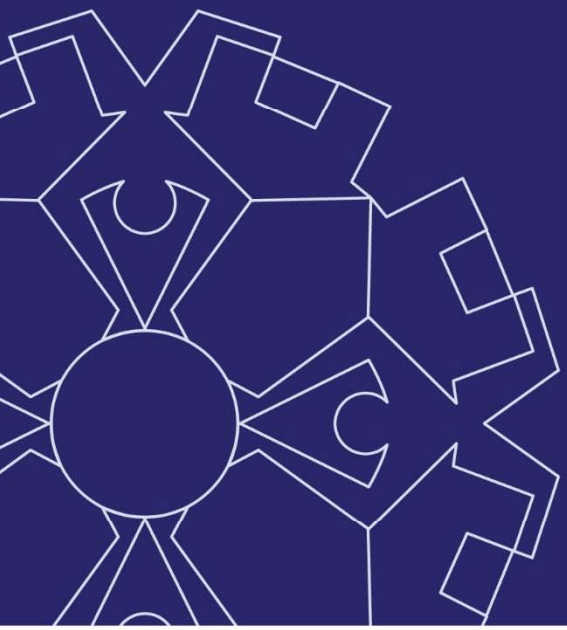
PLANNING PROPOSAL
AMENDMENT TO OBERON LOCAL ENVIRONMENTAL PLAN 2013

PREPARED FOR
BELVOIR HILL PASTORAL COMPANY PTY LTD

MAY 2017



PLANNING PROPOSAL

AMENDMENT TO OBERON LOCAL ENVIRONMENTAL PLAN 2013

PROPOSAL TO REZONE LAND AT O'CONNELL

PREPARED FOR:

BELVOIR HILL PASTORAL COMPANY PTY LTD

MAY 2017

GEOLYSE

POSTAL ADDRESS PO BOX 1963 ORANGE NSW 2800
LOCATION 154 PEISLEY STREET ORANGE NSW 2800
TELEPHONE 02 6393 5000 **FACSIMILE** 02 6393 5050
EMAIL ORANGE@GEOLYSE.COM **WEB SITE** WWW.GEOLYSE.COM

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Geolyse Pty Ltd and the authors responsible for the preparation and compilation of this report declare that we do not have, nor expect to have a beneficial interest in the study area of this project and will not benefit from any of the recommendations outlined in this report.

The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

All information contained within this report is prepared for the exclusive use of Belvoir Hill Pastoral Company to accompany this report for the land described herein and are not to be used for any other purpose or by any other person or entity. No reliance should be placed on the information contained in this report for any purposes apart from those stated therein.

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Executive Summary

Geolyse has been commissioned by Belvoir Hill Pastoral Company to prepare a planning proposal to amend the *Oberon Local Environmental Plan 2013* to rezone land from RU1 – Primary Production to R5 – Large Lot Residential and amend the minimum lot size to enable the future subdivision of the land.

The subject site is described as part Lot 4 DP1023024, located south of Box Flat Road, O'Connell. The site has an area of approximately 200 hectares, is cleared of any large stands of vegetation and the only improvements are internal fencing and a shearing shed in the western extent (adjacent to Beaconsfield Road).

The site is south of the O'Connell village, approximately 22 kilometres north-west of the town of Oberon and approximately 18 kilometres south-east of the city of Bathurst.

The site has frontages to Box Flat Road in the north, O'Connell Road in the east and Beaconsfield Road in the west.

Eight Mile Swamp and Antony's Creeks traverses the site in a south-north direction, draining to the Fish River to the north at a location approximately 700 metres north-east of the site.

The O'Connell Village is a listed conservation area by reference to Schedule 5 of the Oberon LEP and a number of locally listed heritage items are located to the north of the site, within the confines of the village.

The site is not mapped as bushfire or flood prone.

An assessment of the site has been undertaken in accordance with the relevant parameters of the planning proposal process. A Local Environmental Study, supported by various specialist reports including a Supply and Demand analysis, Due Diligence Aboriginal and European heritage assessment and contamination assessment, have been completed and is appended to this proposal.

Overall it is considered that the site is suitable for the proposed purpose and appropriately responds to the identified demand in the sub-region for rural residential allotments.

ABBREVIATIONS

Abbreviation	Full Name
ACHA	Aboriginal Cultural Heritage Assessment
AHD	Australian Height Datum
AHIP	Aboriginal Heritage Impact Permit
APZ	Asset Protection Zone
CBD	Central Business District
CCA	Controlled Activity Approval
D&PE	NSW Department of Planning & Environment
DPI(Fisheries)	Department of Primary Industries (Fisheries)
DPI (Water)	Department of Primary Industries (Water)
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
LEP	*Oberon Local Environmental Plan 2013*
LGA	Local Government Authority
LUS	*Oberon Land Use Strategy 2011*
PBFP	*Planning for Bush Fire Protection 2006*
RMS	Roads and Maritime Services
SEPP	State Environmental Planning Policy
SEPP44	State Environmental Planning Policy No. 44 – Koala Habitat Protection
SEPP55	State Environmental Planning Policy No. 55 – Remediation of Land
TSC Act	*Threatened Species Conservation Act 1995*

Introduction

1.1 OVERVIEW

Belvoir Hill Pastoral Company Pty Ltd own land located at 2519 O'Connell Road, O'Connell, and seek to subdivide the southern portion of the site (south of Box Flat Road) for the purposes of large lot residential land use (allotments of approximately 10 hectares in size).

The site is currently zoned for RU1 – Primary Production and is utilised by the applicant for this purpose.

Currently permissible land uses on the site include extensive and intensive plant agriculture together with a range of other uses. Subdivision is permissible subject to achieving the applicable minimum lot size, which is 100 hectares.

As the minimum lot size precludes subdivision to the proposed size an amendment to the *Oberon Local Environmental Plan 2013* (LEP) is required to rezone the land to a suitable zone that would enable the further subdivision of the land as desired by the applicant. The amendment would also amend the minimum lot size applying to the site.

1.2 SUBJECT SITE

The subject site is described as 2519 O'Connell Road, O'Connell, consisting of part Lot 4 DP1023024 – refer **Figure 1**.

The site is directly south of the O'Connell village, approximately 22 kilometres north-west of the town of Oberon and approximately 18 kilometres south-east of the city of Bathurst – refer **Figure 2**.

Figure 1: The subject site (Source: Six Maps)

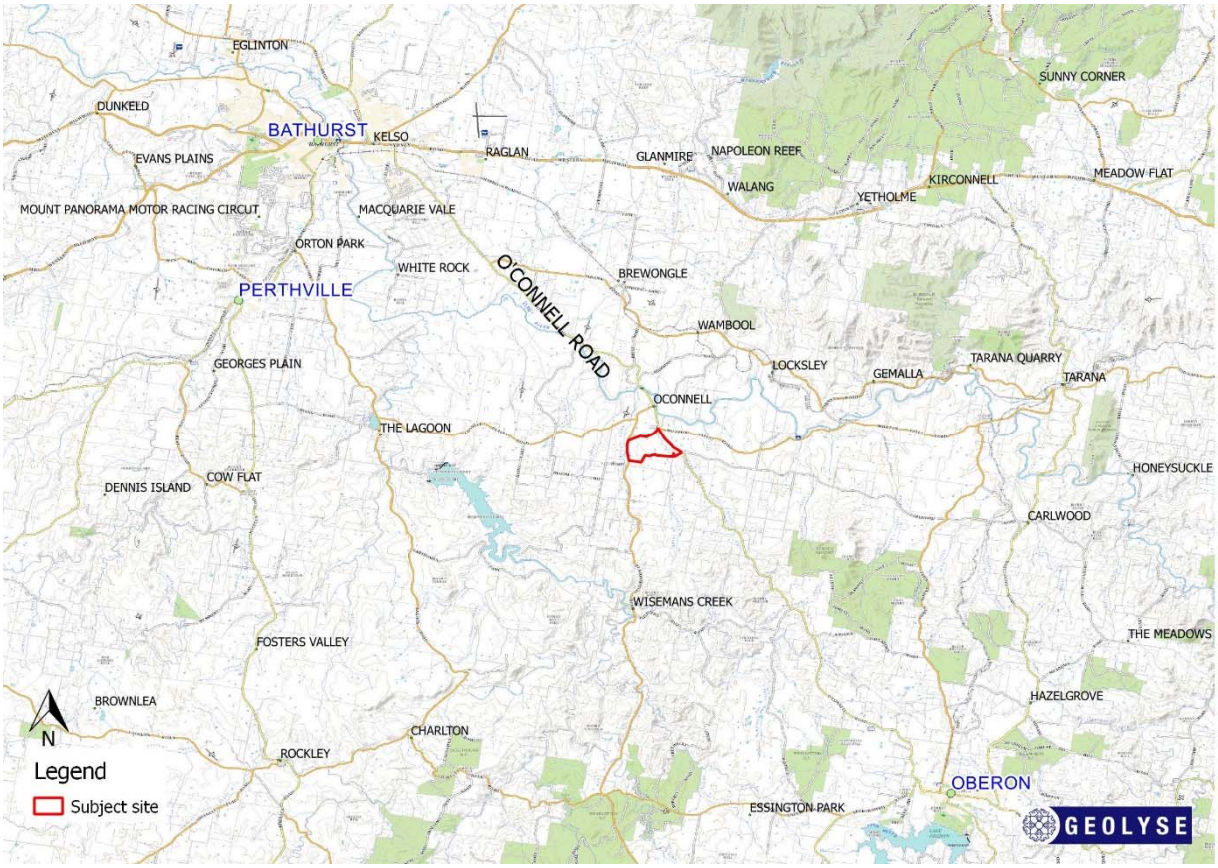


Figure 2: Subject site in the context of the locality

1.3 SITE DESCRIPTION

The site has an area of approximately 200 hectares and frontages to O'Connell Road (1,586 metre), Box Flat Road (1,469 metres) and Beaconsfield Road (999 metres) – refer **Figure 1**.

The O'Connell Village is located to the north of the site including the O'Connell Heritage Conservation Area. A number of locally significant heritage items are located to the north of the site.

Eight Mile Swamp Creek joins Antonys Creek in the southern extent of the site and continues as Eight Mile Swamp Creek draining northward to its confluence with the Fish River. Alicks Creek is to the west of the site, also draining north to the Fish River. A number of first order streams are also located on site together with a number of farm dams. Waterways in the site are predominantly ephemeral and drain to Eight Mile/Antony's Creek.

The fall of the land is generally from south to north. The site ranges in height from 760 in the southern extent to approximately 701 in the northern extent.

General slopes across the site are between 0-5% with little variation. A low ridge runs north-south through the block in the western extent.

As the property slopes to the north and is bounded on three sides by roads, the catchment of drainage gullies is not likely to extend beyond the site's eastern, western or northern boundaries. Flow from beyond the site's southern boundary is anticipated.

Based on the regional and site topography, it is considered that the majority of site stormwater would be captured by drainage gullies across the site and discharge into the various holding dams on the site then either eastward into Eight Mile Swamp Creek and Antony's Creeks or westward to Alicks Creek.

The site is not impacted by mapped natural hazards such as flooding or bushfire.

The site is currently in use for primary production, primarily grazing, purposes. A small portion of the eastern extent of the site is mapped strategic agricultural land and is mapped as land class 2 in the context of land suitability; the remainder is mapped as class 5. The portion of the site mapped as class 2 represents approximately 20% of the site, and is adjacent to land to both the east, west and north-east zoned for large lot residential. This is reflective of the proximity to O'Connell village and demand for housing in this locality.

1.4 STRATEGIC POSITION

The *Oberon Land Use Strategy* (2011) (hereafter referred to as the LUS11) was prepared to provide a strategic framework for future development within the Council area for 25 years from the date of preparation (out to 2035). The LUS provides assessment and discussion on supply and demand for, among other things, rural residential allotments, within the Oberon Local Government Area (LGA), including the village of O'Connell and its surrounds.

The LUS provides for precinct planning for a number of localities in the Oberon LGA including O'Connell (refer Section 4.4 of the LUS11). The stated strategic vision for the O'Connell village is identified as:

> *"To preserve the natural beauty, agricultural heritage and rural lifestyle of O'Connell through sensitive development provisions so as to maintain a rural residential atmosphere".*

Given the rural residential nature of the proposed land uses and the proposed scale of the lots, it is considered that the planning proposal is generally consistent with this strategic vision.

Section 44 of the LUS11 includes a number of constraints maps in respect of land resources, water resources and biodiversity/native vegetation. The following is noted with respect to these three constraints in the context of the subject site and all three are discussed in more detail in **Attachment 1**:

- land resources – the majority of the site is mapped as having a land capability of class 5, with a small area (10%) mapped as class 2;
- water resources - the eastern extent of the site is affected by mapped water resource constraints and a portion of the northern section is mapped as high groundwater vulnerability, with the remainder of the site mapped as having moderately high groundwater vulnerability; and
- biodiversity/native vegetation – the site features limited mapped biodiversity constraints in the south and south-west and a mapped endangered ecological community in the northern extent.

Figure 40 of the LUS confirms that the subject site is outside of, but adjacent to, the O'Connell Conservation Area and Figure 40(A) confirms that the site is not within the mapped 800m radius of the O'Connell Heritage Area.

The LUS provides a range of objectives against which future development in the O'Connell area should be considered, being:

- *That any proposed development should be considered against:*
  - *The potential impact on the heritage and rural lifestyle of O'Connell.*
  - *Areas which are particularly visible from key visual points and would impact on the landscape should not be considered for development.*
  - *These areas being those within the boundaries as indicated on the map showing the cultural landscape protection zone.*
  - *Lot size to be set at a size that would control housing density to minimise the impact on the rural atmosphere of the locality.*
  - *These principles to be supported by a Development Control Plan.*
- *Existing population density justifies the provision of a community service centre (e.g. neighbourhood shop, post office). This should be established in a suitable location in accordance with the above principles.*

- *A logical extension of existing rural residential (Llambeda Estate) is suitable (example: extension or mirroring of existing developments).*

The above matters are discussed in detail in Section 4.4 of **Attachment 1**.

The LUS provides a summary of a number of potential future development areas as reflected in Figure 41 of the LUS. The subject site (hatched red in **Figure 3**) is omitted from this assessment notwithstanding that it represents a logical connection between the areas considered – refer **Figure 3**.

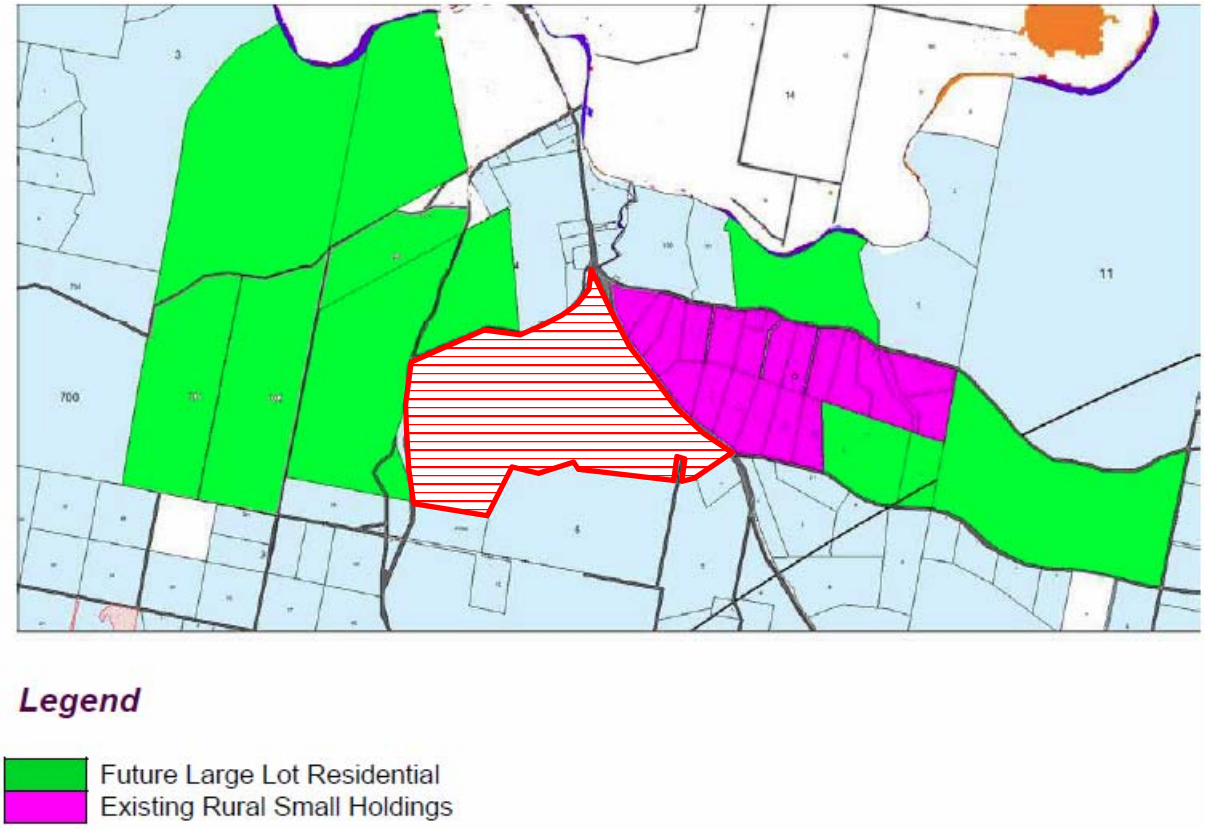


Figure 3: Figure 41 reproduced from the Oberon LUS 2011; subject site outlined and hatched red

The current LEP zoning map reflects that all of the lands identified via the LUS as suitable for future large lot residential have been rezoned for R5 – Large Lot Residential – refer **Figure 4**.

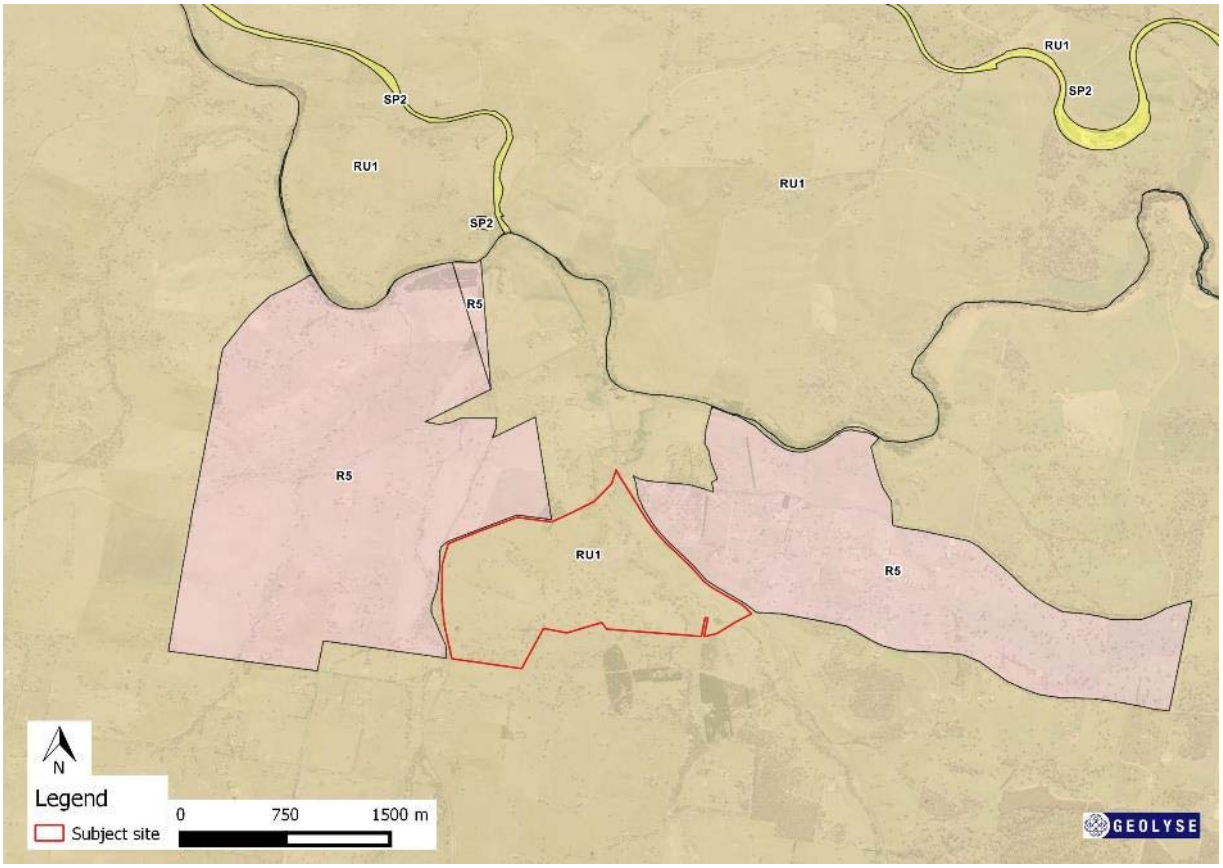


Figure 4: Current zoning (Source: NSW DP&E)

An analysis of supply and demand has been prepared and appended to this report, considering the availability of land in the locality for rural residential purposes and the likely demand for such land. This assessment concludes that there can be a reasonable expectation of demand for the lots proposed. This is discussed in additional detail in **Attachment 1**.

Initial discussions with Council's Health and Building Manager confirms that Council would consider any planning proposal on its merits, subject to the completion of the necessary specialist investigations to determine the suitability of the site for subdivision and to inform the appropriate size of lots to be created.

It is proposed to amend the zoning of the subject site from RU1 – Primary Production to R5 – Large Lot Residential. It is further proposed to amend the minimum lot size from 100 hectares to 10 hectares. Approximately 17 lots (subject to detailed design) would be developed with sizes exceeding 10 hectares. As no concept lots would exceed 20 hectares in size, the proposed minimum lot size would ensure capacity for the further subdivision of created lots is not provided. Specific boundary locations and lot sizes would be confirmed at development application stage following amendment of the LEP but would not be expected to be radically different from the concept plan attached – refer **Drawing TP03**.

1.5 CONCEPT DEVELOPMENT

The proposed rural residential subdivision would consist of the following:

- Approximately 17 lots with lot sizes of approximately 10 hectares;
- An internal cul-de-sac access road connecting to Box Flat Road would be provided to access the majority of the proposed lots;
- Recessed access driveways would be provided from the proposed access road to each proposed lot in accordance with the Austroads standards (at development application stage for subdivision);

- Each lot would feature a 50 metre by 60 metre building envelope setback from boundaries by at least 20 metres;
- On site water supply would primarily be provided via on site harvesting and storage of roof water;
- Each lot would be supplied with an on-site system of effluent management typically supplied within the confines of a dedicated effluent disposal envelope;
- Provision of electricity and telecommunications connections in line with relevant requirements of service providers.

It is expected that the development would be staged to respond to market demand with lots closest to either Box Flat or Beaconsfield Road to be released initially.

A conceptual subdivision plan for is provided as **Drawing TP03**.

Objectives and intended outcomes

2.1 OBJECTIVE

The objective of the planning proposal is to enable the rezoning of the subject site from RU1 – Primary Production to R5 – Large Lot residential to enable the further subdivision of the site. This would also require the amendment of the existing minimum lot size from 100 hectares to 10 hectares.

2.2 EXPLANATION OF PROVISIONS

This is a simple planning proposal to amend the *Oberon Local Environmental Plan 2013* (LEP) in respect of part Lot 4 DP1023024. A future development application would be required to subdivide the land as proposed.

The planning proposal proposes:

- The amendment of LEP Map Sheet LZN_001 to amend the site zoning from RU1 – Primary Production to R5 – Large Lot Residential; and
- The amendment of LEP Map Sheet LSZ_001 to amend the minimum lot size from 100 hectares to 10 hectares.

There would be no change to the text of the LEP on the basis that the objectives of the zone and the land uses permitted with and without consent, and those prohibited, by virtue of the land use table in relation to the R5 zone, would remain unchanged. No site specific clauses are required.

Justification

3.1 NEED FOR THE PLANNING PROPOSAL

Is the planning proposal a result of any strategic study or report?

This planning proposal is developed by reference to the attached study (**Attachment 1**) which provides analysis of the suitability of the site for the proposed purposes. A range of specialist studies have been commissioned to support the preparation of the study to ensure that the impacts associated with its development would not be significant. These studies are appended to the study and their findings summarised throughout the study report.

The conclusion of the study is summarised as follows:

- Analysis by Western Region Institute confirms that the O'Connell area shows strong indicators of demand for this form of housing blocks;
- Population growth is noted to have almost doubled in the last census period (2006-2011) by comparison to a minor population decline in Oberon;
- Higher population growth than projected would increase the demand for rural residential lots;
- Analysis of available information suggests that in recent history, supply of 'lifestyle' allotments within the Oberon LGA has been met by concessional lots and existing holdings, however this will supply will continue to diminish, meaning that provision of well-planned and strategically logical holdings will become more important;
- The site is not unduly constraints by ecological features and opportunities exist for improvement of the land by reference to its current grazed status and rehabilitation of riparian environments;
- The large size of the lots provides sufficient capacity for provision of on-site servicing (water harvesting/roof capture and on site effluent disposal) and is no more heavily constrained than other recently rezoned land in the locality and significantly exceeds the recommended minimum size of 5,000 square metres (as per the Environmental Health Guidelines 1998) for appropriate disposal area for on site effluent management;
- Subject to a visual site assessment, there are no strong indicators of significant heritage constraints;
- The large size of lots ensures that any perceived visual impacts associated with dwelling development would be minimal and consistent with the current level of development within the immediate locality. Measures such as building envelope placement and creek line rehabilitation would ensure visual impacts are minimised. Other measures such as extending the existing vegetation corridor along O'Connell Road along the eastern boundary of the site if deemed necessary;
- Minor localised contamination associated with the former shearing shed is able to be addressed through remediation, to be carried out in conjunction with a future development application for subdivision of the land (or conceivably sooner if deemed necessary); and
- The location of the O'Connell village proximal to Bathurst and Oberon makes it ideal as a locality for this style of development; as evidenced by strong demand in the locality.

It is concluded as a result of the LES that the development is generally acceptable in the context of the site and locality.

Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

Given the current RU1 zoning of the land, the proposed outcome of providing additional rural residential lots within close proximity to Oberon and Bathurst is not able to be achieved without first rezoning the land.

The proposed approach is considered the best means of achieving the desired outcome.

3.2 RELATIONSHIP TO STRATEGIC PLANNING FRAMEWORK

Is the planning proposal consistent with the objectives and actions of the applicable regional or sub-regional strategy?

There is no regional or sub-regional strategy applying to the subject site.

Is the planning proposal consistent with Council's local strategy or other local strategic plan?

The *Oberon Community Strategic Plan 2015* is the relevant Community Strategic Plan (CSP) applying to the Oberon LGA.

The CSP provides a range of strategic outcomes which are arranged in relation to six key future directions. In relation to Future Direction 5 – Open Communication, the CSP states a key strategic outcome is: *Well planned, presented and maintained towns, villages and rural localities*

This planning proposal sits comfortably with this strategic aim in that it provides for additional opportunities for rural residential development within the LGA.

Is the planning proposal consistent with applicable State Environmental Planning Policies?

The planning proposal is broadly compliant with all relevant State Environmental Planning Policies (SEPPs). Relevant SEPPs are considered in Section 2.2 of **Attachment 1**

Is the planning proposal consistent with applicable Ministerial Directions (s177 directions)?

Relevant consideration of applicable ministerial directions is provided at Section 2.3 of **Attachment 1**. The planning proposal is considered to be generally consistent with the relevant directions.

3.3 ENVIRONMENTAL, SOCIAL AND ECONOMIC IMPACTS

Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, would be adversely affected as a result of the proposal?

An ecological constraints and opportunity analysis has been prepared by The Environmental Factor (refer **Attachment 1**).

The site is noted to contain open paddocks consisting primarily of exotic grasslands, which is severely degraded, cleared and modified, and featuring largly exotic species such as Scotch thistle, together with remnant Apple Box-Yellow Box woodland, which is a poor condition resulting from the historical agricultural land use.

The REF report makes the following recommendations:

- *Maintain works outside the recommended riparian buffer corridors for drainage lines/waterways. Where this is not achievable apply the NSW DPI riparian offset guidelines 'averaging rule' to maintain riparian buffers.*
- *Avoid and / or minimise works vehicles or vehicle access entering within the riparian buffer areas. Where this is unavoidable Controlled Activity Approval from NSW DPI Water, and Part 7 permit from NSW DPI Fisheries for Dredging and Reclamation, may be necessary.*

- *Limit the number of subdivision lots along the 3rd and 4th order waterways on site to minimise the increase in water access rights created.*
- *Investigate opportunities to minimise impacts to riparian areas through measures such as:*
  - *Minimising the number of lots along the creek,*
  - *Keeping livestock at appropriate stocking rates for the carrying capacity of each allotment and/or imposing grazing restrictions,*
  - *Avoiding formalised creek crossings in the design,*
  - *Maintaining adequate riparian buffers in accordance with NSW DPI recommendations,*

The above recommendations have been taken into account in the development and refinement of the attached conceptual subdivision layout – refer **Drawing TP03**.

On the basis of the above, and subject to further investigations to be completed in conjunction with the preparation of a development application to subdivide the land, it is considered that the planning proposal may proceed.

Are there any other likely environmental effects as a result of the planning proposal and how are they proposed to be managed?

There is the potential for impacts associated with the development of the land and these are discussed in detail in **Attachment 1** and summarised as follows:

Supply and Demand

Western Region Institute has completed an analysis of supply and demand for properties within the O'Connell locality (refer Section 4.2 of **Attachment 1**). This report concludes that:

> *Based on a range of factors including increased regional population, increased dwelling requirements and an identified strong demand for large lot lifestyle blocks in the O'Connell region, coupled with a limited supply, it appears that there will likely be significant demand for the proposed development, should it go ahead. This thesis has been confirmed in discussions with real estate professionals, who advise that lifestyle factors make the O'Connell region a very popular destination with a limited supply of suitable large lot blocks.*

On the basis of this analysis it is considered that there is sufficient demand for additional lots in this locality to justify a departure from the LUS.

Traffic and Access

The proposed development would generate approximately 16 additional lots on the land (17 in total), based on the concept lot arrangement depicted in **Drawing TP03**.

The subject site is bounded by O'Connell Road to the east, Box Flat Roads to the north and Beaconsfield Road to the west. Land to the south is fragmented into a number of lots and zoned for primary production

O'Connell Road is a classified state road whilst the remaining roads are local roads.

By reference to the *RTA Guide to Traffic Generating Development* (2002) it is anticipated that each additional proposed lot would generate approximately nine additional vehicle movements per day, amounting to approximately 144 vehicle movements per day (16 new lots * 9 movements) on to the local road network. As lot release would be staged, this would be a gradual increase. Given the already developed nature of the locality, and the opportunities for absorption of traffic via a number of routes, it is considered that this low number of additional traffic movements can be comfortably accommodated within the environmental capacity of the existing road network without detriment to the operations of existing efficiency or operation.

The proposed access road and all property accesses would be designed to ensure compliance with Austroads standards together with the engineering standards of Oberon Shire Council. Detailed

assessment would be provided at development application stage to ensure that proposed driveway locations and intersections provide adequate safe sight distances.

This is discussed in additional detail in Section 4.3 of **Attachment 1**.

Water Quality

The proposal has the potential to impact water quality in a number of ways, including the installation of on-site effluent management systems, changes to stormwater management as a result of increased impervious areas, the potential for sedimentation or erosion as a result of construction activities and potential impacts to groundwater to as a result of increased development.

On-site effluent management

The proposed development is very low density with lots of at least 10 hectares in size. There is ample room provided on site to accommodate on site management of effluent without undue risk to the local soil environment. Alternative re-use systems that minimise discharge would be investigated for use on the site and could be a requirement of a restrictive covenant if deemed necessary.

Stormwater Management

Given the proposed rural residential nature of the future subdivision of the land, it is not anticipated that a minor increase in impervious areas would be significant in the context of the overall size of the subject site. The following general mitigation measures in relation to stormwater management are noted:

- All proposed future dwelling developments would be undertaken in accordance with the requirements of BASIX;
- Roof water would be harvested and stored on site to provide a secure potable water supply as well as a secure fire-fighting resource;
- Drainage for impervious areas would be provided including scour protection to ensure erosion is minimised;
- Standard erosion and sediment controls would be implemented during construction activities to minimise the impacts of sedimentation.

Erosion

The impacts of erosion during construction would be managed through preparation and implementation of an erosion and sediment control plan (or soil and water management plan if the area of disturbance exceeds 2,500 square metres) in accordance with the requirements of the Landcom. Standard measure to be incorporated would include but not be limited to:

- Minimise area of disturbance to the maximum necessary.
- Install erosion and sediment control devices where necessary; only to be removed once the area is stabilised.
- Prompt revegetation of areas exposed by construction.

Groundwater

A review of available data identifies that no groundwater bores are located on the site while 24 bores are located within 500 metres of the property. A summary of available bore data is provided in Table 3.1 of **Attachment 1**.

Given the low density nature of the ultimately proposed development, it is considered that the likelihood of detrimental impacts to groundwater resources is low. Alternative waste disposal measures (such as bio systems) could be investigated to support the future subdivision of the site if considered warranted.

Impacts to the water environment are considered in additional detail in Section 4.4 if **Attachment 1**.

Riparian Corridors

Mapping associated with the LEP identifies that the site contains the confluence of Eight Mile Swamp Creek and Antonys Creek, and that this is a tributary of the Fish River. The Fish River is located less than one kilometre to the north and Alicks Creek is located to the west of the site. Both Eight Mile Swamp/Antonys Creek and the Fish River are mapped as being sensitive waterways – refer **Attachment 1**. Both the creeks and river are identified by the Department of Primary Industries (Fisheries) as key fish habitat. A number of ephemeral waterways within the site drain either eastward across the site towards Eight Mile Swamp/Antonys Creek or westward towards Alicks Creek.

If any work (excluding dwelling development) is proposed forty metres of Eight Mile Swamp/Antonys Creek would require a controlled activity approval (CCA) in accordance with Section 91 of the *Water Management Act 2000*. Additionally, any dredging and reclamation within waterland (ie, the confines of Eight Mile Swamp/Antonys Creek) would require a Part 7 permit from Department of Primary Industries (Fisheries) in accordance with the *Fisheries Management Act 1994*.

The building envelopes for proposed Lots 1 – 5 have been sited to the west of the creek so that any proposed dwelling or associated outbuilding or driveway would be provided outside the recommended riparian buffers. Therefore, the only physical element affecting the mapped sensitive waterway would be the installation of fencing of lots. This minor constraint is consistent with other rural-residential subdivisions that have occurred in locality, including the subdivision north of Lagoon Road, which includes property boundaries crossing Alicks Creek. The ecological constraints and opportunities analysis provides recommendations in this regard – refer Appendix B of **Attachment 1**.

Removal of grazing stock from the site would provide the opportunity for rehabilitation of the riparian corridor, which is currently degraded.

Flooding

The site is not identified via mapping as flood prone. Given the undulating nature of the landscape, the distance of proposed building envelopes from Eight Mile Swamp/Antonys Creek and the proposed location of the internal access road it is not expected that any short term flood impacts associated with the creek would present any detrimental impacts to future land owners or occupants. The creek is noted to be generally contained within the established banks. This is discussed in further detail in **Attachment 1.**

Bush Fire Hazard

The site is not mapped as containing bush fire prone land by reference to the Oberon Bush Fire Prone Land Map.

Land is generally cleared with scattered paddock trees, reflecting is current grazing use. There is ample capacity for provision of grassland asset protection zones around proposed dwellings. Building envelopes have been sited to provide separation to trees.

Heritage

A review of available resources, including *Oberon Local Environmental Plan 2012*, confirms that the site does not contain and is not located in the vicinity of any items of mapped non-Aboriginal or Aboriginal heritage significance. It is considered that the likelihood of unearthing previously undiscovered items of heritage significance in relation to site works is low.

A Heritage Assessment has been completed by OzArk – refer **Attachment 1**.

This assessment conclude in relation to Aboriginal and non-Aboriginal heritage:

> *The archaeological/scientific, historic and aesthetic value of any Aboriginal cultural heritage sites is likely to be low due to the nature of the SALs (i.e. the absence of major rivers and levels of ground surface disturbance) and the archaeological context of the region (similar landforms generally have low density, low archaeological value artefact scatters).*

The historic heritage desktop assessment found that no previously recorded historic heritage items are located in the Study Area. The Study Area is located close to O'Connell Settlement and is historically associated with Reverend James Hassall; however, it is considered unlikely that historic items or archaeological deposits of local or state significance exist in the Study Area.

Contamination

A contamination assessment including sampling has been completed by Envirowest – refer Appendix D of **Attachment 1**. The assessment concluded that the site is generally suitable for the future proposed rural residential land use however identified some necessary remediation of localised contamination associated with the shearing shed required prior to the subdivision proceeding. This approach, together with the proposed physical separation provided by the proposed building envelope location for proposed Lots 1-5, ensures that residual contamination impacts would be unlikely.

It is proposed that this remediation would be dealt with concurrently to the subdivision DA, on the basis that the remediation would be considered category 1 remediation (for which development consent is required pursuant to clause 9 of SEPP55). This is because the site is mapped as environmentally sensitive land (mapped as groundwater vulnerable and containing sensitive biodiversity).

This is discussed in additional detail in Section 2.2.4 of **Attachment 1**.

Visual

The environment of the proposed development is consistent with those areas of the surrounding locality that have been zoned for large lot residential land use. The excellent visibility via road frontages, the rolling landscape, access to the creek and proximity to the O'Connell village all combine to provide an excellent environment for the proposed land use.

Impacts to visual amenity are limited through placement of dwellings west of the creek, ongoing rehabilitation of the creek line and, if deemed necessary, the extension of the vegetation corridor along O'Connell Road in the western extent of the site.

Has the planning proposal adequately addressed any social and economic effects?

Social and economic effects associated with the planning proposal are considered to be generally positive. The *Draft Centres Policy 2009* (Policy) provides a number of questions that should be considered in determining whether to proceed with a rezoning; referred to as the Net Community Benefit Test. These questions together with a response are provided in **Table 3.1**.

The Policy identifies that if it is judged that the rezoning would produce a net community benefit, the proposal should proceed through the rezoning process. If no benefit is identified, the proposed rezoning should not proceed.

The outcome of the discussion provided in **Table 3.1** confirms that the rezoning would have a net community benefit and accordingly it is considered that the rezoning should proceed.

Table 3.1 – Net Community Benefit Test

EVALUATION CRITERIA	COMMUNITY COSTS AND BENEFITS			
	BASE CASE – CURRENT SITUATION	PLANNING PROPOSAL	QUALITATIVE COMMUNITY BENEFIT PER CRITERIA	QUANTITATIVE COMMUNITY BENEFIT PER CRITERIA
Would the LEP be compatible with agreed State and regional strategic direction for development in the area (eg land release, strategic corridors)?	Relevant s.117 directions are discussed in detail in Section 2.3 of **Attachment 1**.	The LEP seeks to rezone the subject land from RU1 – Primary Production to R5 – Large Lot Residential	The qualitative benefits of the proposal are: • The creation of additional rural residential lots ensures adequate supply of lots to meet demand; • The supply of additional lots satisfies the needs of the region	No external cost to the community as all services would be provided by the developer.
Is the LEP located in a global/regional city, strategic centre or corridor nominated within the Metropolitan Strategy or another regional/sub-regional strategy? Is the LEP likely to create a precedent or create or change the expectations of the landowner or other landholders?	The area is not a regional hub but is addressed in general terms in the Draft Central West and Orana Regional Strategy (refer Section 2.1.2 of **Attachment 1**.	The proposed LEP applies to a 200 hectare portion of land that has been identified via the attached LES as being a logical and suitable expansion of rural residential land. The land is physically bounded by Box Flat , Beaconsfield and O'Connell Roads. Surrounding land to the east and west has been rezoned for rural residential use and has seen strong take up.	It would be difficult to establish a precedent from support for the LEP based on the characteristics of the proposal and the subject land.	No external cost to the community
Have the cumulative effects of other spot rezoning proposals in the locality been considered? What was the outcome of these considerations?	Oberon Council released its comprehensive LEP in 2013. The LEP rezoned a number of areas in the O'Connell area. Take up of these lots has been strong and there is exhibited demand for additional allotments in this area – refer Section 4.2 of **Attachment 1**.	The proposed LEP has been prepared on behalf of the land owner to facilitate further subdivision of the land.	No external cost to the community	No external cost to the community
Would the LEP facilitate a permanent employment generating activity or result in a loss of employment lands?	No employment lands created.	No employment lands created.	No employment lands created.	No external cost to the community
Would the LEP impact upon the supply of residential land and therefore housing supply and affordability?	The planning proposal would result in 17 rural residential lots being created. The attached LES identifies demand for lots of this type in this area – refer **Attachment 1**.	The planning proposal provides for approximately 17 additional dwelling opportunities.	No external cost to the community	No external cost to the community

Table 3.1 – Net Community Benefit Test

EVALUATION CRITERIA	COMMUNITY COSTS AND BENEFITS			
	BASE CASE – CURRENT SITUATION	PLANNING PROPOSAL	QUALITATIVE COMMUNITY BENEFIT PER CRITERIA	QUANTITATIVE COMMUNITY BENEFIT PER CRITERIA
Is the existing public infrastructure (roads, rail, utilities) capable of servicing the proposed site? Is there good pedestrian and cycling access? Is public transport currently available or is there infrastructure capacity to support future public transport?	Telecommunication, electricity and roads are available to the site. Water and sewer services are not available.	Existing services would be extended to service the site at the cost of the applicant. Water and sewer services would be accommodated on site	No external cost to the community	No external cost to the community
Would the proposal result in changes to the car distances travelled by customers, employees and suppliers? If so, what are the likely impacts in terms of greenhouse gas emissions, operating costs and road safety?	Not applicable	An increase in rural residential land would not affect customers, employees or suppliers.	No external cost to the community	No external cost to the community
Are there significant Government investments in infrastructure or services in the area whose patronage would be affected by the proposal? If so, what is the expected impact?	The proposal would not affect any significant Government investments in infrastructure or services	Minor changes to traffic generation is predicted but this is within the capacity of the road network	No external cost to the community	No external cost to the community
Would the proposal impact on land that the Government has identified a need to protect (eg land with high biodiversity values) or have other environmental impacts? Is the land constrained by environmental factors such as flooding?	No protected land.	The various specialist studies (provided in **Attachment 1**) conclude that the land is suitable for the proposed use.	No external cost to the community	No external cost to the community

Table 3.1 – Net Community Benefit Test

EVALUATION CRITERIA	COMMUNITY COSTS AND BENEFITS			
	BASE CASE – CURRENT SITUATION	PLANNING PROPOSAL	QUALITATIVE COMMUNITY BENEFIT PER CRITERIA	QUANTITATIVE COMMUNITY BENEFIT PER CRITERIA
Would the LEP be compatible/ complementary with surrounding land uses? What is the impact on amenity in the location and wider community? Would the public domain improve?	Surrounding land is zoned for R5 purposes and the proposal is the logical extension of this zoning	The planning proposal is consistent with surrounding land uses and lot sizes. Adequate buffers to primary production land can be provided as discussed in Section 2.3.1 of **Attachment 1**. There would be no negative impact to the public domain as a result of the development	No external cost to the community	No external cost to the community
Would the proposal increase choice and competition by increasing the number of retail and commercial premises operating in the area?	No current commercial or retail land use.	The LEP would not increase retail or commercial function.	No external cost to the community	No external cost to the community
If a stand-alone proposal and not a centre, does the proposal have the potential to develop into a centre in the future?	Not relevant to this planning proposal.			No external cost to the community
What are the public interest reasons for preparing the draft plan? What are the implications of not proceeding at that time?	Provision of additional rural residential lots would ensure demand for these lot types is satisfied.	Further subdivision and dwelling development would be permitted via this LEP.	Public Interest is best served by increasing supply of rural residential land within the locality before demand becomes problematic.	Potential external cost to community if LEP does not proceed due to shortfall of rural residential land.
		Net Community Benefit =	**Positive**	**Positive**

The outcome of the above analysis confirms that the planning proposal would have a net community benefit to the local area.

The social effect of the planning proposal would be best gauged during the period of Community Consultation (refer **Section 4**).

3.4 STATE AND COMMONWEALTH INTERESTS

Is there adequate public infrastructure for the planning proposal?

The planning proposal applies to land that is surrounded on three sides by land that is zoned for R5 – Large Lot Residential and is located near to O'Connell in an area of strong demand and growth. Of the surrounding land zoned for R5 purposes, those which have been subdivided have seen a strong take up. For example, it is noted that land to the north of Lagoon Road (approximately 1km north of the site) has seen steady value increases in land since its release in 2014, representative of its appealing status (LPI Globe, 2017).

The surrounding existing zoned areas have provided lots of a similar size to those proposed via this planning proposal thereby ensuring a generally consistent pattern of development in the locality.

Electricity and telecommunications services are available in the locality and would be extended as required to service the proposed development. More detailed assessment would be completed at subdivision stage, and once staging/release is confirmed, to determine upgrade requirements.

It is not proposed to extend reticulated water and sewer services to the site and the needs of future dwellings in terms of water and sewer would be provided on site.

What are the views of state and commonwealth public authorities consulted in accordance with the Gateway determination?

The views of state and commonwealth public authorities would be ascertained in accordance with the comments contained in the Gateway Determination.

Initial liaison with Roads and Maritime Services and Department of Primary Industries (Water) have not revealed any in principle objections to the proposal – refer Appendix E of **Attachment 1**.

Mapping

4.1 GENERAL

There are two necessary mapping changes resulting from the planning proposal.

- The amendment of LEP Map Sheet LZN_001 to amend the site zoning from RU1 – Primary Production – R5 – Large Lot Residential. Existing and proposed zoning is demonstrated on **Figure 5** and **Figure 6**; and
- The amendment of LEP Map Sheet LSZ_001 to amend the minimum lot size from 100 hectares to 10 hectares. Existing and proposed minimum lot size is demonstrated on **Figure 7** and **Figure** 8.

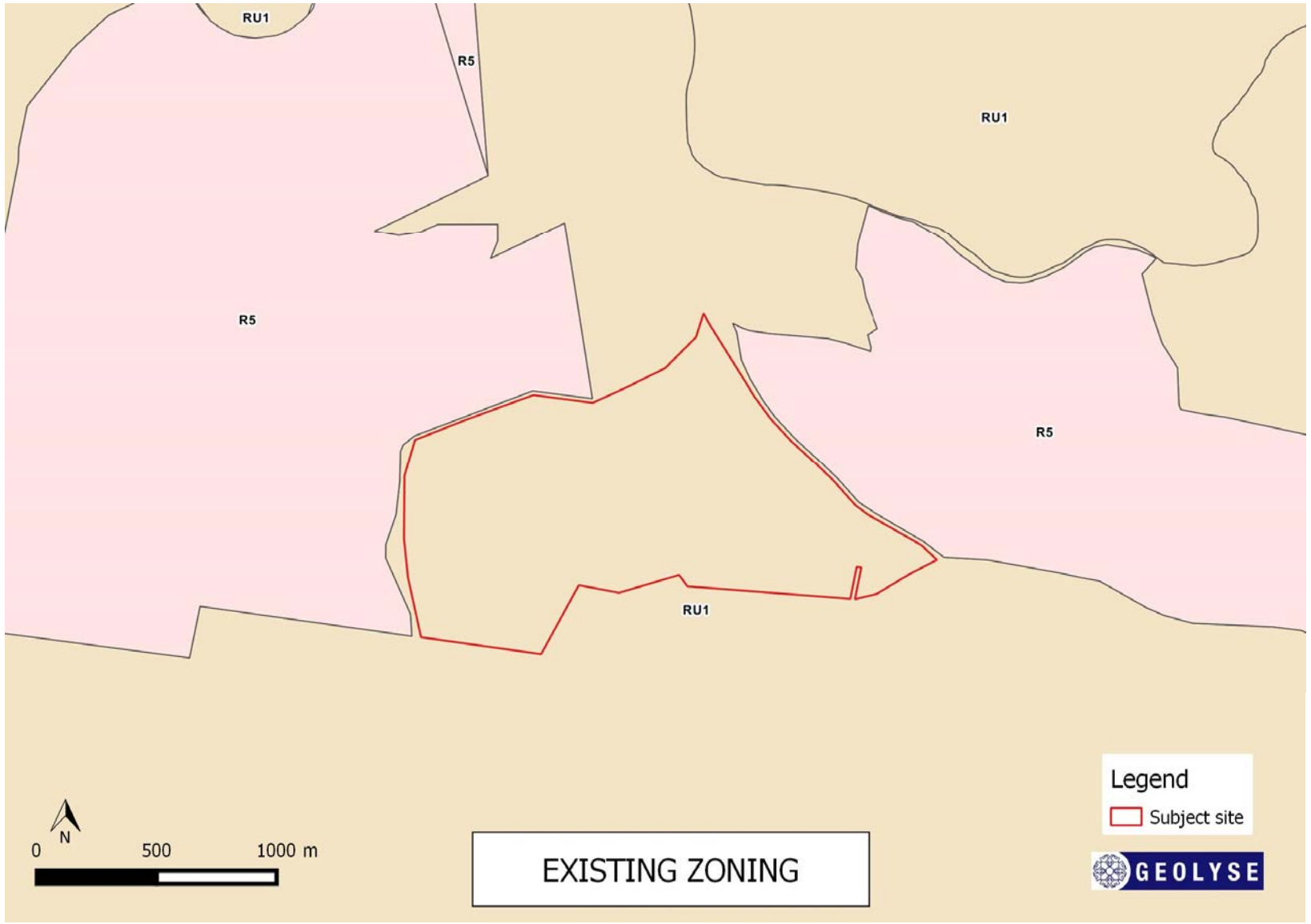


Figure 5: Existing Land Use Zoning

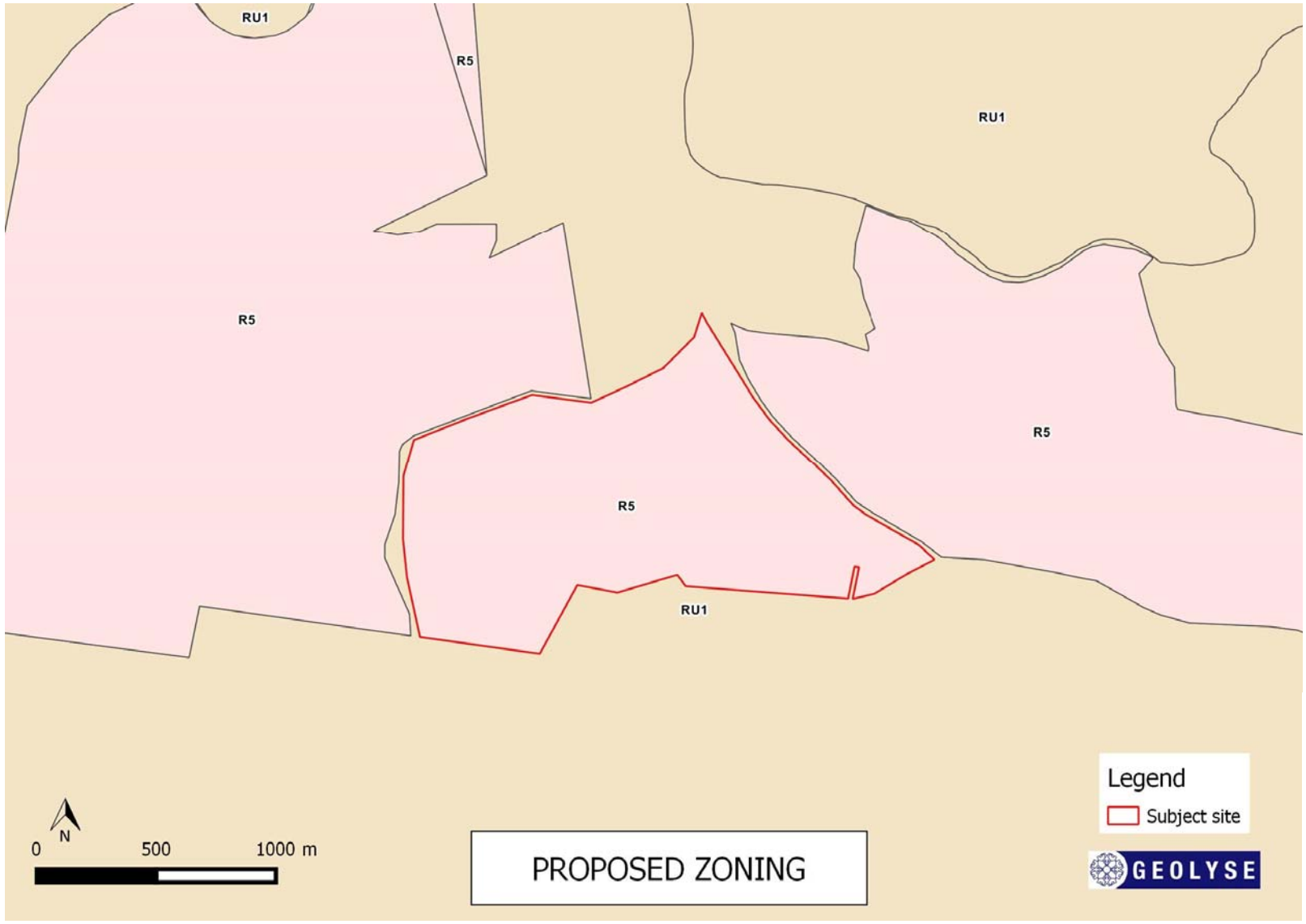


Figure 6: Proposed Land Use Zoning

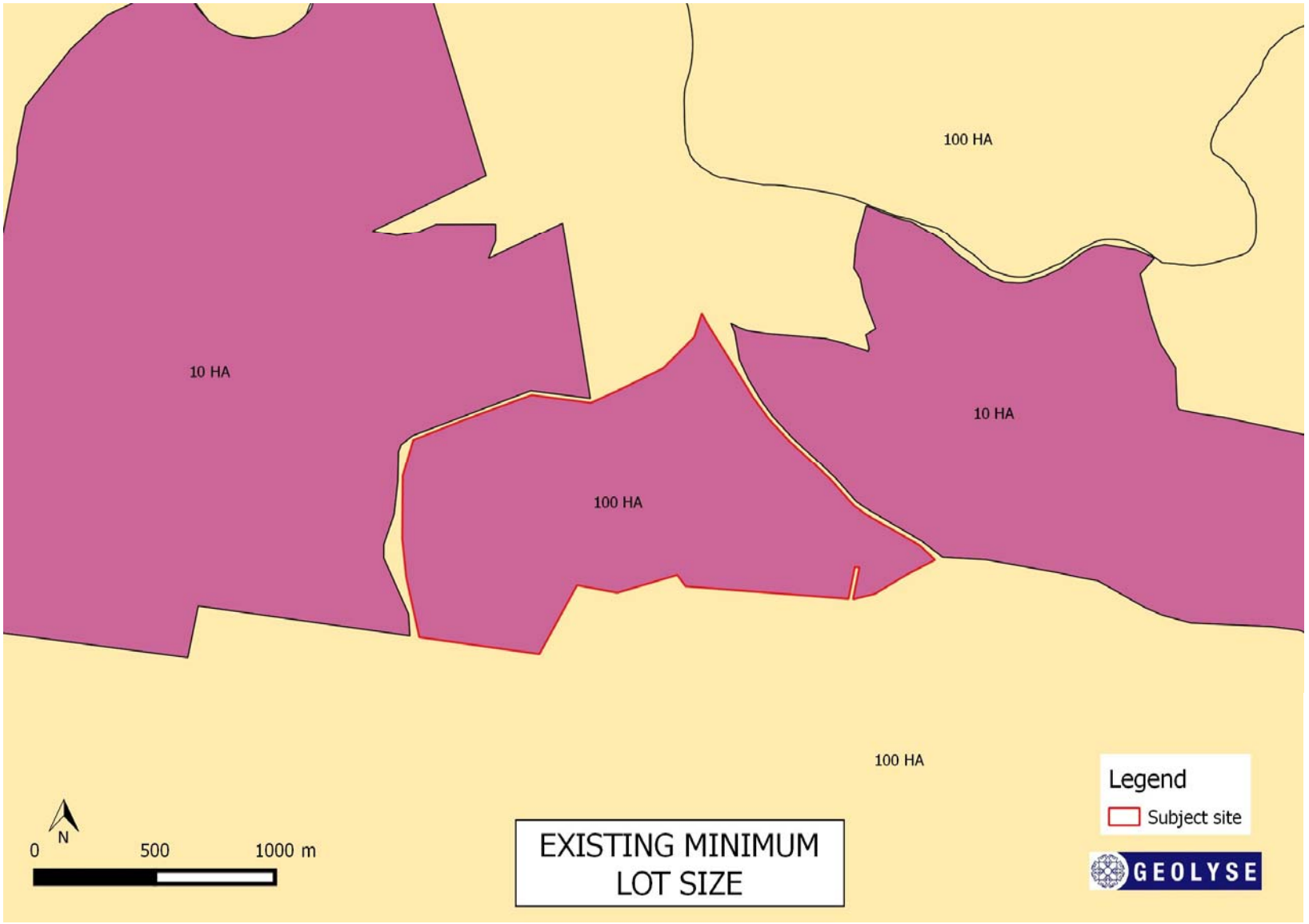


Figure 7: Existing Minimum Lot Size

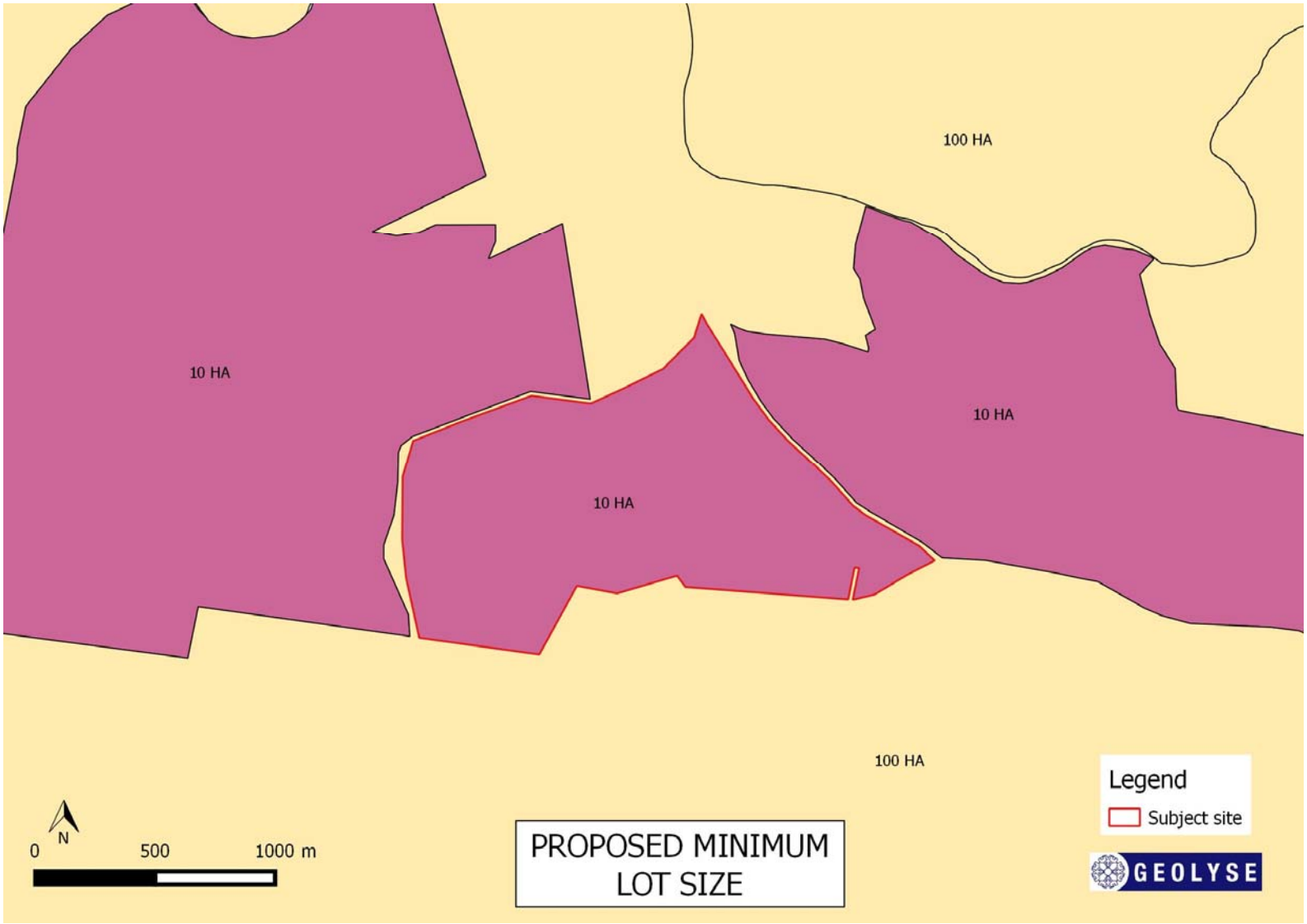


Figure 8: Proposed Minimum Lot Size

Community Consultation

5.1 TYPE OF COMMUNITY CONSULTATION REQUIRED

Section 5.5.2 of 'A Guide to Preparing Local Environmental Plans' identifies two different exhibition periods for community consultation;

- Low Impact Proposals – 14 days; and
- All other planning proposal (including any proposal to reclassify land) – 28 days.

