Sands</td>
</tr>
<tr>
<td>E3f</td>
<td></td>
<td>Minor River Valleys; slope 3 – 8%; relief 5-30m; well drained; Pale Grey Deep Sand over Yellow Sands</td>
</tr>
<tr>
<td>WS</td>
<td>Wet Soil</td>
<td>Slopes &lt; 1%; Soil Profile Saturated for majority of the year; Swampy soil, not described</td>
</tr>
<tr>
<td>SWS</td>
<td>Semi-Wet Soil</td>
<td>Non-saline waterlogged soils, saturated for a major part of the year; feed by fresh water soaks; undescribed soil</td>
</tr>
<tr>
<td>R</td>
<td>Bare Rock</td>
<td>Granitic outcrop; partially buried</td>
</tr>
</tbody>
</table>

There are four main soil-landscape units on Lot 2 Davis Road (Table 3) which are the:

i) Fleming Series soil-landscape series
ii) Corinup soil landscape series
iii) Wet soil landscape unit and;
iv) Bare Rock.

The Fleming Series landscape units are characterised by shallow sandy loam duplex soils with subsurface gravel. The E2b and E2d units are differentiated by the difference in slope and rate of rise.

The Corinup Series of landscape units are characterised by pale grey deep sands with some areas over coarse yellow sands. Again the relief differentiates the E3b, E3c and E3f units.

The Wet Soil landscape units cover the areas around the permanently wet Melijinup creek system (WS unit), the smaller drainage system in the south-west corner of the property and the underground aquifer that feeds the fresh water Soak 1 (SWS unit) and the small creek.

The Bare Rock landscape unit covers the area on the property where the basement granitoid rock is exposed and the surrounding shallow soils.
Figure 5: Soil-Landscape Units of Lot 2 Davis Road
4.4 Land Capability

Land capability can be referred to as the natural ability of the land to support a specific use without causing permanent damage i.e effluent disposal from septic tank systems. An assessment of the land can determine constraints to the proposed land used that may require environmental planning or engineering solutions to minimise their impact or overcome them. There as been no detailed land capability studies done for the Esperance region.

The undertaking of this land capability assessment was guided by the principles outlined in the report, "Land Evaluation Standards for Land Resource Mapping – Assessing Land Qualities and Determining Land Capability in South-Western Australia" (Van Gool, Tille and Moore, 2005). The Soil Landscape Units are used as a basis on which to overlay the land capability of the property for subdivision and ability to sustain septic tank systems.

4.5 Assessment of Land Capability Characteristics

The main characteristics required in assessing land capability for septic tanks in rural small holdings or rural residential and this property are:

- Ease of excavation
- Flood hazard
- Land instability
- Microbial purification ability
- Soil absorption
- Waterlogging
- Water erosion hazard

The soil landscape units for Lot 2 Davis Road (Figure 5) were used as the base map and each unit was rated for the various characteristics as listed above. Rating each characteristic against each soil-landscape unit (Table 4) was part of the process required to formulate the land capability class of each unit. An explanation of the ratings given for each characteristic and what aspects were assessed as part of that characteristic is explained below.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>WS</th>
<th>SWS</th>
<th>R</th>
<th>E2b</th>
<th>E2d</th>
<th>E3b</th>
<th>E3c</th>
<th>E3f</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease of Excavitation (x)</td>
<td>VL</td>
<td>L</td>
<td>VL</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Flood Hazard (f)</td>
<td>H</td>
<td>M</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>L</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Land Instability (c)</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Microbial purification ability</td>
<td>VL</td>
<td>L</td>
<td>VL</td>
<td>M</td>
<td>M</td>
<td>L</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>Soil absorption (zj)</td>
<td>VL</td>
<td>L</td>
<td>VL</td>
<td>M</td>
<td>M</td>
<td>H</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Waterlogging (i)</td>
<td>VH</td>
<td>M</td>
<td>N</td>
<td>N</td>
<td>M</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Water erosion hazard (e)</td>
<td>M</td>
<td>M</td>
<td>L</td>
<td>M/H</td>
<td>L</td>
<td>M</td>
<td>M/H</td>
<td>M/H</td>
</tr>
</tbody>
</table>

Note: N= nil; VL= very low, L= low, M= moderate, H= high, VH= very high, E= extreme

4.5.1 Ease of Excavation

Ease of excavation relates to the ability to install infrastructure such as septic tanks and other structures used to dispose of effluent and wastewater. Impediments to excavation include things such as rock outcrops, waterlogging risk, soil texture and slope.

