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& PARTNERS

ENGINEERS PLANNERS SURVEYORS ENVIRONMENTAL PROJECT MANAGEMENT

LAND CAPABILITY ASSESSMENT

Submission to Byron Shire Council

Lot 38 DP 1059938
31 Alidenes Road, Wilsons Creek

for:
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December 2018

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1. Introduction

As requested, Ardill Payne and Partners has carried out a land capability investigation to support a rezoning application. An initial *On-site Wastewater Management Report* by Byron Environmental Consulting (BEC) dated 2017 was prepared to accompany a development application for a five-bedroom dwelling on the site which did not eventuate. An additional *On-site Sewerage Management System Assessment and Report* by Northern Rivers Septic Solutions (NRSS) has been prepared to accompany a DA for a new four-bedroom dwelling on site.

The proposal involves the rezoning of the existing 12.27 ha site to support additional lots with a minimum size of 3,000 m². No centralised municipal wastewater treatment system exists within practicable reach of the development and therefore onsite effluent disposal will be required. Potable water supply is to be from roof water harvesting.

2. Site Investigations

Site investigations were undertaken by Byron Environmental Consulting in 2016 which included the digging of two boreholes to a depth of 1200mm and Northern Rivers Septic Solutions in 2018 which included the digging of a borehole to 900mm. Their investigations are included in Attachment 1.

The investigation has been prepared in accordance with the following documents:

- Byron Shire Council's (BSC) *DCP 2014 Chapter B3.2.2*
- BSC's *Design Guidelines for Onsite Sewage Management for Single Households* (1 December 2004)

Site inspections (including field works) were carried out on the 13th December 2016 by BEC, on 7th February 2017 by APP as part of the *Preliminary Contaminated Site Investigation* undertaken and on 21st November 2018 by NRSS.

3. Proposed Development and Site Details

3.1. Subject Land

The subject land is described in real property terms as Lot 38 DP 1059938. Details of the lot are described below.

- irregular in shape with an area of approximately 12.27ha
- frontage to Alidenes Road and side access from Wilsons Creek Road
- dwelling house (has been demolished) in eastern portion of site, associated farm sheds in south eastern portion of site
- vegetated cover
- not connected to a reticulated sewerage system
- not connected to a reticulated water system

The site generally slopes to the north east in the western portion and to the east in the eastern portion. The site has levels in the order of 20m to 42m AHD.

3.2. Proposed Development

The planning proposal seeks to rezone the subject land from RU2 – Rural Landscape to R5 – Large Lot Residential and to change the minimum lot size/subdivision standard from 40ha to 3000m² to allow for the future subdivision of the land and construction of dwellings on the new lots.

At this stage there will be no new lots or dwelling entitlements created, with a subdivision being subject to a further DA/SEE process post rezoning.

3.3. Soils

The soils of the subject site are mapped by NSW Environment & Heritage tool eSPADE (2018) as 'Billinudgel'. Morand 1994 describes 'Billinudgel (bi)' soil landscape grouping as:

- Billinudgel (bi)
 - Landscape – low rolling hills on metamorphics of the Neranleigh-Fernvale Group. Relief 50-100m, slopes 10-20% and locally >33%. Slopes are generally moderately long (100-300 m). Ridges and crests are narrow (100-150m). Partly cleared open eucalypt forest. Littoral closed-forest at Brunswick and Broken Heads.
 - Soils – shallow to moderately deep (100cm), moderately well-drained Yellow Podzolic Soils and Yellow Podzolic Soil/Solothintegrades on crests and slopes.

Deep (>100cm), moderately well-drained Yellow Podzolic Soils and Red Podzolic Soil/Red Earths on siltstone.

3.4. Flooding

The lower portions of the site, surrounding the waterways, are subject to flooding however, site works are proposed to mitigate flooding and regardless of this, there is sufficient areas to cater for an onsite wastewater management system above the required flood levels.

3.5. Topography

The majority of the land is relatively flat with a steep ridgeline in the south-western corner of the lot and a shallow slope running north-east on the western portion of the lot. The site ultimately drains to Yankee Creek that transects the site.

The site has levels in the order of 20m in the central and eastern portions of the site to 42m AHD in the western and south-western portions of the site.

3.6. Groundwater Resources

A search of the existing licensed groundwater bores was undertaken on the 6th December 2018 using the WaterNSW website. The search indicated that no registered bores are located on the subject site. However, there is one groundwater bore within 250m of the closest site boundary as identified by the WaterNSW *All Groundwater Map*. Site GW302784 is registered as a domestic bore with a water bearing zone between 25 and 28m.