The Guide describes low impact proposals as having the following attributes;

- *A 'low' impact planning proposal is a planning proposal that, in the opinion of the person making the gateway determination, is;*
  - *Consistent with the pattern of surrounding land use zones and/or land uses;*

The proposed rezoning of the parcel of land to R5 – Large Lot Residential would be consistent with the zoning of nearby land and is consistent with the prevailing quasi-rural residential use of the land within the nearby locality.

  - *Consistent with the strategic planning framework;*

Responses have been provided detailing the proposal's compliance with local and regional planning strategies, SEPPs, and ministerial directions. The proposal is not consistent with the adopted LUS however represents a logical release of land in the locality, and this is justified by the attached LES which demonstrates the suitability of the site for the proposed purpose.

  - *Presents no issues with regard to infrastructure servicing;*

Capacity exists to provide electricity and telecommunications services from existing services in the area. Potable water and effluent management would be provided on site and the size of the proposed lots is considered sufficient to ensure that future dwellings are self-sufficient. DPI (Water) have provided their in-principle support for the proposed minimum lot size.

  - *Not a principal LEP; and*

The planning proposal is not for a principal LEP.

  - *Does not reclassify public land.*

The planning proposal does not seek to reclassify public land.

In accordance with the responses to the above points, the planning proposal is considered to be of low impact. However due to the inconsistency with the adopted and endorsed LUS, it is considered that a community consultation period of 28 days is applicable and appropriate.

References

NSW Department of Planning (DoP). 2009a, A Guide to Preparing Local Environmental Plans, DoP, Sydney.

NSW Department of Planning (DoP). 2009a, A Guide to Preparing Planning Proposals, DoP, Sydney.

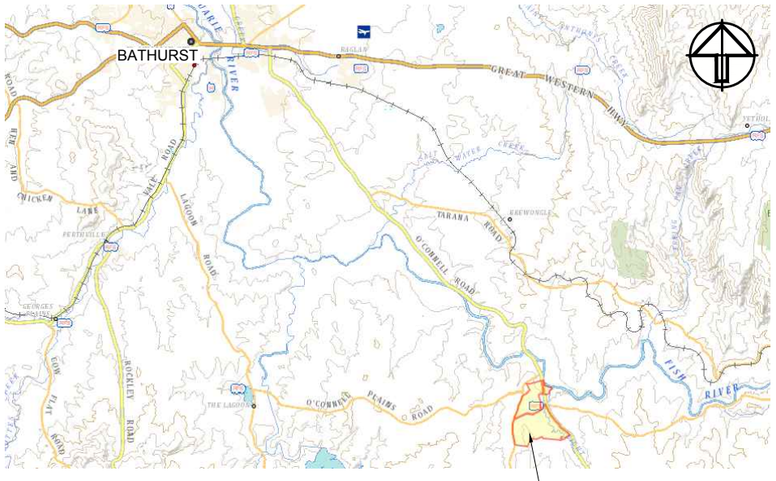
Oberon Council. 2011, *Oberon Land Use Strategy 2011*

NSW Globe. 2017, *NSW Land and Property Information plug-in for Google Earth, accessed 5 May 2017*

Drawings

CONCEPT SUBDIVISION LAYOUT
'BELVOIR' O'CONNELL, NSW
BELVOIR HILL PASTORAL COMPANY
IN SUPPORT OF A PLANNING PROPOSAL

SCHEDULE OF DRAWINGS	
DRAWING	TITLE
TP01	TITLE SHEET AND LOCALITY MAP
TP02	EXISTING SITE PLAN
TP03	PROPOSED SUBDIVISION LAYOUT



SITE LOCALITY
NOT TO SCALE

GEOLYSE
ORANGE
154 PEISLEY STREET
P.O. BOX 1963
ORANGE, NSW 2800
orange@geolyse.com
www.geolyse.com
Ph. (02) 6393 5000
Fx. (02) 6393 5050

REV.	DATE	DFTD.	APPD.	DETAILS
A	02/11/16	AJD	DW	ISSUED FOR REVIEW
B	14/02/17	AJD/GT	DW	ISSUED FOR REVIEW
C	20/02/17	AJD/GT	DW	ISSUED FOR REVIEW
D	27/03/17	AJD/GT	DW	ISSUED FOR REVIEW
E	08/05/17	AJD/GT	DW	ISSUED FOR APPROVAL

DRAWING SCALE

DO NOT SCALE FROM THESE DRAWINGS. ALL MEASUREMENTS SHALL BE CONFIRMED ON SITE AND WITH GEOLYSE PTY. LTD. PRIOR TO CONSTRUCTION

APPROVAL AUTHORITY: OBERON COUNCIL

CLIENT: BELVOIR HILL PASTORAL COMPANY

PROJECT: CONCEPT SUBDIVISION LAYOUT FOR "BELVOIR" O'CONNELL, N.S.W.

DRAWING: TITLE SHEET & SITE LOCALITY

PROJECT NUMBER 115281 | DRAWING FILE 115281_01E_TP01-TP03.dwg | ORIGINAL A1

DATA SOURCE -

IMAGE SOURCE -

SET 01

STATUS FOR APPROVAL | SHEET TP01 OF TP03

GEOLYSE
ORANGE
154 PEISLEY STREET
P.O. BOX 1963
ORANGE, NSW 2800
orange@geolyse.com
www.geolyse.com
Ph. (02) 6393 5000
Fx. (02) 6393 5050

REV.	DATE	DFTD.	APPD.	DETAILS
A	02/11/16	AJD	DW	ISSUED FOR REVIEW
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D	27/03/17	AJD/GT	DW	ISSUED FOR REVIEW
E	08/05/17	AJD/GT	DW	ISSUED FOR APPROVAL

DRAWING SCALE

SCALE 1:4000 (A1)

0 100 200 300 400

0 100 200 300 400

SCALE 1:8000 (A3)

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APPROVAL AUTHORITY

OBERON COUNCIL

CLIENT

BELVOIR HILL PASTORAL COMPANY

PROJECT

CONCEPT SUBDIVISION
LAYOUT FOR
"BELVOIR"
O'CONNELL, N.S.W.

DRAWING

EXISTING SITE PLAN

PROJECT NUMBER 115281	DRAWING FILE 115281_01E_TP01-TP03.dwg	ORIGINAL A1
DATA SOURCE -		
IMAGE SOURCE -		SET 01
STATUS FOR APPROVAL	SHEET TP02 OF TP03	

GEOLYSE
ORANGE
154 PEISLEY STREET
P.O. BOX 1963
ORANGE, NSW 2800
orange@geolyse.com
Ph. (02) 6393 5000
www.geolyse.com
Fx. (02) 6393 5050

REV.	DATE	DFTD.	APPD.	DETAILS
A	02/11/16	AJD	DW	ISSUED FOR REVIEW
B	14/02/17	AJD/GT	DW	ISSUED FOR REVIEW
C	20/02/17	AJD/GT	DW	ISSUED FOR REVIEW
D	27/03/17	AJD/GT	DW	ISSUED FOR REVIEW
E	08/05/17	AJD/GT	DW	ISSUED FOR APPROVAL

DRAWING SCALE

SCALE 1:4000 (A1)

0 100 200 300 400

0 100 200 300 400

SCALE 1:8000 (A3)

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APPROVAL AUTHORITY

OBERON COUNCIL

CLIENT

BELVOIR HILL PASTORAL COMPANY

PROJECT

CONCEPT SUBDIVISION LAYOUT FOR "BELVOIR" O'CONNELL, N.S.W.

DRAWING

PROPOSED SUBDIVISION LAYOUT

PROJECT NUMBER 115281	DRAWING FILE 115281_01E_TP01-TP03.dwg	ORIGINAL A1
DATA SOURCE -		
IMAGE SOURCE -		SET 01
STATUS FOR APPROVAL	SHEET TP03 OF TP03	

Attachment 1

LOCAL ENVIRONMENTAL STUDY

LOCAL ENVIRONMENTAL STUDY

IN SUPPORT OF A PLANNING PROPOSAL

PROPOSAL TO AMEND THE OBERON LOCAL ENVIRONMENTAL PLAN 2013 IN RESPECT OF LAND AT O'CONNELL

PREPARED FOR:

BELVOIR HILL PASTORAL COMPANY PTY LTD

MAY 2017

GEOLYSE

POSTAL ADDRESS PO BOX 1963 ORANGE NSW 2800
LOCATION 154 PEISLEY STREET ORANGE NSW 2800
TELEPHONE 02 6393 5000 **FACSIMILE** 02 6393 5050
EMAIL ORANGE@GEOLYSE.COM **WEB SITE** WWW.GEOLYSE.COM

Report Title:	*Local Environmental Study*
Project:	*In Support of a Planning Proposal*
Client:	*Belvoir Hill Pastoral Company Pty Ltd*
Report Ref.:	*115281_LES_001B.docx*
Status:	*Final*
Issued:	*23 May 2017*

Geolyse Pty Ltd and the authors responsible for the preparation and compilation of this report declare that we do not have, nor expect to have a beneficial interest in the study area of this project and will not benefit from any of the recommendations outlined in this report.

The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

All information contained within this report is prepared for the exclusive use of Belvoir Hill Pastoral Company Pty Ltd to accompany this report for the land described herein and are not to be used for any other purpose or by any other person or entity. No reliance should be placed on the information contained in this report for any purposes apart from those stated therein.

Geolyse Pty Ltd accepts no responsibility for any loss, damage suffered or inconveniences arising from, any person or entity using the plans or information in this study for purposes other than those stated above.

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APPENDICES

ABBREVIATIONS

Abbreviation	Full Name
ACHA	Aboriginal Cultural Heritage Assessment
AHD	Australian Height Datum
AHIP	Aboriginal Heritage Impact Permit
APZ	Asset Protection Zone
CBD	Central Business District
CCA	Controlled Activity Approval
D&PE	NSW Department of Planning & Environment
DPI(Fisheries)	Department of Primary Industries (Fisheries)
DPI (Water)	Department of Primary Industries (Water)
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
LEP87	*Oberon Local Environmental Plan 1987*
LEP13	*Oberon Local Environmental Plan 2013*
LGA	Local Government Authority
LUS04	Oberon Landuse Strategy and Local Environmental Study 2004
LUS11	*Oberon Land Use Strategy 2011*
PBFP	*Planning for Bush Fire Protection 2006*
PCT	Plant Community Type
RMS	Roads and Maritime Services
SEPP	State Environmental Planning Policy
SEPP44	State Environmental Planning Policy No. 44 – Koala Habitat Protection
SEPP55	State Environmental Planning Policy No. 55 – Remediation of Land
TSC Act	*Threatened Species Conservation Act 1995*

Introduction

1.1 OVERVIEW

Belvoir Hill Pastoral Company Pty Ltd own land located at 2519 O'Connell Road, O'Connell (Lot 4 DP1023024), and seek to subdivide the southern portion of the site (south of Box Flat Road) for the purposes of large lot residential land use (ultimately providing allotments of approximately 10 hectares in size).

The site is currently zoned for RU1 – Primary Production and is utilised by the applicant for this purpose.

Permissible land uses on the site include extensive and intensive plant agriculture together with a range of other uses. Subdivision is currently permissible subject to achieving the applicable minimum lot size, which is 100 hectares, or to a lesser size where subdivision is proposed for agricultural purposes (ie, no dwelling is proposed).

Geolyse has been engaged by Belvoir Hill Pastoral Company Pty Ltd to prepare this Local Environmental Study (LES) to support a planning proposal to amend the *Oberon Local Environmental Plan 2013* (LEP13) to enable the proposed rural residential subdivision to proceed.

1.2 SCOPE OF THIS REPORT

By reference to local planning direction 1.2, pursuant to section 117 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), a planning proposal which seeks to rezone land from rural to residential must be supported by a study which gives consideration to the objectives of that direction. Similar references are made with respect to local planning directions 3.1 and 3.4, both of which are also relevant to this planning proposal.

This study has been prepared to provide an assessment of the planning proposal including specific consideration of the above noted local planning directions. This study is set out in the following format:

- **Section 2** provides a description of the statutory framework;
- **Section 3** provides a summary of environmental characteristics;
- **Section 4** provides analysis of the environmental constraints;
- **Section 5** concludes the report.

Statutory Planning

2.1 STRATEGIC DOCUMENTS

2.1.1 NSW 2021: A PLAN TO MAKE NSW NUMBER ONE

The NSW 2021 plan was conceived to make NSW number 1. At its core is a framework built around five key strategies:

1. *Rebuild the economy,*
2. *Return quality services,*
3. *Renovate infrastructure,*
4. *Strengthen our local environment and communities; and*
5. *Restore accountability to government.*

Delivery of these five key strategies is sought via provision of 32 structured goals. Of relevance to this project is the following goals:

3. Drive economic growth in regional NSW

Increase the share of jobs in regional NSW

Increase the population in regional NSW by 470,000 by 2036

Protect strategic agricultural land and improve agricultural productivity

5. Place downward pressure on the cost of living

Improve housing affordability and availability

22. Protect our natural environment

Protect local environments from pollution

Increase renewable energy

23. Increase opportunities for people to look after their own neighbourhoods and environments

Increase the devolution of decision making, funding and control to groups and individuals for local environmental and community activities, including catchment management and landcare

The proposed development is considered to be consistent with the above goals on the basis that it:

- provides additional choice for housing development, which has flow on effects for improved housing affordability and availability;
- utilises land that is predominantly not strategic agricultural land;
- provide allotments of a large size that are consistent with surrounding lot sizes and provide ample opportunities for adoption of forms of renewable energy;
- removes agricultural use of the site and thereby provides for opportunities for rehabilitation of the degraded 4th order creek line and reduces opportunities for water pollution via sedimentation as a result of grazing activities; and
- provides additional land owners along the creek line who can share in the carrying out rehabilitation measures.

2.1.2 DRAFT CENTRAL WEST AND ORANA REGIONAL PLAN

The Draft Central West and Orana Regional Strategy (DCWORC) is centred on a core vision of the region to create:

a sustainable future centred on a thriving economy, with a diverse range of economic industries across each local government area; productive rural lands and natural resources; strong, resilient and well-serviced communities; and a healthy environment.

The CWORC vision would be achieved via pursuit of the following goals:

- *GOAL 1: A growing and diverse regional economy;*
- *GOAL 2: A region with strong freight transport and utility infrastructure networks that support economic growth;*
- *GOAL 3: A region that protects and enhances its productive agricultural land, natural resources and environmental assets; and*
- *GOAL 4: Strong communities and liveable places that cater for the region's changing population.*

Each goal would be achieved through a range of specific directions and actions. Of these directions and actions, the following are relevant to this project:

- *DIRECTION 3.1 Protect regionally important agricultural land*
- *DIRECTION 3.2 Protect the region's mineral and energy resources*
- *DIRECTION 3.3 Manage competing and conflicting interests in agricultural, mineral and energy resource areas to provide greater certainty for investment*
- *DIRECTION 3.4 Manage and conserve water resources across the region*
- *DIRECTION 3.5 Protect and manage the region's environmental assets*
- *DIRECTION 3.6 Protect people, property and the environment from exposure to natural hazards and build resilient communities*
- *DIRECTION 4.1 Manage growth and change in the region's settlements*
- *DIRECTION 4.3 Increase and improve housing choice to suit the different lifestyles and needs of the population*
- *DIRECTION 4.4 Enhance community access to jobs and services by creating well-connected places, designed to meet the needs of a regional community*

The proposed development is considered to be generally consistent with these directions on the basis of the following:

- The development primarily involves development of land that is of low agricultural capability, with those mapped high capability areas being heavily constrained by the proximity to the creek line and other zoned rural-residential land and is therefore of limited productive use;
- The proposed development provides an improved environmental outcome to riparian environments via significant reduction in stocking rates and capacity for rehabilitation work;
- The proposed development provides additional land stock in an area that is in demand for rural residential lots;
- The large size of the proposed lots ensures there is capacity for the sustainable provision of on-site services without undue impact to the natural environment;
- The development would provide local jobs during the initial construction phase;
- The proposed development would enhance the viability of existing businesses in O'Connell by providing an improved local population;
- The proposed development is designed to accommodate the natural constraints and opportunities of the site to ensure that on-going impacts are minimised;
- The proposed development is not proposed in an area of natural hazard (such as flooding or bushfire), ensuring the safety of future dwellings and their occupants.

2.1.3 OBERON LAND USE STRATEGY 2011

An initial Local Environmental Study and Landuse Strategy (LUS04) was prepared for the Oberon Local Government Area in 2004. The LUS04 was completed in 2007 however the document was not endorsed by the then NSW Department of Planning (LUS11, p13).

In 2011 the Oberon Land Use Strategy 2011 (LUS11) was prepared. The aims and intent of the LUS11 were to:

> *…provide a broad land use strategy to guide the future land management and development of both the urban and rural components of the LGA. The intent of the Strategy is to:*
>
> - *Recommend actions for achieving the land use objectives of the Oberon community, consistent with the Council and community's vision.*
> - *Recommend changes to Oberon Local Environmental Plan (LEP) 1998 to reflect the Oberon Council and community vision, the adopted management plan, and the land use objectives, consistent with NSW Government planning requirements, including the Standard LEP provisions.*

It is understood that the LUS11 was endorsed by the Department of Planning.

The Oberon Local Environmental Plan 1998 (LEP98) was replaced by the *Oberon Local Environmental Plan 2013* (LEP13), following gazettal on the 20 December 2013. On this basis, the second component of the strategy intention has been satisfied.

The strategic basis of the LUS11 was centred around a core vision, described as:

> *"To build on the strengths and diversity of the Oberon Local Government Area by encouraging opportunities aimed specifically at the provision of social equity through additional employment, while maintaining environmental sustainability"*

This core vision was assisted by a number of local area vision statements. The specific O'Connell area vision statement is stated as:

> *"To preserve the natural beauty, agricultural heritage and rural lifestyle of O'Connell through sensitive development provisions so as to maintain a rural residential atmosphere"*

As the proposed development seeks to provide for large lot rural residential development which responds to the constraints of the natural environment, it is considered that the proposed development is generally consistent with this high level vision for the O'Connell area.

It is noted that the LUS11 contains reference to a number of pre-existing strategies for minimising land use conflict, including a requirement for buffers between new dwellings and broad acre farming/forestry practises. It is confirmed through discussion at **Section 4.10.4** of this study that these buffers are capable of being achieving for all proposed conceptual building sites. The layout provided in **Drawing TP03** provides one option for an arrangement that would achieve the proposed minimum lot size whilst also minimising impacts to environmental constraints. Other options may be investigated in preparing the DA but would be consistent with the proposed 10 hectare minimum lot size.

In preparing the LUS11 a number of key issues were identified as being important. These include:

- Regional demographics, including the low levels of unemployment, the aging population, the popularity of agricultural and forestry occupations and the consistently low to moderate population growth since 1991;
- Supply and demand, including an abundance of potential (although possibly not actual) dwelling opportunities within the rural zoned land, limitations to rural residential land (as existing at the time), retention of existing holdings rights and limiting rural fragmentation and strengthening villages;
- Land use and geographic characteristics, including indications of rural land fragmentation and indications of significant mineral and extractive resources in the LGA;

- Economic characteristics, including a dependence on the agricultural sector for jobs, historically low unemployment rates and good opportunities for consolidation and growth of tourism opportunities;
- Servicing characteristics, including private transport usage levels are high within the LGA,
- Environmental characteristics, including ensuring adequate provision is put in place to ensure the protection of identified cultural/scenic landscapes including the O'Connell Conservation Area, ensure the provisions are made for the conservation of identified heritage sites and localities, utilise and adopt available resources as strategic planning tools, including sensitive land, water and biodiversity resources.

This project responds to the above by providing minimum lot sizes consistent with the zoned R5 land in the locality and also by acknowledging and responding to environmental constraints on the site through measures including building envelope placement.

The LUS11 also provided comment on the strategic planning context, which the LUS11 sought to consider, including (as relevant):

- Increasing urban development pressure (including rural residential).
- Increased and continuing population growth, with further ageing of population. It is noted that Council's targeted doubling of the population by 2026 is optimistic however there are a number of economic and social drivers that may increase the population forecast beyond the expected population growth of 0.6% per annum as identified by the NSW Department of Planning.
- Increasing inadequacy of housing suited to ageing of population and reduced number of persons per dwelling (possible mismatch in housing supply and demand).
- Increasing cost pressures for services and infrastructure (provision of roads and service infrastructure in rural/rural residential areas, transport costs).
- Increasing demand for maintaining environment and amenity and 'tree change' lifestyle attributes.
- Requirement to improve landscape connectivity for biodiversity and maintain native vegetation.

Also of relevance, the LUS11 provides a summary of settlement supply and demand within the LGA, as current at the time of preparation of that document. Data for the period 2004 – 2009 indicates approval rates for rural and rural residential dwellings at 46.6 dwellings per year. The vast majority of these were located in the 1(a) General Rural Zone as per LEP87, with the next highest proportion being located within the 2(v) – Village zone. A much smaller number were located in the 1(c) and 1(e) zones. It is inferred that the high number of approvals in the 1(a) zone related to land owners seeking to protect dwelling entitlements that could potentially be affected by the (then) imminent changes to the LEP. An analysis of applications received during the 2004-2008 period indicated that, among others, O'Connell was one of the most common areas for lodgement of DA's, suggestive of its high desirability level as a place of residence.

LUS11 contains discussion around the high number of lots created via subdivision in the rural zone in the period 2003-2009 and the low number of lots created within the rural-residential zones. The conclusion of the LUS11 is that demand for 'lifestyle' rural residential lots is largely being met by provision of smaller holdings within the rural zone, consisting of concessional lots and existing holdings. It also notes that some demand is potentially being met via lots in other nearby LGA's. It further notes that the apparently low levels of demand for rural residential/lifestyle lots is at odds with the outcome of public consultation and feedback from special interest groups. As a result of the information gathered it was concluded that the demand for lifestyle blocks via other means, not that demand for smaller lifestyle blocks existed (ie, it was being met in other ways).

The LUS11 identifies the need for housing provision in the rural areas to decrease and for provision in rural residential areas to increase. The LUS11 provides future aims for settlement growth and identifies an expected provision of 28 additional rural lots per year and 14 rural lifestyle lots, or in total approximately 32 lots per year. In reality, it is expected that the majority of demand would be fulfilled by rural residential allotments rather than rural lots.

Even with the proposed/anticipated reduction for the provision of lifestyle blocks in the rural zone, this approach for responding to demand is not considered to be sustainable for the following reasons:

- The 2008 introduction of the Rural Lands SEPP has seen the beginning of the end for concessional lots and existing holdings, with many Council's introducing sunset clauses for existing holdings in their adopted Standard Instrument LEPs. It is conceivable that future amendments to the LEP may propose the introduction of a similar clause in the Oberon LEP at the insistence of the DP&E. This type of lots will therefore decline moving forward and strategic planning to respond to demand is required;
- The provision of lifestyle blocks in a non-strategic manner in the rural zone has a high potential for increasing land use conflicts between traditional forms of primary production and the owners of smaller lifestyle blocks, due to the difficulties of providing adequate buffers on smaller lots.

In contrast, the planned, strategic provision of lifestyle blocks in areas close to other similar scale developments, close to services and close to infrastructure such as roads is consistent with modern land use planning techniques and ensures both that land use conflicts are minimised and 'right to farm' expectations are not diminished. LUS11 supports this position at page 31 where it states that '*The provision of rural residential (currently 1(c) zone) should be limited to sites which encourages a strengthening of the villages and enclaves.'* It further states at page 68:

> *Future settlement developments should focus on the principles of cluster planning and the creation of critical mass with a focus on the township of Oberon and the Village areas of Burraga, Black Springs and O'Connell.*

The project the subject of this planning proposal is consistent with these aims as it seeks to provide rural residential lots in close proximity to the village of O'Connell and in close proximity to existing rural residential zoned land. This proposal ensures that the potential for future land use conflict is reduced.

The LUS11 confirms the validity of the above assessment at Section 3.1.12 whereat it states:

> *Purchasers of rural lifestyle lots are seeking lifestyle rather than productive attributes of the land and are generally persons relying on employment in Oberon and adjoining LGAs, or moving from outside the area. Rural residential subdivision and land use is often considered to be in conflict with commercial agriculture, and separation from agriculture is normally desirable.*
>
> *As previously noted, 1(c) rural residential zoned land demand has been low at an annual average of 6.25 dwelling approvals over the past four years however this style of housing is deemed to be of high demand and its true level of demand is difficult to determine due to:*
>
> *a) No additional supply of 1(c) zoned lands over the past eight years.*
>
> *b) The community consultation and feedback from special interest groups (e.g. real estate agents) has indicated that converse to actual take-up rates there is strong demand for rural residential lands.*
>
> *c) It is considered that the demand for these style/size of lots has also been historically addressed through concessional/excise lot subdivisions within the 1(a) zoning.*
>
> *The planned provision of more efficient 1(c) rural residential zoned lands may address this latent demand and as a consequence further extend the current abundance of 1(a) zoned subdivided approved lands. In addition, suitably sited 1(c) lands may reduce the continued inefficiencies with infrastructure and service provision.*
>
> *Rural residential subdivision and development is a key land use planning issue in the Oberon LGA. Demand for small rural subdivision is primarily related to geographical and visual attributes as well as road accessibility.*

The subject land is sited close to existing rural residential zoned land and has suitable capacity for provision of appropriate buffers to nearby primary production land. It is therefore consistent with the above intended aims.

A range of criteria are identified in relation to lifestyle development blocks and these are discussed in **Table 2.1**.

Table 2.1 – Criteria and objectives for Rural lifestyle development

Criteria/Objective	Assessment
Rural Lifestyle Site Criteria	
New rural residential development should take into consideration a broad range of constraints including vegetation, bush fire, slope, water catchment, availability of water supply and land clearing. The development should not result in the clearance of remnant vegetation, and should incorporate native vegetation into the character and design of the development.	These matters are addressed throughout this LES. The concept plan provided seeks to minimise impacts to vegetation and to incorporate these into the layout. Sympathetic plantings on the O'Connell Road elevation to extend and link to existing 'avenue' plantings would be considered if deemed necessary by Council.
Rural residential development should be designed to maintain and enhance catchment health and should preferably not take place in catchments which are already significantly degraded.	The riparian environment is degraded from the current grazing use. Removal of this use enables rehabilitation and regeneration to take place
Areas which are particularly visible from key visual points and which would impact on the historic, rural character of the Oberon LGA are not favoured for rural residential development	The site is within an undulating landscape and the majority is not highly visible. The density of the development would be low and consistent with prevailing character in the locality. Measures would be considered if deemed necessary (at DA stage) to enhance and extend 'avenue' plantings on the O'Connell Road elevation to provide a link to the existing streetscape.
New rural residential development should have reasonable proximity to one of the LGA's primary or secondary service centres.	The site is close to O'Connell village and proximate to Oberon and Bathurst. The area is shown via WRI's analysis at **Appendix A** to be highly desirable due to its location.
Rural residential development should be located within reasonable proximity to primary and high schools, with links to the public transport network and opportunities for students to walk or cycle, wherever possible.	The proximity to O'Connell Village provides this as does proximity to Oberon and Bathurst.
Rural residential development should form part of an efficient road pattern, with links to public transport services	The site is well placed to connect with public transport links on O'Connell Road, including school bus routes
Rural residential development should be planned as part of a coordinated, logical settlement pattern, and should not generate disproportionate demands for services and infrastructure.	The site is within an area of existing rural residential development and provides for good road connectivity. All services would be provided on site or by the developer with no cost to the local community.
Rural residential development should not displace or conflict with significant agricultural land uses.	Surrounding land uses are predominantly in use or zoned for rural residential purposes. Adjacent primary production land to the south is in fragmented, small lot arrangement. Adequate buffers to ensure right to farm is not diminished are capable of being provided to land to the south.
Rural residential development should not be located in areas where there will be irreconcilable conflict with existing or proposed future land uses.	The proposed development is consistent with surrounding land uses as discussed above.
Rural Lifestyle Development Objectives	
1. Provide opportunities for additional rural residential subdivision and development in suitable locations, and enable a range of different types of rural residential development. Provide for a supply of rural residential lots at an annual rate sufficient to encourage progressive increase in settlement with a focus on existing settlement areas. To enable this to occur, zone adequate land for between five and 10 years supply, with review of land supply being undertaken every four years.	It is unknown whether a review of land supply has taken place since the LUS11 was produced, however a review would be timely. The analysis by WRI at **Appendix A** would inform this review and suggests that demand in this locality is increasing.
2. Ensure that adequate infrastructure and services are available for rural residential lots.	This would be achieved at DA stage – refer **Section 4.11**

Table 2.1 – Criteria and objectives for Rural lifestyle development

Criteria/Objective	Assessment
3. Ensure that the supply of zoned rural residential land does not unreasonably exceed demand. New rural residential areas must relate to the long term preferred settlement structure (i.e. not be located on land with potential for urban development in the long term) and provide adequate transport accessibility. Where possible and economically viable smaller lots on the fringe of Oberon should have reticulated sewer provided.	The analysis by WRI at **Appendix A** confirms that the demand in this area is strong. The small number of lots created by this subdivision would be unlikely to prejudice supply.
4. Apply criteria to identify the best location for rural residential estates and balance socioeconomic goals associated with new rural residential development with the need to preserve areas of high agricultural, scenic or environmental value.	The land is predominantly low capability agricultural class and is well sited adjacent to other rural residential zoned land and the village of O'Connell to be considered a logical location for additional large lot residential lot. All areas near to O'Connell identified via the LUS11 as being suitable for rezoning have been rezoned. There is strong demand in the locality to justify further rezoning as discussed in **Appendix A**.
5. Identify appropriate development controls for rural residential areas through DCP provisions.	In place and discussed at **Section 2.2**
6. Propose additional LEP objectives for rural residential under the proposed Standard LEP zoning provisions.	In place and discussed at **Section 2.2**

Source: Oberon Land Use Strategy 2011

The LUS11 confirms at Section 3.2.3 that one of the aims of Council is to minimise future land use conflicts, including in relation to dispersed settlement patterns. The proposed development seeks to develop land close to other R5 zoned land and close to services in the form of O'Connell village. This is consistent with Council's goal in this regard.

In summary, the proposed development is generally consistent with the LUS11 in that it seeks to minimise rural land fragmentation, provide for well-planned and well located housing options for its residents and minimise costs to the community. The proposed development satisfies these intentions by virtue of the nature and siting of the development. For these reasons, the development is considered to be consistent with the LUS11.

2.1.4 CATCHMENT MANAGEMENT

Local Land Services (LLS) replaced the former Catchment Management Authority (CMA) in 2014. LLS is an amalgamation of the CMA, Livestock Health and Pest Authorities and part of the Department of Primary Industries. The focus of the LLS is effective and efficient regional service delivery. LLS has broad roles across natural resource management (NRM), provision of agricultural advice, biosecurity and plant and animal pest control.

As a result of the recent change in the organisation structure, the Central Tablelands Local Land Services Transitional Catchment Action Plan (TCAP) was released.

The particular focus of the TCAP is:

- *Utilising the existing information and knowledge base*
- *Keeping the strong community ownership*
- *Using the existing vision, goals, strategies and actions. This has required a synthesis of the approaches in the individual CAPs and the development of a new set of priorities to reflect the LLS region and operations*
- *Maintaining the whole of government approach*

The subject site is located within the Central Tablelands local landscape.

The TCAP features a number of core goals against which the proposed development has been considered – refer **Table 2.2**.

Table 2.2 – LLS Transitional Catchment Action Plan goals

CTAP Goal	Response
Environment - To improve and maintain the condition of the natural environment	The site is has historically been used for traditional agriculture purposes, primarily grazing, but with some cropping. Disturbance associated with the proposed development would be the installation of roads and services and development of up to 17 dwellings. Positive impacts of the development including reducing the impacts of stock degradation of the riparian environment and the careful placement of infrastructure and building envelopes to limit impacts to significant vegetation. It is considered that appropriate implementation of recommended controls as recommended throughout this study would ensure that impacts to the environment are limited.
Profitable Farming Systems - To achieve more profitable, healthy and resilient farmland	The development proposes buffers to adjacent agricultural land to ensure land use conflicts are minimised and the 'right to farm' of adjacent properties is not impacted. Notably, adjacent RU1 land to the south is held in small allotments that are likely to be of limited viability, and more accurately reflect the lifestyle take up of the land in this locality, or form the lots within O'Connell village itself. Other operational rural land has been rezoned to large lot residential and would be expected to change to this style of use in the future. In the event it remains in primary production use into the future, the proposed lots are adequately sized to accommodate suitable buffers to ensure right to farm is not reduced.
Communities - To improve social and economic capacity and wellbeing through management of natural resources	The project would provide additional dwellings in the O'Connell village area, which would in turn assist in ensuring the viability and vitality of this area

Source: Central Tablelands Local Land Services Transitional Catchment Action Plan, 2014

2.2 ENVIRONMENTAL PLANNING INSTRUMENTS

2.2.1 OBERON LOCAL ENVIRONMENTAL PLAN 2013

2.2.1.1 Aims

The aims of the Oberon Local Environmental Plan 2013 (LEP13) are stated as:

(1) This Plan aims to make local environmental planning provisions for land in Oberon in accordance with the relevant standard environmental planning instrument under section 33A of the Act.

(2) The particular aims of this Plan are as follows:

(a) to encourage sustainable economic growth and development in Oberon,

(b) to encourage and provide opportunities for local employment growth and the retention of the population in Oberon,

(c) to encourage the retention of productive rural land in agriculture,

(d) to identify, protect, conserve and enhance Oberon's natural assets,

(e) to identify and protect Oberon's built and cultural heritage assets for future generations,

(f) to allow for the equitable provision of social services and facilities for the community,

(g) to provide for future tourist and visitor accommodation in a sustainable manner that is compatible with, and will not compromise the natural resource and heritage values of, the surrounding area.

The development is considered to be generally consistent with all of the above aims.

2.2.1.2 Mapped constraints

A review of LEP13 mapping reveals the following mapped constraints in respect of the subject site:

Table 2.3 – LEP13 Constraint Mapping

Map	Applicability
Land Application Map	The land is located within the Oberon Local Government area. No further discussion required.
Land Zoning Map	The subject site is currently zoned RU1 – Primary Production.
Lot Size Map	The minimum lot size currently applying to the site is 100 hectares.
Heritage Map	The subject site does not contain any items of mapped heritage significance however is located adjacent to the O'Connell conservation area, which contains a number of locally listed heritage items.
Land Reservation Acquisition Map	The subject site is not mapped as being reserved for acquisition
Industrial Buffer Map	The subject site is not mapped as being affected by an industrial buffer
Riparian Lands and Watercourses Map	The subject site contains a number of mapped sensitive watercourses and riparian lands – this is discussed further in **Sections 3.2 and 4.4**
Additional Permitted Uses Map	The site is not mapped as containing any additional permitted uses

Source: Oberon Local Environmental Plan 2013

Other relevant clauses from the LEP13 are discussed in the following sections.

2.2.1.3 Clause 2.6

The subdivision of land within the RU1 zone is permitted with the consent of Council by virtue of clause 2.6, and subject to the provisions of clauses 4.1 and 4.2.

The minimum lot size for subdivision and dwelling development within the RU1 zone by reference to the minimum lot size map is currently 100 hectares. As this proposal seeks to reduce this to 10 hectares, an amendment to the LEP13 is required.

2.2.1.4 Clause 4.1

As noted, the subdivision of land within the rural zone must achieve the minimum lot size set down on the MLS map. The proposed lot size for the conceptual subdivision layout is 10 hectares and therefore subdivision of the land does not satisfy this intent. As such, an amendment to the LEP13 is required.

2.2.1.5 Clause 4.1AA

Clause 4.1AA relates to the community title subdivision of RU1 land and obligates that the applicable minimum lot size must still be satisfied. An amendment to the LEP would amend the LEP13 to rezone the land to R5. As such, this clause would not apply in the event a community title subdivision of the land was ultimately proposed.

2.2.1.6 Clause 4.2

Clause 4.2 allows for the subdivision of land within the RU1 zone to a size below the minimum lot size but only where it would not result in a dwelling house being located or developed on the created lot.

2.2.1.7 Clause 4.2B

Clause 4.2B applies to land within the RU1 and R5 zones and requires that the grant of development consent for the erection of a dwelling house or dual occupancy on land to which this clause applies unless:

(a) is a lot that is at least the minimum lot size shown on the Lot Size Map in relation to that land, or

(b) is a lot created before this Plan commenced and on which the erection of a dual occupancy or dwelling house was permissible immediately before that commencement, or

(c) is a lot resulting from a subdivision for which development consent (or equivalent) was granted before this Plan commenced and on which the erection of a dual occupancy or dwelling house would have been permissible if the plan of subdivision had been registered before that commencement, or

(d) is an existing holding, or

(e) would have been a lot or a holding referred to in paragraph (a), (b), (c) or (d) had it not been affected by:

(i) a minor realignment of its boundaries that did not create an additional lot, or

(ii) a subdivision creating or widening a public road or public reserve or for another public purpose, or

(iii) a consolidation with an adjoining public road or public reserve or for another public purpose.

As the proposal entails the subdivision of the land to lots of 10 hectares in size, an amendment to LEP13 is required.

2.2.1.8 Clause 5.9

Clause 5.9 seeks to preserve trees or vegetation to ensure the preservation of amenity.

For any trees or species listed in a Development Control Plan, the Council's development consent or permission is required prior to tree removal. Clause 5.9AA states that, in the event a DCP has not been prepared for the land or does not list specific species, such consent or permission is not required.

The provisions of the Oberon Development Control Plan 2001 are discussed at Section 2.2.2. There is no reference within the DCP to tree species and as such clause 5.9AA applies.

2.2.1.9 Clause 5.10

Clause 5.10 seeks to:

(a) to conserve the environmental heritage of Oberon,

(b) to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views,

(c) to conserve archaeological sites,

(d) to conserve Aboriginal objects and Aboriginal places of heritage significance.

Consent is required from Council in the following instances:

(a) demolishing or moving any of the following or altering the exterior of any of the following (including, in the case of a building, making changes to its detail, fabric, finish or appearance):

(i) a heritage item,

(ii) an Aboriginal object,

(iii) a building, work, relic or tree within a heritage conservation area,

(b) altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item,

(c) disturbing or excavating an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed,

(d) disturbing or excavating an Aboriginal place of heritage significance,

(e) erecting a building on land:

(i) on which a heritage item is located or that is within a heritage conservation area, or

(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance,

(f) subdividing land:

(i) on which a heritage item is located or that is within a heritage conservation area, or

(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance.

A review of available database records, and by virtue of the heritage assessment, the site is not noted to include any of the above features and as such clause 5.10 is not considered to be specifically applicable.

The development would be consistent with the objectives of the clause, as evidenced by the findings of the OzArk report at **Appendix C**, and as such is generally acceptable in the context of clause 5.10.

2.2.1.10 Clause 6.2

Clause 6.2 relates to flood planning and seeks to:

(a) to minimise the flood risk to life and property associated with the use of land,

(b) to allow development on land that is compatible with the land's flood hazard, taking into account projected changes as a result of climate change,

(c) to avoid significant adverse impacts on flood behaviour and the environment.

The clause applies to flood liable land, which is defined by the floodplain manual as:

Is synonymous with flood prone land (ie) land susceptible to flooding by the PMF event. Note that the term flood liable land covers the whole floodplain, not just that part below the FPL (see flood planning area).

The flood planning area is defined as:

The area of land below the FPL and thus subject to flood related development controls. The concept of flood planning area generally supersedes the 'flood liable land' concept in the 1986 manual

Clause 6.2(3) identifies that:

(3) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development:

(a) is compatible with the flood hazard of the land, and

(b) will not significantly adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties, and

(c) incorporates appropriate measures to manage risk to life from flood, and

(d) will not significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses, and

(e) is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding

To ensure that future dwellings are not negatively impacted by the potential for flooding associated with Eight Mile Swamp/Antonys Creeks, conceptual building envelopes have been located well clear of the creek line and recommended riparian buffers have been adopted. An analysis of ground levels in the location of the creek and in relation to the building envelope locations (as available from commercial mapping sources) confirms that sufficient clearance exists to be satisfied that the land on which these dwellings would not be located does satisfy the definition of flood liable land.

As such, clause 6.2 is not considered to apply to the subject development.

2.2.1.11 Clause 6.3

The site is mapped as contained sensitive watercourse and riparian land. This is discussed further in **Sections 3.2 and 4.4**.

Sub-clauses 6.3(3) & (4) state:

> *(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider:*
>
> *(a) whether or not the development is likely to have any adverse impact on the following:*
>
> *(i) the water quality and flows within the watercourse,*
>
> *(ii) aquatic and riparian species, habitats and ecosystems of the watercourse,*
>
> *(iii) the stability of the bed and banks of the watercourse,*
>
> *(iv) the free passage of fish and other aquatic organisms within or along the watercourse,*
>
> *(v) any future rehabilitation of the watercourse and riparian areas, and*
>
> *(b) whether or not the development is likely to increase water extraction from the watercourse, and*
>
> *(c) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.*
>
> *(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:*
>
> *(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or*
>
> *(b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or*
>
> *(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.*

Building envelopes would be well clear of the watercourse and appropriate buffers to riparian land would be provided in accordance with DPI (Water) guidelines. The development also provides for the rehabilitation of the watercourse and riparian land via the removal of hoofed grazing stock, which, as demonstrated in **Appendix B**, are detrimentally impacting on the health of the watercourse and riparian land. Recommendations within **Appendix B**, and reproduced in **Section 4.4**, would be adopted in the carrying out of the development.

On the above basis, it is considered that the development is generally acceptable in the context of clause 6.3.

2.2.1.12 Clause 6.4

Clause 6.4 seeks to ensure that the following essential services are provided, or capable of being provided, to land:

> *(a) the supply of water,*
>
> *(b) the supply of electricity,*
>
> *(c) the disposal and management of sewage,*
>
> *(d) stormwater drainage or on-site conservation,*
>
> *(e) suitable vehicular access.*

These matters are discussed in **Section 4.11** of this report.

2.2.2 OBERON DEVELOPMENT CONTROL PLAN 2001

The objectives of the Oberon Development Control Plan 2001 (DCP01) are to:

To provide development controls and guidelines which will assist in achieving the objectives of the Oberon Local Environmental Plan, 1998.

To provide development controls and guidelines that are flexible, in order to promote innovative and imaginative building and development that will relate well to its surroundings both man made and natural.

To promote and encourage a high quality of design and amenity for all developments in the area.

To provide for and require well considered development that is environmentally and economically sustainable.

DCP01 is divided into a number of specific Parts; of relevance to this project, or any future development application, are Parts A, B, H and I. A review of these parts confirms that the development of the site can occur consistently with this plan, subject to refinement of design at development application stage.

2.2.3 STATE ENVIRONMENTAL PLANNING POLICIES

The planning proposal is broadly compliant with all relevant State Environmental Planning Policies (SEPPs). The following specific comments are made in relation to applicable SEPPs.

2.2.3.1 State Environmental Planning Policy No 44 – Koala Habitat Protection

State Environmental Planning Policy 44 - Koala Habitat Protection (SEPP44) aims to:

...encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas, to ensure permanent free-living populations over their present range and to reverse the current trend of population decline...

This policy applies to all LGAs within the known state wide distribution of the Koala, including the Oberon LGA. SEPP 44 defines 'potential koala habitat' as vegetation that incorporates a minimum of 15 percent of tree species (listed in Schedule 2 of SEPP 44) in the 'upper or lower strata of the tree component'.

An ecological constraints and opportunities analysis of the site has been completed by The Environmental Factor (TEF), which determined the following in relation to koala feed trees:

These trees are Koala feed trees (listed under SEPP44) and support potential Koala habitat (>15% of preferred feed trees present on site). Note: as this is noted as 'potential' habitat, not 'core' habitat, a Koala Plan of Management is not currently recommended.

From a site visit and review of aerial photography it is apparent that tree cover across the site is scattered. The concept subdivision layout has been prepared to minimise tree loss (all species). Opportunities for further refinements would be investigated at DA stage. As a result of this, and by reference to the above comments from TEF's principal ecologist, it is not considered likely that the proposal would result in an impact to core Koala habitat, and therefore a plan of management is not required.

On the basis of the above, the planning proposal is considered to be considered to be consistent with the aims of SEPP44. Further consideration of the provisions of SEPP44 is not considered to be warranted.

2.2.4 STATE ENVIRONMENTAL PLANNING POLICY NO 55 – REMEDIATION OF LANDS

State Environmental Planning Policy 55– Remediation of Lands (SEPP55) aims to:

...promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment...

This policy applies to the whole of the State, including the Oberon LGA. SEPP55 defines 'contaminated land' as per the definition in Part 5 of the *Contaminated Land Management Act 1997 No 140* as:

the presence in, on or under the land of a substance a concentration above the concentration at which the substance is normally present in, on, or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment.

Clause 6 of SEPP55 states:

(1) In preparing an environmental planning instrument, a planning authority is not to include in a particular zone (within the meaning of the instrument) any land specified in subclause (4) if the inclusion of the land in that zone would permit a change of use of the land, unless:

(a) the planning authority has considered whether the land is contaminated, and

(b) if the land is contaminated, the planning authority is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for all the purposes for which land in the zone concerned is permitted to be used, and

(c) if the land requires remediation to be made suitable for any purpose for which land in that zone is permitted to be used, the planning authority is satisfied that the land will be so remediated before the land is used for that purpose.

Envirowest has completed a Contamination Assessment including site walkover and targeted sampling, attached to this planning proposal as **Appendix D**. This assessment focusses on the former shearing shed located in the western extent of the site due to the common linkages between shearing sheds and sheep dips.

The sampling carried out identified slightly elevated levels of arsenic at three locations near the shearing shed. These areas would be remediated in the context of the proposed DA. The proposed building envelope for the lots in this area have been positioned well clear of this area.

The Envirowest report identifies the following specific conclusions and recommendations:

An inspection of the investigation area was made on 23 February 2017. The site is in a rural setting and has an investigation area of approximately 200m2. A concrete sheep spray dip was identified.

The contamination status of the site was assessed from a soil sampling and laboratory analysis program. Six discrete soil samples were collected from the sheep dip investigation area. The soil samples were analysed for arsenic, organochlorine (OCP) and organophosphate pesticides (OCP). The soil sampling program detected elevated levels of downslope of the concrete sheep spray dip and sump above the health based assessment criteria of 100 mg/kg (B2, B3 and B4). The water sample collected from the sump contained levels of OCP and OPP below the detection limit and less than the adopted threshold for 95% protection of freshwater species.

Additional sampling is required to determine the lateral and vertical extent of arsenic impacted material. Remediation of the sheep spray dip site will be required to enable suitability of the site for the proposed land-use. A remediation action plan should be prepared describing the remediation process. A validation report should be prepared to confirm the effective clean-up of the sheep dip site. The expected remediation method is excavation of the contaminated material and transport to landfill. The arsenic contaminated soil is expected to be classified as general solid waste.

Via these measures, Council and DP&E can be satisfied that the land is suitable for the proposed purpose, subject to the carrying out of remediation. The land therefore satisfies the test set down by Clause 6(1)(b) of SEPP55.

2.2.5 STATE ENVIRONMENTAL PLANNING POLICY (RURAL LANDS) 2008

In accordance with Clause 4 of Ministerial Direction 1.5 – Rural Lands, where a rezoning effects land located within a rural or environmental protection zone, the planning proposal must be consistent with the Clause 7 – Rural Planning Principles contained in the *State Environmental Planning Policy (Rural Lands) 2008* (Rural Lands SEPP).

Below is a project specific response to each of the Rural Planning Principles;

(a) The promotion and protection of opportunities for current and potential productive and sustainable economic activities in rural areas;

The site proposed for rezoning is predominantly located within RU1 – Primary Production zone.

An ecological constraints and opportunities analysis completed in respect of the site (refer **Appendix B**) provides recommendations to ensure the protection of local vegetation through reservation from development (mapped EEC). Careful layout design would ensure that impacts to biodiversity are minimised. The assessment states:

> *Currently Lot 4, DP 1023024 (>200 ha property) is zoned as Primary Agricultural Land (RU1) within the Oberon Local Environmental Plan (LEP). The site contains extensive areas which have minimal to no ecological constraints at risk of impact as a result of potential future subdivision to 10 ha lots. The surrounding properties to the east and south west support similar vegetation, land use and expected ecological values and have been successfully subdivided into Large Lot Residential (R5) 10 ha lots. The rezoning and subdivision of the southern portion of the property would not be inconsistent with the approach taken for adjacent similar properties.*

Controls would be imposed on proposed lots, specifically proposed Lots 1 – 5 along the alignment of the mapped creek lines, to ensure that degradation from grazing use is reversed through restrictions on the type of animals that may be placed on the site and through ongoing rehabilitation of the riparian area.

(b) Recognition of the importance of rural lands and agriculture and the changing nature of agriculture and of trends, demands and issues in agriculture in the area, region or State;

A small portion of the eastern extent of the site is mapped strategic agricultural land and is mapped as land class 2 in the context of land suitability; the remainder is mapped as class 5 – refer **Figure 8 (page 31)**.

Class 2 and 5 land is described by the Land and Soil Capability Assessment Scheme as:

Table 2.4 – Land Capability

Class	Description	Land Management Considerations
2	Land in this class is capable of a wide range of land uses and land management practices. Included in Class 2 is very good cropping land with often fertile soils and short, gradual slopes (1–3%, less than 500 m in length). This gently sloping land is capable of a wide variety of agricultural uses that involve cultivation. These uses include vegetable and horticultural production, and a range of crops including cereals, oilseeds and pulses. It has a high potential for agricultural production on fertile soils similar to Class 1, but has some restrictions on land use due to slight limitations. Class 2 land is common on plains and on extensive foot slopes where run-on from slopes above is not concentrated or can be controlled. Off-site impacts of land management practices are slight and effects can be managed by readily available management practices.	This land can be subject to sheet, rill and gully erosion as well as wind erosion and soil structure decline. However, these limitations can be controlled by land management practices that are readily available and easily implemented, such as conservation tillage and conservation farming practices. These practices include retaining stubble, reducing tillage, sowing with minimum disturbance and rotating pastures. Windbreaks and ground cover should be retained in areas prone to wind erosion. In more western areas, some timber should be retained in strips or clumps to reduce wind velocity. Salinity can be a slight hazard. Land managers need to be aware that deep drainage may cause salinity. Acidity can be a slight hazard. Land managers need to ensure their practices are not slowly acidifying the soils, and pH levels should be monitored regularly.

Table 2.4 – Land Capability

Class	Description	Land Management Considerations
5	Class 5 land has severe limitations for high impact land management uses such as cropping. There are few management practices generally available to overcome these limitations. However, highly specialised land management practices can overcome some limitations for high value crops or products. This land is generally more suitable for grazing with some limitations or very occasional cultivation for pasture establishment. Class 5 land includes sloping lands (10–20% slope) with highly erodible soils and/or significant existing soil erosion, or land that will be subject to wind erosion when cultivated and left bare. Other limitations include shallow soils, stoniness, climatic limitations, acidification, potential for structure decline and salinity hazards.	This land is not capable of supporting regular cultivation due to the various limitations. Soil erosion can be severe without adequate erosion control measures. Fertility is generally lower than land in Class 4 and there is a lower capacity to regenerate ground cover. Class 5 land can be cultivated occasionally for fodder crops and pasture renewal or establishment. It is important to minimise soil disturbance, maintain cover and maintain good organic matter levels. Eroded lands that require earthworks for rehabilitation are included in this class. This land is usually best suited for grazing, especially with pasture improvement and fertiliser application. Windbreaks and ground cover should be retained in areas prone to wind erosion. In western areas, some timber should be retained in strips or clumps to reduce wind velocity. Salinity can be a severe hazard. Land managers need to ensure their practices don't cause deep drainage and movement of the salt stores in the soil. Practices to manage salinity include minimising deep drainage with plant growth to increase evapotranspiration rates and increase perenniality of pastures. Acidification can be a severe hazard, particularly under introduced annual legume pastures, and soils can be naturally acidic near the surface and at depth. Where natural acidity is a problem, practices that are needed include growing acid-tolerant species and adding lime.

Source: The land and soil capability assessment scheme, OEH, 2012

As per **Figure 9 (page 32)**, it is noted that the mapped class 2 lands encroach into the recently rezoned R5 lands to the north-west and east by a similar scale as proposed via this application. In reality, the approximately 20 hectare portion of the site mapped as class 2 is constrained by the alignment of the Eight Mile Swamp/Antonys Creek, the positioning of O'Connell Road and the proximity to rural residential land to the east and north-east, making its viable use for primary production purposes challenging. The majority of the site (90%) is mapped as class 5 land, consistent with the other zoned R5 areas in the locality, and consistent with its current grazing use.

(c) Recognition of the significance of rural land uses to the State and rural communities, including the social and economic benefits of rural land use and development;

The majority of the land is mapped as having a land capability of class 5, consistent with other areas in the immediate locality that have been rezoned for R5 purposes.

The constrained nature of the portion of the site mapped as class 2 land as discussed above makes its use for viable primary production purposes challenging.

(d) In planning for rural lands, to balance the social, economic and environmental interests of the community;

As reflected in the supply and demand analysis prepared by WRI (**Appendix A**) the locality is ideally placed, and exhibits a strong demand, for the provision of rural residential housing, due to both its proximity to and separation from both Oberon and Bathurst. The rolling landscape and picturesque visual qualities are in strong and consistent demand, as reflected by the WRI analysis (refer **Section 4.2)** and more broadly by the LUS11.

(e) The identification and protection of natural resources, having regard to maintaining biodiversity, the protection of native vegetation, the importance of water resources and avoiding constrained land,

The various specialist investigations appended to this report provide confidence that constraints identified to affect the site are manageable.

Specifically, the ecological constraints and opportunities analysis provides recommendations and mitigations to ensure the protection of the vegetation on site (refer **Appendix B**). Consistency with these recommendations would ensure that the planning proposal would not result in significant impacts to threatened flora, fauna or communities.

The heritage assessment (**Appendix C**) provide confidence of the suitability of the site for the proposed land use and the mechanisms available to manage any residual potential impacts to heritage.

The contamination assessment (**Appendix D**) provides confidence the site does not feature widespread contamination and that the localised contamination around the former shearing shed can be appropriately remediated to satisfy the requirements of clause 6 of SEPP55.

(f) The provision of opportunities for rural lifestyle, settlement and housing that contribute to the social and economic welfare of rural communities

This planning proposal provides an opportunity for provision of additional rural residential lifestyle blocks in an area exhibiting strong demand for this form of residential lifestyle blocks.

(g) The consideration of impacts on services and infrastructure and appropriate location when providing for rural housing

The planning proposal as conceived is serviceable with necessary external services (roads, electricity and telecommunications). Other essential services including water and sewer would be provided on site. The proposed lots are sufficiently sized to ensure they are capable of supporting a future dwelling. The lots are sufficient sized, and building envelope's appropriately located, to ensure that impacts to the natural environmental can be appropriately managed.

(h) Ensuring consistency with any applicable regional strategy of the Department of Planning or any applicable local strategy endorsed by the Director-General.

The **Draft Central West and Orana Regional Plan** is discussed in further detail in **Section 2.1.2**. The development represents a minor departure from the adopted Oberon Land Use Strategy 2011 and this is discussed in additional detail in **Section 4.2**.

2.3 SECTION 117 DIRECTIONS

2.3.1 DIRECTION 1.2 – RURAL ZONES

This direction applies when a relevant planning authority prepares a planning proposal that will affect land within an existing or proposed rural zone.