The Wet Soil (W) and Rock (R) soil-landscape units have a very low capability for excavation due to the evident waterlogging on the wet soil and the rock barrier not allowing excavation. The semi-wet soil (SWS) unit has a low capability for excavation too. All these soil-landscape units would not
be considered suitable for the location for a septic tank system. All the other soil-landscape units have a moderate capability for excavation.

4.5.2 Flood Hazard
Flood hazard rating determines the likelihood and frequency of the land being covered by moving flood water from overflowing streams and/or run-off from adjacent slopes (Gool, Tille & Moore, 2005). The flood hazard rating of the Wet Soil (W) soil-landscape units is high due to the regular flow of Melijinup Creek and overflow from Melijinup Swamp (Table 4). The Semi-wet Soil (SWS) unit has also experienced some overland flows in the past from heavy rainfall events but is only a moderate rating for flood hazard due to the landform slope that allows water to move away relatively quickly. The E3b soil-landscape unit has a low flooding risk due to its low relief and proximity to Melijinup Creek. All other units have no risk of flooding.

4.5.3 Land Instability
Land instability assesses the potential for rapid movement of a large volume of soil through slope failure, shifting sands, wave erosion or subsidence. None of the soil-landscape units on Lot 2 Davis Road are subject to this problem (Table 4) due to the gentle slopes of less than 10%.

4.5.4 Microbial Purification Ability
Microbial purification is assessed to determine the soil’s suitability for use in removing microorganisms that can come from effluent disposal systems such as septic tanks. The microorganisms can be detrimental to public health. The assessment is based on soil permeability, depth to water table and slope.

All soil-landscape units with the exception of the E2b and E2d units were considered very low to low microbial purification ability due to the high sand content of these soils (Table 4). The E2b and E2d units were rated moderate. This classification was determined by estimating soil permeability according to the soil textures but depth to water table was not known past about 0.8m.

4.5.5 Soil Absorption
This characteristic relates to the ability of the soil to absorb a liquid and in this case the effluent from a septic tank system. Looking at the soil permeability, degree of waterlogging, soil depth and amount of stones in the soil profile can assist in determining soil absorption.

The soil absorption for Lot 2 Davis Road (Table 4) is most suitable on the E2 and E3 soil-landscape units where it is rated moderate to high. The WS, SWS and R soil-landscape units have low to very low soil absorption rating due to waterlogging and soil depth.

4.5.6 Waterlogging/Inundation Risk
Waterlogging is excess water in a soil layer that can be accompanied by anaerobic conditions, whereas inundation is water ponding on the soil surface (van Gool, Tille and Moore, 2005). Both characteristics are assessed on average annual rainfall, landscape position and soil permeability. Lot 2 Davis Road has been assessed as being within the high rainfall zone (> 600mm/yr) as the average annual rainfall for Esperance is 619mm (BOM, 2008).

The only soil-landscape units prone to waterlogging or inundation are the WS (wet soil), SWS (semi-wet soil) and E3b units (Table 4). All the other units have no risk due to the landform and slope of the property.

4.5.7 Water Erosion Hazard
Water erosion hazard assessment is based on the inherent erodibility of a soil type and the slope. The surface rock was automatically given a low water erosion hazard due to its low erodibility. The
other soil-landscape units were given a moderate rating for water erosion hazard, this was particularly applicable on the land where the slope was in excess of 3% and because of the sandy nature of the surface soils across the property (Table 4).