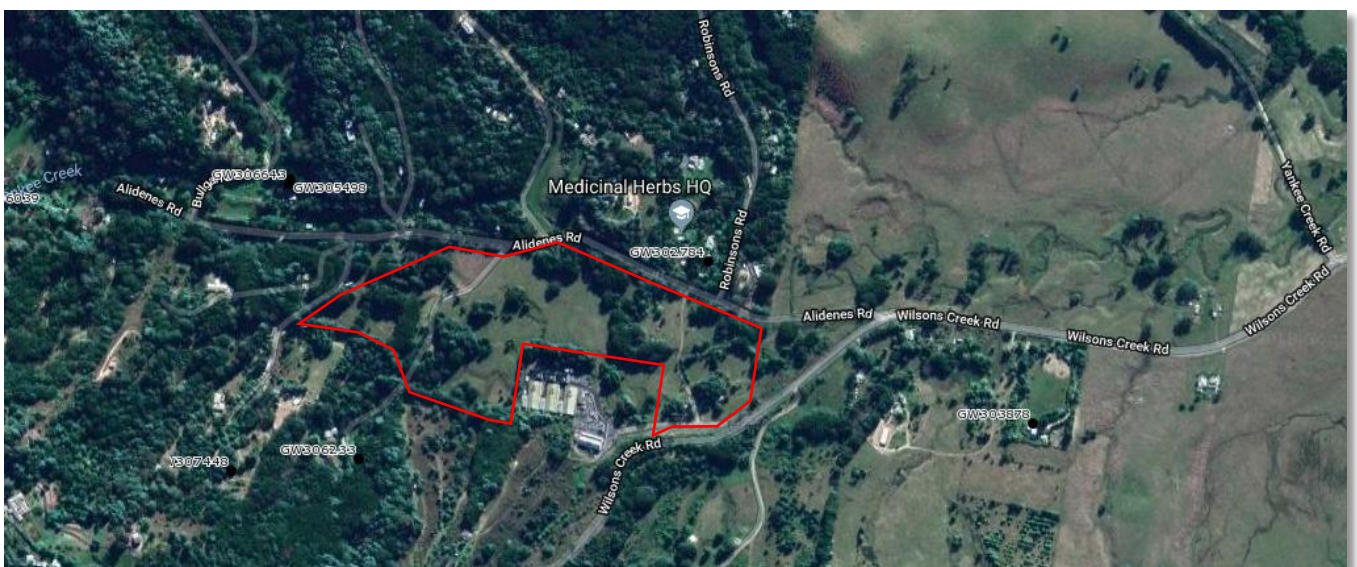


Figure 1: Registered Groundwater Bores (WaterNSW, 2018)

Due to the fact that there are existing dwellings utilizing on-site sewerage systems within close proximity to the active bore, it is not considered that GW302784 being within 250m of the closest site boundary will have an impact on the rezoning application.

Detail design would be required prior to the issue of a development consent for subdivision works demonstrating compliance with relevant provisions in relation to OSSM.

3.7. Surface Water

Surface water on the site generally falls east or north-east into Yankee Creek or one of its tributaries on site. A site plan showing the watercourses (as identified by Google) is included as Figure 2 below.