The objective of the direction is to protect the agricultural production value of rural land.

A planning proposal must not rezone land from a rural zone to a residential, business, industrial, village or tourist zone unless the relevant planning authority can satisfy the Director-General of the Department of Planning that the provisions of the planning proposal that are inconsistent are:

a) justified by a strategy which:

i gives consideration to the objectives of this direction,

ii identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), and

iii is approved by the Director-General of the Department of Planning, or

b) justified by a study prepared in support of the planning proposal which gives consideration to the objectives of this direction, or

c) in accordance with the relevant Regional Strategy or Sub-Regional Strategy prepared by the Department of Planning which gives consideration to the objective of this direction, or

d) is of minor significance.

The proposal demonstrates that it would result in the loss of rural land amounting to approximately 200 hectares. The planning proposal is both justified by this local environmental study and is of minor significance, due to the small number of lots that would result from the eventual subdivision of the land, and therefore satisfies the requirements of sub-clauses (b) and (d) above.

The impact of the loss of the primary production land is considered by this LES.

It is noted that 180 hectares (90%) of the site is mapped as being of low land capability (class 5) – refer **Table 2.4**. The remaining 10% is mapped as having a high land capability (class 2) however is physically constrained by the location of O'Connell Road, the adjacent Eight Mile Swamp/Antonys Creek and adjacent R5 zoned land to the north-east and east, leaving less than 13 of the mapped 20 hectares class 2 land of useable high quality arable land. Notably, a similar quantum of land also mapped as BSAL has been rezoned for rural residential purposes in recent years. The analysis within the LUS11 states only that those adjacent lands had been historically utilised for low-density agriculture, with no reference to the BSAL status of parts of these sites.

The proposed development would provide large rural residential style lots that would not inhibit use by residents for rural purposes including the keeping of animals (noting restrictions on larger animals is proposed).

The site is bordered on three sides by land that has already been rezoned for large lot residential purposes. It is not considered necessary to provide a buffer between the subject site and these lands, given the same land use category would be permissible.

On the fourth side (south) the lot is bounded by primary production land, however none of the four small lots are considered large enough for viable use on their own.

The Department of Primary Industries guide *Living and Working in Rural Areas* (DPI, 2007) recommends buffers between agricultural and non-agricultural development types. These recommended buffers are reproduced in **Figure 1 (overleaf)**.

		Residential areas & urban development	Rural dwellings	Education facilities & pre-schools	Rural tourist accommodation	Watercourses & wetlands	Bores & wells	Potable water supply/ catchment	Property boundary	Roads
Piggeries[1]	Housing & waste storage	1000	500	1000	500	100	SSD	800	100	100
	Waste utilisation area	500	250	250	250	100	SSD	800	20	20
Feedlots[2]	Yards & waste storage	1000	500	1000	1000	100	SSD	800	100	100
	Waste utilisation area	500	250	250	250	100	SSD	800	20	20
Poultry[3]	Sheds & waste storage	1000	500	1000	500	100	SSD	800	100	100
	Waste utilisation area	500	250	250	250	100	SSD	800	20	20
Dairies[4]	Sheds & waste storage	500	250	250	250	100	SSD	800	100	100
	Waste utilisation area	500	250	250	250	100	SSD	800	20	20
Rabbits[5]	Wet shed, ponds & irrig.	300	150	150	150	100	SSD	800	50	50
	Dry shed	120	60	120	60	100	SSD	800	20	20
Other intensive livestock operations[6]		500	300	500	300	100	SSD	800	100	100
Grazing of stock		50	50	50	50	BMP	SSD	BMP	NAI	BMP
Sugar cane, cropping & horticulture		300	200	200	200	BMP	SSD	BMP	NAI	BMP
Greenhouse & controlled environment horticulture		200	200	200	200	50	SSD	SSD	50	50
Macadamia de-husking		300	300	300	300	50	SSD	SSD	50	50
Forestry & plantations		SSD	SSD	SSD	SSD	STRC	SSD	SSD	BMP	STRC
Bananas		150	150	150	150	BMP	SSD	SSD	BMP	BMP
Turf farms[8]		300	200	200	200	50	SSD	SSD	BMP	SSD
Rural industries (incl. feed mills and sawmills)		1000	500	500	500	50	SSD	SSD	SSD	50
Abattoirs		1000	1000	1000	1000	100	SSD	800	100	100
Potentially hazardous or offensive industry		1000	1000	1000	1000	100	SSD	800	100	100
Mining, petroleum, production & extractive industries		500 1000*	500 1000*	500 1000*	500 1000*	SSD	SSD	SSD	SSD	SSD

* Recommended minimum buffer distance for operations involving blasting.

Figure 1: DPI recommended buffers (Source: DPI, 2007)

Of the agriculture types listed, grazing of stock is the most relevant to current land use practises in the locality.

The categorisation of the proposed development type is most closely associated with 'rural dwellings'.

On the basis of the above, a minimum 50 metre is recommended. The size of the proposed lots, and the proposed building envelope locations have provided a buffer to the property boundary of not less than 50 metres, thereby providing an adequate buffer in the event any of the more intense land use activities were proposed on these adjacent lands. Opportunities exist at DA stage to extend these buffers should this prove necessary.

In short, appropriate buffers to the land are able to be accommodated within the site and would be implemented and maintained through placement of building envelopes and registration of these on the title.

2.3.2 DIRECTION 1.3 – MINING, PETROLEUM AND EXTRACTIVE INDUSTRIES

This direction applies when a relevant planning authority prepares a planning proposal that would have the effect of:

> *(b) restricting the potential development of resources of coal, other minerals, petroleum or extractive materials which are of State or regional significance by permitting a land use that is likely to be incompatible with such development.*

A review of the Division of Resources and Energy MinView confirms that the site does is not affected by any mining licences or exploration licences. The site is not known to contain any resources that are of state or regional significance.

2.3.3 DIRECTION 1.5 – RURAL LANDS

In accordance with the following Clause 3(a) of Ministerial Direction 1.5 – Rural Lands as follows:

> *"This direction applies when:*
>
> *(a) "A relevant planning authority prepares a planning proposal that would affect land within an existing or proposed rural or environmental protection zone (including the alteration of any existing rural or environmental protection zone boundary)" or*
>
> *(b) "A relevant planning authority prepares a planning proposal that changes the existing minimum lot size on land within a rural or environmental protection zone.*

This direction is applicable to the planning proposal as the area of land proposed to be rezoned is currently zoned as RU1 – Primary Production. Furthermore, the rezoning of the land to R5 would entail reducing the minimum lot size permissible for development from 100 hectares to 10 hectares.

As per Clause 4 of Ministerial Direction 1.5 – Rural Lands:

> *"A planning proposal to which clauses 3(a) or 3(b) apply must be consistent with the Rural Planning Principles listed in State Environmental Planning Policy (Rural Lands) 2008"*

As Clause 3(a) of the Ministerial Direction 1.5 is applicable, the development must demonstrate consistent with the rural planning principles of the Rural Lands SEPP.

A proposal may be inconsistent with Direction 1.5 if any of the following applies;

> *"A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General) that the provisions of the planning proposal that are inconsistent are:*
>
> *(a) Justified by a strategy which:*
>
> - *gives consideration to the objectives of this direction,*
> - *identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites, and*
> - *is approved by the Director-General of the Department of Planning and is in force, or*
>
> *(b) Is of minor significance".*

Assessment of the Rural Lands SEPP rural planning principles is provided in **Section 0** and the development is therefore considered acceptable in the context of Direction 1.2 on this basis.

2.3.4 DIRECTION 2.3 – HERITAGE CONSERVATION

Ministerial Direction 2.3 is applicable to a planning proposal when an item of local heritage significance is located on the site.

> *"A planning proposal must contain provisions that facilitate the conservation of:*
>
> *(a) items, places, buildings, works, relics, moveable objects or precincts of environmental heritage significance to an area, in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item, area, object or place, identified in a study of the environmental heritage of the area,*
>
> *(b) Aboriginal objects or Aboriginal places that are protected under the National Parks and Wildlife Act 1974, and*
>
> *(c) Aboriginal areas, Aboriginal objects, Aboriginal places or landscapes identified by an Aboriginal heritage survey prepared by or on behalf of an Aboriginal Land Council, Aboriginal body or public authority and provided to the relevant planning authority, which identifies the area, object, place or landscape as being of heritage significance to Aboriginal culture and people".*

Neither the LEP nor the State Heritage Register identifies the site as containing any items of local or state heritage significance.

The O'Connell Village conservation area is located to the north of the site but does not intersect with the site. A desktop assessment heritage assessment completed by OzArk of Aboriginal and European heritage (attached as **Appendix C**) confirms that the site is not impacted by any heritage items. This report concludes:

> *The archaeological/scientific, historic and aesthetic value of any Aboriginal cultural heritage sites is likely to be low due to the nature of the SALs (i.e. the absence of major rivers and levels of ground surface disturbance) and the archaeological context of the region (similar landforms generally have low density, low archaeological value artefact scatters).*
>
> *The historic heritage desktop assessment found that no previously recorded historic heritage items are located in the Study Area. The Study Area is located close to O'Connell Settlement and is historically associated with Reverend James Hassall; however, it is considered unlikely that historic items or archaeological deposits of local or state significance exist in the Study Area.*

Given the absence of identified impact to heritage items the proposal is considered to be consistent with the intent of the direction. Additional investigations if deemed necessary (although not expected) can be completed in conjunction with preparation of a DA documentation.

2.3.5 DIRECTION 3.1 – RESIDENTIAL ZONES

Ministerial Direction 3.1 – Residential Zones is applicable to existing or proposed residential zoned land.

> *(1) A planning proposal must include provisions that encourage the provision of housing that will:*
>
> *(a) broaden the choice of building types and locations available in the housing market, and*
>
> *(b) make more efficient use of existing infrastructure and services, and*
>
> *(c) reduce the consumption of land for housing and associated urban development on the urban fringe, and*
>
> *(d) be of good design.*
>
> *(2) A planning proposal must, in relation to land to which this direction applies:*
>
> *(a) contain a requirement that residential development is not permitted until land is adequately serviced (or arrangements satisfactory to the council, or other appropriate authority, have been made to service it), and*

(b) not contain provisions which will reduce the permissible residential density of land.

The planning proposal contains a requirement (voiced by these terms) that *residential development is not permitted until land is adequately serviced (or arrangements satisfactory to the council, or other appropriate authority, have been made to service*.

This would be satisfied via a future development application. No impediments exist to servicing. Initial discussions with Roads and Maritime Services has confirmed that access to the eastern allotments must be from a road other than O'Connell Road, which is a classified road by reference to the *Roads Act 1993*. This can be accommodated and is reflected in the concept plan attached at **Drawing TP03**.

2.3.6 DIRECTION 3.4 – INTEGRATING LAND USE AND TRANSPORT

This direction applies when:

a relevant planning authority prepares a planning proposal that will create, alter or remove a zone or a provision relating to urban land, including land zoned for residential, business, industrial, village or tourist purposes.

The objectives of the direction is to:

ensure that urban structures, building forms, land use locations, development designs, subdivision and street layouts achieve the following planning objectives:

(a) improving access to housing, jobs and services by walking, cycling and public transport, and

(b) increasing the choice of available transport and reducing dependence on cars, and

(c) reducing travel demand including the number of trips generated by development and the distances travelled, especially by car, and

(d) supporting the efficient and viable operation of public transport services, and

(e) providing for the efficient movement of freight.

A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General) that the provisions of the planning proposal that are inconsistent are:

(a) justified by a strategy which:

(i) gives consideration to the objective of this direction, and

(ii) identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), and

(iii) is approved by the Director-General of the Department of Planning, or

(b) justified by a study prepared in support of the planning proposal which gives consideration to the objective of this direction, or

(c) in accordance with the relevant Regional Strategy or Sub-Regional Strategy prepared by the Department of Planning which gives consideration to the objective of this direction, or

(d) of minor significance.

The proposed development is justified by this study and therefore may be inconsistent with the direction.

The development provides only a small number of lots and these would all be accessible by road. Given the development is located close to the village of O'Connell and close to other areas of zoned large lot residential, the proposal is considered to be consistent with the objectives of the direction.

2.3.7 DIRECTION 6.1 – APPROVAL AND REFERRAL REQUIREMENTS

Ministerial Direction 6.1 – Approval and Referral Requirements applies to all Planning Proposal's forwarded for Gateway Determination by a local authority.

To be compliant with Direction 6.1, a planning proposal must be consistent with the following provisions;

"A planning proposal must:

(a) Minimise the inclusion of provisions that require the concurrence, consultation or referral of development applications to a Minister or public authority, and

(b) Not contain provisions requiring concurrence, consultation or referral of a Minister or public authority unless the relevant planning authority has obtained the approval of:

- *The appropriate Minister or public authority, and*
- *The Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General), prior to undertaking community consultation in satisfaction of section 57 of the Act, and*

(a) Not identify development as designated development unless the relevant planning authority:

- *Can satisfy the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General) that the class of development is likely to have a significant impact on the environment, and*
- *Has obtained the approval of the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General) prior to undertaking community consultation in satisfaction of section 57 of the Act".*

Those matters requiring concurrence are minimised by the undertaking of detailed site investigations at planning proposal stage. An area where concurrence was potentially required related to access to the proposed eastern allotments from O'Connell Road. A redesign of the concept plan ensures that this concurrence is not required.

Other opportunities for external approval/concurrence, such as for controlled activity approvals or dredging and reclamation permits, have been avoided through concept subdivision design and building envelope placement.

As the site is not mapped as bushfire prone, approval from the NSW Rural Fire Service is not required.

No other areas of potential concurrence are noted.

Environment Characteristics

3.1 GENERAL

The site has an area of approximately 200 hectares and is bounded by Box Flats Road to the north, Beaconsfield Road to the west and the O'Connell Road to the east – refer **Figure 2**. Box Flats and Beaconsfield Roads are local roads with a posted speed limit of 100km/hr. O'Connell Road is a classified road with a posted speed limit of 100km/hr for the majority of its length adjacent to the subject site.

The village of O'Connell is located to the north and contains a café, pub and school. Notably, the lots contained within the village are all zoned RU1 – Primary Production and the various non-primary production uses are expected to continue as existing uses.

The Fish River is located less than one kilometre from the northern extent of the site.

Land to the east, north-east and west has been zoned for rural residential use with some of these zoned lots having recently been approved for subdivision. Land to the south is zoned for primary production.

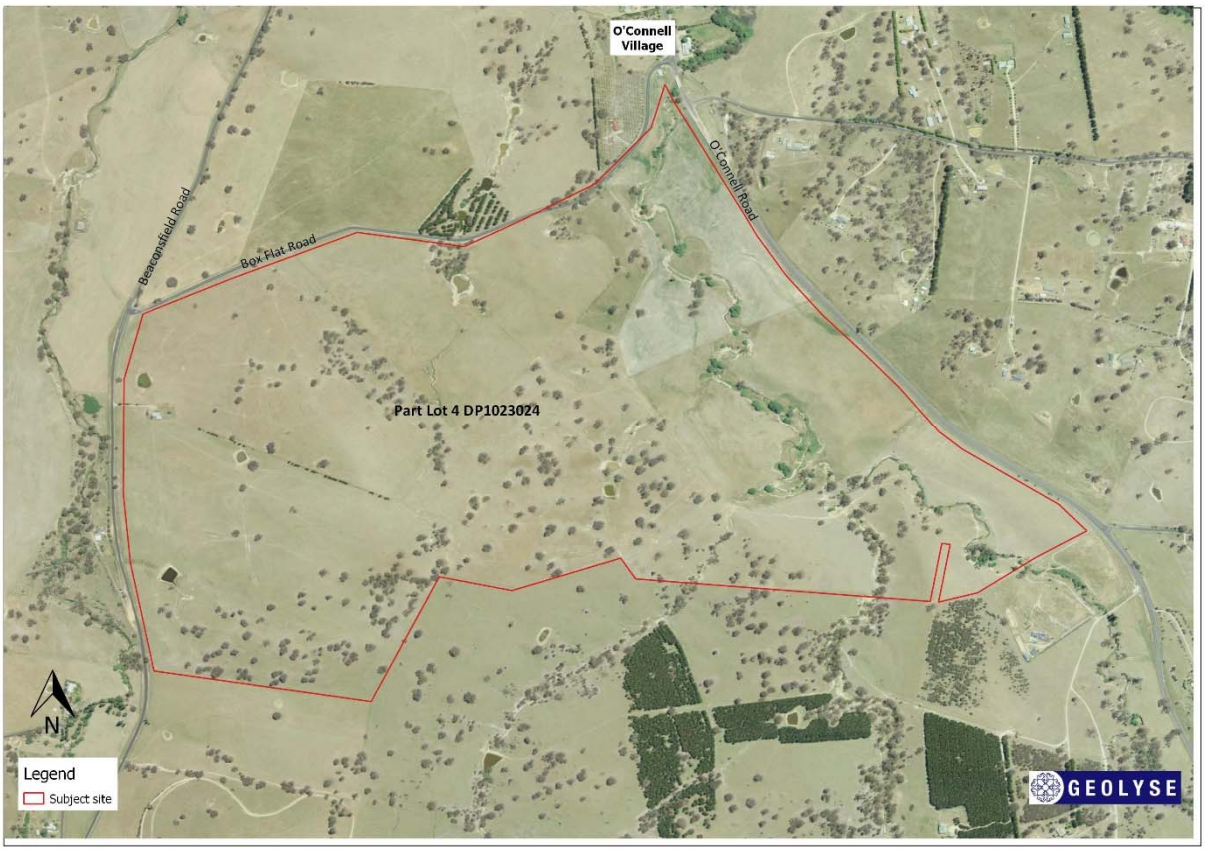

Figure 2: The subject site (Source: Six Maps)

3.2 WATER

Eight Mile Swamp Creek and Antonys Creek (both 3rd order creeks) join in the southern extent of the site to form a 4th order creek and this confluence of Eight Mile Swamp Creek and Antonys Creek then drains northward where it joins with the Fish River. Alicks Creek is to the west of the site, also draining north to the Fish River – refer **Figure 3**. A number of first order streams are also located on site together with a number of farm dams. Waterways in the site are predominantly ephemeral and drain to Antony's Creek.

No groundwater bores are located on the site while 24 bores located within 500 metres of the property (refer **Figure 5**). A summary of available bore data is provided in **Table 3.1**.

The creeks and the river are mapped as sensitive watercourses via the LEP and as key fish habitat – refer **Figure 4**.

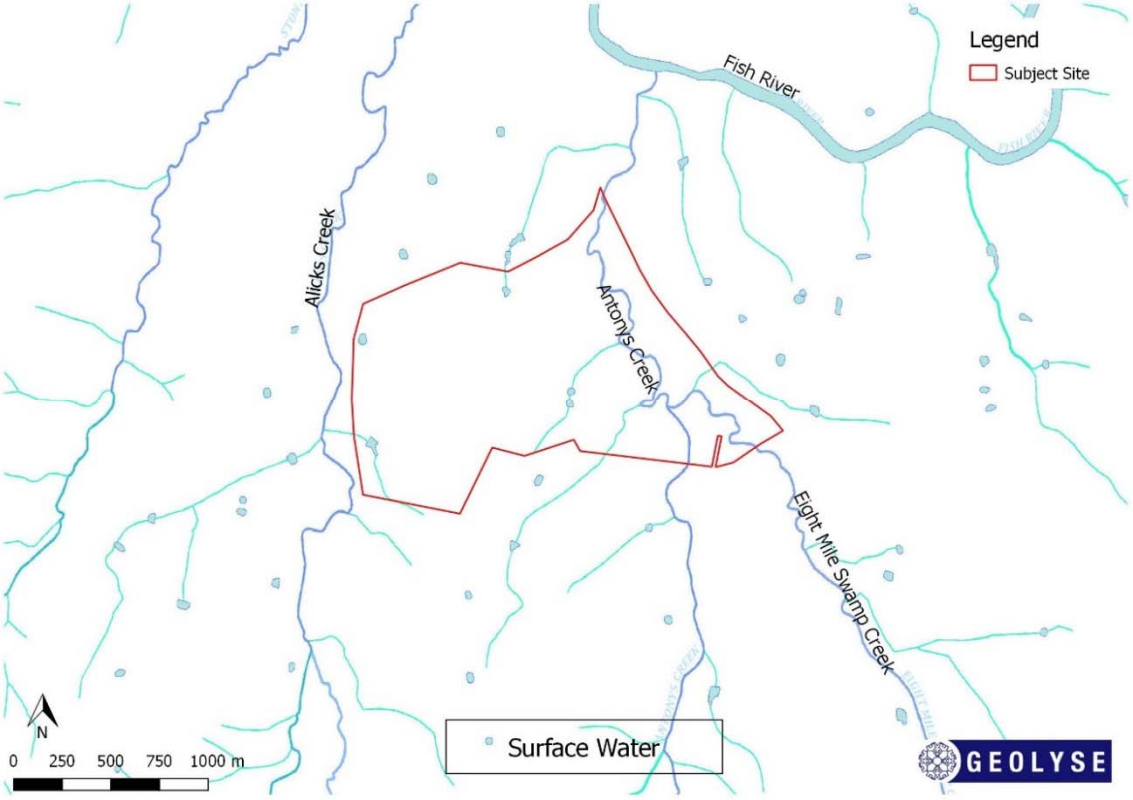

Figure 3: Surface water

Figure 4: Key fish habitat

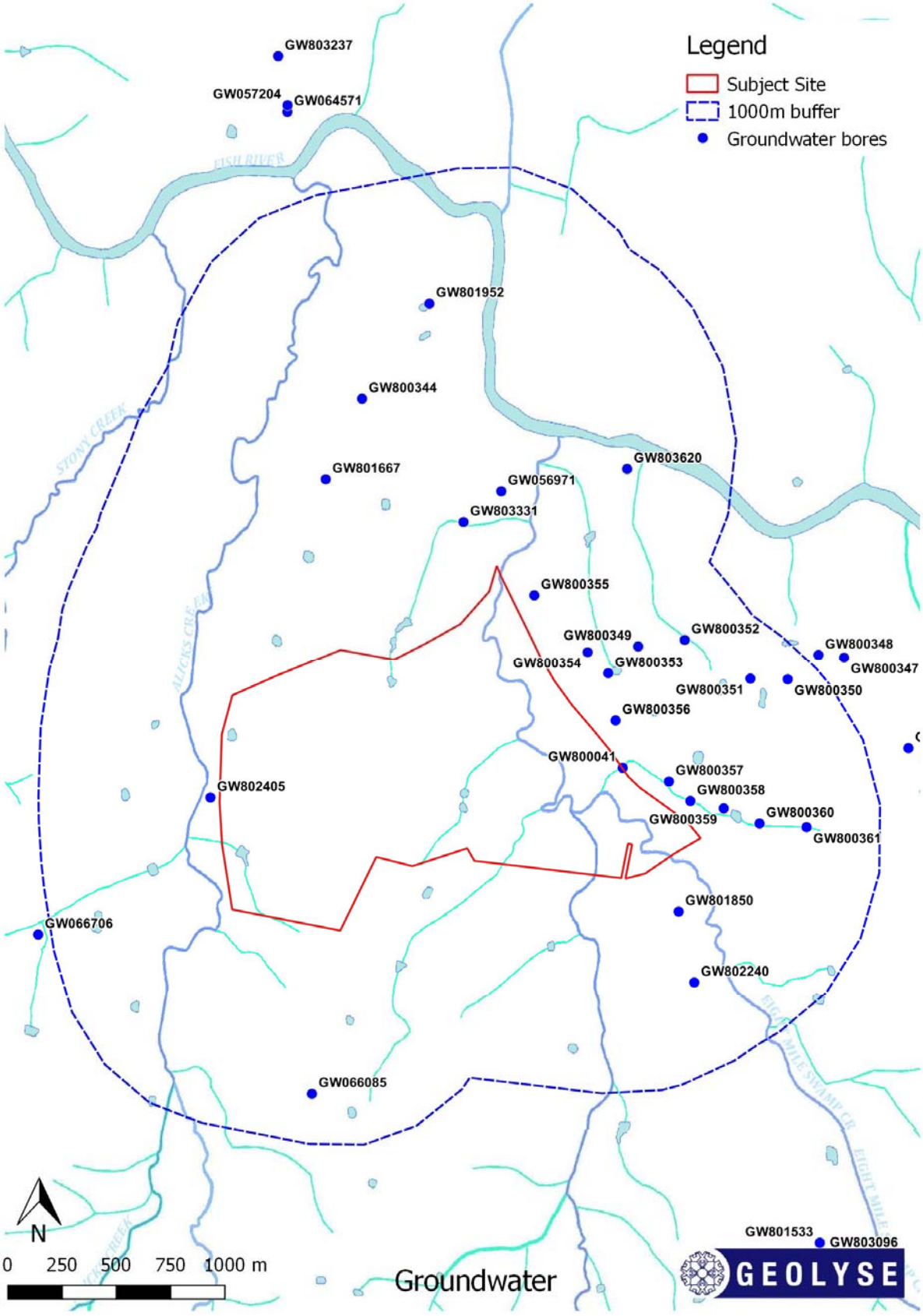

Figure 5: Groundwater bores within 500 metres

Table 3.1 – Groundwater bores within 500 metres of the property (log details)

Bore ID	Standing Water Level (m)	Purpose
GW802240	33.0	Stock domestic
GW800361	39.6	Stock domestic
GW800357	15.2	Stock domestic
GW800358	18.3	Stock domestic
GW800351	30.5	Stock domestic
GW800359	4.6	Stock domestic
GW800041	4.0	Stock domestic
GW801667	18.0	Stock domestic
GW802405	27.0	Stock domestic
GW800354	1.2	Stock domestic
GW056971	4.6	Stock domestic
GW800360	30.5	Stock domestic
GW801952	1.8	Irrigation
GW066085	29.0	Stock domestic
GW801850	8.0	Stock domestic
GW803620	Not provided	Stock domestic
GW800344	Not provided	Stock domestic
GW800353	18.3	Stock domestic
GW800356	12.2	Stock domestic
GW803331	10.0	Domestic

Source: Department of Primary Industries (Water) (allwaterdata.water.nsw.gov.au)

3.3 TOPOGRAPHY

The fall of the land is generally from south to north. The site ranges in height from 760 in the southern extent to 701 in the northern extent. **Figure 6** provides topographical details.

General slopes across the site are between 0-5% with little variation. A low ridge runs north-south through the block in the western extent.

Figure 6: Topographic details

3.4 SOILS AND GEOLOGY

The site is predominantly located within the Bathurst soil landscape with around 20% of the site located in the Macquarie landscape – refer **Figure 7**. The Bathurst soil landscape is located on hills around Bathurst and has non-calcic brown soils with yellow solodic soils on the lower slopes and in drainage lines. Sands and mottled yellow solodic soils also occur.

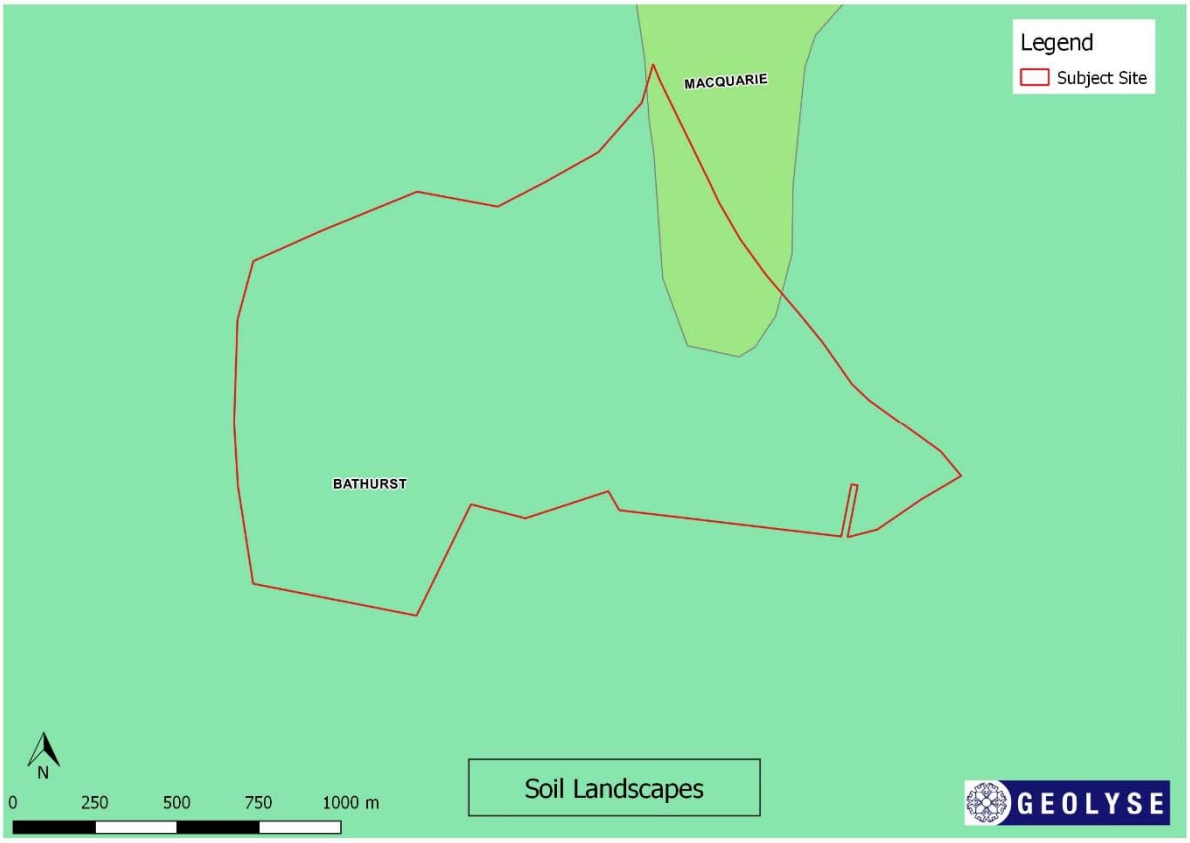

Figure 7: Soil landscapes

3.5 STORMWATER

As the property slopes to the south and is bounded on three sides by roads, the catchment of drainage gullies is not likely to extend beyond the site's eastern, western or northern boundaries. Flow from beyond the site's southern boundary is anticipated.

Based on the regional and site topography, it is considered that the majority of site stormwater would be captured by drainage gullies across the site and discharge into the various holding dams on the site, eastward into Eight Mile Swamp Creek and Antony's Creeks or westward towards Alicks Creek.

3.6 NATURAL HAZARDS

The site is not generally low lying or is not mapped as flood prone by virtue of LEP mapping. It is however acknowledged that some localised flooding may occur around the drainage and creek lines during periods of high rainfall. The proposed lot sizes are considered sufficiently large to provide adequate room to accommodate building envelopes in areas that avoid impacts associated with any localised flooding.

Eight Mile Swamp and Antony's Creek traverse a low section of the site in the eastern extent. A review of aerial mapping suggests this course has meandered over time and it is considered likely that some localised flooding in this area is possible during periods of heavy rainfall, due to the site being at the bottom of the catchment. However the eroded nature of the stream suggests that water flows are generally well contained.

None of the subject land is mapped as bushfire prone.

3.7 LAND USE

The site is currently in use for primary production, primarily grazing, purposes. A small portion of the eastern extent of the site is mapped strategic agricultural land and is mapped as land class 2 in the context of land suitability; the remainder is mapped as class 5 – refer **Figure 8**.

The portion of the site mapped as class 2 represents approximately 10% of the site, and is adjacent to land to both the east, west and north-east zoned for large lot residential. This is reflective of the proximity to O'Connell village and demand for housing in this locality – refer **Figure 9**.

Strategic Regional Land Use Policy – Strategic Agricultural Land (Biophysical) mapping has also been reviewed and this confirms that the site is mapped as strategic agricultural land – refer **Figure 10**.

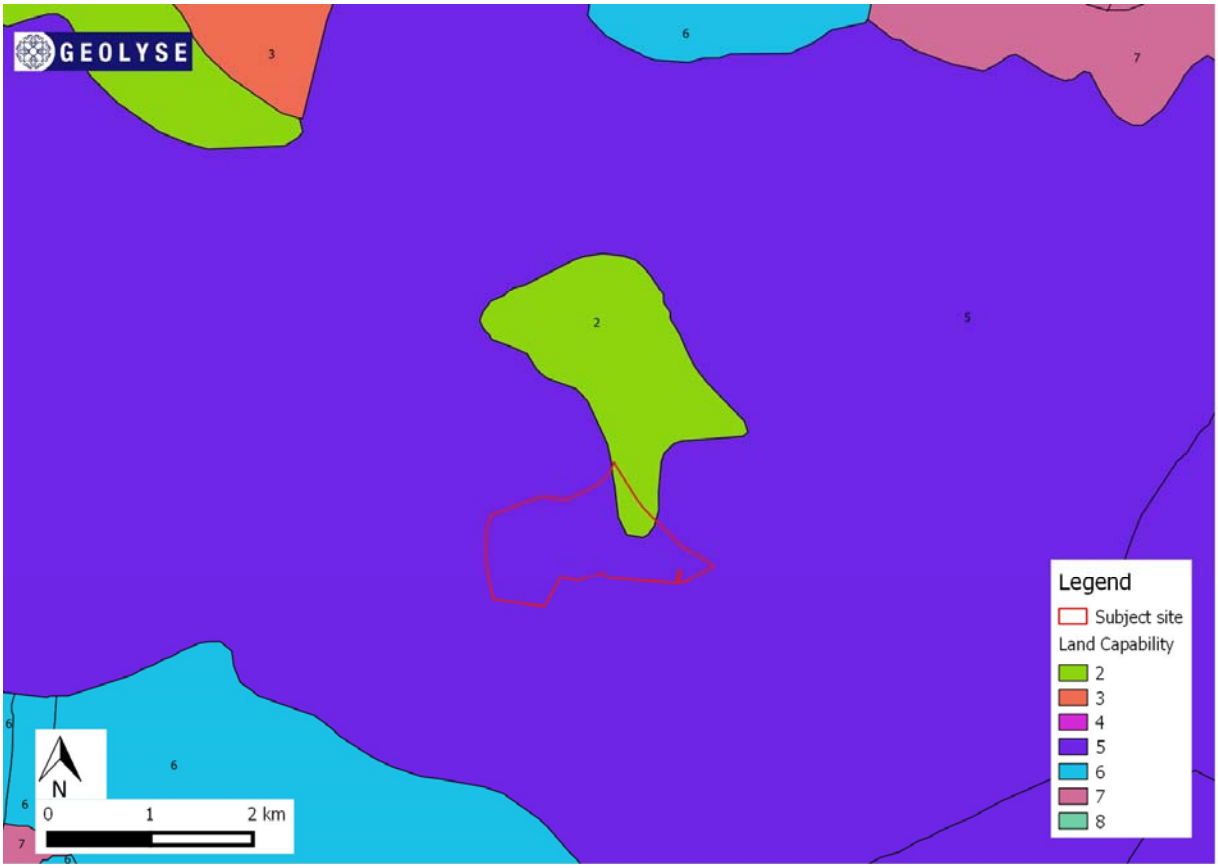

Figure 8: Land and soil capability class

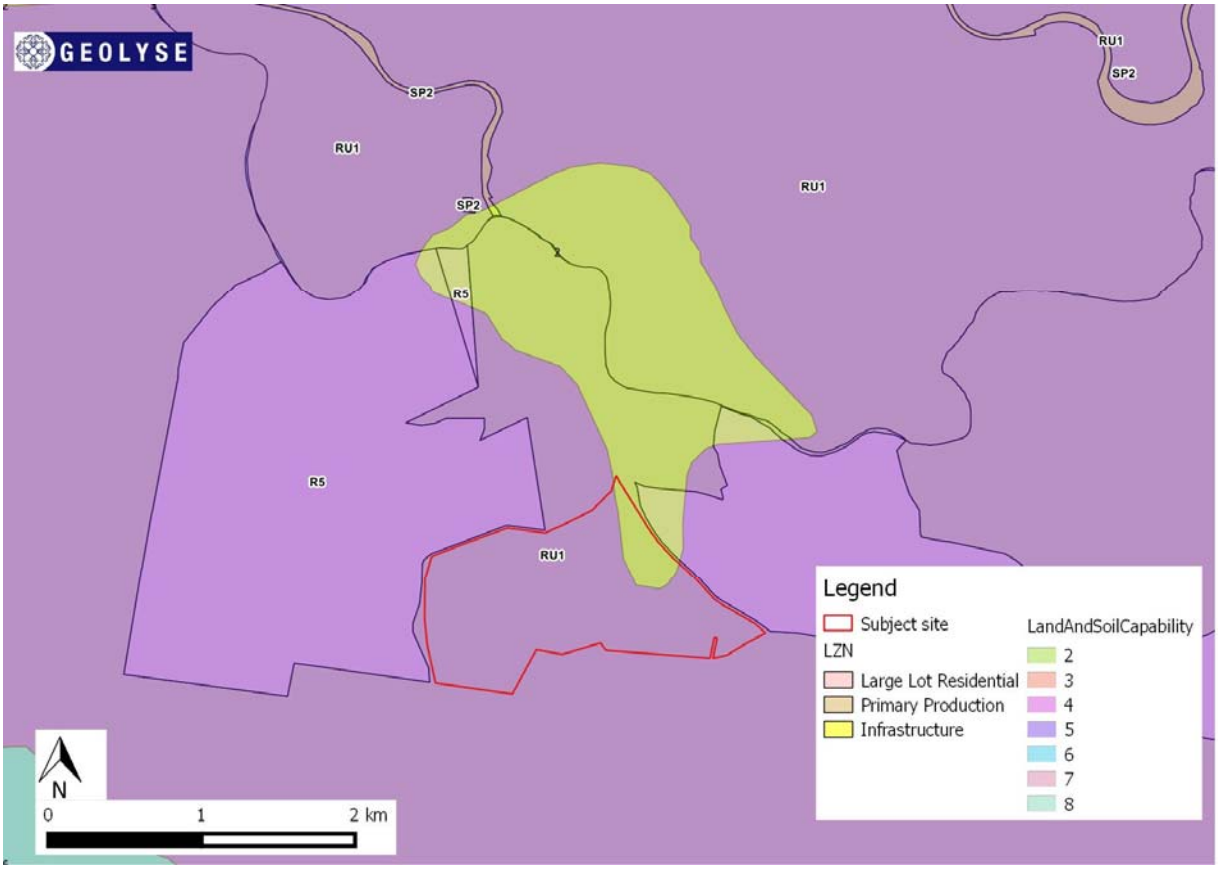

Figure 9: Land capability mapping and zoning

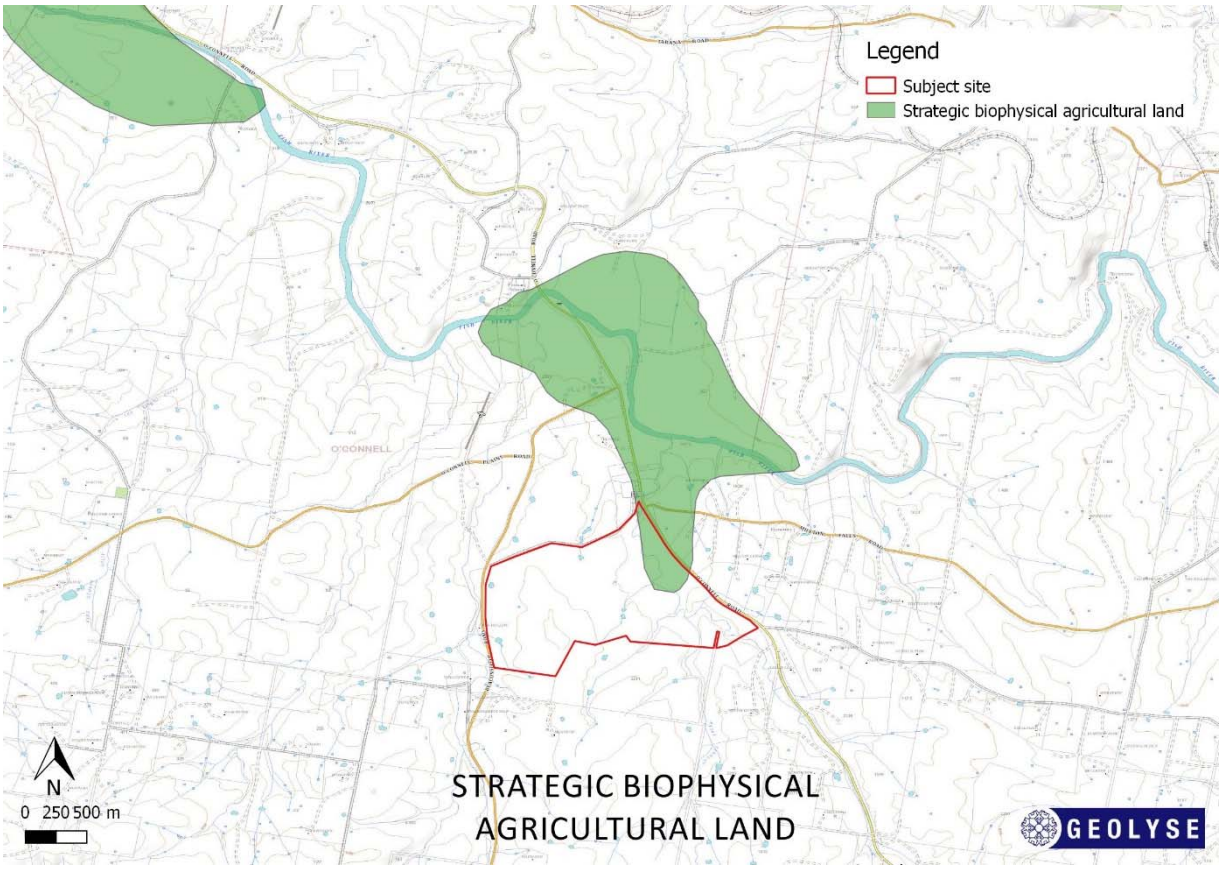

Figure 10: Strategic Regional Land Use Policy – Strategic Agricultural Land (Biophysical) mapping

3.8 VISUAL ASSESSMENT

The setting for the proposed amendment is within gently undulating land with scattered residential dwellings. Historically the area has been used for broad acre farming however recent development centred on the O'Connell Village has resulted in lifestyle allotments being created in the immediate locality. These are typically around the 10 hectare size and are generally focussed around O'Connell and Mutton Falls Roads, with close connection to the amenities of the village and services including a Rural Fire Services depot. The character of the area is in the process of transitioning from this historical primarily primary production use to rural residential/lifestyle, and this will continue as a result of the zoning of land via the LEP13.

O'Connell Road is characterised by rows of ornamental plantings as an approach to O'Connell village from the north (Bathurst) and south (Oberon).

In general terms, the approaches to the village in both directions are characterised by low density dwellings interspersed within native and introduced vegetation.

3.9 BIODIVERSITY

The site is not mapped via LEP13 mapping as containing any areas of sensitive biodiversity. LUS11 identifies an area of mapped endangered ecological community in the northern extent of the site and a number of small areas of vegetation in the west and south of a type that has less than 30% representation within the catchment.

For these reasons, an ecological constraints and opportunities analysis assessment of the site has been completed by The Environmental Factor (TEF). A copy of this report is provided attached as **Appendix B**.

A field inspection was completed by the TEF Principal Consultant on the 23 February 2017.

TEF report provided the following summary of the site:

> *Currently Lot 1, DP 1023024 (>200 ha property) is zoned as Primary Agricultural Land (RU1) within the Oberon Local Environmental Plan (LEP). The site contains extensive areas which have minimal to no ecological constraints at risk of impact as a result of potential future subdivision to 10 ha lots. The surrounding properties to the east and south west support similar vegetation, land use and expected ecological values and have been successfully subdivided into Large Lot Residential (R5) 10 ha lots. The rezoning and subdivision of the southern portion of the property would not be inconsistent with the approach taken for adjacent similar properties.*

A list of threatened species and communities with the potential to occur on site is provided in Appendix B to the TEF report (**Appendix A**).

The site is noted to contain open paddocks consisting primarily of exotic grasslands, which is severely degraded, cleared and modified, and featuring largely exotic species such as Scotch thistle, together with remnant Apple Box-Yellow Box woodland, which is a poor condition resulting from the historical agricultural land use. Whist condition is poor, the woodland satisfies the state endangered ecological community definition but does not satisfy the federal (EPBC Act) definition. In relation to the woodland vegetation community, the following is specifically noted:

> *Apple Box – Yellow Box woodland is equivalent to the DEC (2006) BVT 44 'Apple Box – Yellow Box – Gum open-woodland on flats and low hills of the Central Tablelands'. Apple Box – Yellow Box woodland on the site is in poor condition resulting from historical agricultural land use.*
>
> *This woodland community features a canopy of Apple Box (Eucalyptus bridgesiana) and Yellow Box (E. melliodora) with a sparse exotic shrub layer and predominantly grassy exotic understorey. The canopy includes widely spaced mature trees with little evidence of regeneration occurring (Plate 3). The understorey is dominated by exotic pasture and weeds (Oleander Nerium oleander, Crab Apple Malus sp., African Olive Olea europaea ssp africana, Blackberry Rubus fruticosus). Bare ground makes up a substantial proportion of the ground cover. Overall the community is in poor condition.*

The woodland vegetation community was assessed against the NSW Scientific Committee final determination for the Box Gum Woodland EEC listed under the TSC Act. This community constitutes Box Gum Woodland EEC as it:

- *Occurs on relatively fertile soils on the tablelands at an altitude of 170m - 1200m (onsite elevation 700-760 m asl.), within the south west slopes bioregion;*
- *Contains at least one of the characteristic tree species (Yellow Box) as a dominant;*
- *Contains characteristic species from the final determination; and*
- *Would respond to assisted natural regeneration (natural soil and associated seed bank are still at least partially intact).*

Although this community meets the TSC Act listing criteria it does not qualify as the EPBC Act listed CEEC "White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland" as it is highly degraded with low species richness of perennial natives in the understorey.

A number of waterways are noted to be located on site which, overall, were noted to be *'severely eroded, weed infested and visibly turbid'* (TEF, 2017). The waterways range from 1st order (ephemeral drainage lines predominantly dry during the inspection) through to a 4th order waterway (being Eight Mile Swamp Creek in the north-eastern extent of the site).

The TEF report recommends that buffers to waterways are provided consistent with the recommendations of DPI (Water). Recommended buffers are provided in Table 2 of **Appendix B**. It is possible to achieve these buffers within the context of the conceptual layout provided at **Drawing TP03**.

The reporting confirms no noted wildlife corridors in the form of substantial areas of vegetation. Major waterways (4th order or higher) do provide for regional connectivity.

Three broad habitat types were recorded within the site:

- Open paddocks
- Heavily degraded woodland
- Dams and drainage lines

TEF note that '*The site has poor fauna habitat values with large areas cleared for agricultural purposes*.' (TEF, 2017).

The assessment determines a number of species that may occur on site that would require future assessment, reproduced in **Table 3.2**.

Table 3.2 – Endangered species with the potential to occur on site

Common name	TSC Act	EPBC Act	Potential habitat present
Koala Phascolarctos cinereus	V	V	Potential Koala habitat
Diamond Firetail Stagonopleura guttata	V		Possible foraging and nesting habitat
Dusky Woodswallow Artamus cyanopterus	V		Possible foraging and nesting habitat
Regent Honeyeater Anthochaera phrygia	E	CE	Possible foraging habitat
Swift Parrot *Lathamus discolor*	E	CE	Possible foraging habitat
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	E		Present - canopy present. Highly degraded condition

Source: TEF, 2017

In the context of Koalas the report notes the following:

- *Much of the site supports a scattering of remnant paddocks trees. These trees have been marked as Moderate Constraint (Figure 1), to reflect the additional assessment and consideration of the impacts which may arise from any future subdivision. Constraints associated with these trees include:*

- *Many trees on site support hollows which are an important habitat resource for many native and threatened species.*
- *These trees are Koala feed trees (listed under SEPP44) and support potential Koala habitat (>15% of preferred feed trees present on site). Note: as this is noted as 'potential' habitat, not 'core' habitat, a Koala Plan of Management is not currently recommended.*
- *The remnant trees present on site are part of a highly-degraded form of White Box Yellow Box Blakely's Red Gum Woodland listed as an Endangered Ecological Community under the Threatened Species Conservation Act 1995 (TSC Act). The community is not expected to meet the EPBC Act condition listing criteria.*

3.10 HERITAGE

3.10.1 ABORIGINAL HERITAGE

OzArk (2017) has prepared a desktop assessment of the potential for impacts to Aboriginal heritage associated with the proposed rezoning. The report notes:

> *The archaeological/scientific, historic and aesthetic value of any Aboriginal cultural heritage sites is likely to be low due to the nature of the SALs (i.e. the absence of major rivers and levels of ground surface disturbance) and the archaeological context of the region (similar landforms generally have low density, low archaeological value artefact scatters).*

A further visual inspection of the site is recommended to definitively confirm the absence of items or sites of Aboriginal heritage. It is proposed this would occur in conjunction with preparation of the DA and would inform final site layout and building envelope placement. Given the above conclusion and the large size of the proposed lots, it is not considered that further refinement of the layout to ensure impacts to potential Aboriginal heritage items are limited (if required) would jeopardise the project.

3.10.2 EUROPEAN HERITAGE

A review of available information confirms that the site does not contain any mapped items of local or state heritage significance. However, it is noted that the a number of listed sites, together with the O'Connell village conservation area, are located to the north of the property – as reflected on **Figure** 11.

An assessment of European heritage has been completed by OzArk which concludes that:

> *The desktop historic heritage assessment has found that no previously recorded historic heritage items exist within the Study Area. The Study Area is located a few hundred metres south of O'Connell Settlement, which was situated on Cox's Road and developed between 1815 and the mid-1830s. The Study Area is located on land once owned by Reverend James Hassall, the first Australian candidate for ordination and one of Australia's first 'bush parsons'. Although the Study Area is located close to O'Connell Settlement and is associated with Reverend James Hassall, it is considered unlikely that it contains historic items of local or state significance or intact historic archaeological deposits. Visual inspection of the Study Area is therefore not required. Nevertheless, if the recommended Aboriginal Due Diligence visual inspection is undertaken, then visual inspection for historic heritage items should be undertaken concurrently to corroborate the findings of the desktop historic heritage assessment.*

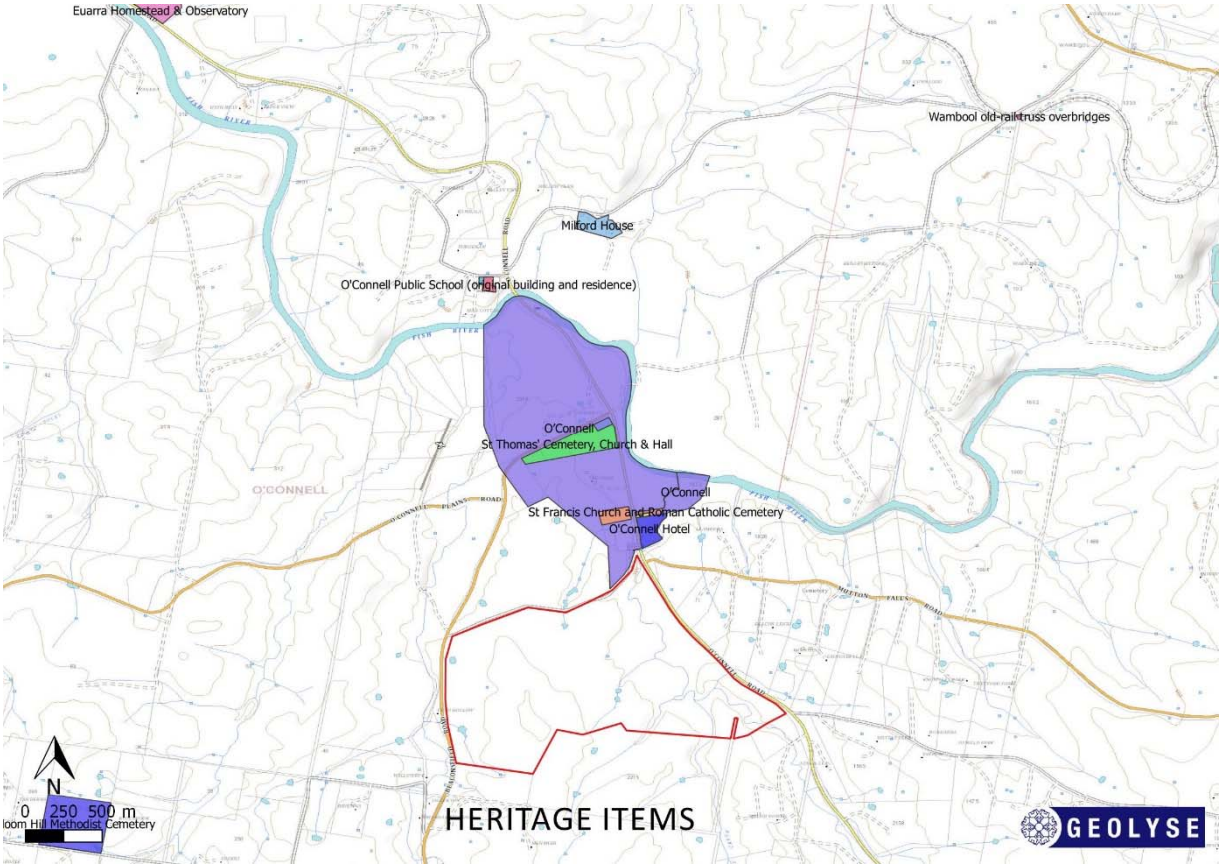

Figure 11: Properties of heritage significance

3.11 TRAFFIC

The site is bounded by roads on three sides, being O'Connell Road to the east, Box Flat Road to the north and Beaconsfield Road to the west. Box Flats and Beaconsfield Roads are local roads with a posted speed limit of 100km/hr (the Box Flats Road speed limit is 60km/hr in the eastern extent close to O'Connell village). O'Connell Road is a classified road with a posted speed limit of 100km/hr for the majority of its length adjacent to the subject site.

Initial consultation with Roads and Maritime Services confirm that direct access to any lots from O'Connell Road would not be supported - refer **Appendix E**. As such, the concept plan has been refined to provide access to all lots from roads other than O'Connell Road. A restriction to user, or similar legal restriction, would be imposed to ensure direct access to O'Connell Road is not provided for proposed Lots 1 - 5.

3.12 SERVICING

The site is located in a rural situation and therefore no trunk sewer or water infrastructure is available or proposed.

A range of electrical infrastructure crosses the property (as depicted in **Figure 12**) and the site is well services by existing local roads (discussed further at **Section 3.11**).

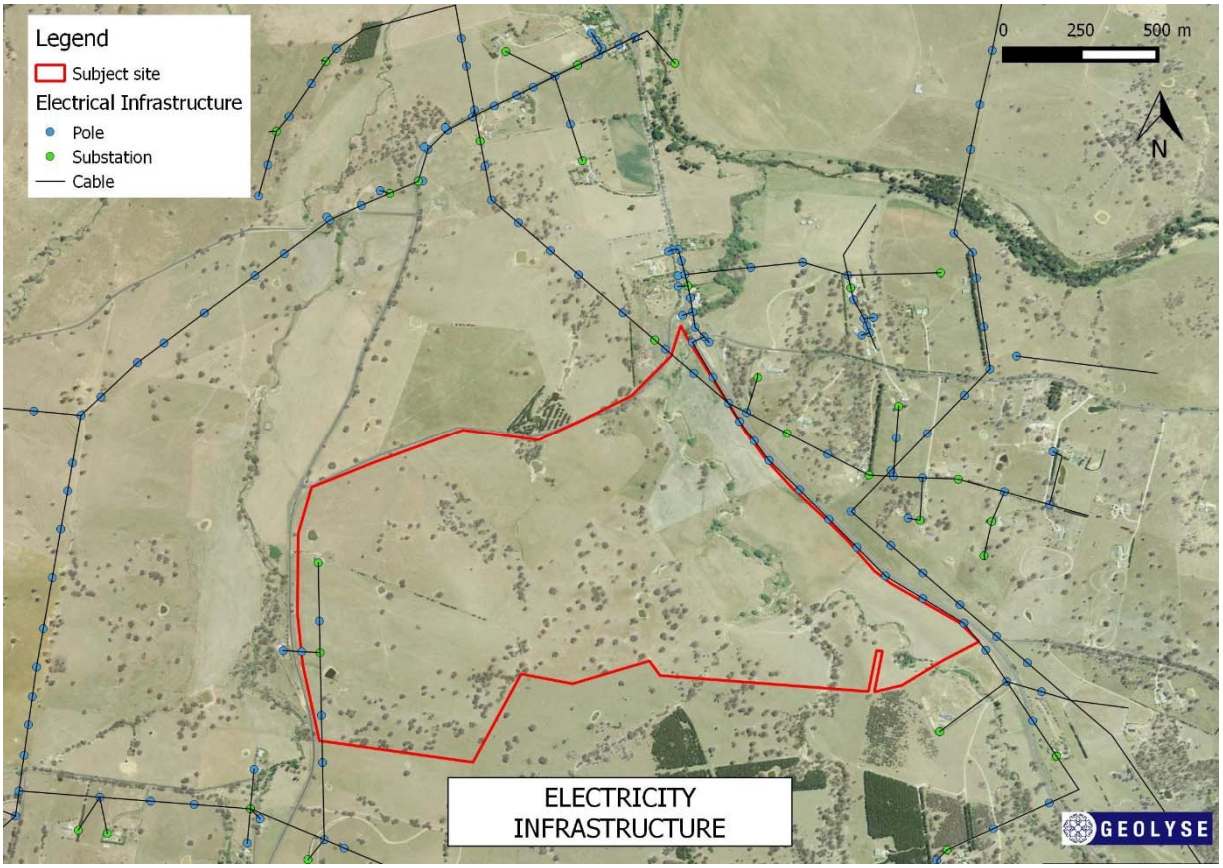

Figure 12: Existing electrical infrastructure

Environmental Analysis

4.1 BIODIVERSITY

An ecological constraints and opportunities analysis of the site has been completed by TEF (refer **Appendix B**). The report makes the following recommendations:

- *Maintain works outside the recommended riparian buffer corridors for drainage lines/waterways. Where this is not achievable apply the NSW DPI riparian offset guidelines 'averaging rule' to maintain riparian buffers.*
- *Avoid and / or minimise works vehicles or vehicle access entering within the riparian buffer areas. Where this is unavoidable Controlled Activity Approval from NSW DPI Water, and Part 7 permit from NSW DPI Fisheries for Dredging and Reclamation, may be necessary.*
- *Limit the number of subdivision lots along the 3rd and 4th order waterways on site to minimise the increase in water access rights created.*
- *Investigate opportunities to minimise impacts to riparian areas through measures such as:*
  - *Minimising the number of lots along the creek,*
  - *Keeping livestock at appropriate stocking rates for the carrying capacity of each allotment and/or imposing grazing restrictions,*
  - *Avoiding formalised creek crossings in the design,*
  - *Maintaining adequate riparian buffers in accordance with NSW DPI recommendations,*

Subject to the above recommendations, it is considered that the development may proceed with limited likelihood of significant impact to the natural environment.