4.6 Land Capability Classes and Mapping
The ratings of the characteristics was undertaken to assist in determining the land capability class for each soil-landscape unit. The land capability classes (Table 5) range from 1 to 5, with 1 being very high and highly suitable to 5 being very low and with severe limitations. These ratings were then cross-correlated with the characteristics ratings (Table 4) and an overall land capability ratings table was formulated (Table 6). The outcome of this was the pictorial representation of the soil-landscape units (Figure 6) using rates of Category A, B or C land.

Table 5: Land Capability Classes for Given Land Use Types

<table>
<thead>
<tr>
<th>Capability Class</th>
<th>General Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Very High</td>
<td>Very few physical limitations present and easily overcome. Risk of land degradation is negligible.</td>
</tr>
<tr>
<td>2 High</td>
<td>Minor physical limitations affecting either productive land use and/or risk of degradation. Limitations overcome by careful planning.</td>
</tr>
<tr>
<td>3 Fair</td>
<td>Moderate physical limitations not easily overcome by standard development techniques and/or resulting in high risk of degradation. Extensive conservation measures and careful ongoing management required.</td>
</tr>
<tr>
<td>4 Low</td>
<td>High degrees of physical limitation not easily overcome</td>
</tr>
<tr>
<td>5 Very Low</td>
<td>Severe limitations. Use is prohibitive in terms of development costs or the associated risk of degradation.</td>
</tr>
</tbody>
</table>

Source: Van Gool, Tille and Moore, 2005

Table 6: Land Capability Rating Table for Soil-Landscape Units on Lot 2 Davis Road

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>WS</th>
<th>SWS</th>
<th>R</th>
<th>E2b</th>
<th>E2d</th>
<th>E3b</th>
<th>E3c</th>
<th>E3f</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease of Excavation (x)</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Flood Hazard (f)</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Land Instability (c)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Microbial purification ability (p)</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Soil absorption (zj)</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Waterlogging (i)</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Water erosion hazard (e)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>OVERALL RATING</td>
<td>4-5</td>
<td>1,2,3</td>
<td>4</td>
<td>1-2</td>
<td>1-2</td>
<td>1,2,3</td>
<td>1-2</td>
<td>1-2</td>
</tr>
<tr>
<td>OVERALL CAPABILITY CLASS</td>
<td>C1</td>
<td>B2</td>
<td>C1</td>
<td>A1</td>
<td>A1</td>
<td>B1</td>
<td>A1</td>
<td>A1</td>
</tr>
</tbody>
</table>

21
The map units for Figure 6 are classified as:

Category A land – if there is 50% or more high capability zone land units (A1 if there is 70-100% capability and A2 is there is 50 – 69%).

Category B land – if there is less than 50% high capability zone land units but 50% or more moderate of high capability zone land units (B1 if there is 70-100% moderate capability and B2 if there is 50-69%).

Category C - if there is 50% or more low capability zone land units (C1 if there is 50-69% low capability and C2 if there is 70-100%).
Figure 6: Land Capability Rating for Septic Tanks for Rural Smallholding Subdivision on Lot 2 Davis Road
5.0 CONCLUSIONS AND RECOMMENDATIONS

South Coast Consulting (Catherine Field) was commissioned by Looranah Pty Ltd to undertake a land capability assessment and an onsite effluent disposal investigation for the proposed subdivision of Lot 2 Davis Road by the owners. The investigation included soil profile logging at 15 location across the site and soil testing.

5.1 Ability to Sustain Subdivision

The land capability assessment showed that Lot 2 Davis Road has the ability to be subdivided and parts of the property (those classes A1 and B1) to be suitable for onsite effluent disposal (Figure 6). Out of the 38 hectares on the property there is about 19.5 hectares that is considered Category A land that could contain effluent systems. The remainder of the property is either bare rock, wet soil or within the 30m buffer zone from a waterway, soak or water bore used for human consumption or for stock water.

5.2 Basis for Rezoning

It is important to look at the context of the Lot 2 Davis Rd within the surrounding land uses and zoning. There is still other land within the Six Mile Hill Precinct that has yet to be developed further for Rural Residential development.