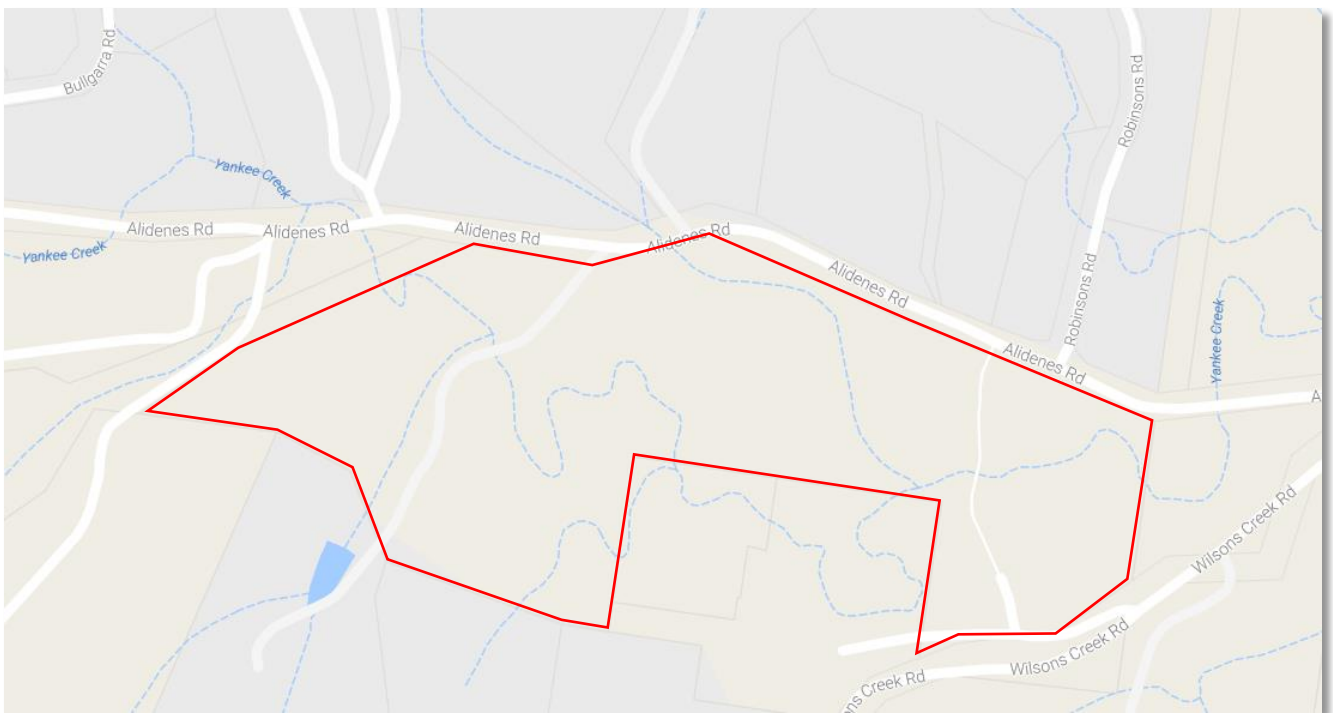


Figure 2: Watercourses on Site (Google Maps, 2017)

The site is not mapped as being within a drinking water catchment.

3.8. Surrounding Environment

The subject land is situated in a rural environment. The broader locality is predominated by a mix of rural and rural residential properties to the north, south and west and rural residential and agricultural to the east.

4. Site Assessment

The site assessment is determined by the investigations that have already been undertaken on the site by BEC in December 2016 and NRSS in November 2018. The following information has been extracted from both reports following the previous investigations.

Site Assessment	
Property Description	Lot 38 DP 1059938 31 Alidenes Rd, Wilsons Creek
Local Government Area	Byron Shire Council
Date of Assessment	13 th December 2017 (BEC) 21 st November 2018 (NRSS)
Proposed Water Supply	On-site roof water harvesting with water saving devices
Recent Weather Conditions	Dry, sunny and no rain in previous week
Site Description	
Allotment Size	12.27 ha
Existing Vegetation	Vegetated with healthy grass cover
Slope Angle	Mostly level
Slope Shape	Slight concave
Aspect	Level site for majority, north-easterly for south-western portion
Exposure to sun	Yes
Exposure to wind	Yes
Boulder, outcrops or floaters	None observed near boreholes but some observed around site
Buffer Distance (m)	Potential Constraints: >250m to groundwater bore <100m to permanent surface water >40m to intermittent watercourse
Buffer to Property	No Constraints:

	>6m from down-slope boundaries, driveways, buildings & swimming pools. >3m from up-slope boundaries, driveways, buildings & swimming pools
Up-slope seepage or run-on	Nil
Flooding potential	Potential Constraints: <100yr ARI Flood Level
Water-logging evidence	Nil
Groundwater Depth	Not encountered
Surface Soil Condition	Healthy grass cover, no cracking
Fill evidence	No fill evident
Erosion/soil movement	No erosion/mass movement evident
Vegetation cover	Grass cover

4.1. Soil Characteristics

The soil characterized by the boreholes excavated by BEC and NRSS were reasonably consistent. BEC described the site as being sandy loam to a depth of 300mm underlain by clay loam to the base of the borehole (approx. 1000mm). NRSS characterized the site as structured alluvial clay from surface to 900mm. The soil according to AS1547:2012 Table L1 is defined as soil category 5, moderately structured light clays.

4.2. Site Constraints and Solutions

The entire site is within 100m of Yankee Creek or one of its tributaries. Due to the proximity, secondary AWTS and tertiary treatment (such as chlorination) should be included in any future system to mitigate this constraint and support the positioning of a system closer than 100m to the closest permanent water surface.

Flood mitigation works are proposed for the site and therefore there will be sufficient and additional land above the 1% AEP flood event.

4.3. Sewage Treatment System

For the purpose of this land capability assessment which is to support and inform a rezoning application, the sewage treatment systems modelled consists of a gravity fed low-tech system and a system that reflects what will be installed on site including an AWTS (plus chlorine dosing or approved equivalent, which has not been included in the model).