These recommendations have been adopted in the preparation of the provided concept lot layout – refer **Drawing TP03**

4.2 SUPPLY AND DEMAND

Appendix A to this study provides an analysis of supply/demand prepared by the Western Region Institute (WRI) in relation to the provision of rural residential lots in the Oberon region.

The findings of that assessment concludes:

> *Based on a range of factors including increased regional population, increased dwelling requirements and an identified strong demand for large lot lifestyle blocks in the O'Connell region, coupled with a limited supply, it appears that there will likely be significant demand for the proposed development, should it go ahead. This thesis has been confirmed in discussions with real estate professionals, who advise that lifestyle factors make the O'Connell region a very popular destination with a limited supply of suitable large lot blocks.*

By reference to this analysis it is considered that there is a sufficient disparity between available supply and anticipated demand in the Oberon area to justify the release of up to 17 additional rural residential lots via this proposed development.

4.3 TRAFFIC AND ACCESS

The proposed development would generate approximately 16 additional lots on the land (17 in total) by reference to the concept plan – refer to **Drawing TP03**.

This equates to an additional 144 movements per day to be added to the local traffic network (16 lots x 9 movements per day). All lots would be accessed from non-classified local roads, thereby ensuring that impacts to the local traffic environment would be minimised.

The intersection of the proposed access road would be located in an area with good sight distances by references to Austroads standards and would be designed to address and respond to all relevant Council and Austroads standards. Access for the majority of the proposed lots would be provided from the proposed local road, which would have a lower maximum speed limit to reflect the additional property access locations. One lot (proposed Lot 1 in the north-eastern corner of the site) would gain vehicular access from Box Flats Road, however this would be in the portion of Box Flats road close to O'Connell village where the speed limit is 60km/hr, thereby ensuring safety for future users. Three lots (15-17) would be expected to gain access from Beaconsfield Road (noting that while Lot 17 is located on the corner of Box Flat and Beaconsfield Road, it expected that Beaconsfield Road would be utilised for access as this is the longer side of the block). In this location Beaconsfield Road is straight and open providing good sight distances in both directions.

All property accesses would be designed to ensure compliance with Austroads standards together with the engineering standards of Oberon Council.

4.4 WATER QUALITY

The proposal has the potential to impact water quality in a number of ways, including changes to stormwater management as a result of increased impervious areas, the potential for sedimentation or erosion as a result of construction activities and potential impacts to groundwater to as a result of increased development and increased effluent disposal.

Given the large size of the proposed lots and the placement of building envelopes clear of drainage lines and streams, it is considered that the site has the capacity to accommodate additional sewer discharge with minimal likelihood of impact to the local soil environment. All systems would be designed to satisfy best practise requirements.

The large size of the lots ensures that there is adequate capacity for management of additional stormwater generated as a result of additional hardstand.

Standard controls would be implemented during construction of roads and services to satisfy best practise requirements and minimise the likelihood of sedimentation or erosion – refer **Section 4.4.3**.

4.4.1 KEY FISH HABITAT

As noted, parts of the site contain waterways that are mapped as key fish habitat. Existing waterways would typically be retained within riparian corridors with significant buffers to encroachment through placement of building envelopes.

No formal vehicle crossing of creeks would be required to facilitate the development.

Preliminary comments have been sought from DPI (Water) (refer **Appendix E**) including providing the conceptual lot layout attached as **Drawing TP03**. The following comments were provided:

> *Thank you for providing DPI Water the opportunity to provide advice at this early stage of the proposal.*
>
> *DPI Water is supportive of the proposed lot size and minimising the need for watercourse crossings. Please not that crossings over the 3rd or 4th order watercourses requires a controlled activity approval from DPI Water.*
>
> *You note DPI Water's riparian buffers, it is appreciated that provisions for DPI Water riparian buffers are included at this rezoning stage, so they may be included through the entire development process.*
>
> *DPI Water encourages grazing restrictions/fencing of watercourses and rehabilitation of watercourses, please see DPI Water guidelines for Vegetation Management Plans*

A controlled activity approval or Part 7 fisheries permit is not expected to be required for the development due to the concept design arrangements. In the event the need for either or both permits is identified during design these would be addressed at DA stage.

4.4.2 STORMWATER MANAGEMENT

The large size of the proposed lots ensures that there is adequate capacity within the sites to accommodate minor increases in stormwater flows with on-site management, including capture for re-use on site.

This approach would also be effective in ensure water quality and environmental flows downstream are maintained.

The following general mitigation measures in relation to stormwater management are noted:

- All proposed dwelling developments would be undertaken in accordance with the requirements of BASIX;
- Drainage for impervious areas would be provided including scour protection to ensure erosion is minimised;
- Standard erosion and sediment controls would be implemented during construction activities to minimise the impacts of sedimentation.

4.4.3 EROSION

The impacts of erosion during construction would be managed through preparation and implementation of an erosion and sediment control management plan for each construction certificate in accordance with the requirements of the Landcom. Standard measure to be incorporated would include but not be limited to:

- Minimise area of disturbance to the maximum necessary.
- Install erosion and sediment control devices where necessary; only to be removed once the area is stabilised.
- Prompt revegetation of areas exposed by construction.

4.4.4 GROUNDWATER

Given the low density and rural residential (rather than rural) nature of the ultimately proposed development, it is considered that the likelihood of detrimental impacts to groundwater resources is low.

Each future dwelling would be required to provide an effluent management report to demonstrate a suitable site for disposal of sewage including sufficient buffers to natural waterbodies.

It is noted that, in making the LEP13, DPI (Water) recommended Council adopt a minimum lot size of 5 hectares for R5 zoned land located within mapped groundwater vulnerable land (in that instance, in relation to the Titania Estate). The aim was to ensure the required 250 metre buffer between a bore and effluent management system could be provided.

The proposed lot size via this planning proposal significantly exceeds this recommendation by providing 10 hectares per lot. The development is therefore consistent with DPI (Water) recommendations in this regard. Specific consultation with DPI (Water) in the preparation of this planning proposal and LES identified support for the proposed lot size (refer **Appendix E**).

4.5 RIPARIAN CORRIDORS

Lot sizes within the subdivision, including along Eight Mile Swamp/Antonys Creek, are generous to ensure the safe development of dwellings and to minimise disturbance to the sensitive watercourse. Building envelopes have been sited to ensure creek crossings are not required.

While animal types and stocking rates would be naturally limited by the size of the lots, investigations would also be completed to provide legal controls in the form of restrictions to user to ensure stocking rates/animal types do not lead to detrimental impacts to the creek. It is noted via **Appendix B** that the current use of the site for cattle grazing has resulted in impacts to the creek (including erosion) and as such, controls to limit stocking numbers and animal types would be expected to produce a positive outcome.

No development beyond fencing is proposed within 40 metres of waterfront land.

Standard controls would be implemented during the carrying out of subdivision to ensure that impacts to the riparian environment, such as due to sedimentation or erosion, are minimised.

As noted, impacts are expected to be limited through detailed lot layout design. These matters would be addressed in conjunction with a future subdivision development application.

4.6 NATURAL HAZARDS

Sufficient capacity has been designed into the width of the riparian zones to ensure that water is contained without posing a risk to building envelopes. A basic analysis of levels along the creekline by comparison to the building envelope locations confirms that sufficient vertical clearance is provided to ensure flooding impacts would be negligible.

The site is not mapped as bush fire prone by reference to the Oberon Bush Fire Prone Land Map. The closest mapped bushfire prone land is along the alignment of the Fish River, approximately one kilometre to the north.

4.7 HERITAGE

A review of available resources, including LEP13 (refer **Section 3.10**) notes a number of local heritage sites within the vicinity of the site however none are noted on the site itself. The O'Connell Village conservation area is located adjacent to the site to the north.

A desktop assessment of Aboriginal and non-Aboriginal heritage was completed by OzArk – refer **Appendix C**.

In relation to Aboriginal heritage, the report makes the following recommendations:

1. *Visual inspection of the Study Area is recommended, with emphasis placed upon the SALs shown in Figure 2-7* (of **Appendix C**)*, any additional SALs identified in the field, and all mature trees of sufficient age to contain Aboriginal scarring or carving;*
2. *If Aboriginal objects or potential archaeological deposits (PADs) are identified during the visual inspection, and the Proposal cannot be amended to avoid harm, then further investigation and impact assessment of the Study Area must be undertaken including the preparation of an Aboriginal Cultural Heritage Assessment Report and consultation with Aboriginal traditional owners or custodians. If this assessment concludes that harm to Aboriginal objects will occur, then an Aboriginal Heritage Impact Permit application must be made; and*
3. *If visual inspection does not identify any Aboriginal objects or PADs in the Study Area likely to be harmed by the Proposal, then the Proposal can proceed without further archaeological assessment.*

In relation to European heritage, the OzArk report makes the following recommendations:

> *The historic heritage desktop assessment has taken into consideration the impacts of the proposed rezoning and subsequent subdivision and housing development in the Study Area, which will disturb the ground surface. No previously recorded historic heritage items exist within the Study Area. Although the Study Area is located close to O'Connell Settlement and is historically associated with Reverend James Hassall, it is considered unlikely that historic items of local or state significance exist.*

To ensure that the historic heritage values of the Study Area are protected, the following recommendations are made:

1. *No historic heritage sites or items are recorded within the Study Area and no landforms are assessed at a desktop level as having historic archaeological potential, therefore no further historic archaeological assessment is required;*
2. *Although not a formal requirement, if an Aboriginal Due Diligence visual inspection of the Study Area is undertaken, then visual inspection for historic heritage items should be undertaken concurrently to corroborate the findings of the desktop historic heritage assessment;*
3. *All land-disturbing activities must be confined to within the assessed Study Area and additional assessment may be required if the location of the Proposal is amended to impact areas outside of the Study Area;*
4. *Inductions for staff undertaking the proposed work must explain the legislative protection requirements for historic sites and items in NSW and the relevant fines for non-compliance; and*
5. *If objects are encountered that are suspected to be historic heritage items, the Unanticipated Finds Protocol (Appendix 3 of **Appendix C**) must be followed.*

The OzArk assessment provides sufficient information to enable the planning proposal to proceed to Gateway determination with any additional assessment to be completed either post Gateway/prior to gazettal or at DA stage if required.

4.8 CONTAMINATION

A targeted contamination assessment has been completed by Envirowest including specific sampling around the site of a former shearing shed, where it is possible (although not confirmed) that a sheep dip may have been located (refer **Appendix D**). Slightly elevated levels of arsenic were detected as a result of this sampling (being, 110 mg/kg, 140 mg/kg and 150 mg/kg where 100 mg/kg is the residential threshold).

Additional sampling is required to determine the lateral and vertical extent of the arsenic. This additional sampling would be carried out to inform preparation of a remediation action plan (RAP) and the RAP would be supplied to Council as an element of a development application (either for the subdivision or as a stand-alone development application in advance of the subdivision DA).

Subsequent to the granting of consent for the remediation, and the carrying out of subdivision works, validation reporting would be prepared and supplied too Council.

Via these means, Council can be satisfied that the site can be appropriately remediated and made suitable for the proposed purpose.

It is also noted that the building envelope for the dwelling to be located on this future lot has been provided well clear of this area to provide another layer of protection.

Via the above measures, the site can be shown to be suitable for the proposed purpose.

4.9 VISUAL AMENITY

The environment of the proposed development is consistent with those areas of the surrounding locality that have been zoned for large lot residential land use. The excellent visibility via road frontages, the rolling landscape, visual access to the creek and proximity to the O'Connell village all combine to provide an excellent environment for the proposed land use.

The scale of development that would result (ie, one dwelling per 10 hectare allotment) is consistent with the scale of development in the surrounding locality. The OzArk Heritage Assessment confirms at Section 3.4 (refer **Appendix C**) that the site is unlikely to contain items of heritage significance.

The conservation area status of the O'Connell village recognises the special visual appeal of the landscape and seeks to provide specific protections for that character. The south-eastern approach to O'Connell village via O'Connell Road is considered to have the greatest potential for impact from the development, however this impact is limited to the addition of a maximum of five visible dwellings on the eastern side of the subdivision. Given the existence of the Mutton Falls Road subdivision to the east of the site, this minor change to the landscape is not considered to represent a significant change to the landscape that would detrimentally impact on the heritage significance of the O'Connell conservation area.

It is proposed that the development of the site would consider and enhance the qualities of the landscape via the following measures:

- Future subdivision of the land would ensure the protection of watercourses, establish appropriate buffers and protect and augment existing riparian vegetation;
- Significant scattered vegetation in the site would be protected by appropriate placement of roads and building envelopes;
- Consideration would be given to the provision of additional 'avenue' style plantings along the O'Connell Road elevation utilising matching species as exists along the route at present, to provide a natural linkage between the subject development and the existing visual identify of the road.

4.10 LAND RESOURCES

The site is currently zoned for primary production purposes and as such the rezoning and future development of the land as proposed would result in the removal of this land from this current purpose. Currently the site is used for grazing, consistent with the primarily class 5 status of the majority of the land – refer **Figure 8 (page 31)**. A small amount of cropping takes place adjacent to the creek in the western extent of the site.

The proposed development would result in the loss of the above resources and their replacement with lots suitable for provision of very low density rural residential housing.

A review of the O'Connell region via the LUS11 provides a number of insights into this proposal, as discussed below.

4.10.1 REGION DEMOGRAPHICS

The LUS11 summaries the 2006 person characteristics of O'Connell as:

- Population – 355 persons, consisting of 184 males and 171 females
- The largest age group is the 25-54 year old's, comprising 38.6% of the population, followed next by the 5-14 year old's, comprising 20% of the population
- The median age is 37.

By comparison, review of the Australian Bureau of Statistics data for the 2011 census, the following is noted for the O'Connell (suburb):

- Population – 648 persons, consisting of 343 males and 305 females;
- The largest age group is the 25-54 year old's, comprising 37% of the population, followed next by the 5-14 year old's, comprising 18.1% of the population
- The median age is 43.

It can be seen from the above that a significant population increase has occurred in O'Connell; the median age has risen but proportionally, the age groups have stayed generally consistent.

This increase in population is representative of the increased demand for housing lots in this area. The 182% increase in population in O'Connell is significantly higher than for the town of Oberon, which decreased in size by approximately 9% (3,498 down to 3,185) within the same period and is generally

consistent with the Oberon village of Burraga, which changed from 117 to 251 between this period (an increase of 214.5%).

It is therefore evident that rural residential areas are proving popular in the market and will accommodate a strong proportion of population growth for the LGA. Therefore, providing additional rural residential lots in these areas will provide housing lots in an area of demand.

The subject site was not considered via the LUS11 for rezoning for lifestyle lots, however key site constraints are revealed via LUS11 mapping. These are discussed in the following sections.

4.10.2 SERVICING

LUS11 summarises servicing opportunities and this is discussed in **Section 4.11**

4.10.3 SUPPLY/DEMAND

As at release of the LUS11, there were no rural residential lots released in the O'Connell village (between 2004-2009). There were 57 lots released in the rural zone during this same period and two village lots.

Since release of the LUS11, and gazettal of LEP13, all areas identified via the LUS11 as being suitable for rural residential use have been rezoned R5. Of this land, around half has been physical subdivided with subdivisions registered.

As noted above, the village population has also almost doubled in this period, no doubt due in part to the rezoning of the land.

4.10.4 CONSTRAINTS AND MANAGEMENT

The site borders primary production zoned land to the south and rural residential land to the north-east, east and west.

The Fish River is located to the north and Eight Mile Swamp Creek/Antony's Creek flow northward through the site, draining towards Fish River. Both waterbodies are mapped as key fish habitat.

The site is mapped as containing areas of sensitive land, groundwater and biodiversity. These matters are discussed in **Sections 3.4, 3.2 and 3.8**. Notably, despite the inclusion of a mapped area of endangered ecological community in the northern extent of the site, the ecological constraints and opportunities assessment formed the conclusion that the communities on site were significantly degraded.

Potential major intrusions between the proposed rural residential use and the existing primary production (grazing) land uses to the south are likely to be dust and noise. The large size of the proposed lots, the small/fragmented nature of the holdings to the south and the land capability (class 5) reduce the likelihood of significant conflict between the land use types. The successful development of rural residential land to the east, and the recent rezoning of land to the north, north-east and west demonstrates the general suitability of the site for the proposed purpose.

The large lot sizes and careful placement of building envelopes for the southern lots provide sufficient capacity for accommodating buffers to primary production, consistent with the recommendations of the DPI Guidelines (refer **Section 3.7**). The DP guidelines identify that a buffer may consist of physical separation, or separation with buffer elements such as planted vegetation. Detailed design of the subdivision at DA stage would ensure that an adequate buffer was implemented to all nearby operational rural land. Capacity exists to provide buffers to zoned R5 land to the west should the primary production use continue as appears to currently be the case.

Other measures for consideration relating to the ongoing use of the land until it is developed include:

- retention of grazing rights until the land is to be used for urban development to ensure weed control and fire hazard reduction;

- restriction of cultivation on Class 5 land to grazing; and
- larger lots would be provided closer to the creek to minimise the potential for impact.

LUS11 notes that the O'Connell village has established 'considerable characteristics' of a village and has developed a rural residential living area in the Llambeda Estate. LUS11 notes:

> *When compared on available facilities and density of population with Black Springs and Burraga, O'Connell has equal or greater justification to be declared a Village Zone.*

LUS11 further notes in terms of future character:

> *The locality of O'Connell has attracted much community discussion with the two key areas being the conservation area and the future dwelling potential of the area. In essence, there are two polar views on retaining the existing character of the area (with limited increased dwelling expansion) or alternatively substantially increasing the amount of rural residential living within the area (primarily driven by several large landowners). A third view of balanced development against strict criteria to protect the existing cultural landscape and heritage significance of the locality is positioned between the two above views.*

The proposed development provides a development scale that is considered to be consistent with the third view discussed above, as it provides for low density rural residential development on lots that are sufficiently sized so as not to detract from the heritage significance or character of the area.

LUS11 notes that a key attribute of the O'Connell heritage area is the avenue of trees. The applicant has no objection to sympathetic plantings on the O'Connell Road elevation of the property to maintain or enhance the avenue of trees.

Notably, two areas adjacent to the conservation area were rezoned to R5 via the LEP13 and have not resulting in any noted decline in the heritage significance of the area. Similarly, the proposed development would not be expected to detrimentally impact on this area.

Growth for the locality is positive as it provides opportunities for improved services and facilities.

4.11 SERVICING

Servicing for the development would be limited to roads, electricity and telecommunications, all to be provided at the applicant's costs and with no costs to the community.

Potable water would be supplied by capture of roof water and on site storage, with some potential augmentation from bores or stock/domestic extraction from the creek.

Effluent would be managed on site via individual proposed on site effluent management systems, designed and sited at individual development application stage. There is sufficient room within each lot, considering the large proposed lot size, to accommodate an appropriate system.

4.12 STAGING

The timing and staging of the development of the subdivision would be developed in consultation with Council to ensure that the objects of the *Environmental Planning and Assessment Act 1979* are appropriately balanced with the desire to develop land to respond adequately to demand.

Careful consideration of the objects of the Act, including the promotion and co-ordination of the orderly and economic use and development of land, is required.

It would be too simplistic to assume yearly releases and instead it is expected that releases will be coordinated having regard to demand and staging would respond to the efficient installation of services to ensure that costs are appropriately balanced for the development.

Conclusion

5.1 CONCLUSION

The site offers an excellent opportunity to provide a high quality rural residential development that is well located, offering good connectivity to both Bathurst and Oberon. The development will provide a sought after rural amenity and lifestyle that is in demand in the region.

The proposed amendment to the Oberon LEP will enable the land to be developed as proposed.

The majority of the land is low capability agricultural class and its transition to rural residential land would provide a high quality, logically located land use.

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Appendix A

LAND USE ANALYSIS

OBERON RESIDENTIAL LAND ANALYSIS

Prepared for Geolyse

CONTENTS

Contact Details

Street Address
Level 1 126 William St
Bathurst NSW 2795

Mailing Address
PO Box 9374
Bathurst NSW 2795

Ph: 02 6333 4000
Email: team@wri.org.au
Website: www.wri.org.au

Prepared for Geolyse on behalf of Mr Cameron Hill.

22 December 2016

16 022 Geolyse – Oberon Residential Land Analysis

Introduction

Geolyse has been engaged to prepare a planning proposal seeking to rezone approximately 200 hectares of Primary Production zoned land at Oberon (adjacent to O'Connell village) to Large Lot Residential land. It has been advised by Oberon Council that supply and demand for residential land would play a significant role in Council's determination as to whether it grants the rezoning. WRI was asked to identify the supply and demand for residential land in the Oberon LGA and provide insights into the adjoining Bathurst Local Government Area.

WRI has developed a number of sources of information and data that highlight trends which may provide some insight into potential supply and demand currently and into the future.

Findings

Current Supply
Over 2015 and 2016, approximately 267 lots have received a subdivision determination in the Oberon LGA. No further information is available on the timeframe for when these lots will be placed on the market.

Current Demand
Socio-economic profiles of the Oberon, Bathurst and O'Connell regions highlight a combined (2011) population of 44,207. More recent population estimates suggest that this figure would be closer to 48,000 residents that live within a short distance of the proposed development. An already large and growing population suggests an abundance of potential demand for large lot residential land in the region.

A key insight into the population demand for R5 Large Lot Residential blocks in the O'Connell region is its proximity to Bathurst, whereby professionals working in Bathurst have shown a strong preference for acreages within a short (10 – 15 minute) distance of their work. Strong demand has already been evidenced in the large population increase in the O'Connell region, which is nearby the proposed development. Between the 2006 and 2011 Census, the O'Connell population has increased by 82.5 percent.

Labour force data, marital status and income data also supports high demand, with high rates of employment and significant purchasing power. Of particular relevance to the proposed development is the median household income for the O'Connell population, which earns significantly more than State and regional averages and also has a very low rate of unemployment. This suggests that the proposed development is in a location that is appealing to a high income cohort who has disposable income to put towards large, rural, lifestyle blocks.

Strong growth in land prices and valuations are another key indicator of strong demand. Data relating to housing reveals a trend towards increased spending on housing and a declining number of persons per house, which all suggests a preference for individuals to put their income towards housing. This has been backed by property reports for the Oberon region, which highlight that there has been sustained growth in the valuation and prices paid for Oberon residential land, with R5 large lot residential block valuations growing strongly in recent years.

Property sales and rent data highlights sustained growth over the 2006 – 2016 period. Oberon and Bathurst sales and rents have increased over this period, although Oberon did see a period of decline during the 2008 – 2011 financial crisis.

Valuer General data also supports the contention that Oberon and Bathurst are seeing significant demand for land, with rising land values. Oberon (including O'Connell) R1 General Residential and R5 Large Lot Residential land values have increased by 9.6 percent and 19.6 percent, respectively, over the 2012 – 2015 period. Bathurst

values have increased by less, with R1 and R5 blocks growing by three and five percent, respectively over the same period.

Furthermore, media information and discussions with three real estate professionals, who are based in or operate in the Oberon/O'Connell area, provide anecdotal evidence to support the strong demand thesis. Interview insights highlight that the Oberon and O'Connell markets are substantially different markets. Whereas the Oberon city market for R1 residential blocks may have a stronger supply and more limited demand, this scenario is not true for the O'Connell region. It has been suggested in these interviews that the attractive lifestyle factors to be had in the O'Connell region relate to significant demand for large residential blocks in the area. This is met with a very limited supply of this type of block, suggesting that there is a deficit of supply and an abundance of demand for R5 residential blocks in the O'Connell locale. Furthermore, the employment and income characteristics of residents in this region suggest that the locale attracts residents with significant resources to put towards housing.

Finally, and importantly, Oberon Council's strategic documentation identifies the need for more R5 Large Lot Residential land in the O'Connell region and the strategic approach to land development contained in the Strategy could be interpreted as supporting the proposed developed. Furthermore, at a high level, the strategy contained in the Bathurst Region Rural Strategy would also support the proposed development insofar as it would concentrate settlement close to established villages, provide housing choice and provide for rural lifestyle living.

Future Demand

Demand for Oberon residential land is expected to continue with NSW Department of Planning and Environment projections suggesting the region will face a shortage of dwellings in the future. Whilst the Projected Implied Dwelling Requirement in the Oberon LGA is expected to grow to 2,850 by 2036, the number of projected households is expected to fall short of requirements by approximately 650 dwellings annually throughout the modelled period (2016 – 2036). Similarly, Bathurst is also expected to have insufficient dwellings to meet demand, with an annual shortage of 1,700 – 2,300 dwellings over the modelled period. This suggests a strong demand scenario for residential development. The increase in demand for dwellings appears to be driven (in part) by a decrease in the average number of persons living in each dwelling.

The future demand for residential blocks in the Oberon region is supported by other evidence. Whilst population projections for the Oberon LGA remain flat through to 2036, the Bathurst population is expected to increase significantly. As found in interviews with real estate professionals, O'Connell is seen as a prime area for Bathurst based professionals who wish to achieve a country lifestyle. Furthermore, in the absence of population projections for the O'Connell region, it may be fairly assumed that large historical population increases in O'Connell could imply strong future demand.

Conclusion

Based on a range of factors including increased regional population, increased dwelling requirements and an identified strong demand for large lot lifestyle blocks in the O'Connell region, coupled with a limited supply, it appears that there will likely be significant demand for the proposed development, should it go ahead. This thesis has been confirmed in discussions with real estate professionals, who advise that lifestyle factors make the O'Connell region a very popular destination with a limited supply of suitable large lot blocks.

Oberon Land Use Strategy - 2011

The Oberon Council Land Use Strategy (LUS) is a key document managing the development of residential land in the Oberon LGA. The Strategy provides the strategic planning basis for the Local Environmental Plan (LEP). The Strategy outlines key land use policies and principles for the Oberon LGA, and provides the planning context for the preparation of local environmental plan provisions.

The key strategic directions for Oberon settlements include:

- Focus on the principle of cluster planning, creation of critical mass for the provision of higher order services and facilities within the LGA and limiting current and future land use conflicts.
- Encourage an increase in the percentage of residential and rural lifestyle living developments through the provision of a suitable level of appropriately zoned land.
- Future residential development will be directed towards enhancing the viability of the township of Oberon and villages and enclaves where appropriate.
- Developments will aim to minimise any impact and the implications of industrial noise in the township of Oberon.

The LUS provides relevant discussion of the need for appropriate zoning in the O'Connell region, adjacent to the proposed development site. A number of relevant points to highlight from the LUS include:

- The residential supply and demand analysis identifies the need to provide large lot residential lots in O'Connell.[1]
- The strategic objectives and actions for rural lifestyle areas include that they are to be zoned R5 Large Lot Residential, with the exception of O'Connell where the minimum lot size will need to be set at a level (greater than 4000 m^2) to protect the heritage and cultural landscape.[2] This is consistent with the proposed development.
- As identified within the settlement section of the Strategy, there is an objective to establish a number of strategically located rural living areas in close proximity to the villages within the LGA, including O'Connell. The stated aim is for these rural living areas are to encourage people to remain or relocate within the Oberon LGA through the provision of alternative lifestyle options and to increase the critical mass of the individual village areas to assist with the provision of infrastructure and services.
- Residential supply and demand in the O'Connell area was considered in the LUS. Data shows that in the period between 2004 and 2009, 57 residential blocks were subdivided in the 1A and 2V categories. It is understood that these classifications do not apply to apply to the current R5 Large Lot Residential, which fall within the 1(c) classification. The LUS notes that there were 3 blocks subdivided under this category in the 2004 to 2009 period. This suggests a shortage of new supply of these blocks over an extended timeframe.[3]
- The LUS notes that the number of blocks created in the 2004 to 2009 period was potentially influenced by changes to the planning regime, which may have contributed to increased subdivisions in 2003.[4]

Comments and data from the LUS identifies the need to provide large lot residential lots in O'Connell, and highlights that this is in line with strategic goals contained in the LUS. A potentially important note arising from the analysis of the LUS is that it appears to conflate the supply and demand of residential blocks. It is arguable that demand is a function of population, income and other variables and must be considered independent of supply.

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[1] Oberon Council, Land Use Strategy, 2011, p 34.
[2] Oberon Council, Land Use Strategy, 2011, p 40.
[3] Oberon Council, Land Use Strategy, 2011, p 159.
[4] Oberon Council, Land Use Strategy, 2011, p 30.

Bathurst Region Rural Strategy

Noting the proposed amalgamation of the Oberon and Bathurst Regional Councils, a review of land management documentation may provide some high level insights into the development of rural residential blocks under an alternative regime. The Bathurst Regional Council adopted its Bathurst Region Rural Strategy in December 2008. The aim of the Strategy is to provide a broad land use strategy to guide the future land management and development of the rural lands, villages and settlements of the Bathurst Regional Local Government Area (LGA).

The strategic approach to land management in the Bathurst LGA is captured in two different strategic responses. These are:

Vibrant and Viable Villages

1. To adopt a settlement strategy that includes the concentration of new living opportunities within and close to the existing villages and settlement areas, where appropriate, so as to improve the viability of these centres, minimise impacts on agricultural lands and enable concentrated service provision.
2. To provide an appropriate level of village amenity through the preparation and adoption of development standards for each village location.
3. To provide a strong and viable village system that includes housing choice, viable business and tourism opportunities, adequate transport systems and a concentration of community services.

Rural Lifestyle Living

1. To adopt a settlement strategy that includes the provision of rural lifestyle living at a level that meets the projected levels of demand.
2. To supply rural lifestyle living in an appropriate form that will minimise its impacts on agriculture and maximise the concentration of population at existing village and settlement locations.
3. To supply rural lifestyle living in appropriate locations that consider relevant planning constraints and constraints identified in earlier recommendations of this strategy.
4. To provide an appropriate level of amenity for rural lifestyle living areas through the preparation and adoption of relevant development standards, particularly minimum lot sizes.

These strategies could be interpreted in favour of the development of the proposed block, insofar as this will concentrate settlement close to established villages, provide housing choice and provides for rural lifestyle living.

Bathurst Region Rural Strategy also provided an estimate of the expected demand for rural lifestyle block in the Bathurst LGA. It was estimated that, as at 2008, the overall existing demand for rural lifestyle living (estate style and scattered allotments) in the new LGA is therefore broadly estimated to be 50 lots per year with half of those lots being required within 10 kilometres of Bathurst and the remaining half required greater than 10 kilometres of Bathurst.[5]

[5] Bathurst Regional Council, Bathurst Region Rural Strategy, p 207.

Supply Analysis

There are a limited number of resources to establish the supply of new residential land in the Oberon LGA. Research activities have discovered one principal source for this information, which is the Oberon Council planning determinations webpage. This source provides a monthly summary of planning approval determinations.

Oberon Council Planning Determinations

A review of the subdivisions in 2015 and 2016 provides insights into the supply of new residential subdivisions. A tally of these subdivisions highlights that in 2015 and 2016, 267 lots were approved for subdivision.

It should be noted that there is no definitive source of information for the total number of subdivisions and that the above subdivisions have been tallied manually from a range of documents and based on limited information. The tally was confirmed by an Oberon Council Planning employee that the count was within a reasonable range of their knowledge of the number of determined subdivisions. Further, determination data was available up to October 2016[6] and no information is available on when these subdivisions will be completed, or when they are likely to come to market.

Demand Analysis

A range of activities have been undertaken to establish the demand for residential blocks in the Oberon, Bathurst and O'Connell region. The O'Connell region has been included in this analysis given its proximity and similarity to the proposed subdivision and will likely provide insight into the kinds of people who may buy one of the proposed blocks and the demand for large lot residential blocks in this locale.

Demand analysis activities include:

- A socio-economic profile of the Oberon and Bathurst Local Government Areas (LGAs) as well as a limited profile of O'Connell. It should be noted that only a limited profile can be provided for O'Connell as data is less available for lower order geographical regions (such as state suburbs).
- A review of available land sales and valuation reports to understand trends in sales and valuations.
- A review of NSW Department of Housing Sales and Rents data to establish median rents and sales trends on an LGA basis.
- A review of NSW Valuer General trends in land valuations.
- An analysis of NSW Department of Planning and Environment household projections to consider the future potential demand for dwellings in the Oberon and Bathurst LGAs.
- A review of anecdotal evidence that assists understanding the demand for dwellings in the Oberon and O'Connell region, including media references and discussions with Oberon real estate professionals.

[6] The Oberon Council determinations webpage provides information up to September 2016. However, communications with the planning department also highlighted a 83 lot subdivision that received approval in October 2016.

Socioeconomic Profile - Oberon Local Government Area

The Oberon Local Government Area (LGA) had a 2011 population of 5,040 and has maintained a steady population over a long period. Population projections suggest that this population will remain stable into the foreseeable future, albeit with an increasing population of persons aged 65 and over. As at 2011, 45 percent of the Oberon population were married or in a de facto married relationship.

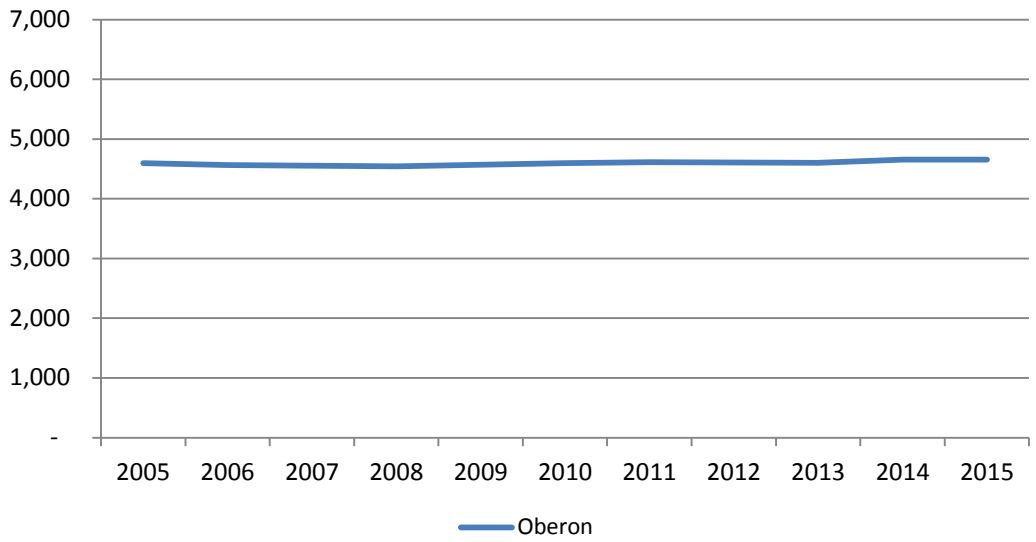
Oberon has a low unemployment rate of 3.8 percent. Oberon incomes are lower than the NSW state average, but are higher than incomes for the Rest of NSW, which is a standard geographical classification for non-metropolitan NSW. Oberon has seen a substantial increase in the housing stock between the 2006 and 2011 Census, accompanied by increases in weekly rents and mortgage repayments, alongside a declining number of persons per household.

Population

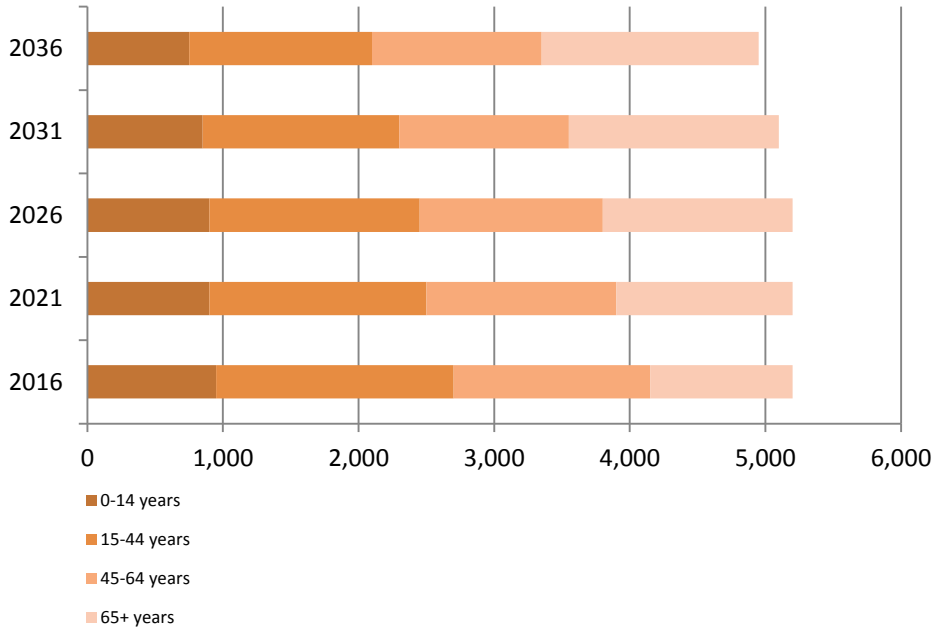
Population is variable in nature and there are a number of different data releases that estimate the population at a given point in time:

- Oberon's population as at the 2011 Census was 5,040. The median age as at 2011 was 41 years.
- The estimated resident population as at June 2015 was 4,654 and has been stable for some time.
- Population projections suggest that the population will stay relatively stable, with an estimated 2036 population of 4,950. Projections suggest the Oberon population is aging, with 20 percent of the current population aged 65 years or older, which will rise to 32 percent by 2036.

Estimated Resident Population



Population Projection Oberon



People

Marital Status

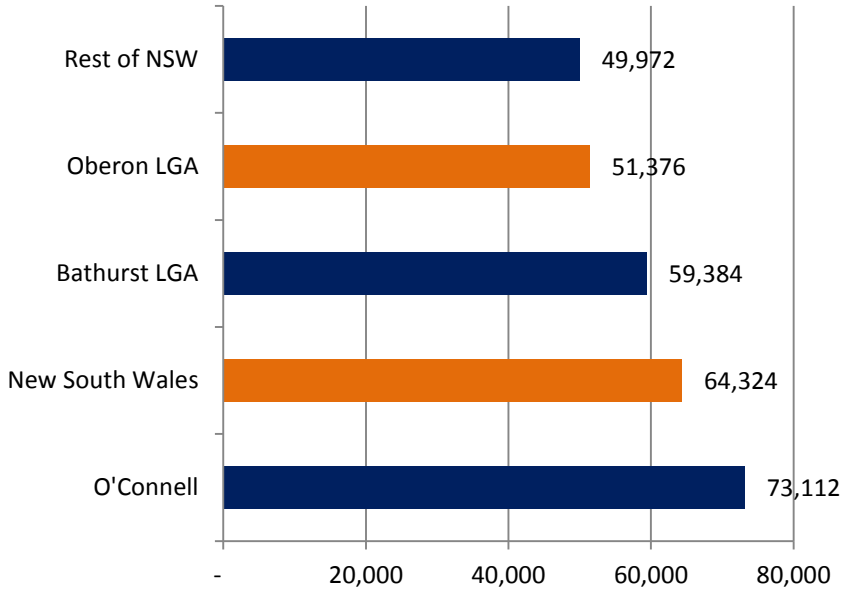
	Number	Percent of Total
Married in a registered marriage	1907	38%
Married in a de facto marriage	367	7%
Not married	1238	25%
Not applicable	1532	30%
Total	5044	100%

As at 2011, 45 percent of Oberon residents were married or in a de facto married relationship.

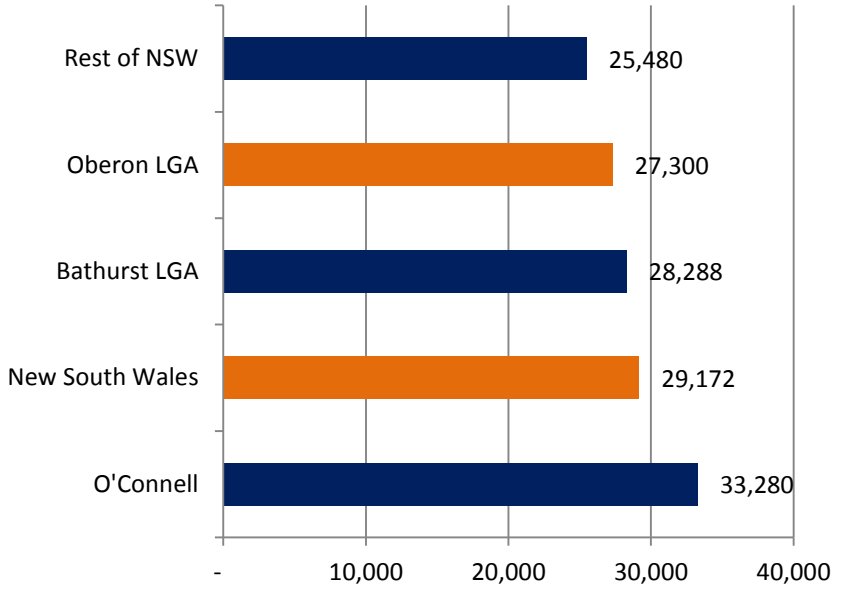
Median Incomes

As at 2011, Oberon median household and personal income was higher than the Rest of NSW, but lower than other reference regions.

Median Household Income 2011



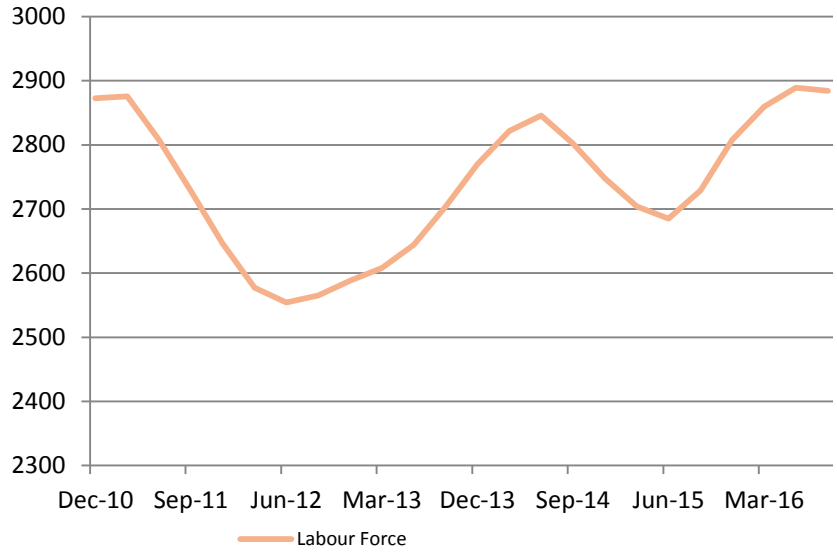
Median Personal Income 2011



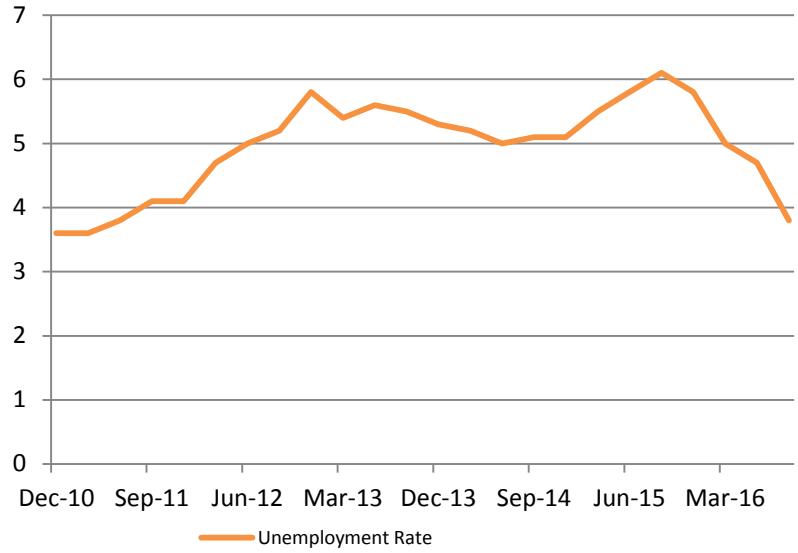
Key Labour Force Data

As at September 2016 Oberon had a labour force of 2,884 and an unemployment rate of 3.8 percent.

Labour Force



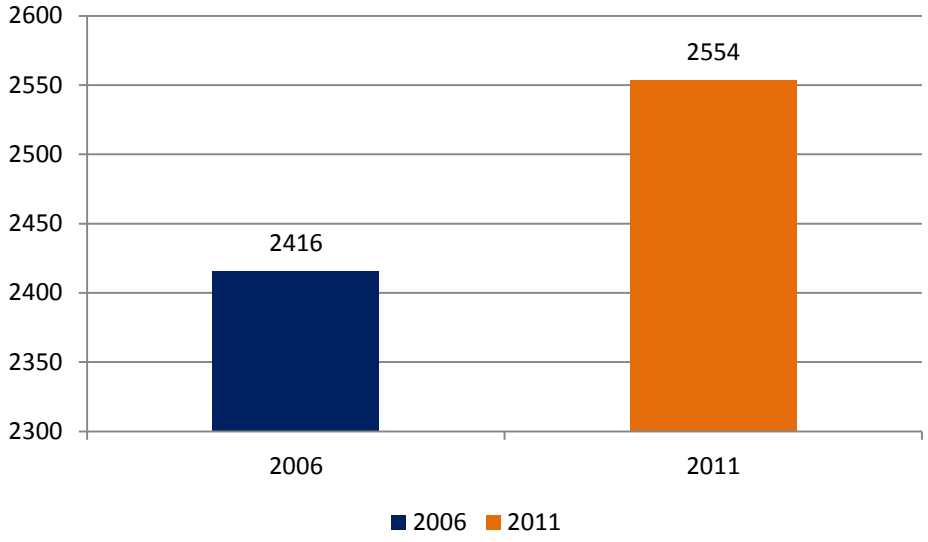
Unemployment Rate



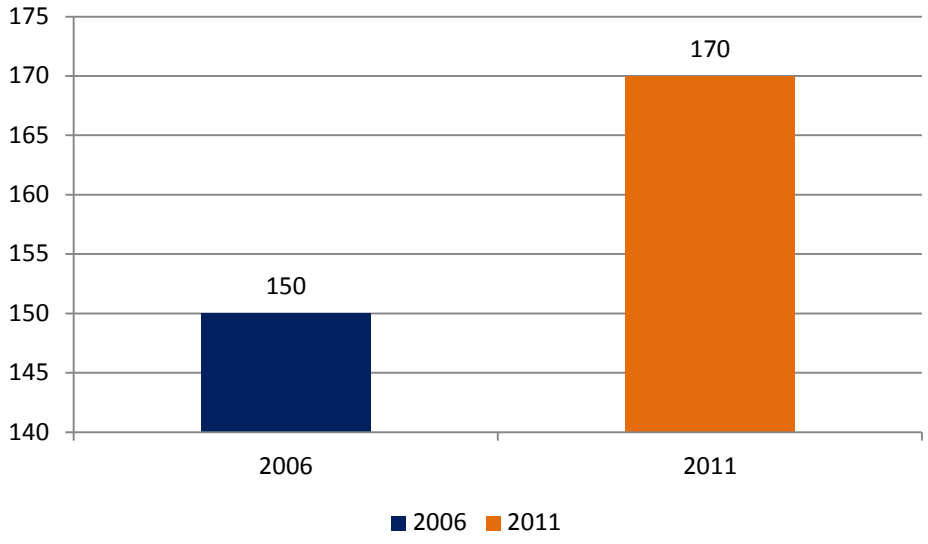
Housing

Oberon housing costs have risen between the two Census periods, at the same time as the average number of household residents has dropped.

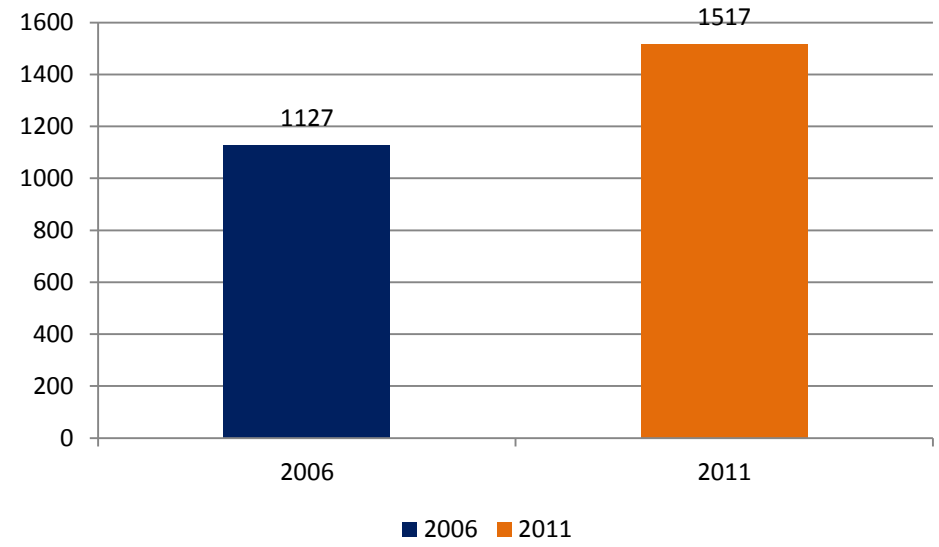
Number of Dwellings



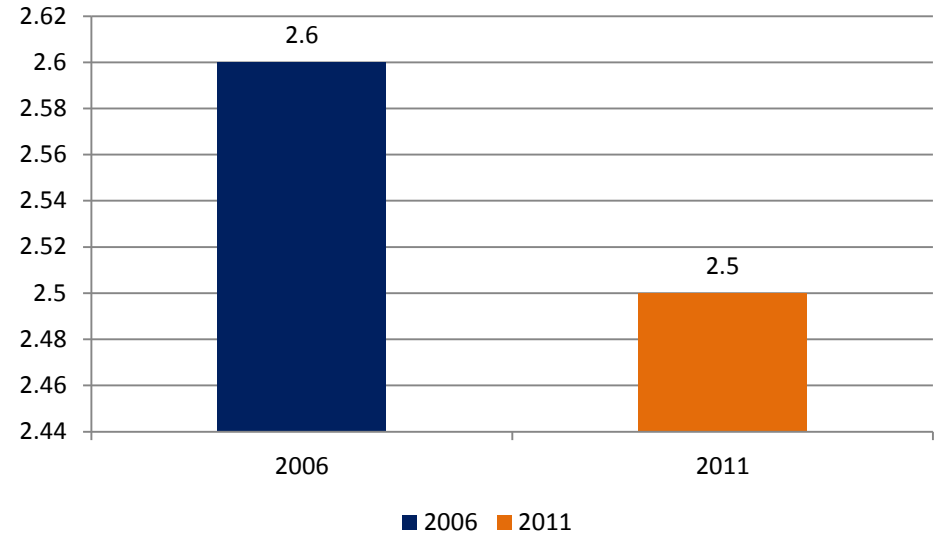
Median Weekly Rent



Median Monthly Mortgage Repayments



Average Household Size (Persons)



Socioeconomic Profile - Bathurst Local Government Area

The Bathurst LGA had a 2011 population of 38,519 and has seen steady population growth over a long period. Population projections suggest that the population will continue to grow, with an estimated 2036 population of 55,350, albeit with increasing population of persons aged 65 and over. As at 2011 40 percent of the Bathurst LGA population were married or in a de facto married relationship.

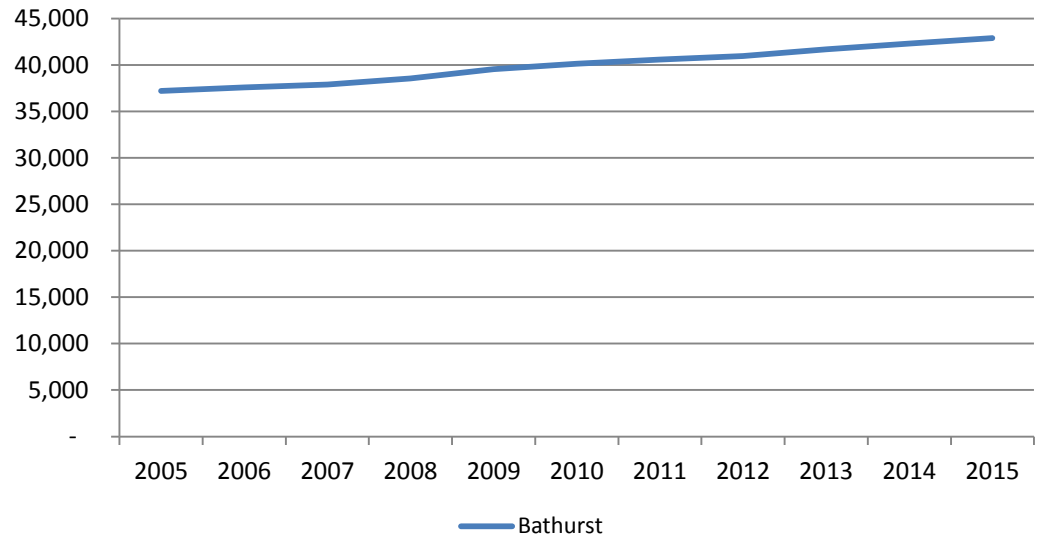
Bathurst has a low unemployment rate of 4.0 percent. Bathurst incomes are close to, but lower than the NSW state average and considerably higher than incomes for the Rest of NSW, which is a standard geographical classification for non-metropolitan NSW. Bathurst has seen a substantial increase in the housing stock between the 2006 and 2011 Census, accompanied by increases in weekly rents and mortgage repayments, alongside a declining number of persons per household.

Population

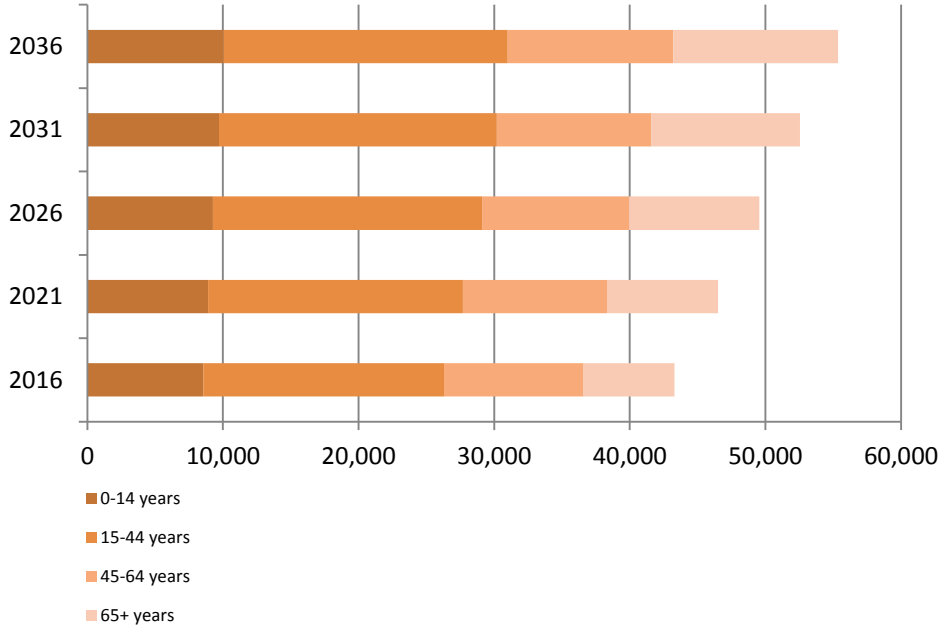
Population is variable in nature and there are a number of different data releases that estimate the population at a given point in time:

- Bathurst's population as at the 2011 Census was 38,519. The median age at 2011 was 36 years.
- The estimated resident population as at June 2015 was 42,886 having grown significantly over recent years.
- Population projections suggest that the population will continue to grow, with an estimated 2036 population of 55,350. Projections suggest that the Bathurst population is relatively young, with 15 percent of the current population aged 65 years or older, but will rise to 22 percent by 2036.

Estimated Resident Population



Population Projection Bathurst



People

Marital Status

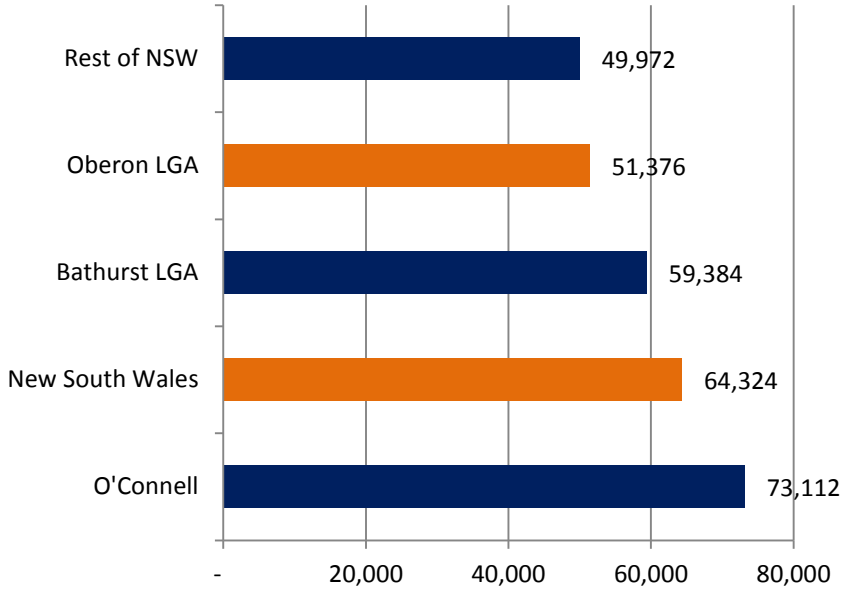
	Number	Percent of Total
Married in a registered marriage	12601	33%
Married in a de facto marriage	2822	7%
Not married	10618	28%
Not applicable	12477	32%
Total	38518	100%

As at 2011, 40 percent of Bathurst residents were married or in a de facto married relationship.

Median Incomes

As at 2011, Bathurst median household and personal income was higher than the Rest of NSW and Oberon, but lower than other reference regions.