The property at 38 hectares is a lifestyle block and too small to operate as a viable commercial agricultural property. The owner’s options are presently limited with Rural zoning. In 30 years that the owners have had the land it has not been a viable size to earn sufficient agricultural income from. The owners cannot continue to sustain this into the future and wish to distribute some of their land asset to their children through subdivision. If subdivision is not approved the only way they can release the capital value of the land would be to sell the property. Potential buyers for this block may be limited if rezoning is not passed as there are few larger neighbouring Rural zoned landowners that could purchase it as an “add-on” block and the sandplain soils do not lend themselves to be turned into an intensive farming operation.

As mentioned above there is only about 19.5 hectares of Lot 2 Davis Road that is suitable for effluent disposal systems and to subdivide this and allow for part of these soil-landscape units on each block would only yield approximately 4 to 9 Rural Residential lots (2 – 4ha size), minus one for the existing residence on the property. Rural Smallholdings seems a more suitable zoning for Lot 2 Davis Road.

Lot 2 Davis Road is also located adjoining to other lots that are zoned Rural Smallholdings in the Bukenerup Precinct (lots size >8ha). The Bukenerup Precinct has a lot more restrictions regarding subdivision development due to its proximity to Lake Warden. Under the LPS the Bukenerup Precinct suggests that development will not be supported unless the water quality and other environmental values of the Bukenerup and Melijinup Creek catchments are protected (Shire of Esperance, 2006). Yet the majority of the Melijinup Creek and its catchment are located in the Six Mile Hill Precinct or the Shark Lake Industrial Precinct that do not have the same conditions and different proposed zonings.

The owners are not intending to sell the subdivided lots but to gift the land to their children. More intensive subdivision down to Rural Residential lots (2ha) is considered by the owners to not currently be cost effective and return on investment for such a development would be slow. Presently demand for small lots (2ha) is very low with only one offer made in 12 months for a rural residential development in the Pink Lake area (L.Fyfe, pers comm., 2010).
5.3 Overall Conclusions and Recommendations

The overall aspects were noted for the subdivision of Lot 2 Davis Road.

- The Shire of Esperance LPS proposal for land to be zoned Rural Residential in the future does not reflect the soil-landscape, servicing or environmental constraints that affect the land.
- The land capability shows that only 51% of the property is suitable for location of effluent disposal systems.
- The land capability assessment has determined that Lot 2 Davis Road is capable of sustaining Rural Smallholding subdivision into four lots.
- The larger lot sizes (9.5ha) provide sufficient room for disposal of effluent.
- Site gradients are within the recommended 1 in 5 and there is adequate relief on the property for effluent disposal.
- It is located outside the 1km up gradient catchment of an Environmental Sensitive Area (ESA) and outside the Public Drinking Water Source Area.
- Separation distances between the natural ground surface and groundwater can be achieved over the E2 and E3 soil-landscape unit areas to a depth of 0.8m.
- On-site effluent treatment systems such as a septic tank system, would be required due to the fact the area is not serviced by deep sewerage (outside Water Corp licence area).
- Soil testing shows that the land units E2d and E2b are characterised by shallow sandy loam duplex soils with subsurface gravel and are most suited to effluent disposal (A1 capability).
- Soil tests show that the land units E3f and E3c are characterised by pale deep sands with very low PRI values and have fair to high suitability for effluent disposal (A1 capability).
- Soils in the E3b land units are characterised by pale deep sand but are less capable than the other E2 and E3 units due to their low lying position in the landscape (B1 capability).
- Soils in the WS, SWS and R soil landscape system are not suitable for effluent disposal due to rock, waterlogging, depth to groundwater and drinking water issues (B1 and C1 capability).
- That a 30m buffer zone be set from the Melijinup Creek, smaller creek in the south-western corner and the 3 soaks and 1 bore to protect water quality.
- That a conservation covenant be placed on the title and a fence erected around the main area of Melijinup Creek and surrounding vegetation to protect the water quality and environmental values of the waterway that feeds into the Lake Warden Wetland.
- Soils within the E3 land unit have low PRI values and are recommended to incorporate soil amendment in the effluent disposal area or use alternative treatment systems with phosphorus removal capability to counteract the low PRI soils and to protect the groundwater from nutrient contamination.
- The exact wastewater disposal system would be dependant on the type of house and household make up and needs to be determined prior to the issue of a building licence.