Model parameters for the effluent treatment systems are summarized below.

Secondary Treated Effluent (Septic + Reed Bed)

- Roof water harvesting with standard water saving devices
- Septic tank
- Reed beds (10.2m², 13.6m² and 17m²) (N reduction 50%)
- Red basaltic soils
- Clay loams – high/mod structure
- 3m to water table (conservative)
- Level bed with grass
- Clay loams in root zone
- ETA beds

Secondary Treated Effluent (AWTS + Reed Bed)

- Roof water harvesting with standard water saving devices
- Everhart AquaNova AWTS (N reduction 63%)
- Reed beds (5.4m², 7.2m² and 9.1m²) (N reduction 31%)
- Total combined Nitrogen reduction 94%
- Red basaltic soils
- Clay loams – high/mod structure
- 3m to water table (conservative)
- Level bed with grass
- Clay loams in root zone
- ETA beds

4.4. Land Application Area Calculations

Byron Shire Council's *OSMS Design Model* was used to determine the land application area (LAA) required. Model outputs are included in Attachment 2.

A range of dwelling configurations have been analysed with bedrooms ranging from 3 to 5.

Table 1: Minimum Land Application Areas from BSC's *OSMS Design Model*

Effluent Treatment System	3 Bedrooms	4 Bedrooms	5 Bedrooms
Minimum ETA Area for Secondary Treated Effluent (reed bed)	332m ²	447m ²	573m ²
Minimum ETA Area for Secondary Treated Effluent (AWTS & reed bed)	68m ²	90m ²	113m ²

As this report is to accompany a rezoning application and the design of any potential future dwellings has not been undertaken, a LAA design and layout has not been included in this report.

5. Conclusion

Based on the above investigation, the site is able to support a minimum lot size of 3,000m² with adequate space remaining for the required land application area. Tertiary treated effluent (including chlorination or approved equivalent) will enable land application areas to be provided within the 3000m² whilst providing a compliant setback to the creek system.

6. General Notes

General

Geotechnical and environmental reports present the results of investigations carried out for a specific project and usually for a specific phase of the project (e.g. preliminary design). The report is based on specific criteria, such as the nature of the project, underground utilities or scope of service limitations imposed by the Client. The report may not be relevant for other phases of the project (e.g. construction), after some time or where project details and clients change.

Soil and Rock Description

Soil and rock descriptions are based on AS1726-1993 using visual and tactile assessment except at discrete locations where field and/or laboratory tests have been carried out. Refer to the terms and symbols sheet for definitions.

Groundwater

The water levels indicated are taken at the time of measurement and depending on material permeability may not reflect the actual groundwater level at those specified locations. Also groundwater levels can vary with time due to seasonal or tidal fluctuation, construction activities and other external factors.

Interpretation of Results

The discussion and recommendations in the accompanying report are based on extrapolation/interpolation from data obtained at discrete locations and other external sources and guidelines. The actual interface between the materials may be far more gradual or abrupt than indicated. Also actual conditions in areas not sampled may differ from those predicted.

The report is based on significant background details that only the authors can be aware of, and therefore implementation of the recommendations by others may lead to misinterpretation and complications. Therefore this company should be consulted to explain the reports implications to other involved parties.

Reporting relies on interpretation of often limited factual information based on judgement and opinion which has a level of uncertainty and ambiguity attached to it, and is far less exact than other design disciplines. This should be considered by users of the report when assessing the implications of the recommendations.

Change in Conditions

Subsurface conditions can change with time and can vary between test locations. Construction operations at or adjacent to the site and natural events such as floods, earthquakes or groundwater fluctuations can also affect subsurface conditions.

7. Scope of Engagement

This report has been prepared by Ardill Payne & Partners (APP) at the request of St Savior Investments Pty. Ltd. for the purpose of a rezoning application and is not to be used for any other purpose or by any other person or corporation.

This report has been prepared from the information provided to us and from other information obtained as a result of enquiries made by us. APP accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this document for a purpose other than that described above.

No part of this report may be reproduced, stored or transmitted in any form without the prior consent of APP.

APP declares that it does not have, nor expects to have, a beneficial interest in the subject project.

To avoid this advice being used inappropriately it is recommended that you consult with APP before conveying the information to another who may not fully understand the objectives of the report. This report is meant only for the subject site/project and should not be applied to any other.

8. Attachments

Attachment 1 Previous On-site Wastewater Management Reports

Attachment 2 BSC Model Design Outputs

ATTACHMENT 1

Attachment 1: Previous On-site Wastewater Management Reports

ATTACHMENT 2