Median Household Income 2011

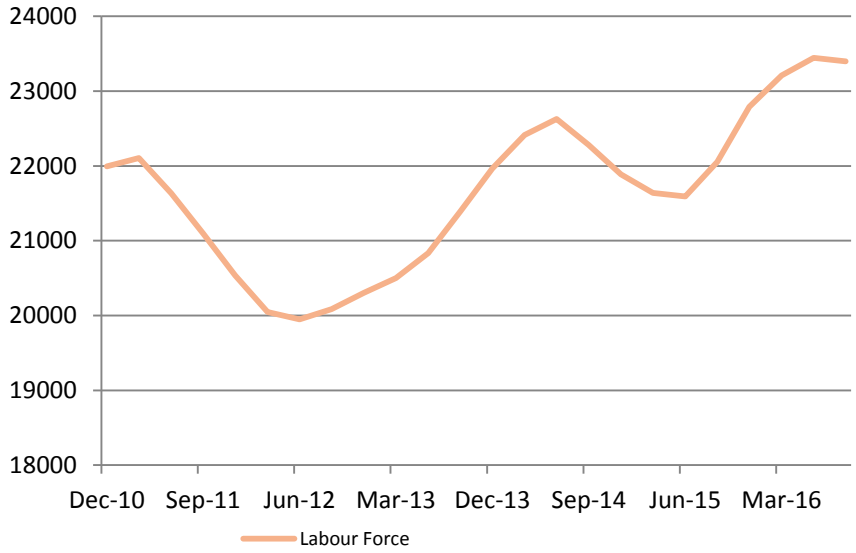


Median Personal Income 2011

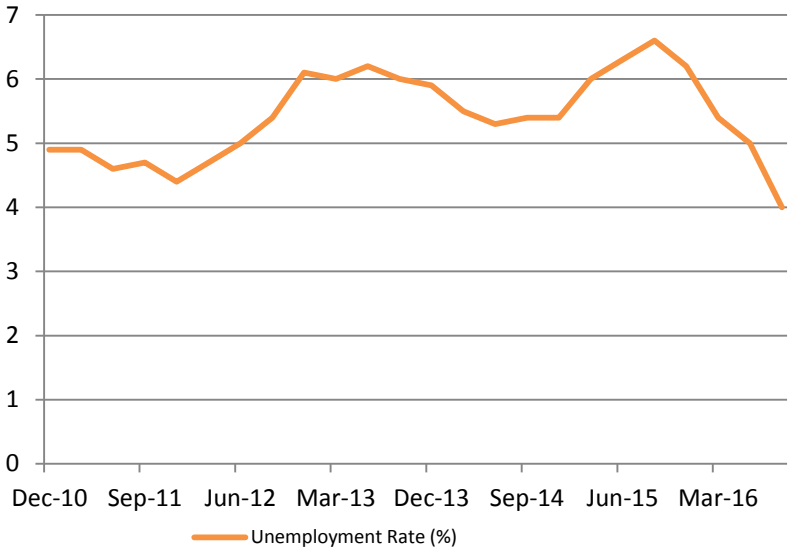
Key Labour Force Data

As at September 2016 Bathurst had a labour force of 23,397 and an unemployment rate of 4 percent.

Labour Force



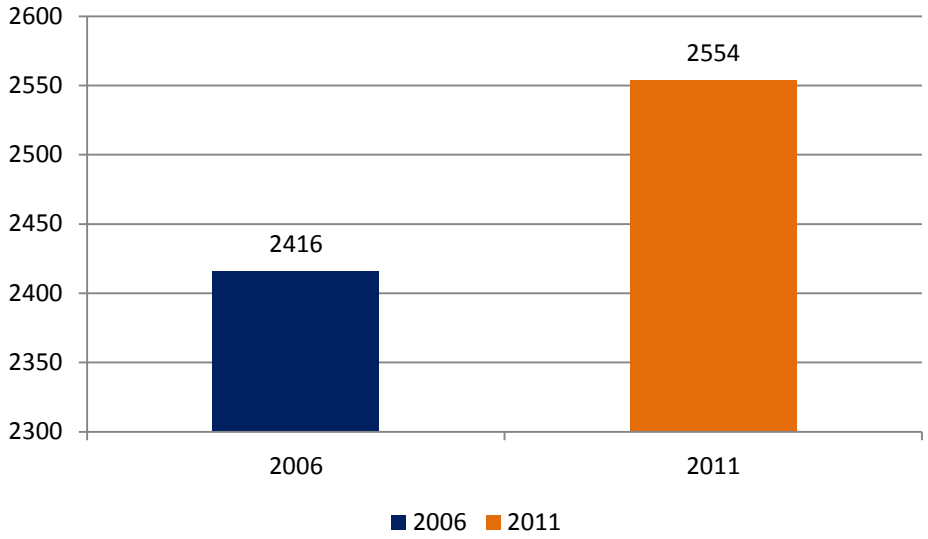
Unemployment Rate



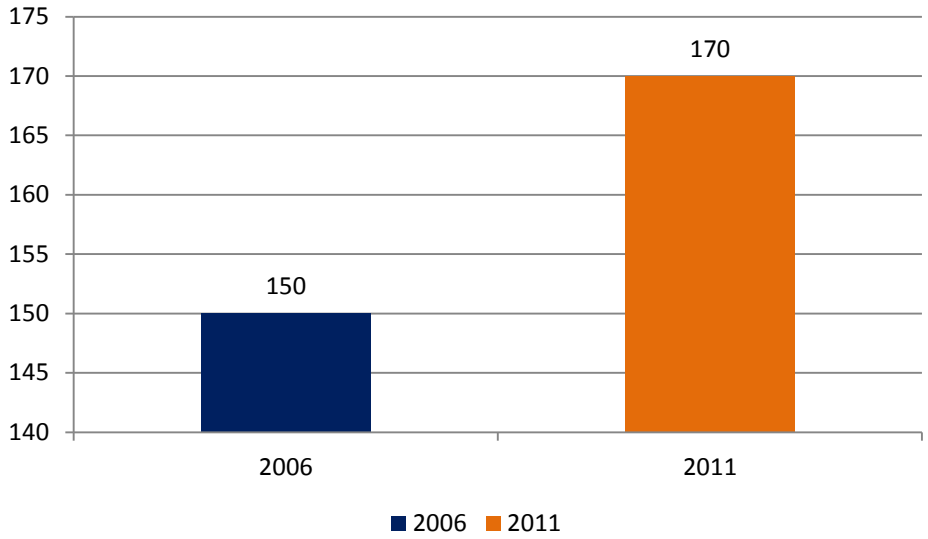
Housing

Bathurst housing costs have risen between the two Census periods, at the same time as the average number of household residents has dropped.

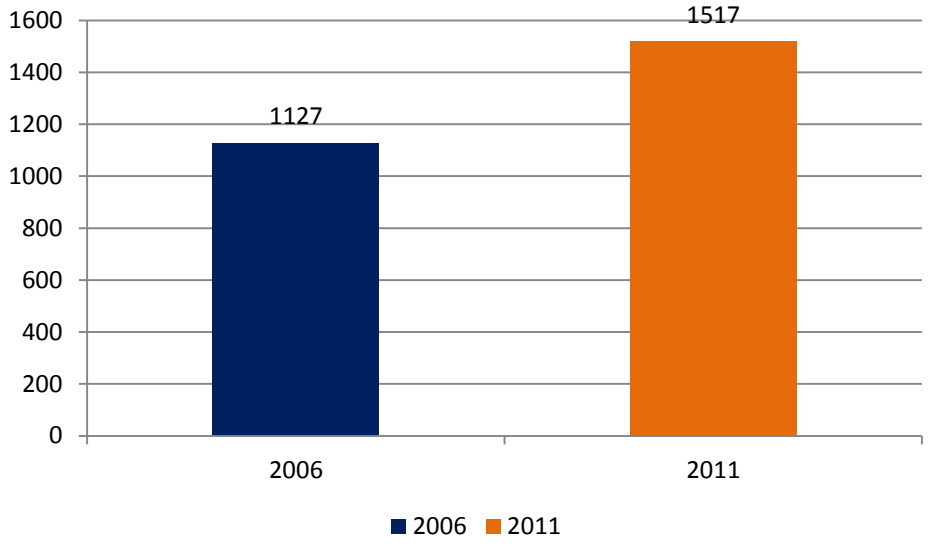
Number of Dwellings



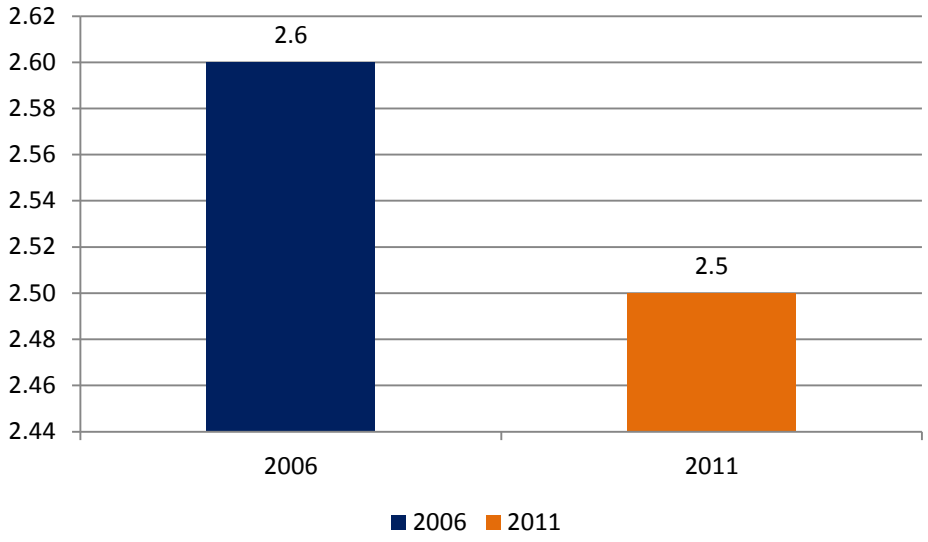
Median Weekly Rent



Median Monthly Mortgage Repayments



Average Household Size (Persons)



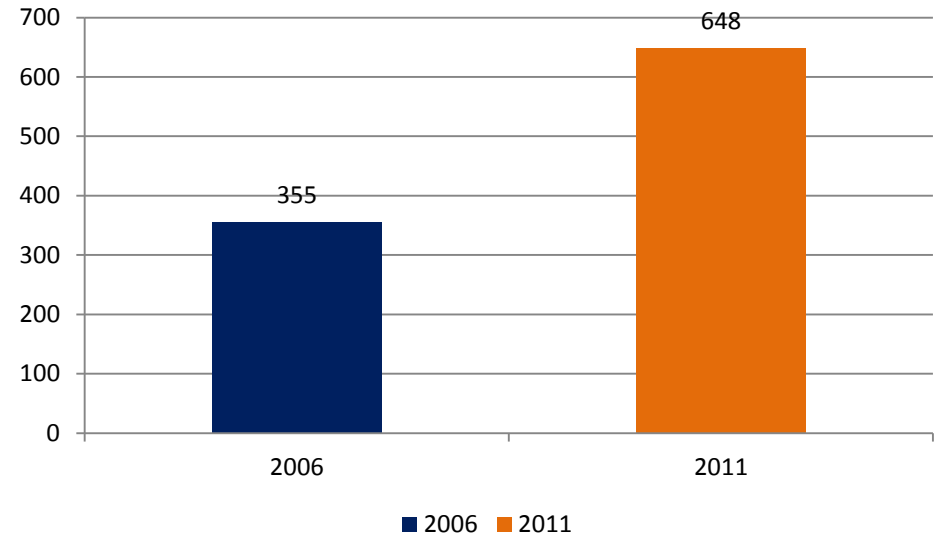
Socioeconomic Profile - O'Connell

O'Connell is a small village approximately 24km North East of Oberon and is located close to the proposed development site. A profile of O'Connell can provide information on individuals living in a similarly zoned neighbouring village and may give insights into the potential buyers/demand of the proposed redevelopment. However, it should be noted that only a limited profile can be developed for O'Connell as data is less available for lower order geographical regions (such as state suburbs).

O'Connell had a 2011 population of 648, which is significantly higher than the 2006 population of 355, suggesting that the O'Connell region is a popular living destination. Over this period, the median age has grown from 37 to 43.

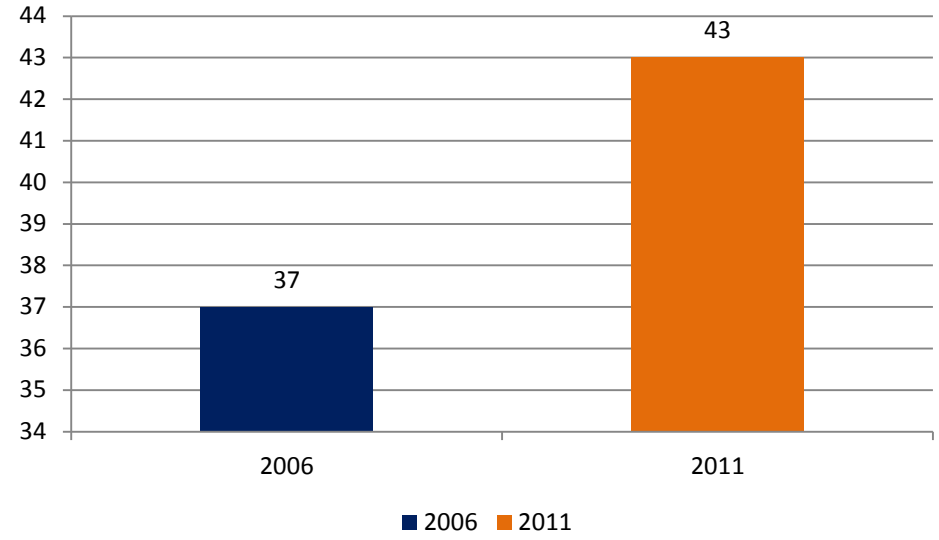
O'Connell has seen a substantial increase in the housing stock between the 2006 and 2011 Census, accompanied by increases in weekly rents and mortgage repayments, alongside a declining number of persons per household. As at 2011, O'Connell had a very low unemployment rate of 1.2 percent. In addition, O'Connell incomes are very high compared with the NSW state average, Rest of NSW, Bathurst and Oberon.

Population



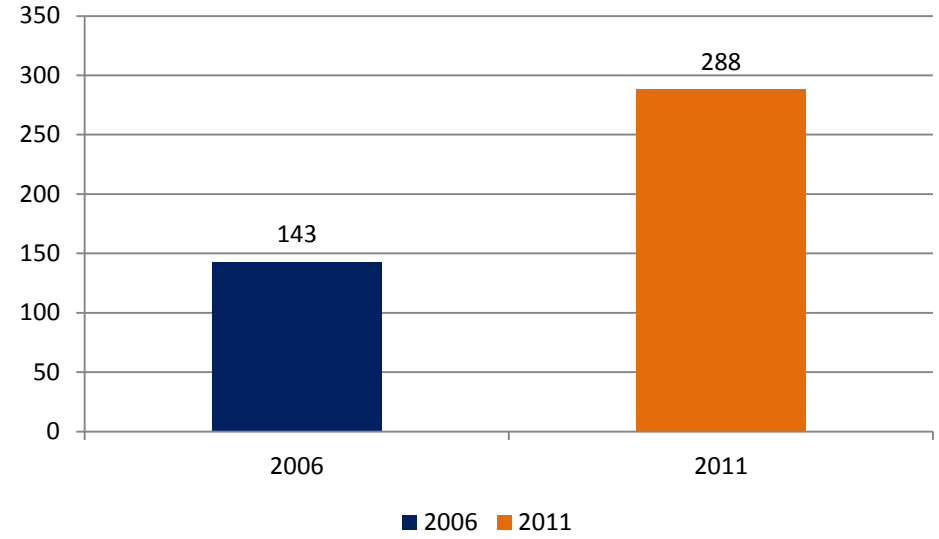
The O'Connell population grew by 82.5 percent between the 2006 and 2011 Census period.

Median Age



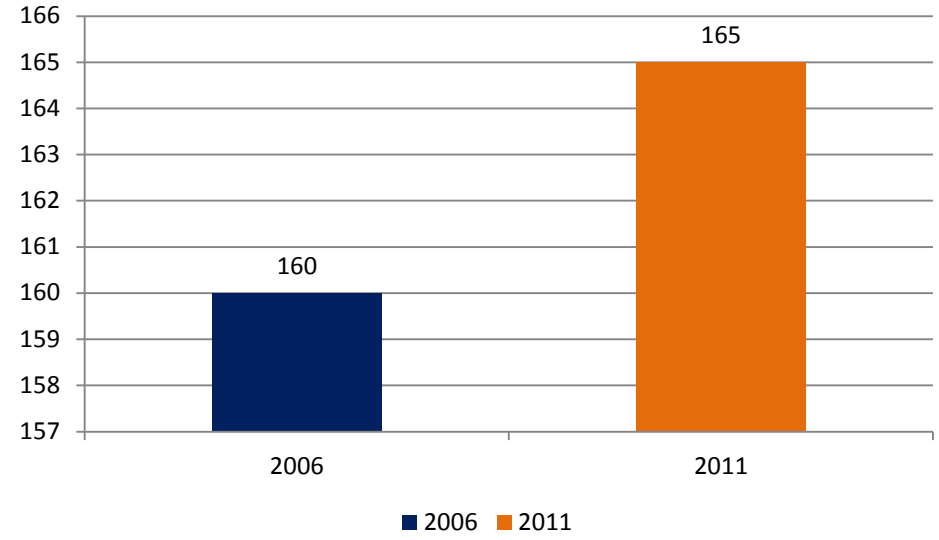
The median age of O'Connell residents increased by 16.2 percent.

Number of Dwellings



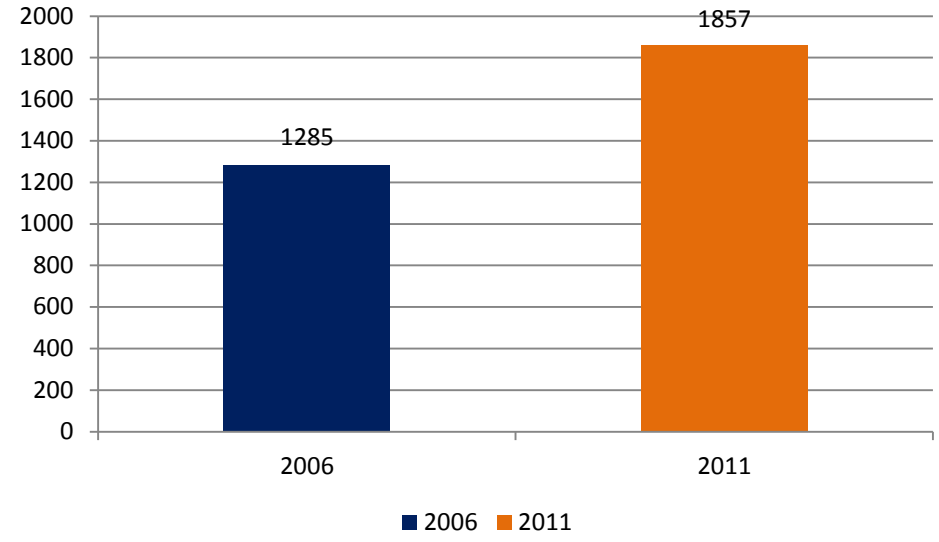
The number of dwellings in O'Connell increased by 101.4 percent over the period.

Median Weekly Rent



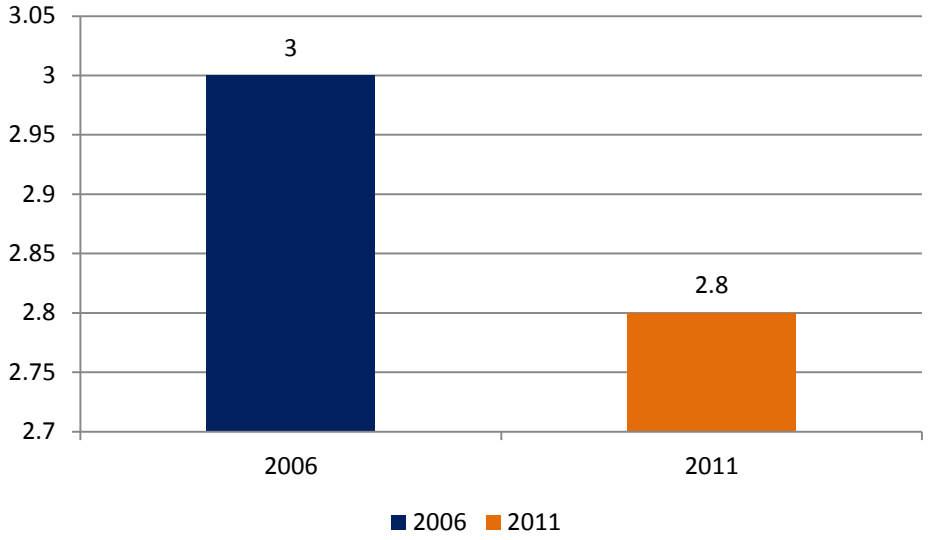
Median weekly rents increased by 3.1 percent.

Median Monthly Mortgage Repayments



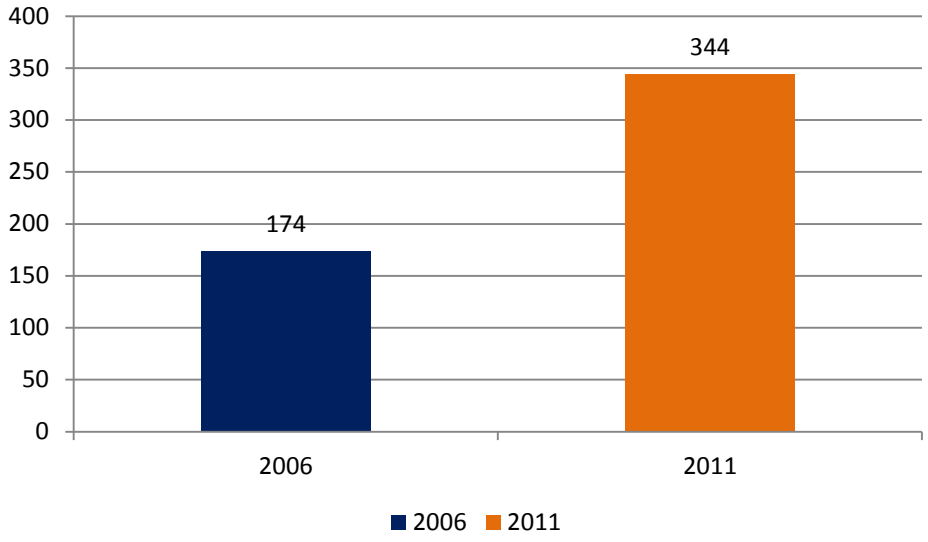
Median monthly mortgage repayments increased by 44.5 percent between 2006 and 2011.

Average Household Size (Persons)



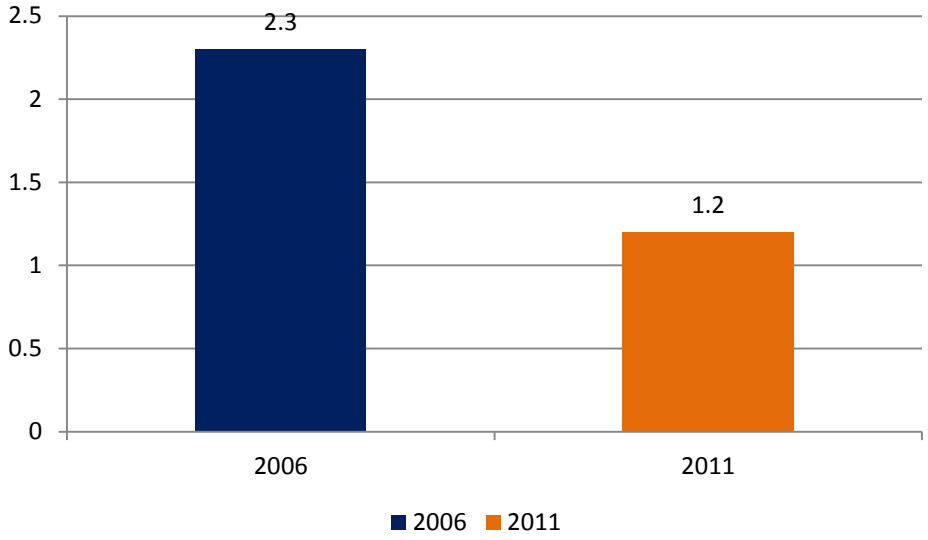
The average number of O'Connell residents per household declined from 3 to 2.8.

Labour Force



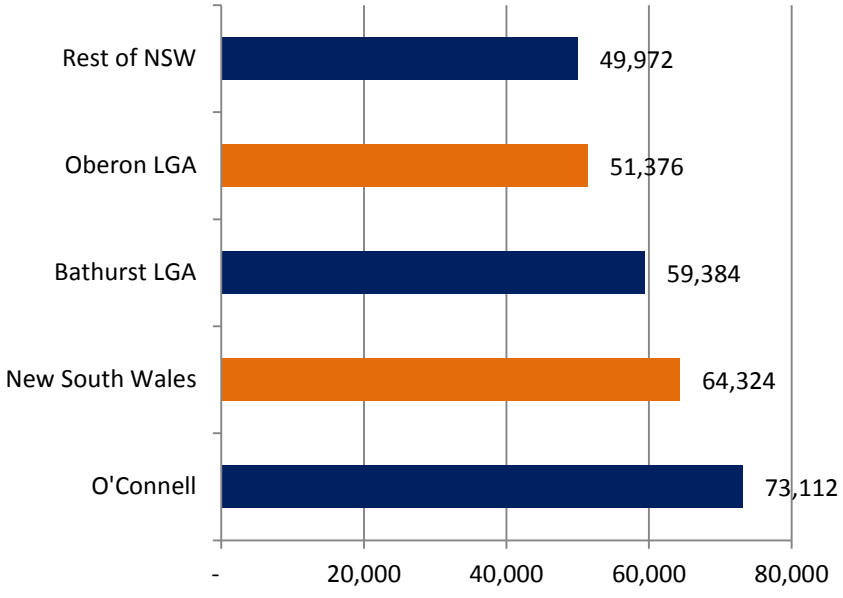
The O'Connell labour force grew by 97.7 percent between the 2006 and 2011 Census.

Unemployment Rate



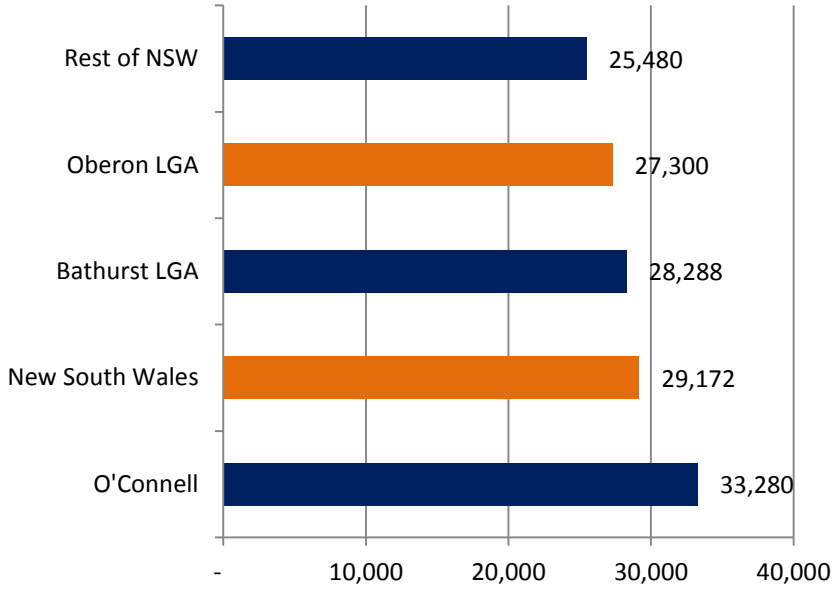
The unemployment rate declined by approximately 50 percent.

Median Annual Household Income 2011



Median annual household income in O'Connell was significantly higher than Oberon, Bathurst, New South Wales and the Rest of New South Wales.

Median Annual Personal Income



Median annual personal income in O'Connell was also significantly higher than Oberon, Bathurst, New South Wales and the Rest of New South Wales.

Residential Land, Data and Valuation

Realestate.com.au Market Report

The popular real estate website realestate.com.au provides summary reports on housing activity in a given region. A report on the Oberon region, based on all housing, provided the following highlights:

- Median price in Oberon - The median sales price for houses in Oberon, NSW in the last year was $285,000 based on 60 home sales. Compared to the same period five years ago, the median house sales price for houses increased 18.8% which equates to a compound annual growth rate of 3.5%.

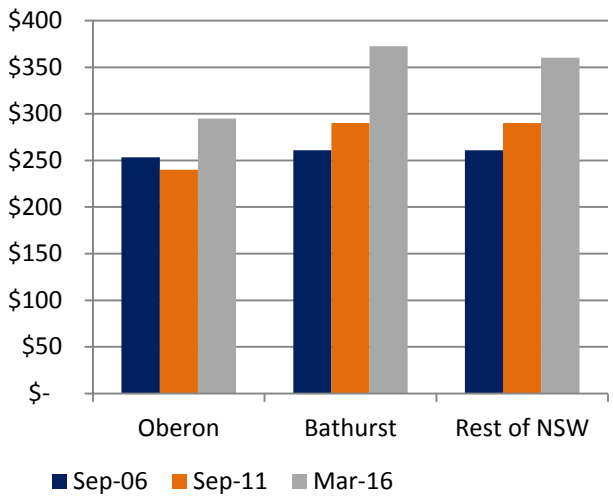
- Market (rental) demand in Oberon - realestate.com.au data suggests there is low demand from people looking to rent houses in Oberon, NSW.

- Rental yield in Oberon - The rental yield for houses in Oberon, NSW was 5.1% based on 80 property rentals and 60 property sales over the preceding 12 months.

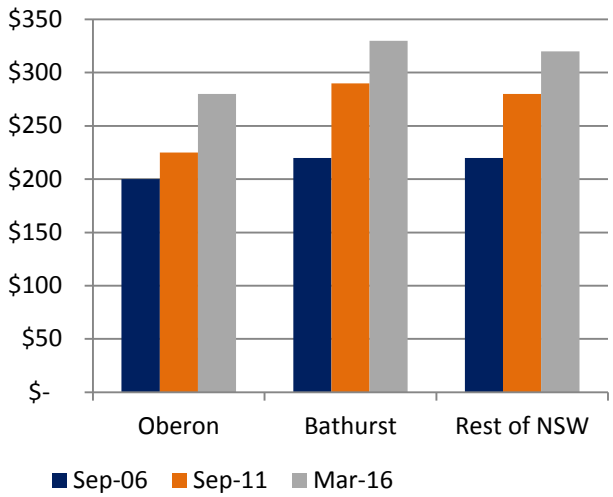
Sales and Rents

Average sales prices and weekly rents have been rising in Oberon and Bathurst and are broadly in line with the Rest of NSW.

All Dwellings Average Sales Price 2006 - 2016



Median Weekly Rent - 3 Bedroom House 2006 - 2016



Valuer General Valuation Report – Oberon 2015

The 2015 Valuer General Valuation Report for the Oberon LGA found that, for 2015, the property market remained relatively stable across most sectors with a slight increase in village values. Combined R1 General Residential and R5 Large Lot Residential lot valuations increased in value by 3.16 percent over the year and increased by 15.43 percent over the 2012 – 2015 period. Stronger growth has been recorded for R5 Large Lot Residential properties surrounding Oberon, which have seen an almost 10% increase in values over the 2014 – 2015 period.

NSW Government Valuer General Data

The Valuer General undertakes land valuations which form the basis for the calculation of property taxes in NSW. An analysis of land valuation trends can assist in understanding the demand for local land by examining the unimproved value of land over a period. As price is one of the key means of balancing supply and demand, a change in price may reflect a change in supply or demand. Land valuations are based on a range of factors including the land's most valuable use, land use issues, the land's characteristics and nearby developments and infrastructure.

It is worth making one observation on the Valuer General data that may speak to the demand for R5 large lot residential property in the O'Connell region. That is, the Oberon typical values data highlights that the valuation for the comparison block has grown by 20.9 percent from 2012 to 2015. This suggests strong demand for this kind of block in the region.

Median Land Value for – Oberon LGA

	2012	2013	2014	2015	Growth 2012 – 2015
R1 General Residential	$63,875	$64,000	$76,400	$76,400	19.6%
R5 Large Lot Residential	$166,000	$166,000	$166,000	$182,000	9.64%

Oberon Typical Values - Large Lot Residential

Street	Suburb	Zone Description	Land Use	Area	Area type	2012 Land Value	2015 Land Value	Percent Change
Burraga	Burraga	Large Lot Residential	Rural Residential	50.8	H	$181,000	$199,000	9.9%
Edgar Hanrahan	Burraga	Large Lot Residential	Rural Residential	8094	M	$12,100	$13,300	9.9%
Edgar Hanrahan	Burraga	Large Lot Residential	Rural Residential	2024	M	$7,290	$8,010	9.9%
Albion	Oberon	Large Lot Residential	Rural Residential	2.7	H	$206,000	$226,000	9.7%
Shakespeare	Oberon	Large Lot Residential	Rural Residential	6333	M	$127,000	$139,000	9.4%
Marks	Oberon	Large Lot Residential	Rural Residential	1.9	H	$162,000	$178,000	9.9%
Carlwood	O'Connell	Large Lot Residential	Rural Residential	10.2	H	$230,000	$278,000	20.9%

Median Land Value for – Bathurst LGA

	2012	2013	2014	2015	Growth 2012 – 2015
R1 General Residential	$112,000	$116,000	$128,000	$132,000	3.13%
R5 Large Lot Residential	$219,000	$220,000	$231,000	$244,000	5.63%

Typical values were unavailable for the Bathurst LGA.

NSW Department of Planning and Environment

The NSW Department of Planning and Environment undertakes population and household projections to help plan for service and infrastructure delivery for the community. These projections provide a framework for assessing future needs for residential and commercial land, housing and public utilities.

The 2016 NSW population and household projections show how the population is expected to change over the coming years. The projections show the expected impact of these changes on households and the implied demand for housing. These projections are not targets. Projections are based on assumptions that take into account trends for births, deaths and migration. Projections can change due to factors such as migration levels, new technology and social attitudes to different living arrangements.

Housing Projections

Oberon LGA	2016	2021	2026	2031	2036
Projected Implied Dwelling Requirement	2,800	2,900	2,900	2,900	2,850
Projected Households	2,150	2,250	2,250	2,250	2,200
Deficit	-650	-650	-650	-650	-650
Household Size (persons)	2.34	2.27	2.23	2.19	2.16

Bathurst LGA	2016	2021	2026	2031	2036
Projected Implied Dwelling Requirement	18,600	20,300	21,900	23,400	24,800
Projected Households	16,850	18,350	19,800	21,150	22,450
Deficit	-1,750	-1,950	-2,100	-2,250	-2,350
Household Size (persons)	2.43	2.40	2.37	2.34	2.32

NOTE

- Projected implied dwellings are the likely number of private dwellings needed to accommodate future population-driven demand.
- Household projections show the future number of households living in private dwellings. Private dwellings are self-contained accommodation such as houses, apartments, mobile homes or other 'substantial' structures. It does not include accommodation such as boarding houses, nursing homes or prisons.

By way of definition, a household is two or more people who share a dwelling (house, apartment, townhouse, caravan, etc) and share food and cooking facilities, and other essentials. Lone person households are where one person is responsible for their own food and other essentials. Household projections show the number of households that would form if demographic trends continue and if assumptions about living arrangements are realised over the projection period.

Household projections also include the implied dwelling demand for those households. This is the likely number of private dwellings needed to accommodate future population-driven demand.

Further information on the methodology of housing projections can be accessed at the NSW Department of Planning and Environment webpage.

Anecdotal Evidence

Research activities undertaken to assess the supply and demand included online searches and discussions with Oberon real estate professionals. These activities provide anecdotal evidence to reinforce the data provided above and may provide some insight into current or future trends that have yet to be evidenced by data releases.

A review of online media found a quote from Oberon Mayor John McMahon in November 2014, who advised that there is a growing demand for rural blocks ranging from two to 10 hectares in size since approval of Council's LEP in 2013, especially east and west of Oberon and in the O'Connell area.[7]

In addition to online anecdotal evidence, WRI contacted three real estate professionals either based or operating in the Oberon region. Agents were asked a number of questions regarding the supply of residential blocks in Oberon and O'Connell, the demand for these blocks and some specific questions about the supply and demand for large lot residential blocks in the O'Connell region, which is close to the proposed development site.

A key message coming from these discussions was that the Oberon R1 residential market is significantly different from the market for R5 blocks in the O'Connell region. There appears to be a good supply of R1 blocks in Oberon and the demand for these blocks is very dependent on jobs and economic growth in the Oberon economy.

In contrast, R5 blocks in the O'Connell region are in high demand, with limited supply. Interviews suggested that the current demand for these blocks mostly comes from young families wanting a lifestyle block, especially to provide a country lifestyle for their children. O'Connell is a popular area with a well-regarded school, a great community, a thriving hospitality scene and access to the Fish River. This creates significant lifestyle appeal.

It was also suggested that the O'Connell region is in high demand from professionals working in Bathurst, who wish to purchase such a lifestyle block within a 10-15 km radius of town. This allows for these professionals to have a country lifestyle, without having to drive too far or compromise their lifestyle to access jobs and services.

It was discussed that the supply of these blocks was very limited. Very few blocks of the 2 – 25 acre size had come on the market in recent years and all but one of these had sold, and that sales prices had climbed significantly over this period, suggesting strong competition and demand.

[7] Oberon Review, *New Lots to Fuel Growth*, 27 November 2014. Accessed 15 December 2016

Methodology

Identifying Supply

There are a limited number of resources to establish the supply of new residential land in the Oberon LGA. Research activities have discovered one principal source for this information, which is the Oberon Council planning determinations webpage. This source provides a monthly summary of planning approval determinations.

Identifying Demand

With regard to demand, WRI undertook a range of research activities to understand the potential current and future demand for residential land. Demand analysis activities include:

- A socio-economic profile of the Oberon and Bathurst Local Government Areas (LGAs) as well as a limited profile of O'Connell. It should be noted that only a limited profile can be provided for O'Connell as data is less available for lower order geographical regions (such as state suburbs).
- A review of available land sales and valuation reports to understand trends in sales and valuations.
- A review of NSW Department of Housing Sales and Rents data to establish median rents and sales trends on an LGA basis.
- A review of NSW Valuer General trends in land valuations.
- An analysis of NSW Department of Planning and Environment household projections to consider the future potential demand for dwellings in the Oberon and Bathurst LGAs.
- A review of anecdotal evidence that assists understanding the demand for dwellings in the Oberon and O'Connell region, including media references and discussions with Oberon real estate professionals.

Real Estate agents interviewed were:

- James Walton, Licensee, Rural Property Sales - First National Bowyer and Livermore, Oberon.
- Stewart Murphy, Rural Sales Specialist - Ray White Emma Mooney, Bathurst.
- Sandy Fairbrother, Sales Consultant - Bathurst Real Estate.

The socio-economic profile utilised the most recent regional data available from a range of national and state administered data sources. These sources include:

- Australian Bureau of Statistics (ABS) Census of Population and Housing 2006 and 2011.
- ABS Census 2006 and 2011 Quick Stats.
- ABS release No. 3218.0 - Regional Population Growth, Australia.
- Australian Government, Department of Employment, Small Area Labour Market (SALM) data.
- New South Wales Government, Family and Community Services, Housing Rent and Sales Reports.
- New South Wales Government, Department of Planning and Environment, New South Wales State and Local Government Area Population and Household Projections, and Implied Dwelling Requirements, 2016.

Note: some data points provide a comparison with the 'Rest of NSW'. This region is a standard ABS term referring to non-metropolitan NSW.

WESTERN RESEARCH INSTITUTE

WRI is a regional development research organisation located in Bathurst, New South Wales. WRI holds a wealth of knowledge on employment, business development and investment issues affecting regional Australia. It has worked with Commonwealth, State and Local Governments and industry groups on numerous investment and development programs in regional areas. WRI has strong credentials in business and commercial market consulting and applied economic modelling including input-output analysis, shift-share, agribusiness and regional socio-economic surveys and analysis.

Ms Wendy Mason – General Manager

Wendy joined the WRI team as General Manager from her former position as Head of the Commonwealth Bank Foundation. Wendy comes to the Western Research Institute Limited with extensive management and business development experience, excellent networks, and a substantial track record in stakeholder relations across the government, financial and not-for-profit sectors; and experience as a major end-user of research to support best practice outcomes.
Bringing with her formal qualifications in education and psychology from the University of Sydney, a Graduate Certificate in Human Resource Management and Graduate Certificate in Business (Marketing), Wendy also holds an Australian Institute of Company Director's Diploma of Business (Governance).

Mr Alistair Maclennan – Senior Research Consultant
BA Political Economy, First Class Honours (UNE)

Having served in a variety of parliamentary, public service and private sector roles, Alistair brings a wealth of research experience to WRI. Alistair has well developed skills in data analysis, economics and business, and has a wide understanding of government. In addition, Alistair also has experience in policy development in the energy sector, where he engaged with industry, government agencies and NGOs to inform policy. Alistair's experience in engaging with clients, stakeholders and the public assists WRI to fully understand its clients' needs and provide tailored research.

Ms Danielle Ranshaw – Senior Research Consultant
BEc&Fin NSW

Danielle's experience in project management in the information technology sector combined with qualifications in economics and finance provides a solid background for WRI projects. With skills in systems design and development, Danielle has been able to extend WRI's capability in developing robust and increasingly complex systems to support research fieldwork. Additionally, Danielle has extensive experience in business process analysis, performance planning and review, report writing and project planning.

Ms Wai Matthews – Research Consultant
BBus (Fin/Eco) CSU

With a background in Business Administration and Bookkeeping, Wai brings to WRI strong experience and knowledge in local business operations, management and finance. Wai has great interest in economic issues affecting regional areas which led to her attaining an internship with the NSW Department of Industry as an Economic Analyst. As an intern, Wai has gained a wealth of knowledge and experience in data analytics and reporting as well as a good understanding of government. Wai is currently undertaking Post Graduate study in Applied Statistics to further her skills.

Ms Dale Curran – Executive Officer
BA ANU

Dale is responsible for all administrative processes at WRI including executive support, finance, management of the Board of Directors and maintenance of policies. She has worked in a variety of roles at WRI, including Fieldwork Supervisor and Research Assistant, and has worked on several community and business surveys. Dale brings a high level of organisational skill to her role as Executive Officer.

Level 1, 126 William Street, Bathurst NSW 2795
Mail: PO Box 9374 Bathurst NSW 2795 Phone: 02 6333 4000
ABN 76 090 089 991
Email: team@wri.org.au

Appendix B

ECOLOGICAL CONSTRAINTS AND OPPORTUNITIES ANALYSIS

Belvoir Pastoral Company
Mr Cameron Hill
C/- Geolyse

The Environmental Factor
PO Box 268
Bathurst, NSW, 2795
info@envirofact.com.au

21 March 2017

Dear Mr Cameron,

Re: Ecological options and constraints analyses to inform planning proposal to rezone part of Belvoir estate, Lot 4 DP 1023024, south of Box Flat Road, O'Connell

As requested on behalf of Geolyse Pty Ltd, The Environmental Factor has been engaged to provide an ecological options and constraints analyses for Lot 4 DP 1023024, O'Connell Road, O'Connell (the site). The entire Lot is not being considered for re-zoning; the southern portion of the landholding extending south of Box Flat Road, O'Connell has been considered only.
These analyses will provide guidance on the proposed rezoning with the intention to sub-divide into 10 hectare (ha) lots.

This letter provides a brief outline of the findings of the analyses undertaken, namely:

- Summary
- Options and constraints
- Methodology
    - Desktop assessment
    - Site visit
- Results
    - Vegetation
    - Waterways
    - Wildlife corridors
    - Habitats available
    - Threatened species
- Recommendations

TEF trusts that the information provided herein is adequate to inform the assessment of the property for rezoning and subdivision. If you have any further queries, please do not hesitate to contact Emily Cotterill via email at emily@envirofact.com.au or via telephone on 0419432208.

Kind regards,

Emily Cotterill
Director

ECOLOGICAL CONSTRAINTS ASSESSMENT

SUMMARY

Currently Lot 4, DP 1023024 (>200 ha property) is zoned as Primary Agricultural Land (RU1) within the Oberon Local Environmental Plan (LEP). The site contains extensive areas which have minimal to no ecological constraints at risk of impact as a result of potential future subdivision to 10 ha lots. The surrounding properties to the east and south west support similar vegetation, land use and expected ecological values and have been successfully subdivided into Large Lot Residential (R5) 10 ha lots. The rezoning and subdivision of the southern portion of the property would not be inconsistent with the approach taken for adjacent similar properties.

OPTIONS AND CONSTRAINTS

- The site proposed for rezoning has large areas that are not important for supporting high biodiversity or important ecological values. These areas are marked as Low Constraint (Figure 1).
- Much of the site supports a scattering of remnant paddocks trees. These trees have been marked as Moderate Constraint (Figure 1), to reflect the additional assessment and consideration of the impacts which may arise from any future subdivision. Constraints associated with these trees include:
    - Many trees on site support hollows which are an important habitat resource for many native and threatened species.
    - These trees are Koala feed trees (listed under SEPP44) and support potential Koala habitat (>15% of preferred feed trees present on site). Note: as this is noted as 'potential' habitat, not 'core' habitat, a Koala Plan of Management is not currently recommended.
    - The remnant trees present on site are part of a highly-degraded form of White Box Yellow Box Blakely's Red Gum Woodland listed as an Endangered Ecological Community under the *Threatened Species Conservation Act 1995* (TSC Act). The community is not expected to meet the EPBC Act condition listing criteria.
- Two 3rd order waterways, Eight Mile Swamp Creek and Antony's Creek flow to the site before joining (to form a 4th order waterway) known as Swamp Creek, continuing to the Fish River some 660m downstream beyond the site boundary. Riparian corridors along waterways are measured based on the stream order of the waterway; accordingly, recommended riparian corridor buffers are shown on Figure 1. These riparian buffers have been marked as a Moderate Constraint for minor drainage lines or High Constraint for the >3rd order stream (Swamp Creek) present on site.
- Subdivision of lots along the 3rd and 4th order waterways will increase the number of water users with water access rights to the creeks, which in turn has the potential to increase pressure on the creek system. This portion of the property has been marked as Moderate to High Constraint reflecting this concern. To reduce this additional pressure, the following range of measures should be considered in the context of a development application for subdivision of this property:
    - Minimise the number of lots along the creek,

- Keep livestock at appropriate stocking rates for the carrying capacity of each allotment, and/or impose grazing restrictions,
- Avoid formalised creek crossings in the subdivision design,
- Maintain adequate riparian buffers in accordance with NSW DPI recommendations,
- Propose riparian rehabilitation, including erosion control, enforcing control of noxious weeds and weeds of national significance (WONS), installation of stock exclusion fencing, and revegetation using appropriate native species, and
- Installation of fish-passage friendly fencing and flood gates.

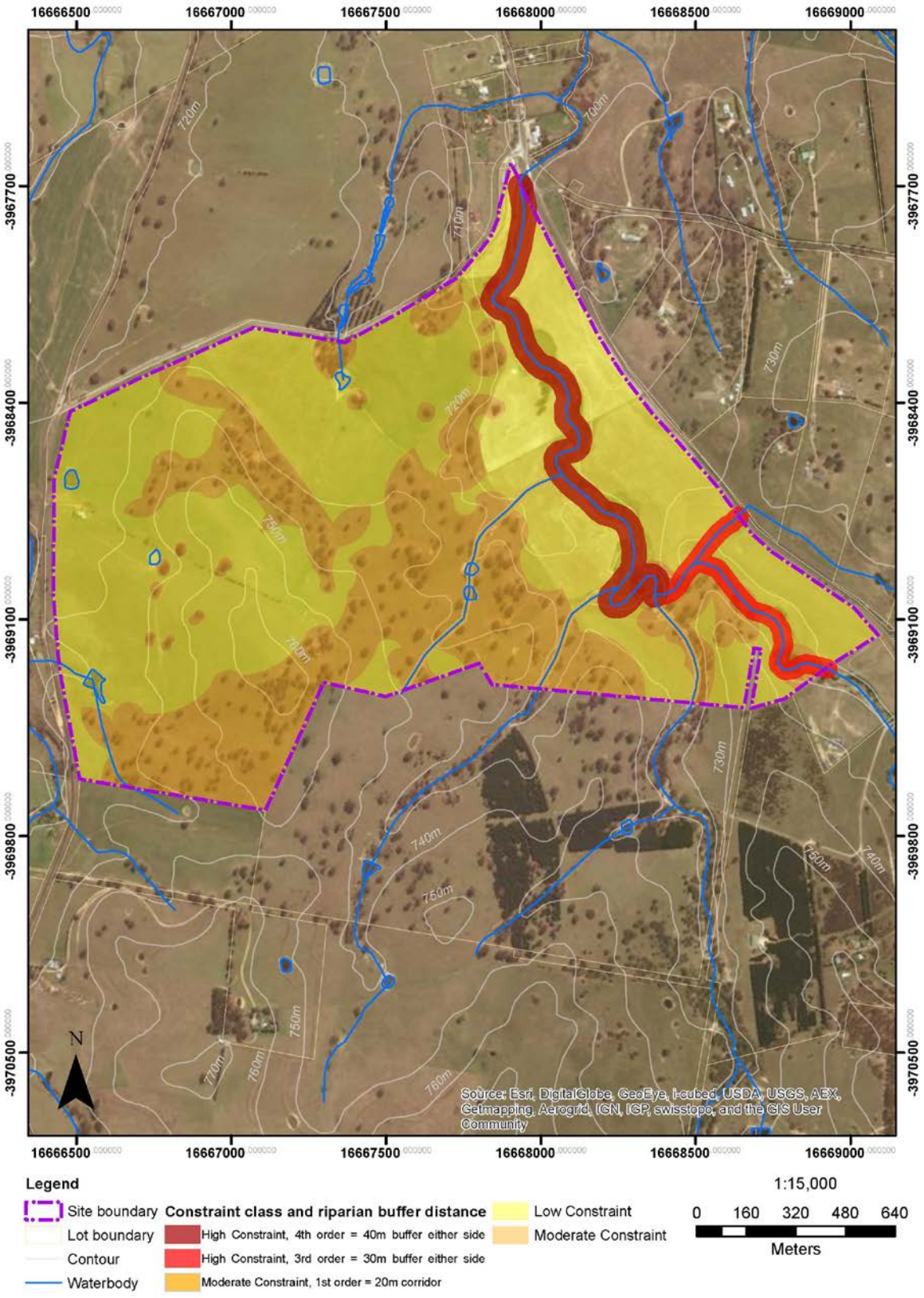


Figure 1 Options and constraints present on site

METHODOLOGY

- Desktop assessment

The following databases and resources were reviewed to inform this constraints assessment:

- OEH Wildlife Atlas database for records of threatened species and endangered ecological communities listed under the TSC Act that has been recorded within the locality (5km) of the site (OEH 2016, data accessed 30th January 2017).
- Fish communities and threatened species distributions of NSW (NSW DPI 2016).
- NSW DPI Key Fish Habitat Mapping.
- Department of the Environment and Energy (DotEE) Protected Matters Search Tool for Matters of National Environmental Significance (MNES) listed under the EPBC Act recorded or predicted to occur in the locality of the site (report generated 30th January 2017).
- Reconstructed and Extant Distribution of Native Vegetation in the Central West Catchment (DECC 2006).
- Noxious weed declarations for the Oberon LGA (DPI 2017).
- Oberon Local Environment Plan (LEP) 2013 mapping.
- Aerial photography interpretation.

- Site visit

On 23rd February 2017, TEF's Principal Consultant conducted a site visit to confirm site condition and constraints present. Prevailing weather conditions had been hot and dry with below average rainfall in the preceding months.

Results of database searches, aerial imagery and observations made during the brief site inspection were used to identify ecological features and condition present on site. Incidental recording and observations of habitat condition were collated however no targeted surveys have been completed to inform this options and constraints report.

Table 1 Monthly rainfall recorded prior to site inspection (Oberon Springbank) {station 063063}

	Average monthly rainfall (mm)	Average monthly rainfall prior to site visit
December 2016	64.1	54
January 2017	64.9	41.8
February 2017	49.9	10.6*

*Rain for February prior to site visit on 23rd February 2017

RESULTS

- Vegetation

Open paddocks and exotic grassland

The site contains exotic grassland, grazing land and cropped agricultural fields (Plate 1 and Plate 2). These areas would have historically supported native woodland prior to European settlement but have been severely degraded, cleared and modified, and feature largely exotic species such as Scotch Thistle *(Onopordum acanthium)*. These areas have very limited capacity for natural regeneration and are subject to ongoing grazing pressure.

Plate 1 exotic ground cover and weedy vegetation

Plate 2 Extensive areas of erosion and bare ground

Apple Box – Yellow Box woodland (BVT 44)

Apple Box – Yellow Box woodland is equivalent to the DEC (2006) BVT 44 'Apple Box – Yellow Box – Gum open-woodland on flats and low hills of the Central Tablelands'. Apple Box – Yellow Box woodland on the site is in poor condition resulting from historical agricultural land use.

This woodland community features a canopy of Apple Box (*Eucalyptus bridgesiana*) and Yellow Box (*E. melliodora*) with a sparse exotic shrub layer and predominantly grassy exotic understorey. The canopy includes widely spaced mature trees with little evidence of regeneration occurring (Plate 3). The understorey is dominated by exotic pasture and weeds (Oleander *Nerium oleander*, Crab Apple *Malus sp.*, African Olive *Olea europaea* ssp *africana*, Blackberry *Rubus fruticosus*). Bare ground makes up a substantial proportion of the ground cover. Overall the community is in poor condition.



Plate 3 Remnant hollow-bearing Yellow Box and Apple Box isolated paddock trees

The woodland vegetation community was assessed against the NSW Scientific Committee final determination for the Box Gum Woodland EEC listed under the TSC Act. This community constitutes Box Gum Woodland EEC as it:

- Occurs on relatively fertile soils on the tablelands at an altitude of 170m - 1200m (onsite elevation 700-760 m asl.), within the south west slopes bioregion;
- Contains at least one of the characteristic tree species (Yellow Box) as a dominant;
- Contains characteristic species from the final determination; and
- Would respond to assisted natural regeneration (natural soil and associated seed bank are still at least partially intact).

Although this community meets the TSC Act listing criteria it does not qualify as the EPBC Act listed CEEC "White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland" as it is highly degraded with low species richness of perennial natives in the understorey.

- Waterways

The months preceding the site visit received below average rainfall affecting the aquatic habitat observed on site (Table 1). Several drainage lines and farm dams occur across the site. Many of these waterbodies were dry being ephemeral drainage lines or holding shallow standing water in isolated pools. Overall the waterways were often severely eroded, weed infested and visibly turbid.

An increase in the number of water users with water access rights along the 3rd and 4th waterways on site will increase pressure on these already degraded waterways. Indirect impacts which may be exacerbated through increased water access include increased turbidity, weed encroachment and water pollution.

Plate 4 Overhanging riparian vegetation

Plate 5 Bank erosion

Plate 6 Emergent macrophyte *Typha domingensis*

Two 3rd order waterways, Eight Mile Swamp Creek and Antony's Creek flow to the site before joining to form a 4th order waterway, known as Swamp Creek, and continuing to Fish River some 660m downstream beyond the site boundary. Clause 6.3 of the Oberon LEP seeks to protect and maintain, among things, water quality, bed and bank stability, aquatic and riparian habitats and ecological process within riparian lands and watercourses. Clause 6.3 obligates that the consent authority must, before determining a DA for land within a 40m buffer either side from the top of bank of major watercourses, consider the likelihood of impact and the measures proposed to manage and minimise impact.

This is consistent with the NSW DPI Water guidelines, which recommend riparian buffer distances to protect and maintain water quality and habitat. Recommended buffer distances are shown on Figure 1 and tabled below (Table 2). Development which encroaches within these riparian buffer distances should be offset using the 'averaging rule' outlined by NSW DPI Water.

Table 2 Recommended riparian corridors based on stream order (NSW DPI)

Stream order	Vegetated Riparian Zone (each side of watercourse) (m)	Total Riparian Zone (m)
1st	10	20 + channel width
2nd	20	40 + channel width
3rd	30	60 + channel width
4th	40	80 + channel width

Eight Mile Swamp Creek, Antony's Creek and the 4th order waterways are mapped as supporting Key Fish Habitat (important habitat for aquatic fish and crustaceans). Aquatic habitat features present on site includes undercut banks, emergent vegetation, large woody debris, semi-permanent and permanent refuge pools (Plate 4, Plate 5 and Plate 6).

Works undertaken within waterways supporting Key Fish Habitat require a Permit from NSW DPI Fisheries. Key Fish Habitat mapping is based on stream order however should also consider the habitat present as well as the functionality of the waterway. The typical correlation between Functionality Type, Habitat Sensitivity Class and stream order are shown in Table 3 below.

Table 3 Key Fish Habitat Waterway Classifications and typical correlation to stream order and waterway functionality (NSW DPI 2013) (Appendix 1)

Stream order	Functionality Type	Habitat Sensitivity Classification
1st	Type 3 (Low Sensitivity)	Class 4 Unlikely Key Fish
2nd	Type 2 (Moderately Sensitive) or Type 3 (Low Sensitivity)	Class 3 Minimal Key Fish Habitat
3rd	Type 1 (Highly Sensitive) or Type 2 (Moderately Sensitive)	Class 2 Moderate Key Fish Habitat
4th	Type 1 Highly Sensitive	Class 1 Major Key Fish Habitat

- Wildlife Corridors

Investigation of aerial photography and field observations confirmed that there are no substantial areas of vegetation (>500m width) within the site to facilitate regional connectivity for wildlife. Major waterways (4th order or larger) however do provide regional connectivity and are considered important wildlife corridors. The Oberon LEP provides for the protection of riparian lands and watercourses requiring a 40m buffer either side from the top of bank of major watercourses to be protected (consistent with the NSW DPI Water guidelines). Similarly, minor waterways can also provide local connectivity and refuge for mobile wildlife.