In summary, the site would be suitable for effluent disposal via a septic tank system, provided sufficient area is included on each lot for effluent disposal to soils in the E2b or E2d soil landscape units. Alternatively soils in the E3f unit could be utilised but would need to be excavated and replaced with material better suited for effluent disposal e.g. loam with a PRI of greater than 20, or use an aerobic treatment unit (ATU) instead.
REFERENCES


Department of Health (2003). Draft Country Sewerage Policy, Department of Health (DoH), Perth, Western Australia.


Fyfe, L. (2010), Laurie Fyfe, sales consultant, Professional Real Estate, Esperance, personal communications.


Willoughby, B (2010) Brian Willoughby, owner of Lot 2 Davis Road, personal communications
APPENDIX 1: SOIL PROFILE LOGS
HOLE 1

Core Number: T0000942

Soil Description: Grey deep sandy duplex

Land System Unit: E1

Surface Cover: Cleared paddock with kikuyu

Landform/Aspect: Undulating slope

Depth

<table>
<thead>
<tr>
<th>Depth Range</th>
<th>Soil Type</th>
<th>pH</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 21cm</td>
<td>Grey Sand</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td>21 - 34cm</td>
<td>Light Brown Sand</td>
<td>6.0</td>
<td>Other: Gravel present</td>
</tr>
<tr>
<td>34 - 92cm+</td>
<td>Red/Brown Sandy Loam</td>
<td>6.8</td>
<td>Other: small gravel; PRI: 31.90</td>
</tr>
</tbody>
</table>

Groundwater Depth

Not detected
Core Number: T0000943
Soil Description: Pale Deep Sand
Land System Unit: E3f
Surface Cover: Cleared paddock with predominately couch grass
Landform/Aspect: Undulating slope

Depth
0 - 16cm  Grey Sand       pH: 6.4       Other: Water repellent
16 - 52cm  White/Grey Sand pH: 6.8       Other: Water repellent
52 - 80cm+ Yellow Sand    pH: 6.5       PRI: 0.60
Groundwater Depth         Not detected
HOLE 3

Core Number: T0000944
Soil Description: Semi-wet Pale Deep Sand
Land System Unit: E3c
Surface Cover: *Juncus pallidus* (Pale Rushes) over pasture
Landform/Aspect: Slight Slope

Depth

<table>
<thead>
<tr>
<th>Depth</th>
<th>Soil Type</th>
<th>pH</th>
<th>PRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 6cm</td>
<td>Grey Sand</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td>6 - 21cm</td>
<td>Light Grey Sand</td>
<td>6.7</td>
<td></td>
</tr>
<tr>
<td>21 - 80cm+</td>
<td>White/Grey Sand</td>
<td>6.6</td>
<td>0.30</td>
</tr>
</tbody>
</table>

Groundwater Depth: Not detected
Core Number: T0000945
Soil Description: Grey Deep Sandy Duplex
Land System Unit:
Surface Cover: Cleared pasture paddock
Landform/Aspect: Gentle slope

Depth
0 – 8cm    Grey Sand  pH: 6.7
8 – 16cm   Grey Sand  pH 6.5
16 – 38cm  Light Brown Sand  pH: 6.4  Other: Some small gravel
38 – 54cm  Red/Brown Loamy Sand  pH: 6.5  Other: Extensive, large gravel
54 – 80cm+ Red/Brown Sandy Clay Loam  pH: 7.7  Other: Slightly slaking, PRI: 191.20

Groundwater Depth  Not detected
Core Number: T0000946

Soil Description: Semi-wet pale deep sand

Land System Unit: E3c

Surface Cover: *Juncus pallidus* (Pale Rushes) over cleared pasture paddock

Landform/Aspect: Gentle slope

### Depth

<table>
<thead>
<tr>
<th>Depth</th>
<th>Soil Description</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 14 cm</td>
<td>Grey Sand</td>
<td>6.3</td>
</tr>
<tr>
<td>14 – 26 cm</td>
<td>Light Grey Sand</td>
<td>6.7</td>
</tr>
<tr>
<td>26 – 80 cm+</td>
<td>White/Grey Sand</td>
<td>6.6</td>
</tr>
</tbody>
</table>