- Habitats available

Three broad habitat types were recorded within the site:

- Open paddocks
- Heavily degraded woodland
- Dams and drainage lines

The suitability of these habitats for native fauna is discussed below, with particular emphasis on habitat resources of relevance to threatened fauna. The site has poor fauna habitat values with large areas cleared for agricultural purposes.

Open paddocks

Open paddocks contain few habitat resources of relevance to most native species. Exotic grasses and herbs would provide foraging resources for relatively mobile and opportunistic native fauna. Scattered canopy trees *Eucalyptus bridgesiana* and *Eucalyptus melliodora* provide some foraging resources for native woodland birds.

These areas generally provide minimal habitat for threatened fauna, albeit mobile fauna, particularly bird and bat species may forage over these areas.

Heavily degraded woodland

The native canopy vegetation is a mixture of predominantly Yellow Box and Apple Box, both of which are listed as secondary Koala (*Phascolarctos cinereus*) food trees under SEPP44 and preferred feed trees under the Central Tablelands Key Management Area. There have been two records of Koala within the surrounding area, however no evidence to suggest that the site supports breeding or a regular movement corridor. Based on the presence of the preferred foraging resources the site supports potential Koala habitat.

Myrtaceous trees provide foraging resources for a range of birds, including cockatoos, parrots and honeyeaters, and other arboreal mammals. Hollow-bearing and habitat (with exfoliating bark) trees are present as isolated or scattered paddock trees (<5% foliage cover). As canopy trees are sparse, leaf litter cover is marginal and the groundcover is disturbed containing a high incidence of weed species. Some large stands of fallen wood have been loosely stockpiled which may provide shelter for foxes and common reptiles.


Plate 7 tree hollows and woody debris provide sheltering habitat


Plate 8 Permanent water and mature trees provide foraging resources

Dams and drainage lines

There are a number of farm dams and drainage lines present on site. The emergent fringing vegetation varies depending on livestock disturbance. Given the dams are largely isolated, degraded and embedded in agricultural land, they are unlikely to be relied upon by any threatened frogs.

Several ephemeral waterways occur on site. Some of these channels are small, lightly vegetated and disturbed by grazing livestock and surrounding agricultural land. The aquatic habitat present supports undercut banks, some refuge pools, fringing and emergent vegetation. The waterways do not support preferred habitat for threatened frogs or fish. Common aquatic life may rely on these waterways as refuge and movement corridors.

- Threatened species and communities

Appendix 2 lists all listed threatened species recorded or predicted to occur within 5km of the site based on the database searches completed. These records were obtained via the OEH Bionet database, and the Protected Matters Search Tool (DotE).

Based on the results of the database searches and brief site inspection, the species and Endangered Ecological Community tabled on the following page (Table 4) were considered to have potential to occur on site and should be considered for future assessment.

Table 4 Threatened species with potential habitat on site

Common name	TSC Act	EPBC Act	Potential habitat present
Koala *Phascolarctos cinereus*	V	V	Potential Koala habitat
Diamond Firetail *Stagonopleura guttata*	V		Possible foraging and nesting habitat
Dusky Woodswallow *Artamus cyanopterus*	V		Possible foraging and nesting habitat
Regent Honeyeater *Anthochaera phrygia*	E	CE	Possible foraging habitat
Swift Parrot *Lathamus discolor*	E	CE	Possible foraging habitat
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	E		Present - canopy present. Highly degraded condition

RECOMMENDATIONS

The following approach and design considerations are recommended:

- Maintain works outside the recommended riparian buffer corridors for drainage lines /waterways. Where this is not achievable apply the NSW DPI riparian offset guidelines 'averaging rule' to maintain riparian buffers.
- Avoid and / or minimise works vehicles or vehicle access entering within the riparian buffer areas. Where this is unavoidable Controlled Activity Approval from NSW DPI Water, and Part 7 permit from NSW DPI Fisheries for Dredging and Reclamation, may be necessary.
- Limit the number of subdivision lots along the 3rd and 4th order waterways on site to minimise the increase in water access rights created.
- Investigate opportunities to minimise impacts to riparian areas through measures such as:
    - Minimising the number of lots along the creek,
    - Keeping livestock at appropriate stocking rates for the carrying capacity of each allotment and/or imposing grazing restrictions,
    - Avoiding formalised creek crossings in the design,
    - Maintaining adequate riparian buffers in accordance with NSW DPI recommendations,

    - Implementing riparian rehabilitation, including erosion control, enforcing control of noxious weeds and weeds of national significance (WONS), installation of stock exclusion fencing, and revegetation using appropriate native species, and
    - Installing fish-passage friendly fencing and flood gates.
- Consider subdivision design to promote the retention of paddock trees where possible to maintain wildlife connectivity, retain important habitat features (tree hollows and foraging resources) as well as allow for potential regeneration of the vegetation community/ies.
- If application for rezoning is successful, following finalisation of subdivision plans assessment of impacts should be appropriately considered in accordance with the EP&A Act, including Assessments of Significance prepared for the EEC present on site, potential Koala habitat and threatened woodland birds and microbats.

APPENDIX 1

The Policy and Guidelines for Fish Habitat Conservation and Management (2013) Key Fish Habitats are categorized according to 'sensitivity', with Type 1 containing Highly Sensitive habitat, Type 2 containing Moderately Sensitive habitats and Type 3 containing Minimally Sensitive habitats (Table 5).

Table 5 Key Fish Habitat Waterway Classifications (NSW DPI 2013)

Classification	Characteristics of Waterway
Class 1 Major Key Fish Habitat	Marine or estuarine waterway or permanently flowing or flooded freshwater waterway (e.g. river or major creek), habitat of a threatened or protected fish species or 'critical habitat'.
Class 2 Moderate Key Fish Habitat	Non-permanently flowing (intermittent) stream, creek or waterway (generally names) with clearly defined bed and banks with semi-permanent to permanent waters in pools or in connected wetlands areas. Freshwater aquatic vegetation is present. Type 1 and 2 habitats present.
Class 3 Minimal Key Fish Habitat	Named or unnamed waterway with intermittent flow and sporadic refuge, breeding or feeding areas for aquatic fauna (e.g. fish, yabbies). Semi-permanent pools form within the waterway or adjacent wetlands after a rain event. Otherwise, any minor waterway that interconnects with wetlands or other Class 1-3 fish habitats.
Class 4 Unlikely Key Fish Habitat	Waterway (generally unnamed) with intermittent flow following rain events only, little or no defined drainage channel, little or no flow or free standing water or pools post rain events (e.g. dry gullies or shallow floodplain depressions with no aquatic flora present).

APPENDIX 2

Table 6 Threatened species and communities potential to occur within the site

Species name	TSC Act listing	EPBC Act listing	Description of record	Potential to occur on site?
Amphibians				
Booroolong Frog *Litoria booroolongensis*	E	E	NSW Bionet, 2 records Fish River	Nil
Green and Golden Bell Frog *Litoria aurea*	E	V	Protected Matters Search Tool Potential habitat	Unlikely
Reptiles				
Pink-tailed Worm-lizard *Aprasia parapulchella*		V	Protected Matters Search Tool Potential habitat	Unlikely
Striped Legless Lizard *Delma impar*		V	Protected Matters Search Tool Potential habitat	Unlikely
Mammals				
Koala *Phascolarctos cinereus*	V	V	NSW Bionet 2 records. Site dominant canopy are Koala preferred feed trees for the Central Tablelands Key Management Area (Apple-topped box *Eucalyptus bridgesiana* and Yellow Box *E. melliodora*). The site supports potential Koala habitat.	Possible
Large-eared Pied Bat *Chalinolobus dwyeri*		V	Protected Matters Search Tool Potential habitat	Unlikely
Spotted-tailed Quoll *Dasyurus maculatus maculatus*	V	E	Protected Matters Search Tool Potential habitat	Unlikely
Greater Glider *Petauroides volans*		V	Protected Matters Search Tool Potential habitat	Unlikely
Grey-headed Flying Fox *Pteropus poliocephalus*		V	Protected Matters Search Tool Potential habitat	Unlikely

Species name	TSC Act listing	EPBC Act listing	Description of record	Potential to occur on site?
Birds				
Diamond Firetail *Stagonopleura guttata*	V		1 record	Possible
Speckled Warbler *Chthonicola sagittata*	V		Beyond 5km	Unlikely
Dusky Woodswallow *Artamus cyanopterus*	V		1 record Bionet	Possible
Regent Honeyeater *Anthochaera phrygia*	E	CE	Protected Matters Search Tool Potential habitat	Possible
Painted Honeyeater *Grantiella picta*	V	V	Protected Matters Search Tool Potential habitat	Unlikely
Curlew Sandpiper *Calidris ferruginea*		CE	Protected Matters Search Tool Potential habitat	Unlikely
Swift Parrot *Lathamus discolor*	E	CE	Protected Matters Search Tool Potential habitat	Possible
Malleefowl *Leipoa ocellata*		V	Protected Matters Search Tool Potential habitat	Unlikely
Eastern Curlew *Numenius madagascariensis*		CE	Protected Matters Search Tool Potential habitat	Unlikely
Australian Painted Snipe *Rostratula australis*		E	Protected Matters Search Tool Potential habitat	Unlikely
Fish				
Murray Cod *Maccullochella peelii*		V	Protected Matters Search Tool Potential habitat	Unlikely
Macquarie Perch *Macquaria australasica*		E	Protected Matters Search Tool Potential habitat	Unlikely
Invertebrates				
Purple Copper Butterfly *Paralucia spinifera*	E	V	Protected Matters Search Tool Potential habitat	Unlikely
Flora				
Black Gum *Eucalyptus aggregata*		V	Protected Matters Search Tool Potential habitat	Unlikely
Silver-leaved Gum *Eucalyptus*		V	Protected Matters Search Tool Potential habitat	Unlikely

Species name	TSC Act listing	EPBC Act listing	Description of record	Potential to occur on site?
pulverulenta				
Euphrasia arguta		CE	Protected Matters Search Tool Potential habitat	Unlikely
Basalt Peppercress *Lepidium hyssopifolium*		E	Protected Matters Search Tool Potential habitat	Unlikely
Hoary Sun-ray *Leucochrysum albicans var. tricolor*		E	Protected Matters Search Tool Potential habitat	Unlikely
Tarengo Leek Orchid *Prasophyllum petilum*		E	Protected Matters Search Tool Potential habitat	Unlikely
Prasophyllum sp Wybong		CE	Protected Matters Search Tool Potential habitat	Unlikely
Austral Toadflax *Thesium australe*	V	V	Protected Matters Search Tool Potential habitat	Unlikely
EEC				
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	E		Protected Matters Search Tool Potential habitat	Likely – canopy trees present
Natural Temperate Grassland of the South Eastern Highlands		CE	Protected Matters Search Tool Potential habitat	Nil

Appendix C

HERITAGE ASSESSMENT

DESKTOP ABORIGINAL AND HISTORIC DUE DILIGENCE ARCHAEOLOGICAL ASSESSMENT

Rezoning of 200ha of Lot 4 DP1023024 South of Box Flat Road, O'Connell NSW

Oberon LGA

March 2017

Report Prepared by

OzArk Environmental & Heritage Management Pty Ltd

Belvoir Hill Pastoral Company Pty Ltd

C/- Geolyse Ptd Ltd

Environmental and Heritage Management P/L

OzArk EHM
145 Wingewarra St
(PO Box 2069)
Dubbo NSW 2830

Phone: (02) 6882 0118
Fax: (02) 6882 0630
enquiry@ozarkehm.com.au
www.ozarkehm.com.au

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Client	Belvoir Hill Pastoral Company Pty Ltd C/- Geolyse		
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Prepared For		Prepared By	
Belvoir Hill Pastoral Company Pty Ltd C/ - David Walker Town Planner Geolyse 154 Peisley St Orange NSW 2800 P: 02 6393 9000 M: 0437 621 057 dwalker@geolyse.com		Dr Chris Lovell Senior Archaeologist OzArk Environmental & Heritage Management 145 Wingewarra Street (PO Box 2069) Dubbo NSW 2830 P: 02 6882 0118 F: 02 6882 6030 chris@ozarkehm.com.au	

Acknowledgement

OzArk acknowledge Traditional Owners of the area on which this assessment took place and pay respect to their beliefs, cultural heritage and continuing connection with the land. We also acknowledge and pay respect to the post-contact experiences of Aboriginal people with attachment to the area and to the elders, past and present, as the next generation of role models and vessels for memories, traditions, culture and hopes of local Aboriginal people.

EXECUTIVE SUMMARY

OzArk Environmental & Heritage Management was engaged by Belvoir Hill Pastoral Company to complete an Aboriginal and historic Due Diligence archaeological assessment for the proposed rezoning of a 200 hectare parcel of land located in Lot 4 DP1023024 south of Box Flat Road (the Study Area), O'Connell, in the Oberon Local Government Area, NSW. The Due Diligence archaeological assessment took into consideration the impacts of the proposed rezoning and subsequent subdivision and housing development in the Study Area which will disturb the ground surface. The assessment was undertaken at a desktop level to ascertain whether further assessment (e.g. visual inspection) is required.

No previously recorded Aboriginal sites are located in the Study Area; however, several sensitive archaeological landforms (SALs) were identified. SALs were identified on the basis of likely Aboriginal site locations determined from background research (ethno-historic, regional Aboriginal archaeological studies and nearby Aboriginal archaeological assessments), consideration of land use history and examination of satellite imagery and topographic maps of the Study Area. The desktop assessment concluded that visual inspection is required to adequately assess whether Aboriginal objects or intact Aboriginal archaeological deposits are likely to be harmed by the Proposal.

The suitability of the Study Area for the proposed rezoning, subdivision and housing development will depend upon whether any Aboriginal cultural heritage values are associated with it. The archaeological/scientific, historic and aesthetic value of any Aboriginal cultural heritage sites is likely to be low due to the nature of the SALs (i.e. the absence of major rivers and levels of ground surface disturbance) and the archaeological context of the region (similar landforms generally have low density, low archaeological value artefact scatters). However, this can only be confirmed by visual inspection of the Study Area; and the cultural or social value of Aboriginal sites can only be assessed by Aboriginal traditional owners or custodians. If any Aboriginal cultural heritage values are found to be associated with the Study Area, and if the Proposal proceeds, then management and mitigation of those values will need to occur.

The historic heritage desktop assessment found that no previously recorded historic heritage items are located in the Study Area. The Study Area is located close to O'Connell Settlement and is historically associated with Reverend James Hassall; however, it is considered unlikely that historic items or archaeological deposits of local or state significance exist in the Study Area.

To ensure that any Aboriginal cultural heritage values associated with the Study Area are protected, the following recommendations are made:

1. Visual inspection of the Study Area is recommended, with emphasis placed upon the SALs shown in **Figure 2-7**, any additional SALs identified in the field, and all mature trees of sufficient age to contain Aboriginal scarring or carving;

2. If Aboriginal objects or potential archaeological deposits (PADs) are identified during the visual inspection, and the Proposal cannot be amended to avoid harm, then further investigation and impact assessment of the Study Area must be undertaken including the preparation of an Aboriginal Cultural Heritage Assessment Report and consultation with Aboriginal traditional owners or custodians. If this assessment concludes that harm to Aboriginal objects will occur, then an Aboriginal Heritage Impact Permit application must be made; and
3. If visual inspection does not identify any Aboriginal objects or PADs in the Study Area likely to be harmed by the Proposal, then the Proposal can proceed without further archaeological assessment.

To ensure that the historic heritage values of the Study Area are protected, the following recommendations are made:

1. No historic heritage sites or items are recorded within the Study Area and no landforms are assessed at a desktop level as having historic archaeological potential, therefore no further historic archaeological assessment is required;
2. While not a formal requirement, if an Aboriginal Due Diligence visual inspection of the Study Area is undertaken, then visual inspection for historic heritage items should be undertaken concurrently to corroborate the findings of the desktop historic heritage assessment;
3. All land-disturbing activities must be confined to within the assessed Study Area and additional assessment may be required if the location of the Proposal is amended to impact areas outside of the Study Area;
4. Inductions for staff undertaking the proposed work must explain the legislative protection requirements for historic sites and items in NSW and the relevant fines for non-compliance; and
5. If objects are encountered that are suspected to be historic heritage items, the *Unanticipated Finds Protocol* (**Appendix 3**) must be followed.

CONTENTS

FIGURES

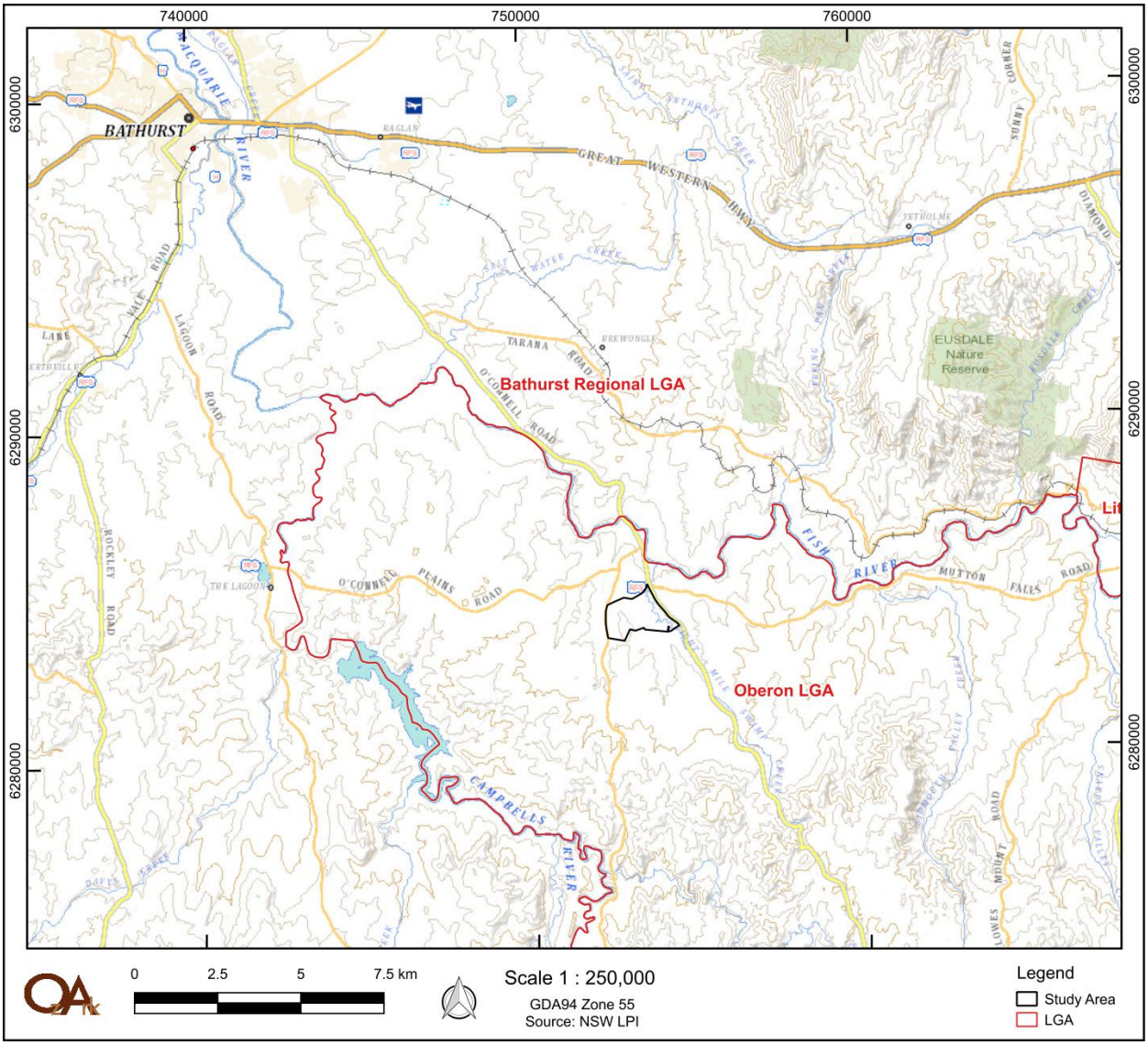
TABLES

1 INTRODUCTION

1.1 BRIEF DESCRIPTION OF THE PROPOSAL

OzArk Environmental & Heritage Management (OzArk) was engaged by Belvoir Hill Pastoral (the Client and Proponent) to complete an Aboriginal and historic Due Diligence archaeological assessment for the proposed rezoning of a 200 hectare parcel of land located in Lot 4 DP1023024 south of Box Flat Road in O'Connell NSW. This report examines proposed work associated with the rezoning and the subsequent subdivision of land and housing development (the Proposal). The Proposal is situated within the Oberon Local Government Area (LGA) (**Figure 1-1**).

Figure 1-1: Map showing the location of the Proposal (Study Area).



1.2 BACKGROUND

The Due Diligence assessment has been undertaken at a desktop level at the request of the Client in order to ascertain whether the land is suitable for the proposed purpose.

1.3 STUDY AREA

The Study Area includes 200 hectares incorporating Lot 4 DP1023024 south of Box Flat Road and is located about 20 kilometres southeast of Bathurst on O'Connell Road, O'Connell NSW (**Figure 1-2**).

Figure 1-2: Map showing satellite imagery of the Study Area.

1.4 ASSESSMENT APPROACH

The desktop investigation for the Study Area follows the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (Due Diligence; DECCW 2010).

2 DUE DILIGENCE ASSESSMENT

2.1 INTRODUCTION

The National Parks and Wildlife Regulation 2009 (NPW Regulation) made under the *National Parks and Wildlife Act 1974* advocates a Due Diligence process to determining likely impacts on Aboriginal objects. Carrying out Due Diligence provides a defence to the offence of harming Aboriginal objects and is an important step in satisfying Aboriginal heritage obligations in NSW.

2.2 DEFENCES UNDER THE NPW REGULATION 2009

2.2.1 Low Impact Activities

The first step before application of the Due Diligence process itself is to determine whether the proposed activity is a "low impact activity" for which there is a defence in the NPW Regulation. The exemptions are listed in Section 80B (1) of the NPW Regulation (DECCW 2010: 6).

The activities of Belvoir Hill Pastoral Company are not an exempt 'low impact activity' listed in the NPW Regulation. Therefore, the Due Diligence process must be applied.

2.2.2 Disturbed Lands

Relevant to this process is the assessed levels of previous land-use disturbance.

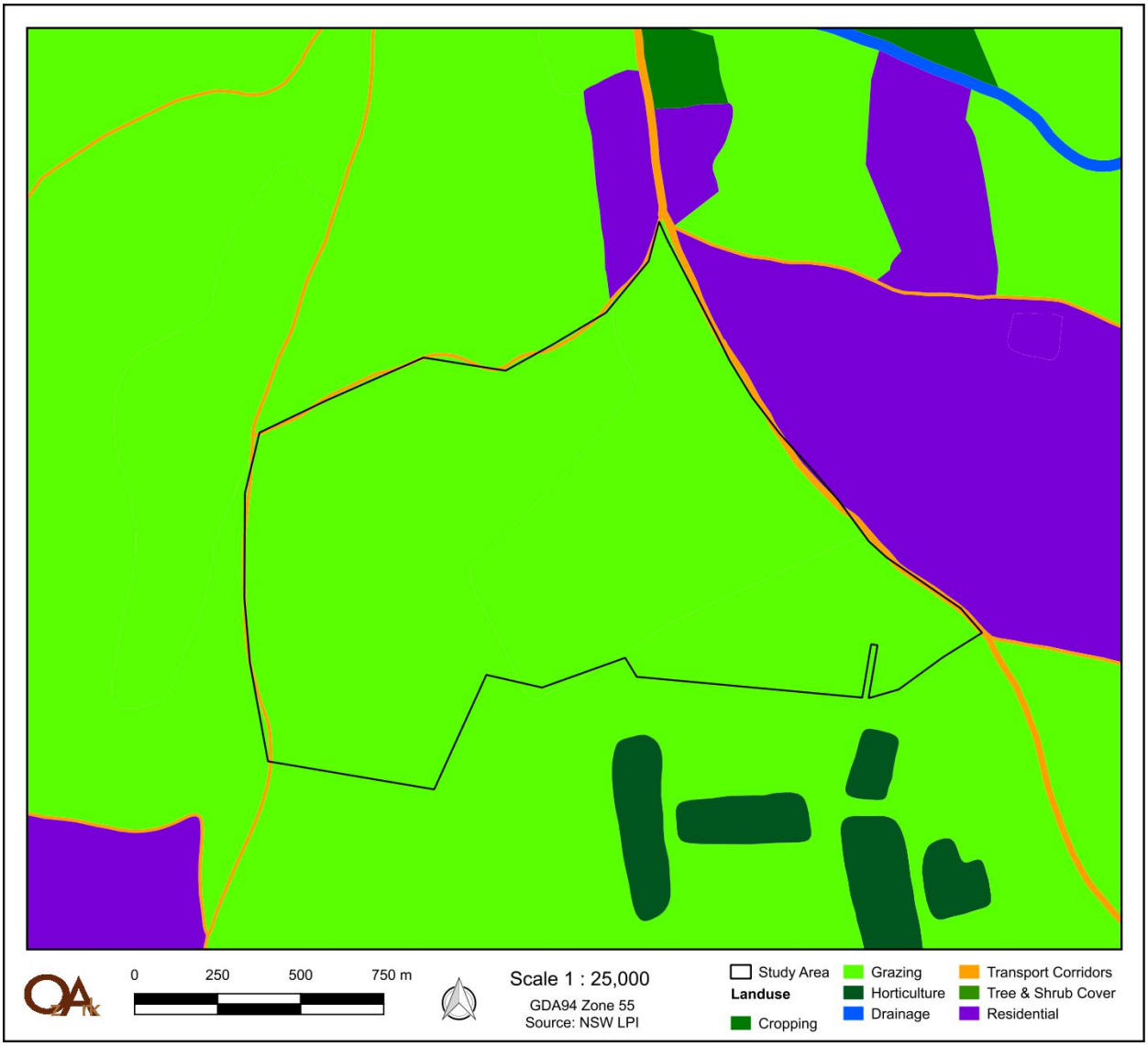
The NPW Regulation Section 80B (4) (DECCW 2010a: 18) define disturbed land as follows:

> *Land is disturbed if it has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable.*
>
> *Examples include ploughing, construction of rural infrastructure (such as dams and fences), construction of roads, trails and tracks (including fire trails and tracks and walking tracks), clearing vegetation, construction of buildings and the erection of other structures, construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure) and construction of earthworks.*

Figure 2-1 shows land use patterns in the vicinity of the Study Area. Examination of satellite imagery (**Figure 1-2**) confirms that the area has been cleared of vegetation primarily for grazing. It is evident from available aerial photography that parts of the Study Area may have been ploughed, particularly the floodplain landforms adjacent to Eight Mile Swamp Creek and Antony's Creek along the eastern boundary; however, visual inspection is required to confirm whether ploughing has occurred. Remnant trees and/or regrowth exist throughout the Study Area, particularly in the central south area and along Eight Mile Swamp Creek and Antony's Creek. A shearing shed, stock yards and driveway

have been constructed near the western boundary on Beaconsfield Road. Vehicle tracks exist in parts of the property and paddock fences have been constructed. At least six earthen dams and associated drainage channels have been constructed in the Study Area along the western boundary and in the central areas. As such, parts of the Study Area do fall under the NPW Regulation definition of 'disturbed land', including the construction footprints of the shearing shed, driveway, stock yards, earthen dams, drainage channels and any areas that have been ploughed. The remainder of the Study Area cannot be considered 'disturbed land' and therefore the Due Diligence process must be applied.

Figure 2-1: Map showing land use in the vicinity of the Study Area.



2.3 APPLICATION OF THE DUE DILIGENCE CODE OF PRACTICE TO THE PROPOSAL

To follow the generic Due Diligence process, a series of steps in a question/answer flowchart format (DECCW 2010: 10) are applied to the proposed impacts and the Study Area, and the responses documented.

2.3.1 Step 1

Will the activity disturb the ground surface or any culturally modified trees?

Yes. The Proposal involves the rezoning of part of Lot 4 DP1023024 in preparation for a future subdivision and housing development (**Figure 2-2**). The rezoning of land is a local government administrative procedure that does not involve ground surface disturbance and will not affect any culturally modified trees. However, construction of housing would occur after the subdivision is complete and this development will disturb the ground surface and could affect culturally modified trees, if present. It is noted that the conceptual lot layout plan includes the placement of building envelopes which are located to minimise disturbance of existing trees. This assessment takes into consideration the impacts of the subsequent subdivision and housing development.

Figure 2-2: Map showing the proposed lot layout for the proposed subdivision within the Study Area.

2.3.2 Step 2 a)

Are there any relevant confirmed site records or other associated landscape feature information on AHIMS?

Yes. A search of the Office of Environment and Heritage (OEH) administered Aboriginal Heritage Information Management System (AHIMS) database was conducted on 17 February 2017. The search encompassed a thirty kilometre by thirty kilometre area centred on the Study Area. The AHIMS search returned 59 Aboriginal sites within the search area (**Appendix 1**). All sites are listed as being valid. One site was restricted with no locational information or site details provided. However, this site was confirmed as not being located within the Study Area by a search of Lot 4 DP1023024 on 15 September 2016 (**Appendix 1**). The AHIMS search results are summarised in **Table 2-1** and site locations and types are plotted in **Figure 2-3** in relation to the Study Area and watercourses. None of the sites revealed via the search are located within the Study Area.

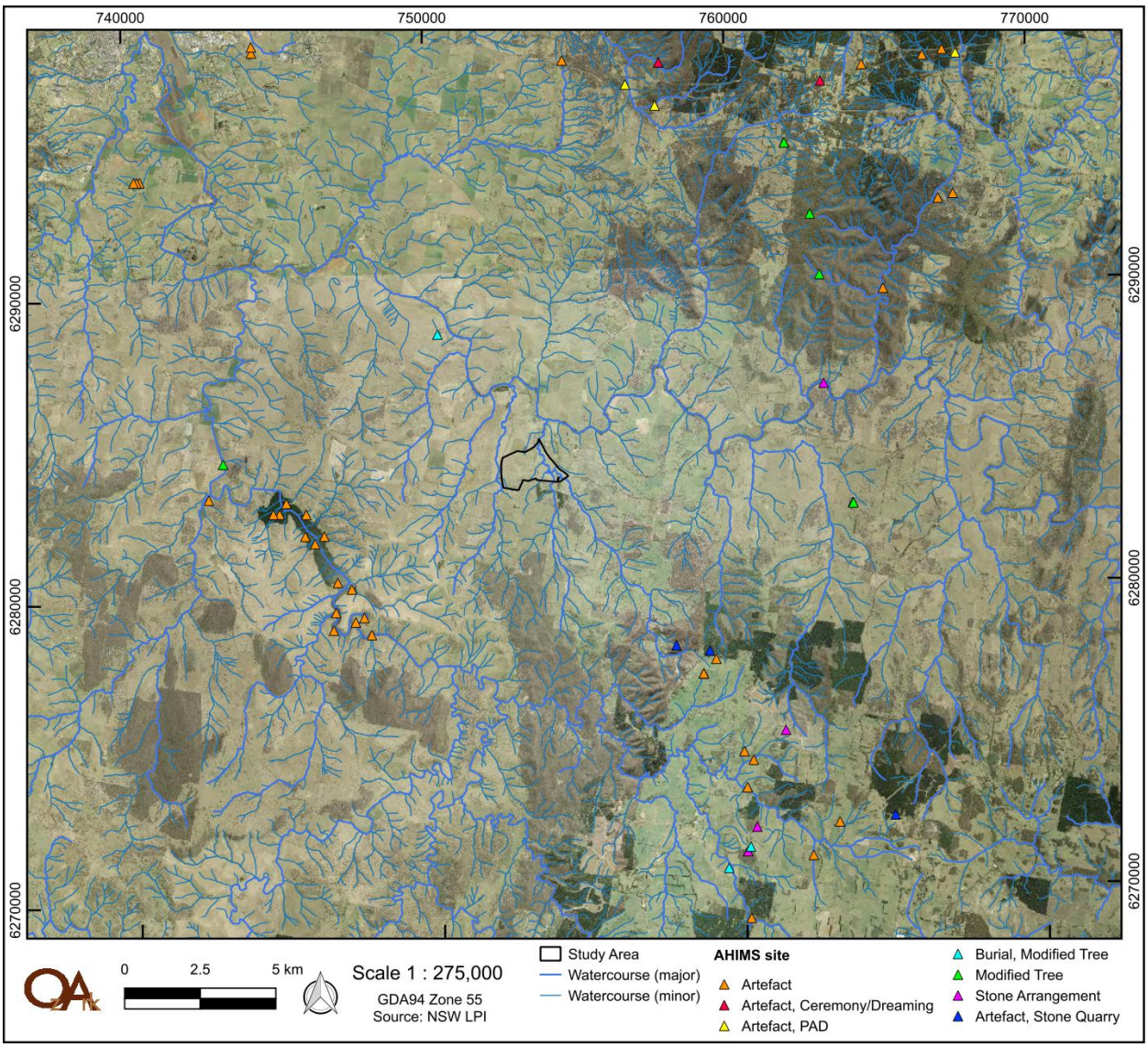
Table 2-1: AHIMS site types and frequencies within the database search area (unrestricted sites).

Site Type	Number	% Frequency
Artefact	36	62
Modified tree (carved or scarred)	5	9
Burial, modified tree	4	7
Stone arrangement	4	7
Stone quarry, artefact	4	7
Artefact, PAD	3	5
Artefact, Aboriginal ceremony and Dreaming	2	3
TOTAL	**58**	**100**

Artefact scatters and isolated artefacts comprise more than three quarters of the AHIMS sites. Three artefact sites are associated with potential archaeological deposits (PADs), four with stone quarries and two with Aboriginal ceremony and Dreaming sites. Most of the artefact sites are located within proximity to a watercourse, particularly major named rivers and creeks including: Cambell's River, Fish River, Davy's Creek, Middle Creek, Wiseman's Creek, Kitt's Creek, Eight Mile Swamp Creek, Rainville Creek, Brook's Gully, Diamond Swamp Creek, Cave Creek and Saint Anthony's Creek. All PADs are located adjacent to named creeks and appear to be situated on flat or gently sloping landforms. One Aboriginal ceremony and Dreaming site is located close to Cave Creek on an unnamed watercourse and the other on the crest of a low hill. Three stone arrangement sites are located on the moderate mid slopes of hills and one is located on the southern bank of the Fish River. Stone quarries tend to be located on moderate mid slopes, probably where suitable outcropping stone exists; and burials are likewise located on moderate mid slopes, probably where sediment suitable for interment exists. Culturally modified trees comprise almost ten per cent of AHIMS sites. Most are located within several hundred metres of

watercourses, particularly near named rivers and creek including Campbell's River, Kitt's Creek, Charlie's Gully, Davy's Creek, Raglan Creek, Eusdale Creek and a number of unnamed watercourses; although several culturally modified trees are more distant from water.

Figure 2-3: Map showing the location of previously recorded AHIMS sites in relation to the Study Area and watercourses.



As such, artefact scatters could exist in the Study Area, particularly within a few hundred metres of Eight Mile Swamp Creek, Anthony's Creek, Alick's Creek and associated unnamed tributaries. PADs are likewise possible close to water, particularly on flat to gently sloping landforms elevated above the floodplains in the eastern, north-eastern and western portions of the Study Area. Aboriginal ceremony and Dreaming sites could exist anywhere in the Study Area. Stone arrangement sites are also possible and could exist anywhere in the Study Area. Stone quarries are possible where suitable outcropping stone exists; and burials could occur away from watercourses where sediment suitable for interment exists, and are likely to be associated with culturally modified trees. Culturally modified trees are possible in the Study Area, particularly

within a few hundred metres of Eight Mile Swamp Creek, Anthony's Creek, Alick's Creek and associated unnamed tributaries; but could occur anywhere in the Study Area with remnant mature trees of sufficient age to contain Aboriginal scarring or carving.

2.3.3 Step 2 b)

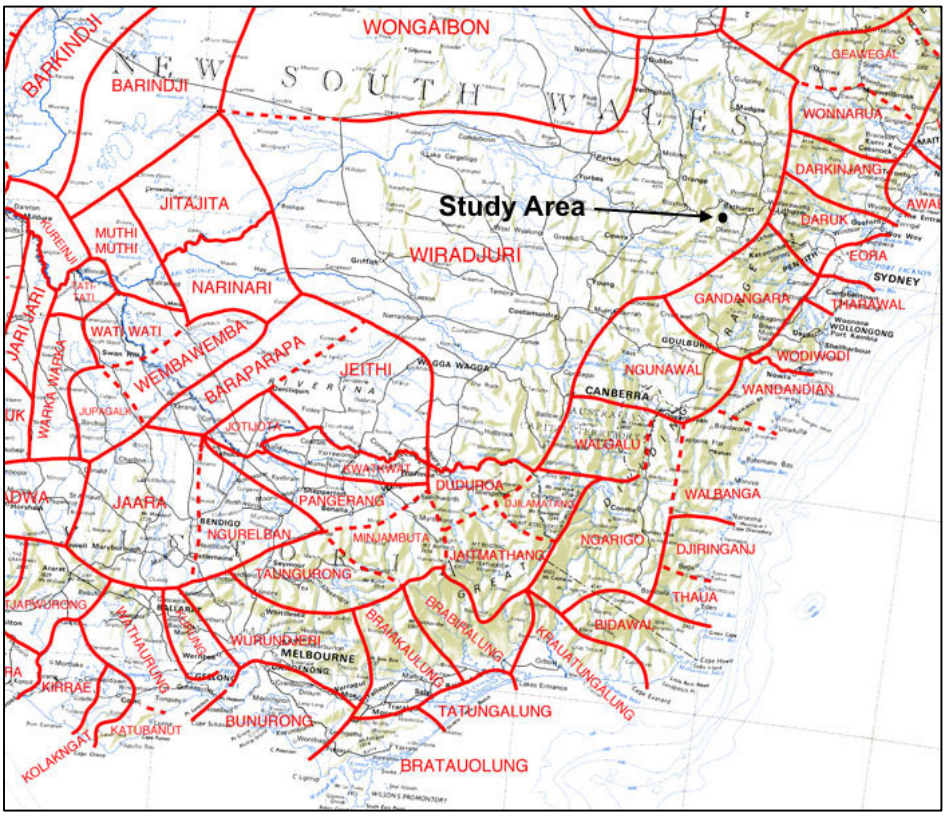
Are there any other sources of information of which a person is already aware?

The Bathurst region has been inhabited by Aboriginal people for over 40,000 years. According to Tindale's (1974) and Horton's (1994) maps of tribal or ethno-linguistic boundaries, the Wiradjuri occupied the northern parts of the South Eastern Highlands bioregion, including the Bathurst region, with the Dharug (alternatively Daruk) and Gundungurra (alternatively Gandangara) occupying the peripheral eastern and south-eastern areas of the Bathurst region.

The traditional custodians of the Study Area are the Wiradjuri people of the three rivers: the Wambool (Macquarie), Calare (Lachlan) and the Murrumbidgee. The Bathurst Wiradjuri are the most easterly group of the Wiradjuri nation.

As such, the Study Area falls within the Wiradjuri ethno-linguistic group. It is acknowledged that use of the term 'tribe' and the delineation of 'tribal boundaries' on maps is problematic but that distinctive ethno-linguistic groups are known to exist.

Figure 2-4: A portion of Tindale's (1974) map showing the location of the Wiradjuri ethno-linguistic group in relation to the Study Area.



Early references to Aboriginal people in the Bathurst region are provided by John Oxley (1820), who passed by Limestone Creek, south of Mt Canobolas, on 12 April 1817, describing the area as “a beautiful picturesque country of low hills and fine valleys well watered” (Whitehead 2003: 351). Further southwest, at the Lachlan River, Oxley met Aboriginal people carrying stone hatchets and possum skin cloaks. Oxley then returned to Bathurst along the Bell and Macquarie Rivers north of Orange in late August, noting abundant natural resources in areas adjacent to the Macquarie River, including: emus, ducks, swans, fish and freshwater muscles. Oxley notes that the country had an abundance of running water, and that on every hill was a spring (Rawson 1997: 8).

Several early first-hand local accounts of Aboriginal people are available, providing insights into aspects of daily life. These accounts must be understood in terms of the language and ethos of the era in which they were written. For instance, Jane Piper, daughter of Captain Piper, owner of ‘Alloway’ and ‘Westbourne’ properties at Bathurst, wrote in her diary (cited in McBurney 1995):

> In the 1830’s, there was a large camp of Aborigines near “Westbourne”. Their shelters were made of bark under which an Aboriginal man, his mate and their piccaninnies slept at night. If they owned any dogs these would sleep with them in their ‘gunyah’ to help keep them warm. The men provided food, consisting of kangaroo, opossums, lizards, snakes and other delicacies. The women cooked them by throwing them on to hot coals, skinned but not disembowelled. When they were cooked, they were laid on a piece of bark and the man sat down to eat, his woman seated at his back. He tore the food to pieces with his fingers, and threw the bones over his shoulder to his lubra, who then gnawed them and passed them on to the dogs.

Piper describes a confrontation between local and non-local Aboriginal groups, which she understand to be due to the abduction of a woman (cited in McBurney 1995):

> They used spears, nulla nullas, boomerangs and womerahs. A European sympathiser persuaded one of the local tribe to allow him make the warrior of the home (local?) tribe into a devil. This he did by fastening two bullocks’ tails to a thick cord, made from grass, tying them around the man’s waist. His hair was plastered down with pipeclay, and he had red circles around his eyes and red streaks around his body. The Bathurst Tribe won, but the victory cost six lives. It is not known what happened to the woman, perhaps she escaped!
>
> The fallen heroes were buried with much ceremony, the bodies in a sitting position with their heads bowed on their knees. The war weapons of the dead were placed inside the opossum skin rug in which each body was buried. During the burial the women cried and wailed, the dead man’s woman cut her head and body severely causing streams of blood to flow freely. The men and women joined in a sort of chant to tell of the deceased’s virtues. When the women died they were buried anywhere.

Piper also recounts her understanding of local Aboriginal ceremonial practices (cited in McBurney 1995):

> The mystic rites of the Aborigine were frequently carried out in secrecy, but when a young man was initiated he had his front tooth knocked out, and was then considered to be eligible for matrimony.

Ethnohistoric sources also indicate that Wiradjuri people travelled to the alpine regions of the South Eastern Highlands and Australian Alps for annual summer ceremonial gatherings and feasts involving the consumption of bogong moths (Flood 1980).

Prior to 1979, no systematic regional archaeological studies had been undertaken in the Bathurst area, although some interested locals or amateurs had recorded some Aboriginal sites. In the 1960s Percy Gresser (1965), a Bathurst shearer and amateur historian, described how the hilly land to the north of Bathurst contained numerous camp sites located on low ridges adjacent to creeks and springs. Gresser notes that, although most sites are located adjacent to creeks, occasionally they are located elsewhere, including elevated ridge tops.

Pearson (1981) analysed the patterns of Aboriginal and early European settlement within the Upper Macquarie Region, including some excavation. Three shelters were excavated, yielding occupation dates to around 7,000 year before present. Pearson argued that archaeological sites could be divided into two main categories: occupation sites and non-occupation sites (which included grinding grooves, scarred or carved trees, ceremonial and burial sites, etc.). Pearson's analysis of site location yielded a site prediction model with occupation sites occurring in areas with:

- Access to water – site size decreased with distance from water;
- Good drainage and views over watercourses or river flats;
- Level ground;
- Adequate fuel; and
- Appropriate localised weather patterns for summer or winter occupation.

As such, occupation sites were most frequently found on low ridge tops, creek banks, gently undulating hills and river flats, usually in open woodland vegetation (Pearson 1981: 101). The location of non-occupation sites, meanwhile, depended on several factors relating to site function. For instance:

- Grinding grooves only occur where there is appropriate outcropping sandstone, but as close to occupation sites as possible;
- Scarred trees are variably located with no obvious patterning, other than proximity to watercourses, where camps are more frequently located;
- Burial grounds are generally in soft soils, as close to occupation sites as geological conditions permit; and

- Ceremonial sites, such as bora rings and stone arrangements, are located away from occupation sites.

Koettig (1985: 49-50) considers Pearson's findings preliminary, mainly due to the unsystematic nature of the recording of most sites used in the analysis. In her view, this would have skewed site types and locations, particularly as sample sizes are too small to yield significant results.

Bell (1979) undertook an extensive field survey of Aboriginal carved trees in NSW, including the Bathurst region in the vicinity of the Study Area. A total of 205 sites were investigated, 53 of which were found to contain extant carved trees, 41 no longer contained carved trees, 111 were unable to be located and 85 contained dead trees (57 of which had been removed from the site). In total, 120 carved trees were located and recorded. Bell found that fewer carved trees were preserved east of the Great Dividing Range due to: the greater intensity of European settlement and vegetation clearing; generally wetter more humid conditions leading to poorer preservation; and the tendency for North Coast carvings to be cut into the bark only, and were therefore less likely to be preserved, whereas inland carvings tended to be cut into the sapwood or heartwood. The findings suggested that: carved trees are concentrated along the major rivers of the Central West; and carved trees are confined to the eastern two-thirds of NSW.

Pickering (1980) surveyed a proposed electricity easement between Bathurst, Ragland and Mount Panorama about 20 kilometres northwest of the Study Area. Seven sites were recorded, including: several isolated finds (including a small quartzite flake and a large bifacially flaked pebble), a lithic scatter and a possible scarred tree. In addition, Pickering attempted to relocate five previously recorded stone arrangements recorded by Gresser, but found that all of them had been destroyed by agricultural activities (e.g. ploughing) or campers in the vicinity of the Mount Panorama motor racing circuit.

OzArk (2013) conducted an assessment at Trunkey Creek, about 40 kilometres southwest of the Study Area. A total of 22 sites were recorded and two previously recorded sites located. Twenty of the 24 sites were located on elevated terraces or knoll/spur crests. Most sites were artefact scatters and isolated finds, although scarred trees were also recorded. Unmodified flakes and debitage dominated artefact assemblages, with some cores and blades and one axe recorded. Stone materials were diverse and included: quartz, mudstone, chert, a fine-grained unidentified material, silcrete, rhyolite and basalt.

Williams and Barber (1994) undertook a survey along the foreshores of the Ben Chifley Dam, located about 6.5 kilometres west southwest of the Study Area, on Campbell's River. Eight areas were targeted for investigation on the basis of landform sensitivity in accordance with their predictive model. Five artefact scatters and one PAD were identified during the survey. Artefacts included flakes, flaked pieces, cores, hammerstones and an anvil/hammerstone. Raw material types included quartz, volcanics, chert, historic bottle glass and silcrete. Landforms are described

here as they would have appeared prior to inundation of the lake with the construction of the dam. Site locations included: the crest of a low hill (Snake Island) overlooking Campbells' River at the confluence of two drainage lines; the slope of a low hill (Snake Island) overlooking Campbell's River and the gentle slopes of spurs overlooking Campbell's River. The PAD is located on a flat well drained spur above Campbell's River.

Lance and Truscott (1987) undertook an archaeological survey along a proposed natural gas pipeline route between Bathurst and Oberon, passing within a kilometre east of the Study Area. Six sites were recorded during the survey, including five artefact scatters and one isolated find. Four previously recoded sites were assessed including two quarries (one a volcanic outcrop on hilltop) and two stone arrangements (one destroyed). Artefact scatters were located on: a gently sloping creek bank (Charlies Gully); a low rise overlooking Wiseman's Creek; a valley floor adjacent to Kitts Creek; a gentle slope; and a saddle between two tributaries of Rainville Creek. Artefacts included flakes, blades, cores and anvils; and raw materials included indurated mudstone, chert, chalcedony, silcrete, volcanics and quartz.

Heritage database searches were undertaken to identify any previously recorded Aboriginal sites and places in the Study Area. The database search results are summarised in **Table 2-2**.

Table 2-2: Summary of desktop database search results for Aboriginal heritage.

Name of Database Searched	Date of Search	Type of Search	Comment
Australian Heritage Database	20.02.2017	Oberon LGA	No places listed are near the Study Area
NSW Heritage Office State Heritage Register and State Heritage Inventory	21.02.2017	Oberon LGA	No places listed are near the Study Area
National Native Title Claims Search	20.02.2017	Oberon LGA	No Native Title Claims cover the Study Area
OEH AHIMS	17.02.2017	30km x 30km area centred on the Study Area	59 sites are located within the search area
Local Environment Plan (LEP)	20.02.2017	Oberon LEP 2013	No places listed are near the Study Area

The desktop database searches and background literature review indicates that there are no known Aboriginal cultural values associated with the Study Area. It is noted that no Aboriginal community consultation was involved to reach this conclusion. Nevertheless, the desktop database searches and background literature review suggest that unidentified Aboriginal sites could exist in the Study Area, particularly on landforms with Aboriginal archaeological potential.

2.3.4 Step 2 c)

Are there any Landscape features that are likely to indicate presence of Aboriginal objects?

Yes. The Study Area is located in the South Eastern Highlands bioregion (Bathurst subregion) (NPWS 2003: 203-209) and traverses two Mitchell (2002: 131, 142) landscape units: Bathurst Granites and Upper Macquarie Channels and Floodplains (**Figure 2-5**). At the time of European

settlement, vegetation in the vicinity of the Study Area would have comprised open eucalypt dominated forest and woodland with river oak along streams. These plant communities would have supported a variety of native fauna, providing Aboriginal people with access to a range of plant and animal resources.

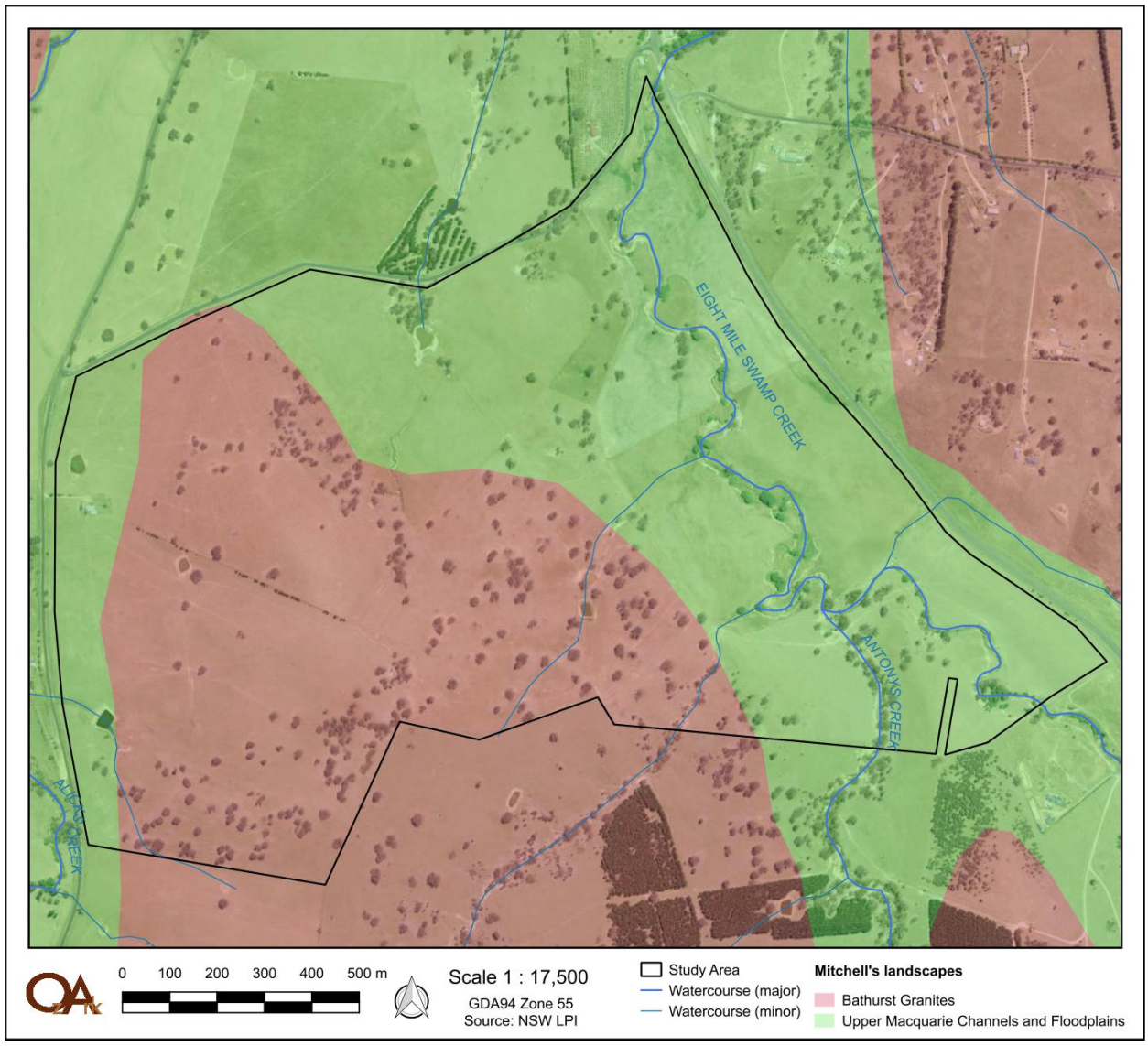
Characteristic landforms of the Bathurst subregion include rounded hills in a granite basin surrounded by steep slopes on the contact margin and granite outcrops with tors. Chain of ponds streams occur in wide flat valley floors, with terrace alluvium along the Macquarie River. Shallow red earths occur on ridges with yellow texture contrast soils on all slopes and deep coarse sands in alluvium. The Upper Macquarie Channels and Floodplains landscape unit includes the Macquarie valley, which opens wide through the Bathurst Granites, with general elevation between 260 and 420 metres and local relief from five to 25 metres. Narrow floodplain benches occur with alluvial sands and gravels and minimal soil development, with red gradational earths and texture-contrast soils on terraces. The Bathurst Granites landscape unit includes undulating to steep hills. Tors and rock outcrops are common on the margins of the pluton, which is surrounded by a distinctive contact ridge with steep slopes. General elevation ranges from 650 to 1000 metres with local relief to 250 metres. Shallow red earths or siliceous sands occur on ridges; gritty texture-contrast soils with yellow clay subsoils occur on the slopes; and deep coarse sands occur along streamlines, with dense black clays in small swamps.

The Study Area contains two named creeks flowing northwest along the eastern boundary (Eight Mile Swamp Creek and Anthony's Creek) and several ephemeral tributaries lines flowing northeast between spurs with moderate to steep slopes (**Figure 2-5** and **Figure 2-6**). The confluence of Eight Mile Swamp Creek and Anthony's Creek occurs in the southeast corner of the Study Area with a low spur at the confluence between the two creeks. Gently sloping to flat floodplain and terrace landforms occur adjacent to Eight Mile Swamp Creek in the northeast portion of the Study Area. Alick's Creek flows north through a narrow floodplain and valley about 50 to 150 metres west of the western Study Area boundary, with gently sloping landforms to the east of the creek bank within the Study Area. A low granite hill, including the crest and moderate to steep slopes, exists in the central west portion of the Study Area.

In summary, artefact scatters and isolated artefacts are the most likely site types in the Study Area. Artefacts are most likely to have been manufactured from quartz, silcrete, quartzite, mudstone, chert, volcanics and potentially from historic glass. Artefact scatters are likely to be located adjacent to drainage lines, particularly on flat or gently sloping landforms elevated above the floodplain, or on the crests, saddles and benches of the low hill and spurs. PADs are also possible on these landforms, particularly where conditions suitable for archaeological preservation and sediment deposition exist. Culturally modified trees could exist in the Study Area, and are more likely to be located closer to watercourses or wherever mature trees of sufficient age to contain Aboriginal scarring or carving exist. Stone arrangements are possible,

and are likely to be located away from occupation sites. Quarries for the procurement of raw materials used for the manufacture stone tools are possible where suitable sources of outcropping stone exist. Aboriginal ceremony and Dreaming sites could exist anywhere in the Study Area. Burials could occur away from watercourses where sediment suitable for interment exists.

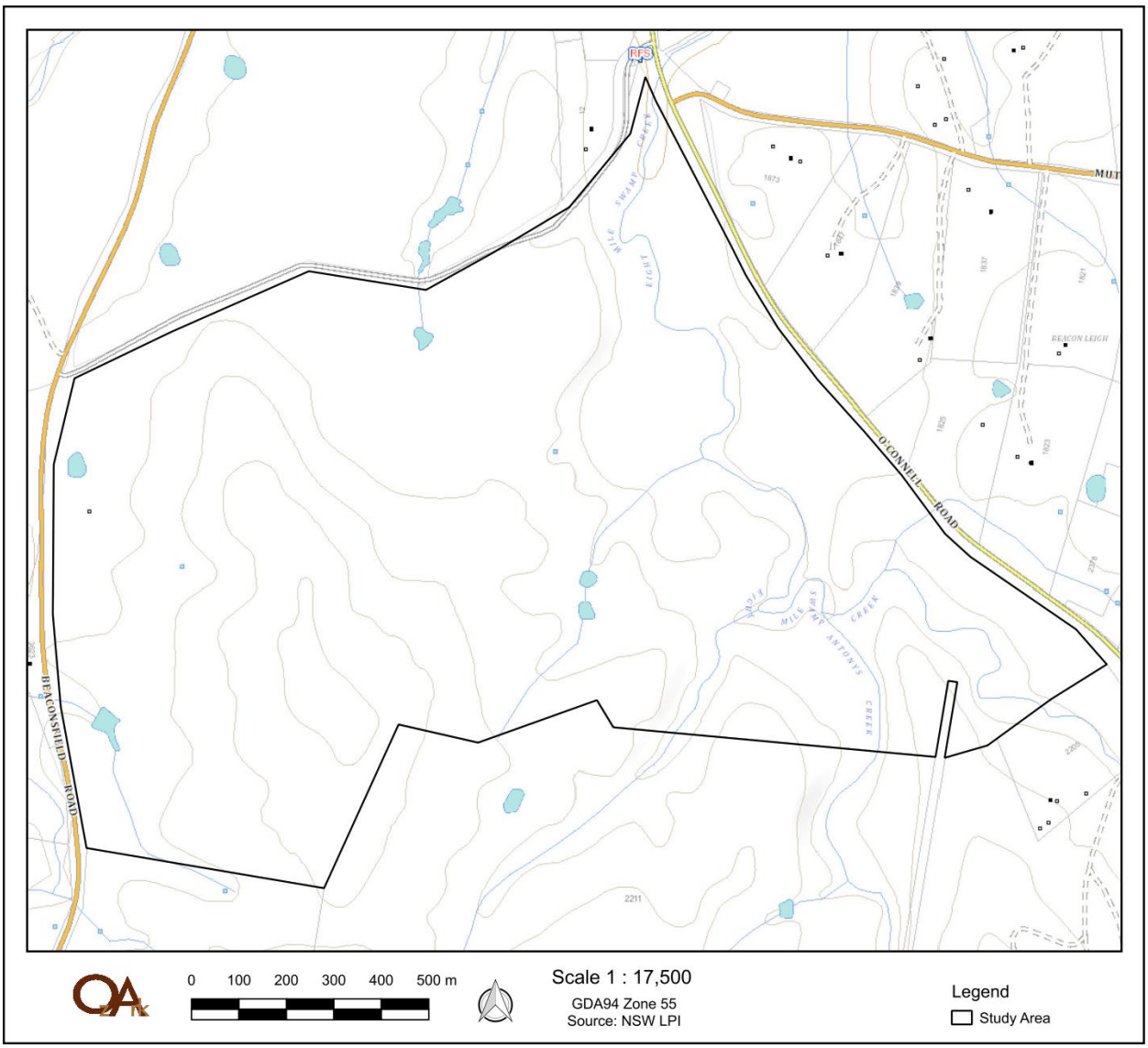
Figure 2-5: Map showing Mitchell (2002) landscape units and watercourses in relation to the Study Area.