Groundwater Depth: Not detected
Core Number: T0000947
Soil Description: Semi-wet pale deep sand
Land System Unit: E3b
Surface Cover: Cleared pasture paddock adjoining *Melaleuca cuticularis* swamp (Melijinup Swamp)
Landform/Aspect: Slight Slope

**Depth**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Description</th>
<th>pH</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 22cm</td>
<td>Grey Sand</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td>22 – 80cm+</td>
<td>Light Grey Sand</td>
<td>6.0</td>
<td>Water Repellent</td>
</tr>
<tr>
<td></td>
<td>Groundwater Depth</td>
<td></td>
<td>Not detected</td>
</tr>
</tbody>
</table>
Core Number: T0000948

Soil Description: Pale Deep Sand

Land System Unit: E3f

Surface Cover: Cleared pasture paddock

Landform/Aspect: Slight Slope

Depth

<table>
<thead>
<tr>
<th>Depth</th>
<th>Material</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 24cm</td>
<td>Grey Sand</td>
<td>6.5</td>
</tr>
<tr>
<td>24 – 80cm+</td>
<td>Yellow Sand</td>
<td>6.6</td>
</tr>
</tbody>
</table>

Groundwater Depth: Not detected
HOLE 8

Core Number: T0000949
Soil Group: Grey Deep Sandy Duplex
Land System Unit: E17
Surface Cover: Cleared pasture paddock
Landform/Aspect: Slight Slope

Depth

<table>
<thead>
<tr>
<th>Depth</th>
<th>Description</th>
<th>pH</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 16cm</td>
<td>Grey Sand</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>16– 37cm</td>
<td>Mid Brown Sand</td>
<td>6.2</td>
<td>gravel at 35cm</td>
</tr>
<tr>
<td>37 – 89cm+</td>
<td>White/Light Brown Sandy Loam</td>
<td>6.5</td>
<td>PRI: 247.60</td>
</tr>
</tbody>
</table>

Groundwater Depth

Not detected
Core Number: T0000950

Soil Group: Grey Deep Sandy Duplex

Land System Unit: E1?

Surface Cover: Cleared pasture paddock plus planted *Eucalyptus sp.*

Landform/Aspect: Undulating

<table>
<thead>
<tr>
<th>Depth</th>
<th>Material</th>
<th>pH</th>
<th>Other</th>
<th>PRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 19 cm</td>
<td>Grey Sand</td>
<td>5.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 – 51 cm</td>
<td>Red/Brown Sand</td>
<td>5.7</td>
<td>Other: with red gravel</td>
<td>535.40</td>
</tr>
<tr>
<td>51 – 80 cm+</td>
<td>Light Brown Sandy Loam</td>
<td>6.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Groundwater Depth</td>
<td></td>
<td></td>
<td>Not detected</td>
</tr>
</tbody>
</table>
Core Number: T0000951
Soil Group: Grey Deep Sandy Duplex
Land System Unit: E1?
Surface Cover: Cleared pasture paddock
Landform/Aspect: Flat to slight slope

Depth
0 - 14cm  Grey Sand  pH: 5.8
14 - 49cm  Light Brown Sand  pH: 5.7
49 - 80cm+ Red/Brown Sandy Loam  pH: 7.3  Other: some gravel PRI: 111.50
Groundwater Depth  Not detected
HOLE 11

Core Number: T0000952
Soil Group: Grey Deep Sandy Duplex
Land System Unit:
Surface Cover: Cleared pasture paddock
Landform/Aspect: Top of ridge, close to highway

Depth
0 – 16cm     Grey Sand     pH: 5.6
16 – 58cm     Red/Brown Sand     pH: 6.0     Other: with gravel
58 – 80cm+    Mid Brown Sandy Loam     pH: 6.5     Other: small gravel PRI: 60.50

Groundwater Depth
Not detected
**HOLE 12**

Core Number: T0000953

<table>
<thead>
<tr>
<th>Depth</th>
<th>Soil Type</th>
<th>pH</th>
<th>Other</th>
<th>PRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 30cm</td>
<td>Grey Sand</td>
<td>5.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30– 51cm</td>
<td>Red/Brown Sand</td>
<td>6.3</td>
<td>Other: gravel with mottles</td>
<td>120.90</td>
</tr>
<tr>
<td>51 – 80cm+</td>
<td>Yellow/Red Sandy Loam</td>
<td>6.3</td>
<td>PRI: 120.90</td>
<td></td>
</tr>
</tbody>
</table>

Groundwater Depth: Not detected
HOLE 13

Core Number: T0000954
Soil Description: Pale Deep Sand
Land System Unit:
Surface Cover: *Nuytsia floribunda* in cleared pasture paddock next to *Banksia speciosa* woodland
Landform/Aspect: Midslope

<table>
<thead>
<tr>
<th>Depth</th>
<th>Soil Type</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 10cm</td>
<td>Grey Sand</td>
<td>6.3</td>
</tr>
<tr>
<td>10 – 80cm+</td>
<td>Yellow Sand</td>
<td>6.1</td>
</tr>
</tbody>
</table>
Groundwater Depth: Not detected

Groundwater Depth
HOLE 14

Core Number: T0000955

Land System Unit:

Surface Cover: Cleared pasture paddock

Landform/Aspect: Mid slope

Depth

<table>
<thead>
<tr>
<th>Depth</th>
<th>Description</th>
<th>pH</th>
<th>Other</th>
<th>PRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 14cm</td>
<td>Dark Grey Sand</td>
<td>5.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 – 40cm</td>
<td>Light Grey Sand</td>
<td>5.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 – 80cm+</td>
<td>Dark Brown Sandy Loam</td>
<td>6.4</td>
<td>Other: Gravel</td>
<td>39.50</td>
</tr>
</tbody>
</table>

Groundwater Depth: Not detected
HOLE 15

Core Number: T0000956
Soil Description: Pale Deep Sand
Land System Unit:
Surface Cover: Cleared pasture paddock with kikuyu
Landform/Aspect: Mid slope

Depth
0 - 32cm Grey Sand pH: 5.6 Other: Slightly water repellent
32 - 80cm+ Yellow Sand pH: 60
Groundwater Depth Not detected
The Esperance Shire Council under and by virtue of the power conferred upon it in that behalf by the Planning and Development Act, 2005, hereby amends the above local planning scheme by:

1. Amending the Scheme Map by rezoning Lot 2 Coolgardie-Esperance Highway, Monjingup to “Rural Smallholdings” as depicted on the Amendment Map.
SHIRE OF ESPERANCE
LOCAL PLANNING SCHEME NO. 23
AMENDMENT NO. 9

EXISTING ZONING

PROPOSED ZONING

Legend
- State Highway
- Parks, Recreation and Conservation - Local
- National Park or Nature Reserve
- Railway or Port installation
- Agriculture - General
- Rural Smallholdings
ADOPTION

Adopted by resolution of the Council of the Shire of Esperance at the Ordinary Meeting of the Council held on the ___ day of ____________ 2011.

....................................................
PRESIDENT

....................................................
CHIEF EXECUTIVE OFFICER

FINAL APPROVAL

Adopted by Resolution of the local government of the Shire of Esperance at the meeting of the local government held on the ___ day of ____________ 20___, and pursuant to that Resolution the Seal of the Municipality was hereunto affixed in the presence of:

....................................................
PRESIDENT

....................................................
CHIEF EXECUTIVE OFFICER

RECOMMENDED/SUBMITTED FOR FINAL APPROVAL

....................................................
DELEGATED UNDER S.16 OF THE PLANNING AND DEVELOPMENT ACT 2005

Date..............................................

FINAL APPROVAL GRANTED

....................................................
MINISTER FOR PLANNING

Date..............................................