Aboriginal archaeological deposits are likely to have been harmed or destroyed by various land use activities and disturbances within the Study Area, particularly: vegetation clearing; building construction; stock yards; ploughing; fencing; construction of water management infrastructure (e.g. pipelines, drainage channels and earthen dams); vehicle tracks; and erosion (e.g. wind, sheet wash, rill, gully and streambank erosion). Nevertheless, areas containing sensitive archaeological landforms (SALs) that cannot be considered 'disturbed land' are considered likely to exist in the Study Area, particularly on flat to gently sloping slightly elevated landforms on the floodplains in the eastern portion of the Study Area adjacent to Eight Mile Swamp Creek and

Anthony's Creek (particularly at the confluence of the two named creeks); the crests of low spurs; the crest of the hill in the central west portion of the Study Area; and flat to gently sloping slightly elevated landforms on the floodplain east of Alick's Creek along the western boundary of the Study Area (**Figure 2-7**). Visual inspection would likely discount the sensitivity of some of the SALs shown in **Figure 2-7**, identify some SALs as being 'disturbed land' and recognise additional SALs not identified at a desktop level. Culturally modified trees could exist wherever mature trees of sufficient age to contain Aboriginal scarring or carving exist, particularly near waterways. As such, visual inspection of the Study Area is recommended, with emphasis placed upon the SALs shown in **Figure 2-7**, any additional SALs identified in the field, and all mature trees of sufficient age to contain Aboriginal scarring or carving.

Figure 2-6: Topographic map of the Study Area.

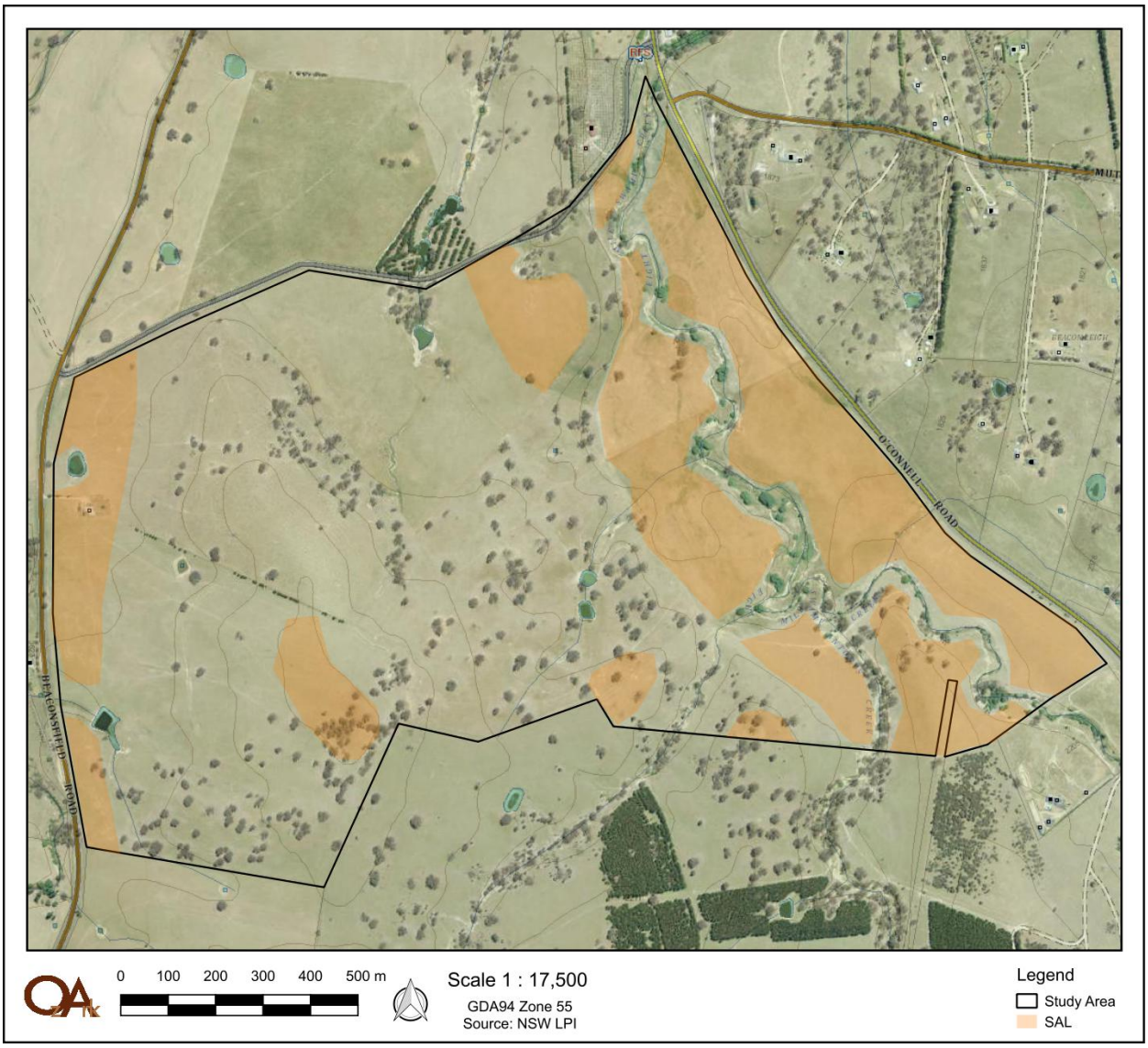


2.3.5 Step 3

Can harm to Aboriginal objects listed on AHIMS or identified by other sources of information and/or can the carrying out of the activity at the relevant landscape features be avoided?

No. The Proposal includes landscape features that contain, or have potential to contain, Aboriginal objects and sites, and these landscape features have not been avoided. Visual inspection of the Study Area is recommended, with emphasis placed upon SALs.

Figure 2-7: Map showing SALs identified during the desktop assessment within the Study Area.



3 HISTORIC HERITAGE ASSESSMENT

3.1 INTRODUCTION

The current assessment will apply the *Historical Archaeology Code of Practice* (Heritage Council 2006) in the completion of a desktop historical heritage assessment.

3.2 BRIEF HISTORY OF BATHURST AND O'CONNELL

The Bathurst region was proclaimed by European colonists in May 1815, establishing the oldest inland European settlement on the Australian continent (BRC 2014). Following the European discovery of a route through the Blue Mountains by Blaxland Lawson and Wentworth, assistant Surveyor George Evans was sent by Governor Macquarie in 1813 to examine the route and describe the country (Evans 1916). Evans's party reached the area near the junction of the Fish and Campbell Rivers, naming the O'Connell Plains after the Lieutenant-Governor Maurice Charles O'Connell. On Monday 6 December 1813, Evans (1916) wrote of the O'Connell Plains:

> …this Morning had a better appearance; the river now forms large ponds; at the Space of about a Mile I came on a fine Plain of rich Land, the handsomest Country I ever saw; it surpasseth Port Dalrymple; this place is worth speaking of as good and beautiful; the Track of clear land occupies about a Mile on each side of the River; I have named it after the Lieut. Governor. "O'Connell Plains", on which we saw a number of wild Geese but too shy to let us near them; the Timber around is thinly scattered, I do not suppose there are more than ten Gum Trees on an Acre…

Following Evans's positive reports of Bathurst and surrounds, Macquarie commissioned William Cox to build a road from Emu Plains to the Bathurst Plains, which Cox completed in February 1815. Macquarie travelled the road in 1815, reaching the Macquarie River on 4 May, where he formally established the town of Bathurst (McLaughlan 2013: 10–11). Bathurst historian, Robin McLauchlan (2014), recently rediscovered an early map of Cox's road to Bathurst, and of Macquarie's proposed town plan for Bathurst, produced by John Oxley in 1815, and held in the National Archives, London. The early European settlement of O'Connell was on Cox's Road from 1815 until the route was changed in the mid-1830s. The O'Connell settlement is located about one kilometre north of the Study Area on the Fish River.

A limited number of small land grants were approved by the Colonial Office in 1818 to ten selected settlers on the north bank of the Macquarie River, effectively separating the government settlement of Bathurst from private settlers. Commissioner John Bigge visited the government settlement in 1819 and conducted Bigge's Enquiry, which uncovered various corrupt and questionable practices, particularly attributable to Macquarie's appointed 'superintendent', Richard Lewis and Commandant, William Cox (McLaughlan 2013: 11–12). Major James Morisset was appointed Commandant in 1823 by Governor Brisbane, who wanted the government settlement and adjacent lands at Bathurst developed for agriculture, contrary to Commissioner

Bigge's recommendation to wind down the settlement (McLaughlan 2013: 14). Between 1822 and 1825 more than 1,000 convicts were deployed to Bathurst, three-quarters of which were assigned to private pastoralists, and the remainder to public work (Roberts 2014: 247).

In 1824, open war erupted between the Wiradjuri, under the leadership of Windradyne, and the government settlement, which declared martial law soon after (Roberts 1995: 618–624). With civil law suspended, violence was officially sanctioned, and Brisbane transmitted a proclamation to London that: "It hath been found that Mutual Bloodshed may be stopped by the Use of Arms against the Natives beyond the ordinary Rule of Law... and for this End resort to summary justice has become necessary" (cited in Roberts 1995: 622). On 14 October 1824, the *Sydney Gazette* reported that: "Bathurst [and] its surrounding district is engaged in an exterminating war" (cited in Roberts 1995: 623) and by October and November reports of Aboriginal people surrendering in groups of up to sixty were reaching Sydney. Martial law was repealed on 11 December 1824.

By 1826 the government settlement at Bathurst had become a diverse and extensive agricultural enterprise, including the production of grain, wool, vegetables, cattle, sheep and leather via convict labour. However, due to the poor profitability of this enterprise, Governor Darling instructed the Bathurst government settlement to cease operating as a government farm, and by 1829 only six convicts remained in public service (McLaughlan 2013: 16).

Bathurst's regional economy was transformed by the discovery of gold in 1851 (NSW HO and DUAP 1996: 91-93). Prospectors and settlers flooded to the area, triggering an era of prosperity and growth. Hotels, courts, police stations, post offices, schools and businesses, including Cobb & Co, were established. After the gold rush, Bathurst became a centre for coal mining and manufacturing. The Main Western railway line from Sydney reached Bathurst in 1876 and the town became an important railway centre, including workshops, locomotive depots and track and signal engineering offices (NSW HO and DUAP 1996: 93-94). Today Bathurst hosts the railway regional engineering headquarters, including large manufacturing facilities. In 1885, Bathurst had a population of approximately 8,000 and a district population of an additional 20,000 people, mostly employed in agriculture and pastoralism. Bathurst is now a large regional centre for forestry, agriculture and industry. Education, tourism and manufacturing are important contemporary economic drivers (OzArk 2013).

3.3 LOCAL CONTEXT

3.3.1 Desktop Database Searches Conducted

Desktop database searches were conducted to identify any potential previously recorded historic heritage items within the Study Area. The results of these searches are summarised in **Table 3-1**.

.

Table 3-1: Summary of desktop database search results for historic heritage.

Name of Database Searched	Date of Search	Type of Search	Comment
Australia's National Heritage List	21.02.2017	NSW	No items listed are located within the Study Area
Australian Heritage Database	20.02.2017	Oberon LGA	One item (O'Connell Settlement) located a few hundred metres north of Study Area
NSW Heritage Office State Heritage Register and State Heritage Inventory	21.02.2017	Oberon LGA	No items listed are located within the Study Area
Local Environment Plan (LEP)	20.02.2017	Oberon LEP of 2013	The O'Connell heritage conservation area is located close to the Study Area

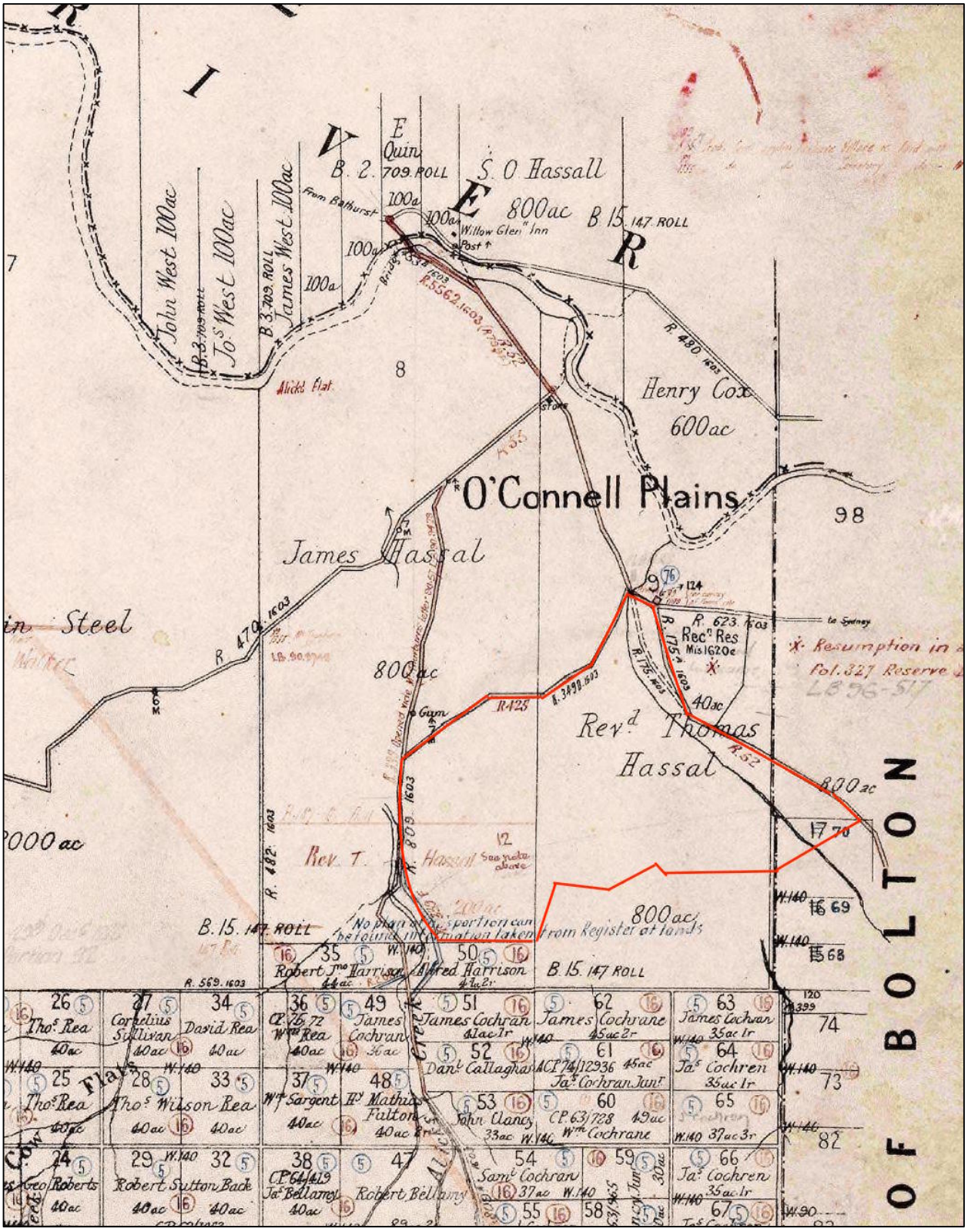
No records of previously recorded historical heritage items exist within the Study Area. One item listed on the Australian Heritage Database is located a few hundred metres north of the Study Area: O'Connell Settlement (**Appendix 2**). O'Connell Settlement is an early European settlement located on Cox's Road from 1815. The item comprises four nineteenth century building groups exhibiting a range of building types and materials from slab and pise barns to stone and red brick churches. The site occupies approximately 200 hectares of land and extends about 800 meters south of the intersection of O'Connell Road and Beaconsfield Road to within several hundred metres north of the Study Area. The Oberon LEP lists several of the buildings located within the O'Connell Settlement, including: Former Butcher Shop (I43), O'Connell Hotel (I44), O'Connell Roman Catholic Church Group (I45), School House (I47) and St Francis Church and Roman Catholic Cemetery (I49) – see **Appendix 2**. These items are located within 400 metres of the Study Area northeast boundary. All of the above mentioned items are contained within the O'Connell heritage conservation area, also listed on the Oberon LEP (**Appendix 2**). The boundary of the O'Connell heritage conservation area is north of Box Flat Road, adjacent to the Study Area.

A Historical Parish Map (Parish of Langdale) from 1894 shows that the Study Area occupies part of an 800 acre portion of land (No. 9) attributed to 'Revd Thomas Hassal' and part of an 800 acre portion of land (No. 7) attributed to 'James Hassal' (LPI 2017) (**Figure 3-1**). Reverend Thomas Hassall (1794-1868) was an Anglican clergyman who was the first Australian candidate for ordination and one of Australia's first 'bush parsons' (Gunson 1966). After serving as chaplain to the penal settlement at Port Macquarie, Hassall was appointed to the Bathurst district in 1826 soon after losing his library in the wreck of the *Henriette*. He resided at 'Lampeter Farm' on the O'Connell Plains where be built Salem Chapel and regularly preached in a barn in Kelso. Hassall left the Bathurst area in 1827 to be appointed to the new parish of Cowpastures.

The neighbouring 800 acre portion of land attributed to 'James Hassal' is likely one of Hassall's relatives, several of which were named James including his son, nephew and brother (Gunson

1966). A 600 acre portion of land to the north of the Study Area is attributed to 'Henry Cox', who is likely a descendant of William Cox.

Figure 3-1: Historical Parish Map (Langdale) from 1894 showing the Study Area (red) in relation to an 800 acre portion of land (No. 9) attributed to 'Rev^{d} Thomas Hassal' and an 800 acre portion of land (No. 7) attributed to 'James Hassal' (LPI 2017).



3.4 DISCUSSION

The desktop historic heritage assessment has found that no previously recorded historic heritage items exist within the Study Area. The Study Area is located a few hundred metres south of O'Connell Settlement, which was situated on Cox's Road and developed between 1815 and the mid-1830s. The Study Area is located close to a number of buildings located within the O'Connell heritage conservation area, which encompasses the O'Connell Settlement. The boundary of the O'Connell Conservation Area is adjacent to the northeast Study Area boundary along Box Flat Road. The Study Area is located on land once owned by Reverend James Hassall, the first Australian candidate for ordination and one of Australia's first 'bush parsons'.

Although the Study Area is located close to O'Connell Settlement and the O'Connell conservation area and is associated with Reverend James Hassall, it is considered unlikely that it contains historic items of local or state significance or intact historic archaeological deposits. Visual inspection of the Study Area is therefore not required. Nevertheless, if the recommended Aboriginal Due Diligence visual inspection is undertaken, then visual inspection for historic heritage items should be undertaken concurrently to corroborate the findings of the desktop historic heritage assessment.

4 MANAGEMENT RECOMMENDATIONS

4.1 ABORIGINAL CULTURAL HERITAGE

The Due Diligence archaeological assessment has taken into consideration the impacts of the proposed rezoning and subsequent subdivision and housing development in the Study Area, which will disturb the ground surface.

No previously recorded Aboriginal sites are located in the Study Area. However, several SALs were identified within the Study Area requiring visual inspection, with additional SALs likely to be identified the field. The assessment has concluded that visual inspection of the Study Area is required in order to adequately assess whether Aboriginal objects or intact Aboriginal archaeological deposits are likely to be harmed by the Proposal.

The suitability of the Study Area for the proposed rezoning, subdivision and housing development will depend upon whether any Aboriginal cultural heritage values are associated with it. The archaeological/scientific, historic and aesthetic value of any Aboriginal cultural heritage sites is likely to be low due to the nature of the SALs (i.e. the absence of major rivers and levels of ground surface disturbance) and the archaeological context of the region (similar landforms generally have low density, low archaeological value artefact scatters). However, this can only be confirmed by visual inspection of the Study Area; and the cultural or social value of Aboriginal sites can only be assessed by Aboriginal traditional owners or custodians. If any Aboriginal cultural heritage values are found to be associated with the Study Area, and if the Proposal proceeds, then management and mitigation of those values will need to occur.

To ensure that any Aboriginal cultural heritage values associated with the Study Area are protected, the following recommendations are made:

1. Visual inspection of the Study Area is recommended, with emphasis placed upon the SALs shown in **Figure 2-7**, any additional SALs identified in the field, and all mature trees of sufficient age to contain Aboriginal scarring or carving;
2. If Aboriginal objects or PADs are identified during the visual inspection, then further investigation and impact assessment of the Study Area must be undertaken, including the preparation of an Aboriginal Cultural Heritage Assessment Report and consultation with Aboriginal traditional owners or custodians. If this assessment concludes that harm to Aboriginal objects will occur, then an Aboriginal Heritage Impact Permit application must be made; and
3. If visual inspection does not identify any Aboriginal objects or PADs in the Study Area, then the Proposal can proceed without further archaeological assessment, provided all ground disturbing activities are confined to within the Study Area.

4.2 HISTORIC HERITAGE

The historic heritage desktop assessment has taken into consideration the impacts of the proposed rezoning and subsequent subdivision and housing development in the Study Area, which will disturb the ground surface. No previously recorded historic heritage items exist within the Study Area. Although the Study Area is located close to O'Connell Settlement and is historically associated with Reverend James Hassall, it is considered unlikely that historic items of local or state significance exist.

To ensure that the historic heritage values of the Study Area are protected, the following recommendations are made:

1. No historic heritage sites or items are recorded within the Study Area and no landforms are assessed at a desktop level as having historic archaeological potential, therefore no further historic archaeological assessment is required;
2. Although not a formal requirement, if an Aboriginal Due Diligence visual inspection of the Study Area is undertaken, then visual inspection for historic heritage items should be undertaken concurrently to corroborate the findings of the desktop historic heritage assessment;
3. All land-disturbing activities must be confined to within the assessed Study Area and additional assessment may be required if the location of the Proposal is amended to impact areas outside of the Study Area;
4. Inductions for staff undertaking the proposed work must explain the legislative protection requirements for historic sites and items in NSW and the relevant fines for non-compliance; and
5. If objects are encountered that are suspected to be historic heritage items, the *Unanticipated Finds Protocol* (**Appendix 3**) must be followed.

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APPENDIX 1: AHIMS SEARCH RESULTS

Office of Environment & Heritage

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : Q Belvoir geolyse

Client Service ID : 244933

OzArk Environmental and Heritage Management

Date: 15 September 2016

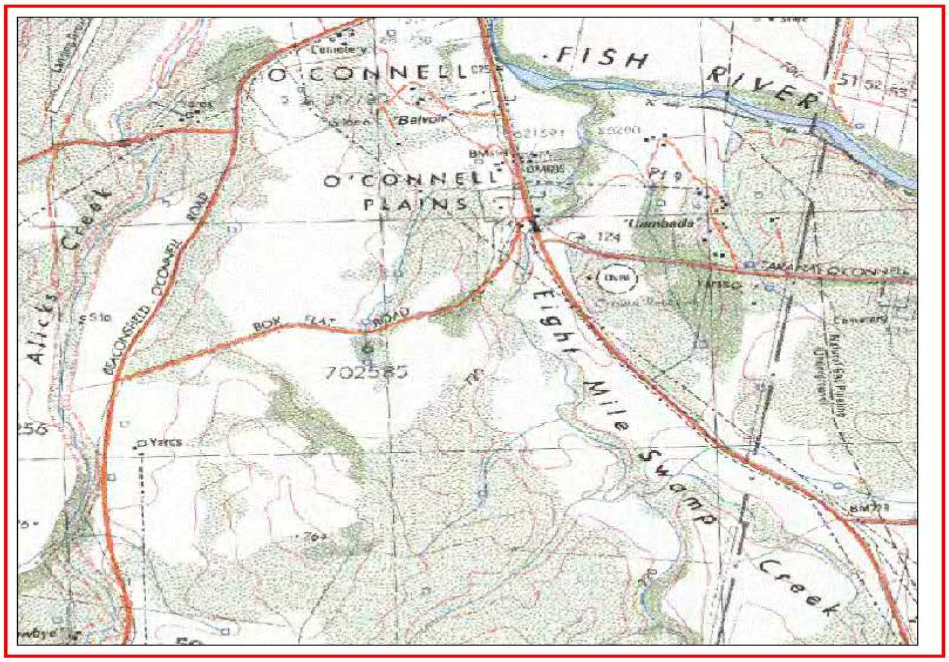
PO Box 2069
Dubbo New South Wales 2830
Attention: Jodie Benton

Email: jodie@ozarkehm.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 4, DP:DP1023024 with a Buffer of 50 meters, conducted by Jodie Benton on 15 September 2016.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

Office of Environment & Heritage

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 1550Belvoir_3
Client Service ID : 267194

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
44-6-0081	BCD-7; Ben Chitley Dam;	AGD	55	745920	6281650	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits	1260,1261,1262,1263	
44-3-0108	BH-CS-1; Browns Hill Napoleon Reefs;	AGD	55	754500	6297400	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
44-3-0117	Restriction applied. Please contact ahims@environment.nsw.gov.au.					Open site	Valid			
	Contact Bill Allen	Recorders	Bill Allen					Permits		
44-3-0145	Gemalla Trail Modified Tree	AGD	55	762591	6292125	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact Searle	Recorders	Mr.Gavin Newton					Permits		
44-6-0012	Fish River - Carved Tree	AGD	55	750144	6288455	Open site	Valid	Burial : -, Modified Tree (Carved or Scarred) : -	Burial/s,Carved Tree	65,1298
	Contact	Recorders	David Bell,NPWS - Blackheath Office,P Gresser,John Davidson,W McKibbin,Bruce Gi					Permits		
44-6-0116	Busdale Creek Trail - Artefacts	AGD	55	764949	6289612	Open site	Valid	Artefact : 3		
	Contact Searle	Recorders	Mr.Gavin Newton					Permits		
44-6-0086	BCD-15	AGD	55	746640	6280350	Open site	Valid	Artefact : -	Open Camp Site	97712
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
44-6-0087	BCD-14	AGD	55	746230	6281890	Open site	Valid	Artefact : -	Open Camp Site	97712
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
44-6-0088	BCD-13	AGD	55	747100	6280120	Open site	Valid	Artefact : -	Open Camp Site	97712
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
44-6-0089	BCD-12	AGD	55	746560	6279360	Open site	Valid	Artefact : -	Open Camp Site	97712
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
44-6-0090	BCD-11	AGD	55	746470	6278780	Open site	Valid	Artefact : -	Open Camp Site	97712
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
44-6-0091	BCD-10	AGD	55	747490	6279170	Open site	Valid	Artefact : -	Open Camp Site	97712
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
44-6-0092	BCD-9	AGD	55	747200	6279030	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
44-6-0093	BCD-8	AGD	55	747720	6278600	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
44-6-0031	Oberon Site 2;	AGD	55	759100	6277520	Open site	Valid	Artefact : -	Open Camp Site	1240
	Contact	Recorders	Mr.Allan Lance					Permits		
44-6-0032	Oberon 1;	AGD	55	759950	6274450	Open site	Valid	Artefact : -	Open Camp Site	1240

Report generated by AHIMS Web Service on 17/02/2017 for Chris Lovell for the following area at Datum :GDA, Zone : 55, Eastings : 738000 - 768000, Northings : 6269000 - 6299000 with a Buffer of 0 meters. Additional Info : Due Diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 59

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 1550Belvoir_3
Client Service ID : 267194

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Mr.Allan Lance					Permits		
44-6-0033	Wisemans Creek 2;	AGD	55	760250	6274160	Open site	Valid	Artefact : -	Open Camp Site	1240
	Contact	Recorders	Mr.Allan Lance					Permits		
44-6-0034	Wisemans_Creek 1;	AGD	55	760020	6273260	Open site	Valid	Artefact : -	Open Camp Site	1240
	Contact	Recorders	Mr.Allan Lance					Permits		
44-6-0035	Charlies Gully I;	AGD	55	762150	6270970	Open site	Valid	Artefact : -	Open Camp Site	1240
	Contact	Recorders	Mr.Allan Lance					Permits		
44-6-0056	Mt Oberon;	AGD	55	758900	6277800	Open site	Valid	Stone Quarry : -, Artefact : -	Quarry	1240
	Contact	Recorders	Tekhittingham					Permits		
44-6-0065	Ben Chifley Dam; BCD-2;	AGD	55	744770	6282650	Open site	Valid	Artefact : -	Open Camp Site	2906
	Contact	Recorders	Mr.Doug Williams					Permits	1260,1261,1262,1263	
44-6-0067	Middle Creek;	AGD	55	760040	6268950	Open site	Valid	Artefact : -	Open Camp Site	2907
	Contact	Recorders	Helen Brayshaw,Mary Dallas Consulting Archaeologists					Permits		
44-6-0068	Wisemans Creek 1;	AGD	55	763050	6272050	Open site	Valid	Artefact : -	Open Camp Site	2907
	Contact	Recorders	Helen Brayshaw,Mary Dallas Consulting Archaeologists					Permits		
44-6-0069	Ben Chifley Dam; BCD- 6;	AGD	55	745000	6283000	Open site	Valid	Artefact : -	Open Camp Site	2906
	Contact	Recorders	Mr.Doug Williams					Permits	1260,1261,1262,1263	
44-6-0070	Ben Chifley Dam; BCD- 4;	AGD	55	745600	6281900	Open site	Valid	Artefact : -	Open Camp Site	2906
	Contact	Recorders	Mr.Doug Williams					Permits	1260,1261,1262,1263	
44-6-0071	Ben Chifley Dam; BCD- 1;	AGD	55	744560	6282650	Open site	Valid	Artefact : -	Open Camp Site	2906
	Contact	Recorders	Mr.Doug Williams					Permits	1260,1261,1262,1263	
44-6-0072	Ben Chifley Dam; BCD- 3;	AGD	55	745650	6282620	Open site	Valid	Artefact : -	Open Camp Site	2906
	Contact	Recorders	Mr.Doug Williams					Permits	1260,1261,1262,1263	
44-6-0004	Wisemans Creek;Mt Oberon;	AGD	55	758673	6277050	Open site	Valid	Stone Quarry : -, Artefact : -	Quarry	353,1240
	Contact	Recorders	ASRSYS					Permits		
44-6-0007	Oberon;	AGD	55	760307	6271952	Open site	Valid	Stone Arrangement : -	Stone Arrangement	353,1240
	Contact	Recorders	ASRSYS					Permits		
44-3-0058	Orton Park Bathurst	AGD	55	740400	6293700	Open site	Valid	Artefact : 6	Open Camp Site	606,1298
	Contact	Recorders	Michael Pickering					Permits		
44-3-0059	Orton Park;Bathurst.	AGD	55	740300	6293700	Open site	Valid	Artefact : 1	Open Camp Site	606
	Contact	Recorders	Michael Pickering					Permits		

Report generated by AHIMS Web Service on 17/02/2017 for Chris Lovell for the following area at Datum :GDA, Zone : 55, Eastings : 738000 - 768000, Northings : 6269000 - 6299000 with a Buffer of 0 meters. Additional Info : Due Diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 59

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Extensive search - Site list report

Your Ref/PO Number : 1550Belvoir_3
Client Service ID : 267194

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
44-6-0011	Davis's Creek Davys Creek	AGD	55	742939	6284340	Open site	Valid	Modified Tree (Carved or Scarred) : -	Carved Tree	65,353,1298
	Contact	**Recorders**	ASRSYS					**Permits**		
44-6-0013	Oberon	AGD	55	759340	6270617	Open site	Valid	Burial : -, Modified Tree (Carved or Scarred) : -	Burial/s,Carved Tree	65
	Contact	**Recorders**	David Bell,P Gresser					**Permits**		
44-6-0014	Mt Oberon;	AGD	55	758673	6277050	Open site	Valid	Artefact : -	Open Camp Site	353
	Contact	**Recorders**	ASRSYS					**Permits**		
44-6-0016	Mt Oberon;	AGD	55	761344	6275116	Open site	Valid	Stone Arrangement : -	Stone Arrangement	1240
	Contact	**Recorders**	ASRSYS					**Permits**		
44-6-0017	Lowes Mount Road;Oberon;	AGD	55	764894	6272232	Open site	Valid	Stone Quarry : -, Artefact : -	Quarry	
	Contact	**Recorders**	ASRSYS					**Permits**		
44-6-0018	Oberon;	AGD	55	759980	6271150	Open site	Valid	Stone Arrangement : -	Stone Arrangement	
	Contact	**Recorders**	P Gresser					**Permits**		
44-6-0022	Oberon	AGD	55	760080	6271300	Open site	Valid	Burial : -, Modified Tree (Carved or Scarred) : -	Burial/s,Carved Tree	1240
	Contact	**Recorders**	Michael Pearson,P Gresser					**Permits**		
44-6-0023	Arrowgrove;Oberon;	AGD	55	757795	6277999	Open site	Valid	Stone Quarry : -, Artefact : -	Quarry	1240
	Contact	**Recorders**	ASRSYS					**Permits**		
44-3-0076	Diamond Creek 1	AGD	55	767110	6297450	Open site	Valid	Artefact : -	Open Camp Site	232,1298
	Contact	**Recorders**	ASRSYS					**Permits**		
44-3-0077	Kirkconnell Creek 1	AGD	55	764430	6297020	Open site	Valid	Artefact : -	Open Camp Site	232,1298
	Contact	**Recorders**	ASRSYS					**Permits**		
44-3-0078	Frying Pan Creek 1	AGD	55	763050	6296510	Open site	Valid	Artefact : -, Aboriginal Ceremony and Dreaming : -		232,1298,102146
	Contact	**Recorders**	ASRSYS					**Permits**		
44-3-0079	Cave Creek 1	AGD	55	757703	6297253	Open site	Valid	Artefact : -, Aboriginal Ceremony and Dreaming : -		232,1298
	Contact	**Recorders**	ASRSYS					**Permits**		
44-3-0060	Orton Park;Bathurst;	AGD	55	740200	6293700	Open site	Valid	Artefact : 1	Open Camp Site	606

Report generated by AHIMS Web Service on 17/02/2017 for Chris Lovell for the following area at Datum :GDA, Zone : 55, Eastings : 738000 - 768000, Northings : 6269000 - 6299000 with a Buffer of 0 meters. Additional Info : Due Diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 59

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 1550Belvoir_3
Client Service ID : 267194

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	**Recorders**	Michael Pickering					**Permits**		
44-3-0063	Raglan;Bathurst;	AGD	55	744200	6297900	Open site	Valid	Artefact : -	Open Camp Site	606
	Contact	**Recorders**	ASRSYS					**Permits**		
44-3-0064	Raglan;Bathurst;	AGD	55	744200	6298100	Open site	Valid	Artefact : -	Open Camp Site	606
	Contact	**Recorders**	ASRSYS					**Permits**		
44-3-0140	Brooks Gully Modified Tree 1	AGD	55	762853	6290123	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact Searle	**Recorders**	Mr.Gavin Newton					**Permits**		
44-6-0117	Keirstone - Sidmouth Valley Burial Site (Tarana)	AGD	55	763763	6282572	Open site	Valid	Burial : 1, Modified Tree (Carved or Scarred) : 1		
	Contact	**Recorders**	Mr.Gavin Newton					**Permits**		
44-6-0003	Campbells River The Lagoon	AGD	55	742436	6283169	Open site	Valid	Artefact : -	Open Camp Site	353,1298
	Contact	**Recorders**	ASRSYS					**Permits**		
44-6-0118	Keirstone - Sidmouth Valley - Modified Tree (Tarana)	AGD	55	763781	6282551	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	**Recorders**	Mr.Gavin Newton					**Permits**		
44-3-0170	W20 A7	GDA	55	756692	6296736	Open site	Valid	Artefact : 1, Potential Archaeological Deposit (PAD) : 1		
	Contact	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**	3764	
44-3-0171	W20 A8	GDA	55	757657	6296015	Open site	Valid	Artefact : 1, Potential Archaeological Deposit (PAD) : 1		
	Contact	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**	3764	
44-3-0162	W20 A5	GDA	55	767671	6297505	Open site	Valid	Artefact : 1, Potential Archaeological Deposit (PAD) : 1		
	Contact	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**		
44-3-0163	W20 A6	GDA	55	766565	6297463	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**	3764	
44-6-0085	Gemalla Stone Arrangement	AGD	55	762900	6286530	Open site	Valid	Stone Arrangement : -	Stone Arrangement	
	Contact	**Recorders**	Bill Allen					**Permits**		
44-3-0086	Yetholme (YLS/3)	AGD	55	761800	6294500	Open site	Valid	Artefact : -	Open Camp Site	1027,102146
	Contact	**Recorders**	Bonhomme Craib & Associates					**Permits**		

Report generated by AHIMS Web Service on 17/02/2017 for Chris Lovell for the following area at Datum :GDA, Zone : 55, Eastings : 738000 - 768000, Northings : 6269000 - 6299000 with a Buffer of 0 meters. Additional Info : Due Diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 59

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 1550Belvoir_3
Client Service ID : 267194

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
44-3-0087	Brae Lee Molbodonite Road	AGD	55	761800	6294500	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1027,102146
	Contact	**Recorders**	Bonhomme Craib & Associates					**Permits**		
44-3-0096	Eusdale Creek - Artefact 1	AGD	55	766850	6292540	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Mr.Doug Williams					**Permits**		
44-3-0097	Eusdale Creek - Artefact 2	AGD	55	767350	6292680	Open site	Valid	Artefact : -	Open Camp Site	102146
	Contact	**Recorders**	Mr.Doug Williams					**Permits**		

Report generated by AHIMS Web Service on 17/02/2017 for Chris Lovell for the following area at Datum :GDA, Zone : 55, Eastings : 738000 - 768000, Northings : 6269000 - 6299000 with a Buffer of 0 meters. Additional Info : Due Diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 59

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APPENDIX 2: HISTORIC HERITAGE: DATABASE SEARCH RESULTS

Place Details

Send Feedback

O'Connell Settlement, Bathurst - Oberon Rd, O'Connell, NSW, Australia

Photographs




List	Register of the National Estate (Non-statutory archive)
Class	Historic
Legal Status	Registered (21/03/1978)
Place ID	884
Place File No	1/07/236/0001

Statement of Significance

O'Connell's several distinct nineteenth century building groups, unaffected by modern intrusions and related to one another by a tree lined road, form an area of aesthetic value. (Criterion E.1)

The village is significant for containing a wide range of building types and materials, ranging from slab and pise barns to stone and red brick churches. (Criterion A.3)

O'Connell, originally on the main road from Sydney to Bathurst in the early decades of the nineteenth century, has an association with the early history of the district, and its range of buildings reflects the settlement's former status during the nineteenth century. (Criteria B.2 and A.4).

Official Values Not Available

Description

The O'Connell area was first crossed by a European in December 1813 when Assistant Surveyor, George Evans, passed through on his journey of exploration and survey. He named the area O'Connell Plains, after the Lieutenant Governor, Sir Maurice O'Connell. O'Connell was on the first road from Sydney to Bathurst (Cox's Road) from 1815 until the route was changed in the mid 1830s. The village is situated on the Fish River, and the surrounding plain is cleared and surrounded by rising country. The registered area consists of several distinct groups of buildings which are linked by a tree lined road. In the centre is the store/farm group, which includes two brick stores, a pise barn, a slab barn, a timber woolshed and outbuildings. A short distance to the south-west is St Thomas' Anglican Church Group, consisting of a red brick Romanesque church completed in 1866 and a red brick Gothic rectory built in 1877; there is also a later church hall also built in brick (the church and rectory are also separately registered). On the southern boundary of the registered area towards Eight Mile Creek is the Roman Catholic Church Group. This consists of a stone Roman Catholic Church (St Francis') built in 1857 or 1867, a presbytery used as a post office dating from around 1870 and a shop and cottage. The church is Gothic in style and is built of stone with dressed stone to openings, pointed arch windows, buttresses, a spire and a steeply gabled iron roof. The former presbytery has a steep gabled iron roof and pointed arch windows; the front verandah has a gabled entrance porch. The cottage and shop opposite are, respectively, a building with rendered walls and hipped iron roof, and a simple brick gabled structure with verandah and a round window in the gable.

History Not Available

Condition and Integrity

The Anglican Church buildings, at the time of nomination in the 1970s, were said to be in good condition, and the integrity of the registered area was intact and there had been few modern intrusions. A brief site visit in May 1992 showed the St Thomas's Group to be in apparently good condition, the Roman Catholic Group to be likewise (the church and former presbytery seem now to be private residences), and at least one of the store/farm group buildings to have some modern cladding and verandah infill. (May 1992)

Location

About 200ha, O'Connell, 19km south-east of Bathurst, comprising the area bounded by a circle of radius 0.8km centred at the intersection of the Bathurst - Oberon Road and the Beaconsfield - O'Connell Road.

Bibliography

Greaves, Bernard ed., "The Story of Bathurst", Sydney 1976.
Information from the National Trust of Australia (New South Wales).

Report Produced Tue Feb 21 11:55:41 2017

Place Details

Send Feedback

O'Connell Settlement (redefinition), Bathurst - Oberon Rd, O'Connell, NSW, Australia

Photographs	None
List	Register of the National Estate (Non-statutory archive)
Class	Historic
Legal Status	Indicative Place
Place ID	19038
Place File No	1/07/236/0001

Statement of Significance Not Available

Official Values Not Available

Description

The O'Connell area was first crossed by a European in December 1813 when Assistant Surveyor, George Evans, passed through on his journey of exploration and survey. He named the area O'Connell Plains, after the Lieutenant Governor, Sir Maurice O'Connell. O'Connell was on the first road from Sydney to Bathurst (Cox's Road) from 1815 until the route was changed in the mid 1830s. The village is situated on the Fish River, and the surrounding plain is cleared and surrounded by rising country. The registered area consists of several distinct groups of buildings which are linked by a tree lined road. In the centre is the store/farm group, which includes two brick stores, a pise barn, a slab barn, a timber woolshed and outbuildings. A short distance to the south-west is St Thomas' Anglican Church Group, consisting of a red brick Romanesque church completed in 1866 and a red brick Gothic rectory built in 1877; there is also a later church hall also built in brick (the church and rectory are also separately registered). On the southern boundary of the registered area towards Eight Mile Creek is the Roman Catholic Church Group. This consists of a stone Roman Catholic Church (St Francis') built in 1857 or 1867, a presbytery used as a post office dating from around 1870 and a shop and cottage. The church is Gothic in style and is built of stone with dressed stone to openings, pointed arch windows, buttresses, a spire and a steeply gabled iron roof. The former presbytery has a steep gabled iron roof and pointed arch windows; the front verandah has a gabled entrance porch. The cottage and shop opposite are, respectively, a building with rendered walls and hipped iron roof, and a simple brick gabled structure with verandah and a round window in the gable.

History Not Available

Condition and Integrity Not Available

Location

19km south-east of Bathurst, comprising established trees along road within township and four groups of buildings:

1) The school group, near the intersection of the Bathurst and O'Connell/Wambool Road, comprising a red brick school, 1870 school residence and a small brick cottage,

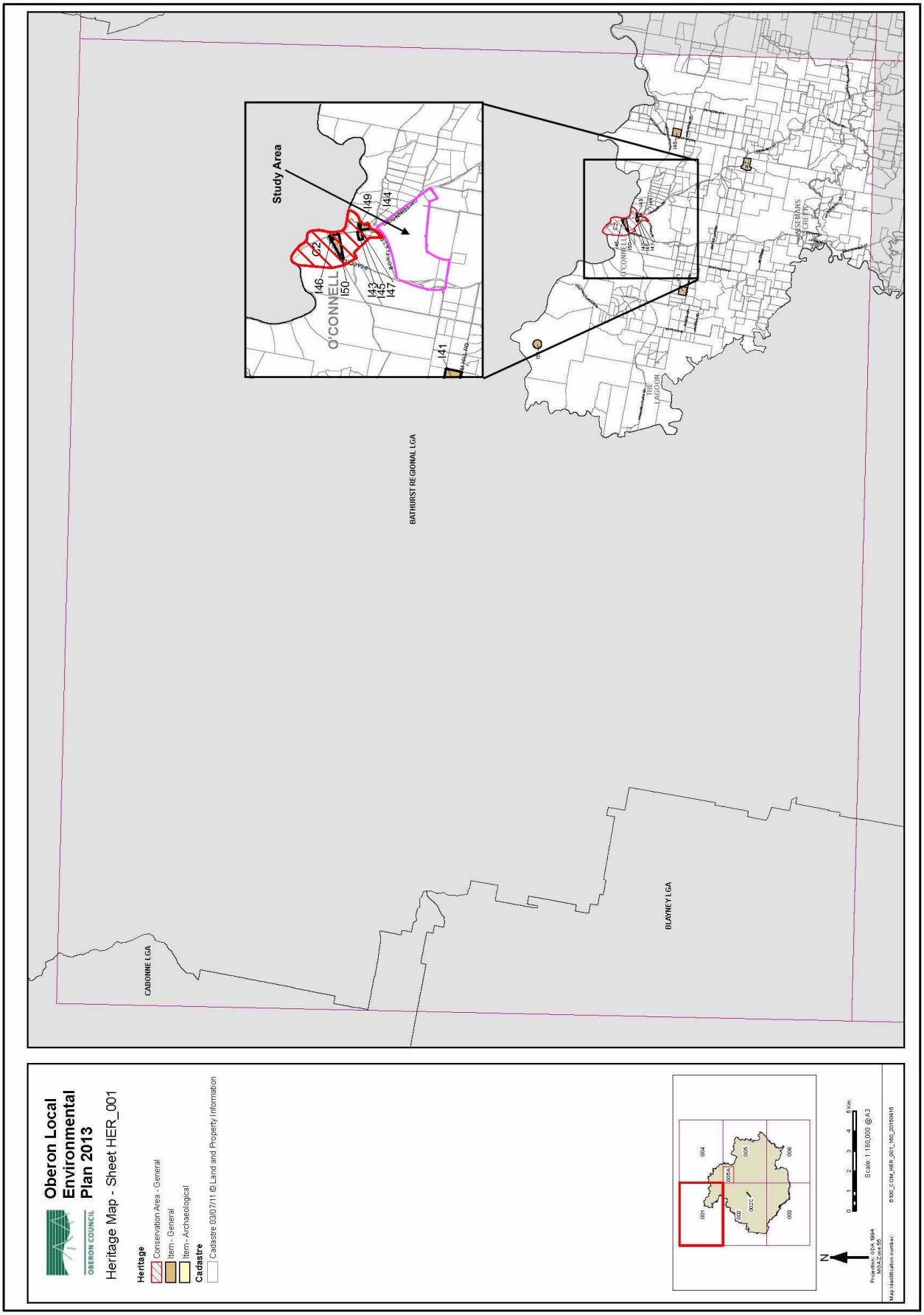
2) The store/farm group, at the intersection of the Bathurst-Oberon Road and Beaconsfield-O'Connell Road, comprising two brick stores, a pise barn, a slab barn, a timber woolshed and outbuildings,

3) The St Thomas Anglican Church group, on the Beaconsfield-O'Connell Road, comprising: church, rectory, hall and cemetery,

4) The St Francis Catholic Church Group, Bathurst-Oberon Road, comprising church, presbytery/post office, graveyard, timber school house, shop and cottage opposite church, the O'Connell Hotel and adjacent timber cottage.

Bibliography Not Available

Report Produced Tue Feb 21 11:55:40 2017


Oberon Local Environmental Plan 2013
OBERON COUNCIL
Heritage Map - Sheet HER_001
Heritage
Conservation Area - General
Item - General
Item - Archaeological
Cadastre
Cadastre 03/07/11 © Land and Property Information
Study Area
O'CONNELL
BATHURST REGIONAL LGA
BLAYNEY LGA
CABONNE LGA
I41
I42
I43
I44
I45
I46
I47
I49
I50
G22
THE LAGOON
Scale: 1:160,000 @A3
Projection: GDA 1994 MGA Zone 55
Map identification number: 6700_COM_HER_001_160_20150415

APPENDIX 3: HISTORIC HERITAGE: UNANTICIPATED FINDS PROTOCOL

A historic artefact is anything which is the result of past activity not related to the Aboriginal occupation of the area. This includes pottery, wood, glass and metal objects as well as the built remains of structures, sometimes heavily ruined.

Heritage significance is assessed by suitably qualified archaeologists who place the item or site in context and determine its role in aiding the community's understanding of the local area, or their wider role in being an exemplar of State or even National historic themes.

Protocol to be followed in the event that previously unrecorded or unanticipated historic object(s) are encountered:

1. All ground surface disturbance in the area of the finds should cease immediately the finds are uncovered.
    a) The discoverer of the find(s) will notify machinery operators in the immediate vicinity of the find(s) so that work can be halted; and
    b) The site supervisor will be informed of the find(s).
2. If finds are suspected to be human skeletal remains, then NSW Police must be contacted as a matter of priority.
3. If there is substantial doubt regarding the historic significance for the finds, then gain a qualified opinion from an archaeologist as soon as possible. This can circumvent proceeding further along the protocol for items which turn out not to be significant. If a quick opinion cannot be gained, or the identification is that the item is likely to be significant, then proceed to the next step.
4. Immediately notify OEH (Heritage Branch) of the discovery:
5. Facilitate, in co-operation with the appropriate authorities:
    a) The recording and assessment of the finds;
    b) Fulfilling any legal constraints arising from the find(s). This will include complying with OEH directions; and
    c) The development and conduct of appropriate management strategies. Strategies will depend on consultation with stakeholders and the assessment of the significance of the find(s).
6. Where the find(s) are determined to be significant historic items, any re-commencement of construction related ground surface disturbance may only resume in the area of the find(s) following compliance with any consequential legal requirements and gaining written approval from OEH (normally a Section 60 excavation permit).

Appendix D

CONTAMINATION ASSESSMENT

Contamination investigation

Belvoir, Part Lot 4 DP1023024, Beaconsfield Road, O'Connell NSW

Ref: R7983c
Date: 12 May 2017

Envirowest Consulting *Pty Ltd* ABN 18 103 955 246
• 9 Cameron Place, PO Box 8158, Orange NSW 2800 • Tel (02) 6361 4954 •
• 6/72 Corporation Avenue, Bathurst NSW Fax (02) 6360 3960
• Email admin@envirowest.net.au • Web www.envirowest.net.au •

Environmental
Geotechnical
Asbestos
Services

Client:	Belvoir Pastoral Company c/- Geolyse PO Box 1963 Orange NSW 2800
Assessors:	Ashleigh Pickering BSc Environmental Scientist
Checked by:	Leah Desborough BNatRes (Hons) Senior Environmental Scientist
Authorised by:	Greg Madafiglio CPSS Senior Soil Scientist
Interested authorities:	Oberon Council
Date:	12 May 2015
Report Number:	R7983c

Summary report

Address: *Belvoir*, Beaconsfield Road, O'Connell NSW

Lot: Part Lot 4 Section: - DP: 1023024

Dates of works 23/02/2017

Main areas of concern

A rural residential subdivision is proposed for *Belvoir*, Part Lot 4 DP1023024, Beaconsfield Road, O'Connell NSW. The investigation area was the historic sheep spray dip located in the western section of the lot. The process of sheep dipping is expected to have resulted in the splashing and spraying of some chemical solution onto soil near the spray dip and drainage pen.

Notable contaminant concentrations

Three soil samples were above the human health adopted threshold for arsenic (100mg/kg). Organochlorine pesticides (OCP) and organophosphate pesticides (OPP) were not detected in any soil samples or water sample collected.

B2 – 140 mg/kg arsenic
B3 – 150mg/kg arsenic
B4 – 110 mg/kg arsenic

Nature of works carried out

An investigation including site inspection and surface soil sampling was undertaken within the investigation area surrounding the historic sheep spray dip.

Nature and extent of residual contamination

Arsenic impacted soil was identified downslope of the spray dip and sump. The vertical and lateral extent of contamination requires additional investigations.

Risk factors

The potential contamination sources were chemicals used in the process of sheep spray dipping for control of exoparasites including arsenic, OCP and OPP. The potential exposure pathways included direct (ingestion and absorption) and indirect contact (inhalation). The potential receptors included on-site workers, residential, visitors and the terrestrial environment.

Waste removed

No soil was removed as part of the contamination investigation.

Remediation summary

Additional sampling is required to determine the lateral and vertical extent of arsenic impacted material. Remediation of the sheep spray dip site will be required to enable suitability of the site for the proposed land-use. A remediation action plan should be prepared describing the remediation process. A validation report should be prepared to confirm the effective clean-up of the sheep dip site. The expected remediation method is excavation of the contaminated material and transport to landfill. The arsenic contaminated soil is expected to be classified as general solid waste.

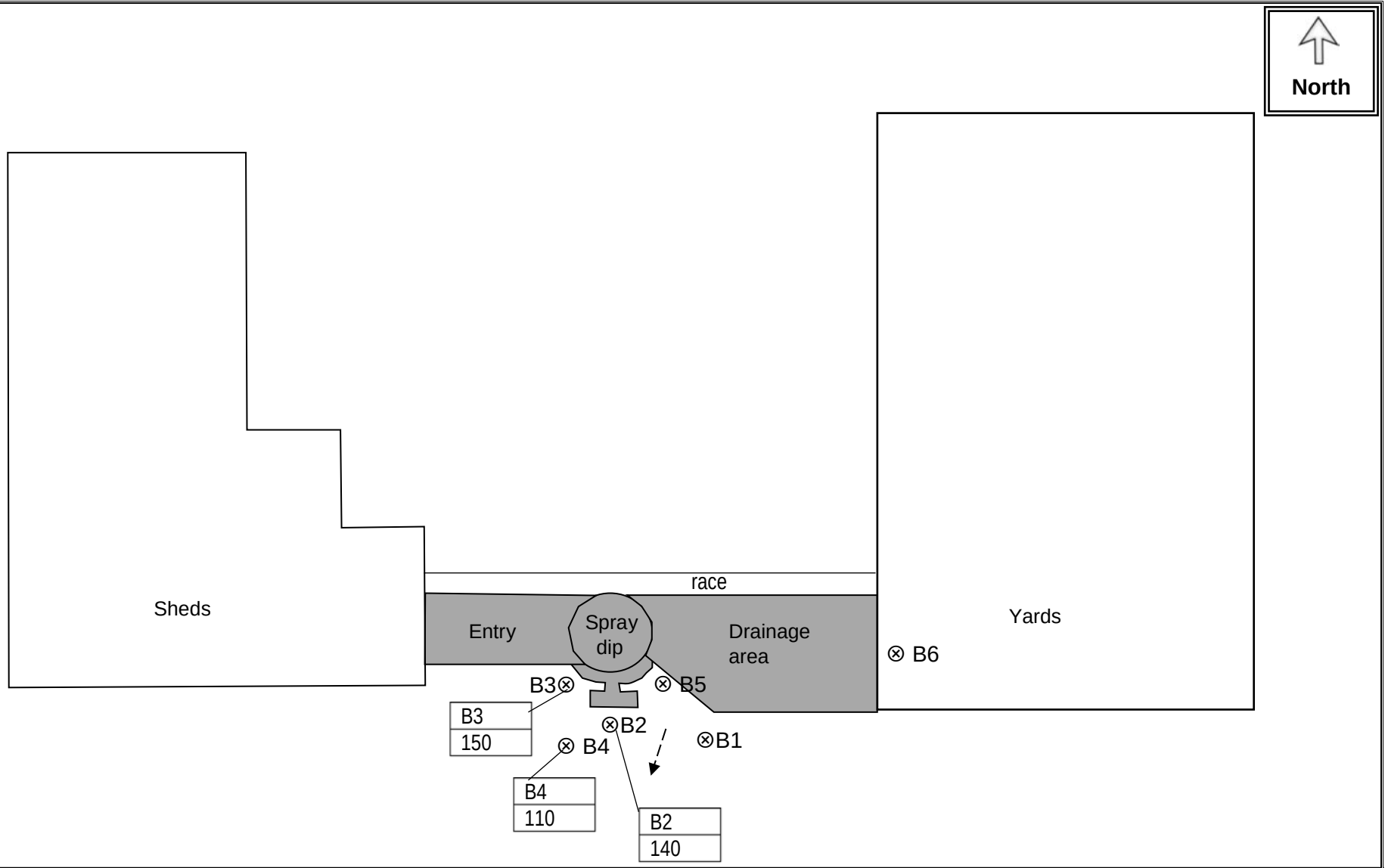
Statement if suitability

The site is expected to be made suitable for the proposed residential land-use following remediation of arsenic impacted soils.

This is an accurate summary of the report titled: Preliminary Contamination investigation – *Belvoir*, Part Lot 4 DP1023024, Beaconsfield Road, O'Connell NSW (Report number R7983c)

Produced by: Envirowest Consulting Pty Ltd Dated: 12/05/2017

Name: Gregory Madafiglio Certification details: Pending



Legend

⊗ Sampling locations

Slope

Concrete

Sample ID
Arsenic mg/kg

Approximate Scale 1: 300

0 3 6 12m

Figure: Plan of sheep spray dip site with elevated levels

Belvoir, Lot 4 DP1023024, Beaconsfield Road, O'Connell NSW

Envirowest Consulting Pty Ltd

Job: R7983c	Drawn by: AP	Date: 12/5/2017

Contents

page

1. Introduction

A residential subdivision is proposed for *Belvoir*, Part Lot 4 DP1023024, Beaconsfield Road, O'Connell NSW. A historical sheep spray dip is located on the site and a contamination investigation is required to determine if the site is suitable for proposed residential land-use.

A desktop study and a review of the available history were undertaken of the site. A walkover and site inspection for evidence of contamination from past activities was conducted on 23 February 2017. Soil samples were collected and analysed for arsenic and persistent pesticides.

2. Scope of work

Envirowest Consulting Pty Ltd was commissioned by Geolyse on behalf of Belvoir Pastoral Company to undertake a preliminary contamination investigation, in accordance with the contaminated land management planning guidelines, from the *Contaminated Land Management Act 1997* and the *State Environmental Policy No. 55 (SEPP 55)*, of the site on *Belvoir*, Lot 4 DP1023024, Beaconsfield Road, O'Connell NSW. The objective was to identify contamination associated with the historic sheep dip.

3. Site identification

Address	Beaconsfield Road O'Connell NSW
Owner(s)	c/- Belvoir Pastoral Company
Deposited plans	Part Lot 4 DP1023024
Locality map	Figure 1
Site plan	Figure 2
Photographs	Figure 3
Area	Site – approximately 200ha Investigation area – approximately 200m^2

4. Site history

4.1 Zoning

The site is zoned RU1- Primary Production in the Oberon Local Environmental Plan (2013).

4.2 Land-use

The site has an agricultural land-use history. Land-use of the site at the time of inspection was livestock grazing with a proposal for a residential subdivision.

4.3 Summary of council records

Council records of a sheep dip located on the site.

4.4 Sources of information

- Site inspection 23 February 2017 by Envirowest Consulting
- Aerial photographs 2012 and 2015
- Interview with the current owner – Cameron
- NSW EPA records of public notices under the CLM Act 1997

4.5 Chronological list of site uses

The aerial photos indicate the site has historically been used for grazing of stock. The historic concrete sheep spray dip and associated yards are still present on the site. The sheep dip was reportedly constructed in the 1970's and was used until 1997. Yards surrounding the dip had been abandoned at the time of inspection.

No obvious changes are evident in the aerial photographs (2012 and 2015). The surrounding property appears to be used for grazing of stock. No irrigated crops or horticulture crops are known to have been grown on the site.

4.6 Buildings and infrastructure

An abandoned concrete sheep spray dip was identified in the investigation area associated with the sheep yards. A shearing shed was located west of the historic sheep spray dip.

4.7 Previous investigations

None known

4.8 Relevant complaint history

Nil

4.9 Contaminated site register

The site is not listed on the NSW EPA register of contaminated sites.

4.10 Potential contaminants

Chemicals most likely used in the sheep dip were those registered for the control of sheep exoparasites. These could have included arsenic, organochlorine and organophosphate compounds. Arsenic, organochlorines and organophosphates are highly persistent in the soil.

4.11 Neighbouring land-use

North – Sheep yards
South – Grazing
East – Sheep yards
West – Shearing shed

No neighbouring land-uses are expected to have impacted on the contaminated status of the site.

4.12 Integrity assessment

The site history was obtained from a site inspection and history review. The information is consistent with the current site condition and to the best of the assessor's knowledge is accurate.

5. Site condition and environment

5.1 Surface cover

The investigation area had concrete surface cover with sparse vegetation surrounding the sheep spray dip.

5.2 Topography

The site is located on a mid-slope with a south western aspect.

5.3 Soils and geology

The soil is part of the Bathurst soil landscape. The area is dominated by with non-calcic brown soils with yellow solodic soils on lower slopes in drainage lines. Sands and mottles yellow solodic soils also occur (Kovac et al. 1990).

Geological unit in the area includes Bathurst Granite with parent rock including medium to coarse grained and massive granodiorites and adamellites. *In situ* and alluvial-colluvial materials are derived from parent rock (Kovac et al. 1990).

5.4 Water

5.4.1 Surface water

The soil is expected to have a moderate permeability. Eight Mile Creek is located on the site, approximately 1.3km west of the investigation area.

5.4.2 Groundwater

One groundwater bore is located within 500m of the investigation area. The bore is approximately 250m south west of the site. The bore is licenced for stock and domestic use. The water bearing zones are from 29m and standing water level from 27m. The groundwater is confined within sandstone and clay horizons.

5.5 Evidence of contamination checklist

Site layout showing industrial processes	None present
Sewer and service plans	None known
Manufacturing processes	None known
Underground tanks	None known
Product spills and loss history	No specific details known. It is assumed that some chemical spills would have occurred on the soil surrounding the sheep dip during its use.
Discharges to land, water and air	The process of sheep dipping is expected to have resulted in the splashing and spraying of some chemical solution onto soil near the spray dip and drainage pen. No waterways are located near the site.
Disposal locations, presence of drums, wastes and fill materials	After spraying, the chemical solution was pumped out onto adjacent land. The disposal of solution would have resulted in movement downslope from the dip.
Soil staining	Nil
Visible signs of plant stress, bare areas	The area surrounding the historic sheep dip had sparse vegetation
Odours	Nil
Ruins	The historic spray sheep dip is still present within the investigation area
Other	Nil

6. Data Quality Objectives

6.1 State the problem

A rural residential subdivision is proposed for *Belvoir*, part Lot 4 DP1023024, Beaconsfield Road, O'Connell NSW. A historical sheep dip is located on the site and a contamination investigation is required to ensure the site is suitable for proposed rural residential land-use.

6.2 Identify the decision

The proposed land-use is residential and the levels of contaminants should be less than the thresholds listed in Section 10. The decision problem is, do the levels of potential contaminants exceed the assessment criteria listed in Section 10.

6.3 Identify the inputs decision

Investigation of the site is required to identify any potential contaminants from historical land-use and activities.

6.4 Define the boundaries of the study

The investigation area is part Lot 4 DP1023024, Beaconsfield Road, O'Connell NSW.

6.5 Develop a decision rule

The guidelines for soil were the residential land-use health investigation levels (HIL) and ecological investigation levels (EIL) (Section 10). The guidelines for water were ANZECC (2000) Guidelines for 95% protection of aquatic ecosystems (Section 10).

6.6 Specify acceptable limits on the decision errors.

The 95% upper confidence limit of average levels of samples collected is less than the threshold levels.

6.7 Optimize the design for obtaining data

Sampling was undertaken as described in Section 8.2.

Quality assurance and quality control objective and indicators are described in Section 8.

7. Sampling analysis plan and sampling methodology

7.1 Sampling strategy

7.1.1 Sampling design

A systematic sampling strategy was undertaken over the sheep dip site.

7.1.2 Sampling density

The soil samples were collected on an approximate 5m grid pattern in the historic sheep dip area.

One water sample was collected from the concrete sump.

7.1.3 Sampling locations

The soil samples were collected on 23 February 2017. The approximate location of each soil sampling site is described in Figure 3.

Six discrete soil samples were collected from the historic sheep dip area. Chemical movement to the soil surrounding the sheep dip occurs from splash of the dip solution in the treatment process, dripping of the solution from the sheep after treatment and flows from the cleaning out process. The contaminated area is expected to be immediately adjacent to the sheep dip, the drainage areas and downslope of the dip (McDougall and Macoun 1996).

One water sample was collected form the concrete sump.

Schedule of samples collected for laboratory analysis is outlined in Table 1.

7.1.4 Sampling depth

No soil disturbance is known to have occurred. The contaminants of concern are expected to be contained within the top 100mm of soil. Samples were taken from the 0-100mm soil layers. The water sample collected was a sample of the water present in the concrete sump.

7.2 Analytes

The samples were analysed for potential contaminants of concern as listed in Section 4.10

Table 1. Schedule of samples and analyses

Sample ID	Location	Depth (mm)	Analysis undertaken
B1	Downslope of the spray dip drainage area	0-100	Arsenic (As), organochlorine pesticides (OCP) and organophosphate pesticides (OPP)
B2	Downslope of the sump	0-100	As, OCP, OPP
B3	Downslope of the spray dip	0-100	As, OCP, OPP
B4	Downslope of the sump and spray dip	0-100	As, OCP, OPP
B5	Adjacent the spray dip and downslope of the drainage area	0-100	As, OCP, OPP
B6	Within holding pen east of the drainage area	0-100	As, OCP, OPP
B7	Sump water	-	OCP, OPP

7.3 Sampling methods

Soil samples were taken using a stainless steel hand shovel. Soil was taken at each individual sampling location below the vegetated and detrital layer.

The water sample was collected from the water present in the concrete sump.

8. Quality assurance and quality control

8.1 Sampling design

The sampling program is intended to provide data as to the presence and levels of contaminants.

Six discrete soil samples were collected on a judgemental sampling strategy. One water sample was collected from the sump.

The number and location of samples taken is expected to provide an adequate assurance that the soil samples are representative of the areas targeted.

8.2 Field

The collection of samples was undertaken in accordance with accepted standard protocols (NEPC 1999). All soil samples were analysed for arsenic, OCP and OPP. The water sample was analysed for OCP and OPP.

One field duplicate was collected. Sampling equipment was decontaminated between each sampling event. The appropriate storage conditions and duration were observed between sampling and analysis. A chain of custody form accompanied the samples to the laboratory (Appendix 2).

A single sampler was used to collect the samples using standard methods. Soil collected was a fresh sample from a hand shovel. After collection the samples were immediately placed in new glass sampling jars and placed in a cooler.

Water was collected from the sump and immediately placed into a sampling jar.

No field blank, rinsate, trip blank or matrix spikes were submitted for analysis.

A field sampling log is presented in Appendix 3.

8.3 Laboratory

Chemical analysis was conducted by SGS Laboratories, Alexandria, which is NATA accredited for the tests undertaken. The laboratories have quality assurance and quality control programs in place, which include internal replication and analysis of spike samples and recoveries.

Method blanks, matrix duplicates and laboratory control samples were within acceptance criteria. The quality assurance and quality control report is presented together with the laboratory report as Appendix 2.

8.4 Data evaluation

The laboratory quality control report indicates the data variability is within acceptable industry limits. The data is considered representative and usable for the purposes of the investigation. Data quality indicators are presented in Appendix 1.

9. Conceptual site model

Contamination source, exposure pathways and receptors are presented below.

Contamination source	Potential exposure pathways	Receptors
Arsenic impacted soils OCP impacted soils	Airborne (inhalation) Direct contact (ingestion and absorption)	*On-site* Site workers Residential *Off-site* Residential Rural

10. Assessment criteria

The laboratory results were assessed against the proposed land-use of residential with access to soil. The health-based investigation levels of contaminants in the soil for residential sites, for the substances for which criteria are available, are listed in Table 2, as recommended in the NEPC (1999).

Ecological investigation levels (EIL) have been developed for the protection of terrestrial ecosystems for selected metals and organic substances in the soil in the guideline (NEPC 1999). EILs vary with land-use and apply to contaminants up to 2m depth below the surface. The EILs for residential land-use are listed in Table 2.

Water samples for metals were assessed against the aquatic freshwater ecosystem trigger value for protection of 95% of species (ANZECC 2000).

Table 2. Assessment criteria for soil samples (mg/kg) and water (µg/L)

Analyte	HIL A - Residential land-use with access to soil threshold (NEPC 1999)	EIL – Urban residential and public open space	95% Protection for freshwater species (ANZECC 2000)
Arsenic	100	100	-
DDT+DDE+DDD	240	-	
DDT	-	180	0.01
Aldrin and dieldrin	6	-	-
Chlordane	50	-	0.08
Endosulfan	270	-	0.2
Endrin	10	-	0.02
Heptachlor	6	-	0.09
Chlorpyrifos	-	-	0.01
Diazinon	-	-	-

11. Results and discussion

The investigation area had a surface cover of concrete with sparse vegetation surrounding the spray sheep dip.

Soil samples (B2, B3 and B4) adjacent to the sheep spray dip and sump contained elevated levels of arsenic (140mg/kg, 150mg/kg and 110mg/kg respectively) exceeding the adopted assessment criteria 100 mg/kg (Table 3). Contamination of soil surrounding the dip is expected to have occurred as a result of spraying in the dipping process, spills in mixing the chemicals and surface run off in the cleaning operation.

Levels of all analytes in other soil samples collected around the sheep dip and evaluated (Table 3) were low or below detection limits and less than the adopted residential land-use threshold.

The water sample collected from the sump contained levels of OCP and OPP below the detection limit (Table 3) and less than the adopted threshold for 95% protection of freshwater species.

Table 3. Analytical results and threshold concentrations – soil (mg/kg) and water (µg/L)

Sample ID	Location	Arsenic	DDT +DDE+DDD	DDD	Aldrin and Dieldrin	Total OCP	Total OPP
B1	Downslope of the spray dip drainage area	56	ND	ND	ND	ND	ND
B2	Downslope of the sump	140	ND	ND	ND	ND	ND
B3	Downslope of the spray dip	150	ND	ND	ND	ND	ND
B4	Downslope of the sump and spray dip	110	ND	ND	ND	ND	ND
B5	Adjacent the spray dip and downslope of the drainage area	25	ND	ND	ND	ND	ND
B6	Within holding pen east of the drainage area	21	ND	ND	ND	ND	ND
B7	Water collected from sump	-	ND	ND	ND	ND	ND
HIL A - Residential land-use (NEPC 1999)		*100*	*240*	*-*	*6*	*-*	*-*
EIL – Residential and public open space		*100*	*-*	*180*	*-*	*-*	*-*
95% Protection for freshwater species (ANZECC 2000)		*-*	*-*	*0.01*	*-*	*-*	*-*

ND = not detected at the detection limit.

12. Site characterisation

12.1 Environmental contamination

Soil around the sheep dip contained arsenic at levels greater than the adopted threshold of 100mg/kg. The lateral and vertical extent of the contamination has not been determined.

12.2 Chemical degradation production

Arsenic is an element and consequently does not degrade, rather forms complexes with other compounds. Arsenic can exist in a variety of valencies and forms. The binding of arsenate to oxides and hydroxides is at a maximum between pH 3-7 (Holm and Curtis 1989). The pH at the dip site is expected to fall within this range.

12.3 Exposed population

Arsenic was detected at elevated levels downslope of the historic sheep dip and around the historic sump. The current land use in the area with elevated arsenic is rural and therefore exposure to people

at present is expected to be low. The contaminant is not highly mobile and not expected to move from the site without soil disturbance.

Effects on the soil biota are expected to be restricted to the area surround the dip. Movement of contaminants will occur by soil erosion.

13. Conclusions and recommendations

13.1 Summary

An inspection of the investigation area was made on 23 February 2017. The site is in a rural setting and has an investigation area of approximately 200m^2. A concrete sheep spray dip was identified.

The contamination status of the site was assessed from a soil sampling and laboratory analysis program. Six discrete soil samples were collected from the sheep dip investigation area. The soil samples were analysed for arsenic, organochlorine (OCP) and organophosphate pesticides (OCP).

The soil sampling program detected elevated levels of downslope of the concrete sheep spray dip and sump above the health based assessment criteria of 100 mg/kg (B2, B3 and B4).

The water sample collected from the sump contained levels of OCP and OPP below the detection limit and less than the adopted threshold for 95% protection of freshwater species.

13.2 Assumptions in reaching the conclusions

It is assumed the sampling locations are representative of the site. An accurate history has been obtained and typical past farming practices were adopted.

13.3 Extent of uncertainties

The analytical data relate only to the locations sampled. Soil conditions can vary both laterally and vertically and it cannot be excluded that unidentified contaminants may be present.

13.4 Suitability for proposed use of the site

Remediation is required before the investigation area is suitable for a residential land-use. The site is suitable for agricultural land-use.

13.5 Limitations and constraints on the use of the site

The area around the sheep dip is not suitable for the proposed residential land-use. The area is expected to be able to be made suitable following additional investigations and remediation of impacted soil.

13.6 Recommendation for further work

Additional sampling is required to determine the lateral and vertical extent of arsenic impacted material. Remediation of the sheep spray dip site will be required to enable suitability of the site for the proposed land-use. A remediation action plan should be prepared describing the remediation process. A validation report should be prepared to confirm the effective clean-up of the sheep dip site.

The expected remediation method is excavation of the contaminated material and transport to landfill. The arsenic contaminated soil is expected to be classified as general solid waste.

14. Report limitations and intellectual property

This report has been prepared for the use of the client to achieve the objectives given the clients requirements. The level of confidence of the conclusion reached is governed by the scope of the investigation and the availability and quality of existing data. Where limitations or uncertainties are known, they are identified in the report. No liability can be accepted for failure to identify conditions or issues which arise in the future and which could not reasonably have been predicted using the scope of the investigation and the information obtained.

The investigation identifies the actual subsurface conditions only at those points where samples are taken, when they are taken. Data derived through sampling and subsequent laboratory testing is interpreted by geologists, engineers or scientists who then render an opinion about overall subsurface conditions, the nature and extent of the contamination, it's likely impact on the proposed development and appropriate remediation measures. Actual conditions may differ from those inferred to exist, because no professional, no matter how well qualified, and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock or time. The actual interface between materials may be far more gradual or abrupt than a report indicates. Actual conditions in areas not sampled may differ from predictions. It is thus important to understand the limitations of the investigation and recognise that we are not responsible for these limitations.

15. References

DEC (2006) *Contaminated Sites: Guidelines for the NSW Site Auditors Scheme* (NSW Department of Environment and Conservation, Chatswood)

Environment Protection Authority (1995) *Contaminated sites: Sampling Design Guidelines* (NSW Environment Protection Authority, Chatswood)

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Figures

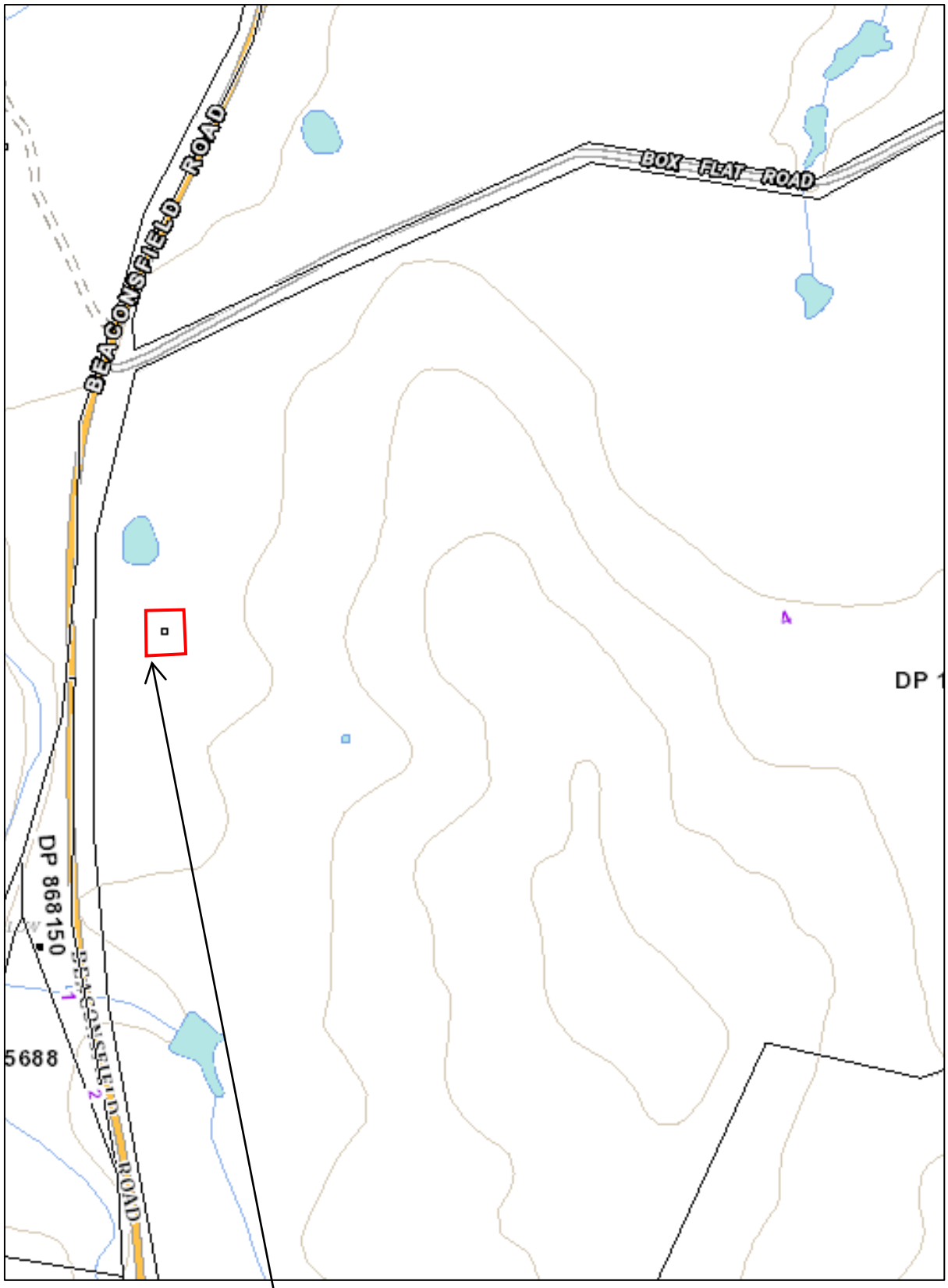
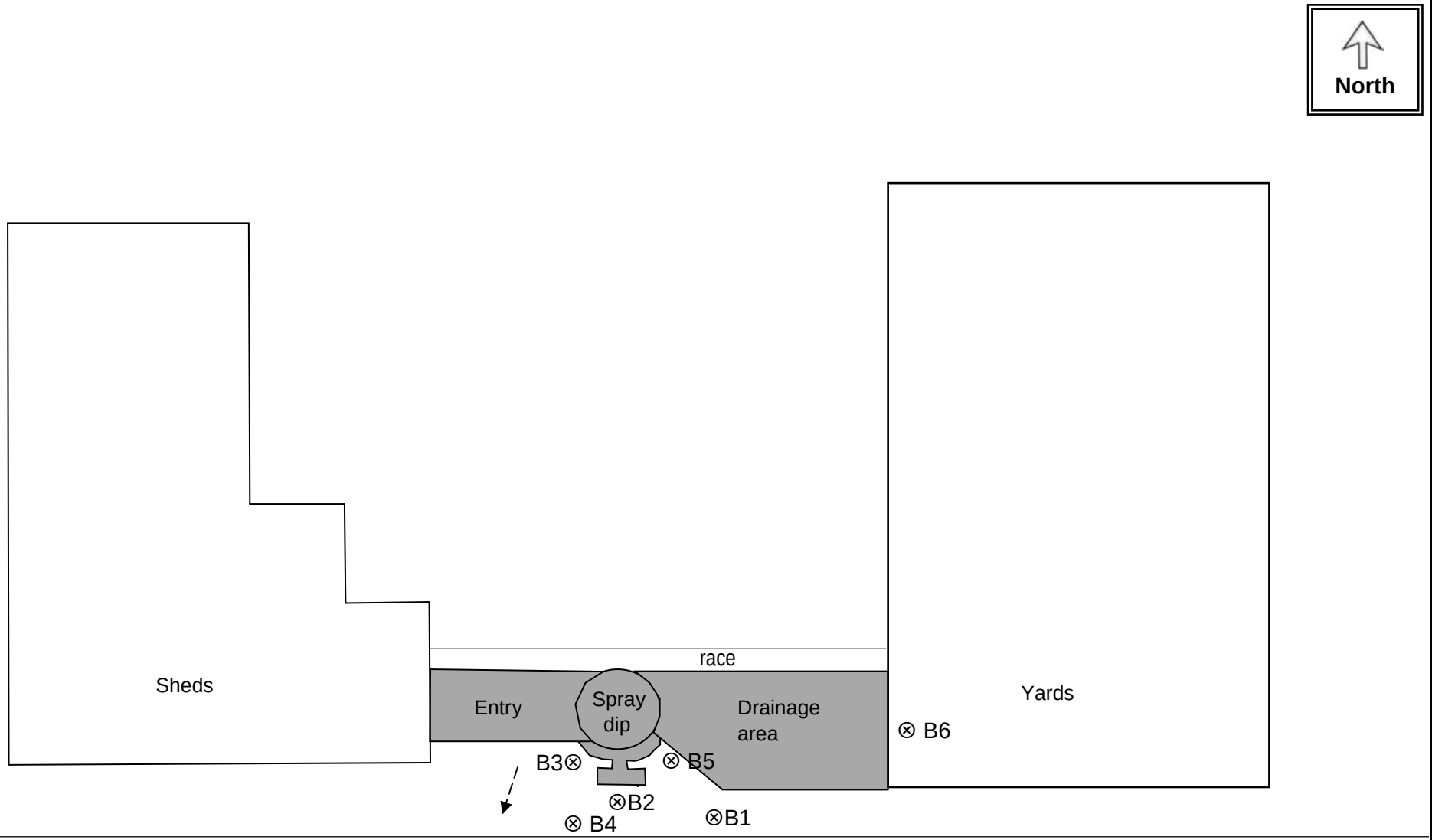


Figure 1: Locality map	
Belvoir, Lot 4 DP1023024, Beaconsfield Road, O'Connell NSW	
	Envirowest Consulting Pty Ltd
Job: R5246c1	Date: 2/05/2017

Figure 2: Aerial photograph and site layout	
Belvoir, Lot 4 DP1023024, Beaconsfield Road, O'Connell NSW	
	Envirowest Consulting Pty Ltd
Job: R7983c	Date: 12/05/2017



Legend

⊗ Sampling locations

Slope

Concrete

Approximate Scale 1: 300

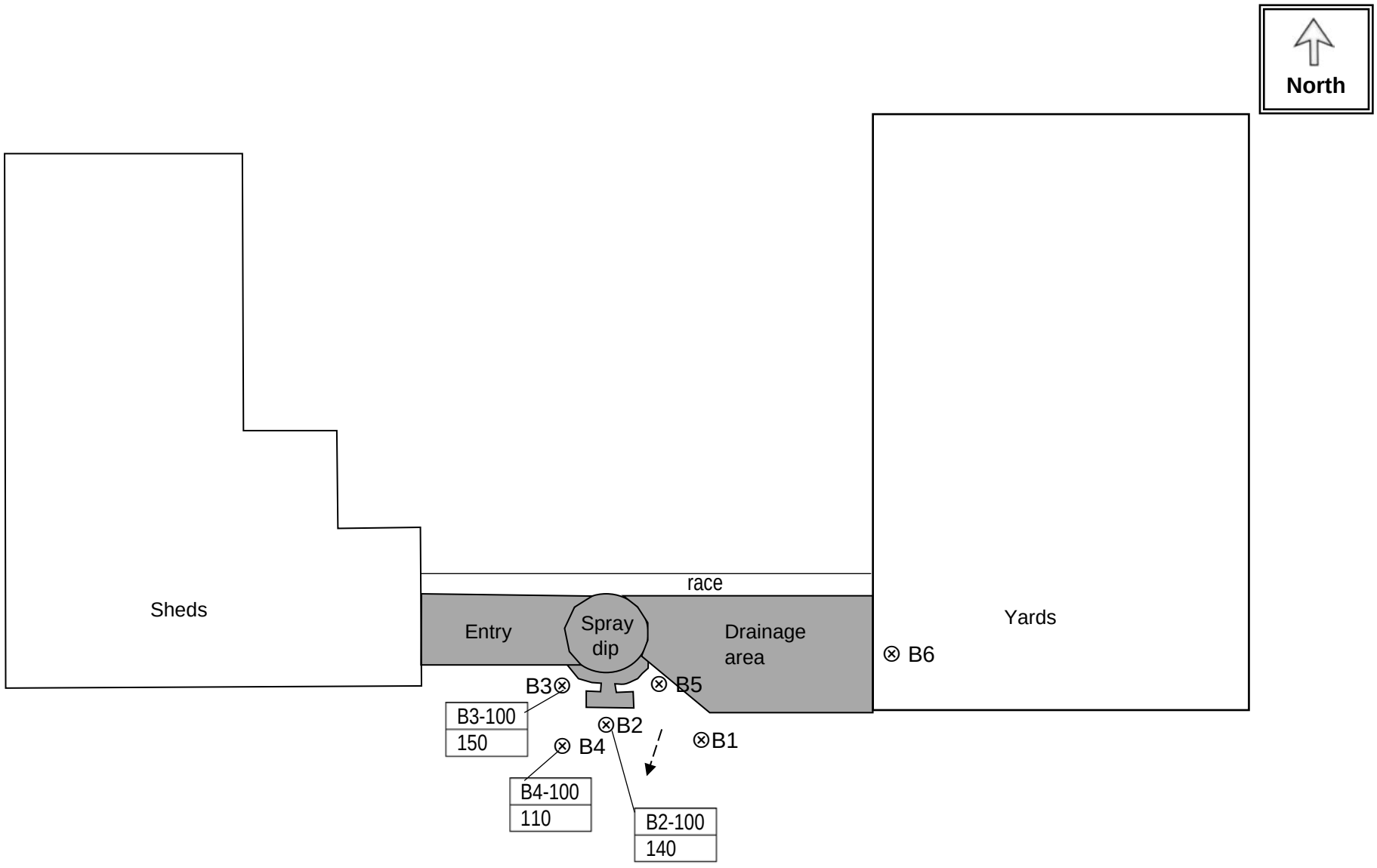
0 3 6 12m

Figure 3: Plan of sheep spray dip site and soil sampling locations

Belvoir, Lot 4 DP1023024, Beaconsfield Road, O'Connell NSW

Envirowest Consulting Pty Ltd

Job: R7983	Drawn by: AP	Date: 12/5/2017



Legend

⊗ Sampling locations

Slope

Concrete

BH-depth (mm)
Arsenic mg/kg

Approximate Scale 1: 300

0 3 6 12m

Figure 4: Plan of sheep spray dip site with elevated levels

Belvoir, Lot 4 DP1023024, Beaconsfield Road, O'Connell NSW

Envirowest Consulting Pty Ltd

Job: R7983c	Drawn by: AP	Date: 12/5/2017

Figure 5. Photographs of the site

Looking north west over investigation area towards spray dip

Looking north east over investigation area

Looking into concrete spray dip

Looking west towards across drainage area and spray

dipppendices

Appendices

Appendix 1. Soil sampling protocol
Appendix 2. Sample analysis, quality assurance and quality control (QAQC) report
Appendix 3. Field sampling log
Appendix 4. Soil analysis results – SGS report number SE162376 and chain of custody form.

Appendix 1. Soil sampling protocol

1. Sampling

The samples will be collected from the auger tip, mattock, hand auger or shovel immediately on withdrawal.

The time between retrieval of the sample and sealing of the sample container was kept to a minimum.

The material was collected using single use disposal gloves or a stainless steel spade which represented material which had not been exposed to the atmosphere prior to sampling.

All sampling jars were filled as close to the top as possible to minimise the available airspace within the jar.

2. Handling, containment and transport

Daily sampling activities will be recorded including sampling locations, numbers, observations, measurements, sampler, date and time and weather condition.

The sampling jars will be new sterile glass jars fitted with plastic lid and airtight Teflon seals, supplied by the laboratories for the purpose of collecting soil samples for analysis. Sample containers will be marked indelibly with the sample ID code to waterproof labels affixed to the body of the container.

All samples will be removed from direct sunlight as soon as possible after sampling and placed in insulated containers. Samples were stored in a refrigerator at 4°C prior to transportation to the laboratory in insulated containers with ice bricks in accordance with AS4482.1.

Handling and transportation to the laboratory will be accompanied with a chain of custody form to demonstrate the specimens are properly received, documents, processed and stored.

Maximum holding time for extraction (AS4482.1) are:

Analyte	Maximum holding time
Metals	6 months
Mercury	28 days
Sulfate	7 days
Oragnic carbon	7 days
OCP, OPP, PCB	14 days
TPH, BTEX, PAH, phenols	14 days

3. Decontamination of sampling equipment

Sampling tools will be decontaminated between sampling locations by

- Removing soil adhering to the sampling equipment by scraping, brushing or wiping
- Washing with a phosphate-free detergent
- Rinsing thoroughly with clean water
- Repeating if necessary
- Dry equipment with disposable towels or air

Appendix 2. Sample analysis, quality assurance and quality control (QA/QC) report

1. Data quality indicators (DQI) requirements

1.1 Completeness

A measure of the amount of usable data for a data collection activity. Greater than 95% of the data must be reliable based on the quality objectives. Where greater than two quality objectives have less reliability than the acceptance criterion the data may be considered with uncertainty.

1.1.1 Field

Consideration	Requirement
Locations and depths to be sampled	Described in the sampling plan. The acceptance criterion is 95% data retrieved compared with proposed. Acceptance criterion is 100% in crucial areas.
SOP appropriate and compiled	Described in the sampling plan.
Experienced sampler	Sampler or supervisor
Documentation correct	Sampling log and chain of custody completed

1.1.2 Laboratory

Consideration	Requirement
Samples analysed	Number according to sampling and quality plan
Analytes	Number according to sampling and quality plan
Methods	EPA or other recognised methods with suitable PQL
Sample documentation	Complete including chain of custody and sample description
Sample holding times	Metals 6 months, OCP, PAH, TPH, PCB 14 days

1.2 Comparability

The confidence that data may be considered to be equivalent for each sampling and analytical event. The data must show little or no inconsistencies with results and field observations.

1.2.1 Field

Consideration	Requirement
SOP	Same sampling procedures to be used
Experienced sampler	Sampler or supervisor
Climatic conditions	Described as may influence results
Samples collected	Sample medium, size, preparation, storage, transport

1.2.2 Laboratory

Consideration	Requirement
Analytical methods	Same methods, approved methods
PQL	Same
Same laboratory	Justify if different
Same units	Justify if different

1.3 Representativeness

The confidence (expressed qualitatively) that data are representative of each media present on the site.

1.3.1 Field

Consideration	Requirement
Appropriate media sampled	Sampled according to sampling and quality plan or in accordance with the EPA (1995) sampling guidelines.
All media identified	Sampling media identified in the sampling and quality plan. Where surface water bodies on the site sampled.

1.3.2 Laboratory

Consideration	Requirement
Samples analysed	Blanks

1.4 Precision

A quantitative measure of the variability (or reproduced of the data). Is measured by standard deviation or relative percent difference (RPD). A RPD analysis is calculated and compared to the practical quantitation limit (PQL) or absolute difference AD.

- Levels greater than 10 times the PQL the RPD is 50%
- Levels between 5 and 10 times the PQL the RPD is 75%
- Levels between 2 and 5 times the PQL the RPD is 100%
- Levels less than 2 times the PQL, the AD is less than 2.5 times the PQL

Data not conforming to the acceptance criterion will be examined for determination of suitability for the purpose of site characterisation.

1.4.1 Field

Consideration	Requirement
Field duplicates	Frequency of 5%, results to be within RPD or discussion required indicate the appropriateness of SOP

1.4.2 Laboratory

Consideration	Requirement
Laboratory and inter lab duplicates	Frequency of 5%, results to be within RPD or discussion required. Inter laboratory duplicates will be one sample per batch.
Field duplicates	Frequency of 5%, results to be within RPD or discussion required
Laboratory prepared volatile trip spikes	Not required as volatiles not analysed

1.5 Accuracy

A quantitative measure of the closeness of the reported data to the true value.

1.5.1 Field

Consideration	Requirement
SOP	Complied
Inter laboratory duplicates	Frequency of 5%. Analysis criterion 60% RPD for levels greater than 10 times the PQL 85% RPD for levels between 5 to 10 times the PQL 100% RPD at levels between 2 to 5 times the PQL Absolute difference, 3.5 times the PQL where levels are, 2 times PQL

1.5.2 Laboratory

Recovery data (surrogates, laboratory control samples and matrix spikes) data subject to the following control limits:

- 60 to 140% acceptable data
- 20-60% discussion required, may be considered acceptable
- 10-20% data should considered as estimates
- 10% data should be rejected

Consideration	Requirement
Field blanks	Frequency of 5%, <5 times the PQL, PQL may be adjusted
Rinsate blanks	Frequency of 5%, <5 times the PQL, PQL may be adjusted
Method blanks	Frequency of 5%, <5 times the PQL, PQL may be adjusted
Matrix spikes	Frequency of 5%, results to be within +/-40% or discussion required
Matrix duplicates	Sample injected with a known concentration of contaminants with tested. Frequency of 5%, results to be within +/-40% or discussion required
Surrogate spikes	QC monitoring spikes to be added to samples at the extraction process in the laboratory where applicable. Surrogates are closely related to the organic target analyte and not normally found in the natural environment. Frequency of 5%, results to be within +/-40% or discussion required
Laboratory control samples	Externally prepared reference material containing representative analytes under investigation. These will be undertaken at one per batch. It s to be within +/-40% or discussion required
Laboratory prepared spikes	Frequency of 5%, results to be within +/-40% or discussion required

2. Laboratory analysis summary

One analysis batch was undertaken over the investigation program. The samples were analysed at the laboratories of SGS, Alexandria, NSW which is National Association of Testing Authorities (NATA) accredited for the tests undertaken. The analyses undertaken, number of samples tested and methods are presented in the following tables:

Laboratory analysis schedule

Sample id. (sampling location)	Number of samples	Duplicate	Analyses	Date collected	Substrate	Lab report
B1, B2, B3, B4, B5 , B6	6	1	Arsenic (As), organochlorine pesticides (OCP), organophosphate pesticides (OPP)	2/05/17	Soil	SE162376

Analytical methods

Analyte	Extraction	Laboratory methods
Metals	USEPA 200.2 Mod	APHA USEPA SW846-6010
Mercury	USEPA 200.2 Mod	APHA 3112
TPH(C6-C9)	USPEA SW846-5030A	USPEA SW 846-8260B
TPH(C10-C36)	Tumbler extraction of solids	USEPA SW 846-8270B
PCB	Tumbler extraction of solids	USEPA SW 846-8270B
OC Pesticides	Tumbler extraction of solids	USEPA SW 846-8270B
BTEX	Tumbler extraction of solids	USEPA SW 846-8260B

3. Field quality assurance and quality control

One intra laboratory duplicate sample was collected for the investigation. The frequency was greater than the recommended frequency of 5%. Table A3.1 outlines the samples collected and differences in replicate analyses. Relative differences were deemed to pass if they were within the acceptance limits of +/- 40% for replicate analyses or less than 5 times the detection limit.

Table A3.1. Relative differences for intra laboratory duplicates

	B2, BDA	
	Relative difference (%)	Pass/Fail
Arsenic	0	Pass
OCP	NA	-
OPP	NA	-

NA – relative difference unable to be calculated as results are less than laboratory detection limit

No rinsate, trip blanks or spikes were submitted for analysis. This is not considered to create significant uncertainty in the analysis results because of the following rationale:

- The fieldwork was completed within a short time period and consistent methods were used for soil sampling.
- Soil samples were placed in insulated cooled containers after sampling to ensure preservation during transport and storage.
- The samples were placed in single use jars using clean sampling tools and disposable gloves from material not in contact with other samples. This reduces the likelihood of cross contamination.
- Samples in the analysis batch contain analytes below the level of detection. It is considered unlikely that contamination has occurred as a result of transport and handling.

4. Laboratory quality assurance and quality control

Sample holding times are recommended in NEPM (1999). The time between collection and extraction for all samples was less than the criteria listed below:

Analyte	Maximum holding time
Metals	6 months
Mercury	28 days
Sulfate	7 days
OCP, OPP, PCB	14 days
TPH, BTEX, PAH	14 days

The laboratory interpretative reports are presented with individual laboratory report. Assessment is made of holding time, frequency of control samples and quality control samples. No outliers exist for the sampling batch. The laboratory report also contains a detailed description of preparation methods and analytical methods.

The results, quality report, interpretative report and chain of custody are presented in the attached appendices. The quality report contains the laboratory duplicates, spikes, laboratory control samples, blanks and where appropriate matrix spike recovery (surrogate).

5. Data quality indicators (DQI)

5.1 Completeness

A measure of the amount of usable data for a data collection activity (total to be greater than 90%)

5.1.1 Field

Consideration	Accepted	Comment
Locations to be sampled	Yes	In accordance with sampling methodology, described in the report.
SOP appropriate and compiled	Yes	In accordance with sampling methodology
Experienced sampler	Yes	Environmental scientist
Documentation correct	Yes	Chain of custody completed

5.1.2 Laboratory

Consideration	Accepted	Comment
Samples analysed	Yes	In accordance with chain of custody and analysis plan
Analytes	Yes	In accordance with chain of custody and analysis plan
Methods	Yes	Analysed in NATA accredited laboratory with recognised methods and suitable PQL
Sample documentation	Yes	Completed including chain of custody and sample results and quality results
Sample holding times	Yes	Metals < 6 months Mercury < 28 days OCP, OPP, PAH, TPH, PCB, BTEX < 14 days

5.2 Comparability

The confidence that data may be considered to be equivalent for each sampling and analytical event.

5.2.1 Field

Consideration	Accepted	Comment
SOP	Yes	Same sampling procedures used and sampled on one date
Experienced sampler	Yes	Experienced environmental scientist
Climatic conditions	Yes	Sampling log
Samples collected	Yes	Suitable size and storage

5.2.2 Laboratory

Consideration	Accepted	Comment
Analytical methods	Yes	Same methods all samples
PQL	Yes	Suitable for analytes
Same laboratory	Yes	-
Same units	Yes	-

5.3 Representativeness

The confidence (expressed qualitatively) that data are representative of each media present on the site

5.3.1 Field

Consideration	Accepted	Comment
Appropriate media sampled	Yes	Sampled according to sampling and quality plan
All media identified	Yes	Soil sampling media identified in the sampling and quality plan

5.3.2 Laboratory

Consideration	Accepted	Comment
Samples analysed	Yes	Undertaken in NATA accredited laboratory. Samples in the analysis batch contain analytes below the level of detection. It is considered unlikely that contamination has occurred as a result of transport and handling.

5.4 Precision

A quantitative measure of the variability (or reproduced of the data)

5.4.1 Field

Consideration	Accepted	Comment
SOP	Yes	Complied
Field duplicates	Yes	Greater than 5% frequency

5.4.2 Laboratory

Consideration	Accepted	Comment
Laboratory duplicates	Yes	Frequency of 5%, results to be within +/-40% or discussion required
Field duplicates (intra and inter laboratory)	Yes	Frequency of 5%. Comparisons described in Tables A1.1 and A1.2. Results within +/-40 or<5 times detection limit.
Laboratory prepared volatile trip spikes	N/A	Volatiles analytes were not analysed

5.5 Accuracy

A quantitative measure of the closeness of the reported data to the true value

5.5.1 Field

Consideration	Accepted	Comment
SOP	Yes	Complied
Field blanks	Yes	Frequency of 5%, <5 times the PQL, PQL may be adjusted

5.5.2 Laboratory

Consideration	Accepted	Comment
Method blanks	Yes	Frequency of 5%, <5 times the PQL, PQL may be adjusted
Matrix spikes	No	Frequency of 5%, results to be within +/-40% or discussion required
Matrix duplicates	No	Frequency of 5%, results to be within +/-40% or discussion required
Surrogate spikes	Yes	Frequency of 5%, results to be within +/-40% or discussion required
Laboratory control samples	Yes	Frequency of 5%, results to be within +/-40% or discussion required
Laboratory prepared spikes	Yes	Frequency of 5%, results to be within +/-40% or discussion required Results outside limits due to laboratory instrumentation

6. Conclusion

All media appropriate to the objectives of this investigation have been adequately analysed and no area of significant uncertainty exist.

It is concluded the data is usable for the purposes of the investigation.

Appendix 3. Field sampling log

Client	c/- Geolyse
Contact	-
Job number	R7983c
Location	*Belvoir,* Lot 4 DP1023024, Beaconsfield Road, O'Connell NSW
Date	23/02/2017
Investigator(s)	Greg Madafiglio and Dane Graham
Weather conditions	Warm and sunny

Sample id	Matrix	Date	Analysis required	Observations/comments
B1	Soil	23/02/2017	As, OCP, OPP	
B2	Soil	23/02/2017	As, OCP, OPP	
B3	Soil	23/02/2017	As, OCP, OPP	
B4	Soil	23/02/2017	As, OCP, OPP	
B5	Soil	23/02/2017	As, OCP, OPP	
B6	Soil	23/02/2017	As, OCP, OPP	
DBA	Soil	23/02/2017	As, OCP, OPP	Duplicate of B2

Appendix 4. Soil analysis results – SGS report number SE162376 and chain of custody form.

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Greg Madafiglio
Client	ENVIROWEST CONSULTING PTY LIMITED
Address	PO BOX 8158 ORANGE NSW 2800
Telephone	61 2 63614954
Facsimile	(Not specified)
Email	greg@envirowest.net.au
Project	**7983**
Order Number	**7983**
Samples	8

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE162376 R0**
Date Received	24/2/2017
Date Reported	3/3/2017

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

SIGNATORIES

Bennet Lo
Senior Organic Chemist/Metals Chemist

Ly Kim Ha
Organic Section Head

OC Pesticides in Soil [AN420] Tested: 27/2/2017

PARAMETER	UOM	LOR	B1 SOIL - 23/2/2017 SE162376.001	B2 SOIL - 23/2/2017 SE162376.002	B3 SOIL - 23/2/2017 SE162376.003	B4 SOIL - 23/2/2017 SE162376.004	B5 SOIL - 23/2/2017 SE162376.005
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

OC Pesticides in Soil [AN420] Tested: 27/2/2017 (continued)

PARAMETER	UOM	LOR	B6 SOIL - 23/2/2017 SE162376.006	BDA SOIL - 23/2/2017 SE162376.007
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1

OP Pesticides in Soil [AN420] Tested: 27/2/2017

PARAMETER	UOM	LOR	B1 SOIL - 23/2/2017 SE162376.001	B2 SOIL - 23/2/2017 SE162376.002	B3 SOIL - 23/2/2017 SE162376.003	B4 SOIL - 23/2/2017 SE162376.004	B5 SOIL - 23/2/2017 SE162376.005
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2

PARAMETER	UOM	LOR	B6 SOIL - 23/2/2017 SE162376.006	BDA SOIL - 23/2/2017 SE162376.007
Dichlorvos	mg/kg	0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 2/3/2017

PARAMETER	UOM	LOR	B1 SOIL - 23/2/2017 SE162376.001	B2 SOIL - 23/2/2017 SE162376.002	B3 SOIL - 23/2/2017 SE162376.003	B4 SOIL - 23/2/2017 SE162376.004	B5 SOIL - 23/2/2017 SE162376.005
Arsenic, As	mg/kg	1	56	140	150	110	25
Cadmium, Cd	mg/kg	0.3	0.4	0.3	0.5	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	14	18	83	15	7.2
Copper, Cu	mg/kg	0.5	7.2	14	16	11	11
Lead, Pb	mg/kg	1	12	17	20	12	20
Nickel, Ni	mg/kg	0.5	3.2	4.5	4.2	3.9	3.4
Zinc, Zn	mg/kg	2	67	250	430	210	110

PARAMETER	UOM	LOR	B6 SOIL - 23/2/2017 SE162376.006	BDA SOIL - 23/2/2017 SE162376.007
Arsenic, As	mg/kg	1	21	140
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	13	18
Copper, Cu	mg/kg	0.5	13	13
Lead, Pb	mg/kg	1	18	20
Nickel, Ni	mg/kg	0.5	3.5	4.1
Zinc, Zn	mg/kg	2	130	230

Moisture Content [AN002] Tested: 27/2/2017

PARAMETER	UOM	LOR	B1 SOIL - 23/2/2017 SE162376.001	B2 SOIL - 23/2/2017 SE162376.002	B3 SOIL - 23/2/2017 SE162376.003	B4 SOIL - 23/2/2017 SE162376.004	B5 SOIL - 23/2/2017 SE162376.005
% Moisture	%w/w	0.5	2.6	6.1	3.4	2.8	1.7

PARAMETER	UOM	LOR	B6 SOIL - 23/2/2017 SE162376.006	BDA SOIL - 23/2/2017 SE162376.007
% Moisture	%w/w	0.5	2.8	5.5

OC Pesticides in Water [AN420] Tested: 27/2/2017

PARAMETER	UOM	LOR	B7 WATER - 23/2/2017 SE162376.008
Hexachlorobenzene (HCB)	µg/L	0.1	<0.1
Alpha BHC	µg/L	0.1	<0.1
Lindane (gamma BHC)	µg/L	0.1	<0.1
Heptachlor	µg/L	0.1	<0.1
Aldrin	µg/L	0.1	<0.1
Beta BHC	µg/L	0.1	<0.1
Delta BHC	µg/L	0.1	<0.1
Heptachlor epoxide	µg/L	0.1	<0.1
o,p'-DDE	µg/L	0.1	<0.1
Alpha Endosulfan	µg/L	0.1	<0.1
Gamma Chlordane	µg/L	0.1	<0.1
Alpha Chlordane	µg/L	0.1	<0.1
trans-Nonachlor	µg/L	0.1	<0.1
p,p'-DDE	µg/L	0.1	<0.1
Dieldrin	µg/L	0.1	<0.1
Endrin	µg/L	0.1	<0.1
o,p'-DDD	µg/L	0.1	<0.1
o,p'-DDT	µg/L	0.1	<0.1
Beta Endosulfan	µg/L	0.1	<0.1
p,p'-DDD	µg/L	0.1	<0.1
p,p'-DDT	µg/L	0.1	<0.1
Endosulfan sulphate	µg/L	0.1	<0.1
Endrin aldehyde	µg/L	0.1	<0.1
Methoxychlor	µg/L	0.1	<0.1
Endrin ketone	µg/L	0.1	<0.1
Isodrin	µg/L	0.1	<0.1
Mirex	µg/L	0.1	<0.1

OP Pesticides in Water [AN420] Tested: 27/2/2017

PARAMETER	UOM	LOR	B7 WATER - 23/2/2017 SE162376.008
Dichlorvos	µg/L	0.5	<0.5
Dimethoate	µg/L	0.5	<0.5
Diazinon (Dimpylate)	µg/L	0.5	<0.5
Fenitrothion	µg/L	0.2	<0.2
Malathion	µg/L	0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2
Parathion-ethyl (Parathion)	µg/L	0.2	<0.2
Bromophos Ethyl	µg/L	0.2	<0.2
Methidathion	µg/L	0.5	<0.5
Ethion	µg/L	0.2	<0.2
Azinphos-methyl	µg/L	0.2	<0.2

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
		NVL	Not validated.	LOR	Limit of Reporting.
**	Indicative data, theoretical holding time exceeded.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

STATEMENT OF QA/QC PERFORMANCE

SE162376 R0

CLIENT DETAILS

Contact	Greg Madafiglio
Client	ENVIROWEST CONSULTING PTY LIMITED
Address	PO BOX 8158 ORANGE NSW 2800
Telephone	61 2 63614954
Facsimile	(Not specified)
Email	greg@envirowest.net.au
Project	**7983**
Order Number	**7983**
Samples	8

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE162376 R0**
Date Received	24 Feb 2017
Date Reported	03 Mar 2017

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Matrix Spike	Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES	1 item

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	7 Soil, 1 Water
Date documentation received	24/2/2017	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	16.1°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

HOLDING TIME SUMMARY

SE162376 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
B1	SE162376.001	LB119431	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	04 Mar 2017	28 Feb 2017
B2	SE162376.002	LB119431	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	04 Mar 2017	28 Feb 2017
B3	SE162376.003	LB119431	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	04 Mar 2017	28 Feb 2017
B4	SE162376.004	LB119431	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	04 Mar 2017	28 Feb 2017
B5	SE162376.005	LB119431	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	04 Mar 2017	28 Feb 2017
B6	SE162376.006	LB119431	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	04 Mar 2017	28 Feb 2017
BDA	SE162376.007	LB119431	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	04 Mar 2017	28 Feb 2017

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
B1	SE162376.001	LB119368	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	08 Apr 2017	02 Mar 2017
B2	SE162376.002	LB119368	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	08 Apr 2017	02 Mar 2017
B3	SE162376.003	LB119368	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	08 Apr 2017	02 Mar 2017
B4	SE162376.004	LB119368	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	08 Apr 2017	02 Mar 2017
B5	SE162376.005	LB119368	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	08 Apr 2017	02 Mar 2017
B6	SE162376.006	LB119368	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	08 Apr 2017	02 Mar 2017
BDA	SE162376.007	LB119368	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	08 Apr 2017	02 Mar 2017

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
B7	SE162376.008	LB119377	23 Feb 2017	24 Feb 2017	02 Mar 2017	27 Feb 2017	08 Apr 2017	03 Mar 2017

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
B1	SE162376.001	LB119368	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	08 Apr 2017	28 Feb 2017
B2	SE162376.002	LB119368	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	08 Apr 2017	28 Feb 2017
B3	SE162376.003	LB119368	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	08 Apr 2017	28 Feb 2017
B4	SE162376.004	LB119368	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	08 Apr 2017	28 Feb 2017
B5	SE162376.005	LB119368	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	08 Apr 2017	28 Feb 2017
B6	SE162376.006	LB119368	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	08 Apr 2017	28 Feb 2017
BDA	SE162376.007	LB119368	23 Feb 2017	24 Feb 2017	09 Mar 2017	27 Feb 2017	08 Apr 2017	28 Feb 2017

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
B7	SE162376.008	LB119377	23 Feb 2017	24 Feb 2017	02 Mar 2017	27 Feb 2017	08 Apr 2017	03 Mar 2017

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
B1	SE162376.001	LB119681	23 Feb 2017	24 Feb 2017	22 Aug 2017	02 Mar 2017	22 Aug 2017	03 Mar 2017
B2	SE162376.002	LB119681	23 Feb 2017	24 Feb 2017	22 Aug 2017	02 Mar 2017	22 Aug 2017	03 Mar 2017
B3	SE162376.003	LB119681	23 Feb 2017	24 Feb 2017	22 Aug 2017	02 Mar 2017	22 Aug 2017	03 Mar 2017
B4	SE162376.004	LB119681	23 Feb 2017	24 Feb 2017	22 Aug 2017	02 Mar 2017	22 Aug 2017	03 Mar 2017
B5	SE162376.005	LB119681	23 Feb 2017	24 Feb 2017	22 Aug 2017	02 Mar 2017	22 Aug 2017	03 Mar 2017
B6	SE162376.006	LB119681	23 Feb 2017	24 Feb 2017	22 Aug 2017	02 Mar 2017	22 Aug 2017	03 Mar 2017
BDA	SE162376.007	LB119681	23 Feb 2017	24 Feb 2017	22 Aug 2017	02 Mar 2017	22 Aug 2017	03 Mar 2017

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	B1	SE162376.001	%	60 - 130%	71
	B2	SE162376.002	%	60 - 130%	71
	B3	SE162376.003	%	60 - 130%	70
	B4	SE162376.004	%	60 - 130%	70
	B5	SE162376.005	%	60 - 130%	71
	B6	SE162376.006	%	60 - 130%	71
	BDA	SE162376.007	%	60 - 130%	71

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	B7	SE162376.008	%	40 - 130%	44

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	B1	SE162376.001	%	60 - 130%	88
	B2	SE162376.002	%	60 - 130%	90
	B3	SE162376.003	%	60 - 130%	88
	B4	SE162376.004	%	60 - 130%	90
	B5	SE162376.005	%	60 - 130%	88
	B6	SE162376.006	%	60 - 130%	92
	BDA	SE162376.007	%	60 - 130%	82
d14-p-terphenyl (Surrogate)	B1	SE162376.001	%	60 - 130%	84
	B2	SE162376.002	%	60 - 130%	104
	B3	SE162376.003	%	60 - 130%	104
	B4	SE162376.004	%	60 - 130%	98
	B5	SE162376.005	%	60 - 130%	100
	B6	SE162376.006	%	60 - 130%	100
	BDA	SE162376.007	%	60 - 130%	98

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	B7	SE162376.008	%	40 - 130%	40
d14-p-terphenyl (Surrogate)	B7	SE162376.008	%	40 - 130%	48

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB119368.001		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
		Alpha BHC	mg/kg	0.1	<0.1
		Lindane	mg/kg	0.1	<0.1
		Heptachlor	mg/kg	0.1	<0.1
		Aldrin	mg/kg	0.1	<0.1
		Beta BHC	mg/kg	0.1	<0.1
		Delta BHC	mg/kg	0.1	<0.1
		Heptachlor epoxide	mg/kg	0.1	<0.1
		Alpha Endosulfan	mg/kg	0.2	<0.2
		Gamma Chlordane	mg/kg	0.1	<0.1
		Alpha Chlordane	mg/kg	0.1	<0.1
		p,p'-DDE	mg/kg	0.1	<0.1
		Dieldrin	mg/kg	0.2	<0.2
		Endrin	mg/kg	0.2	<0.2
		Beta Endosulfan	mg/kg	0.2	<0.2
		p,p'-DDD	mg/kg	0.1	<0.1
		p,p'-DDT	mg/kg	0.1	<0.1
		Endosulfan sulphate	mg/kg	0.1	<0.1
		Endrin Aldehyde	mg/kg	0.1	<0.1
		Methoxychlor	mg/kg	0.1	<0.1
		Endrin Ketone	mg/kg	0.1	<0.1
		Isodrin	mg/kg	0.1	<0.1
		Mirex	mg/kg	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	72

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB119377.001		Hexachlorobenzene (HCB)	µg/L	0.1	<0.1
		Alpha BHC	µg/L	0.1	<0.1
		Lindane (gamma BHC)	µg/L	0.1	<0.1
		Heptachlor	µg/L	0.1	<0.1
		Aldrin	µg/L	0.1	<0.1
		Beta BHC	µg/L	0.1	<0.1
		Delta BHC	µg/L	0.1	<0.1
		Heptachlor epoxide	µg/L	0.1	<0.1
		Alpha Endosulfan	µg/L	0.1	<0.1
		Gamma Chlordane	µg/L	0.1	<0.1
		Alpha Chlordane	µg/L	0.1	<0.1
		p,p'-DDE	µg/L	0.1	<0.1
		Dieldrin	µg/L	0.1	<0.1
		Endrin	µg/L	0.1	<0.1
		Beta Endosulfan	µg/L	0.1	<0.1
		p,p'-DDD	µg/L	0.1	<0.1
		p,p'-DDT	µg/L	0.1	<0.1
		Endosulfan sulphate	µg/L	0.1	<0.1
		Endrin aldehyde	µg/L	0.1	<0.1
		Methoxychlor	µg/L	0.1	<0.1
		Endrin ketone	µg/L	0.1	<0.1
		Isodrin	µg/L	0.1	<0.1
		Mirex	µg/L	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	73

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result
LB119368.001	Dichlorvos	mg/kg	0.5	<0.5
	Dimethoate	mg/kg	0.5	<0.5
	Diazinon (Dimpylate)	mg/kg	0.5	<0.5
	Fenitrothion	mg/kg	0.2	<0.2
	Malathion	mg/kg	0.2	<0.2
	Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
	Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
	Bromophos Ethyl	mg/kg	0.2	<0.2

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

OP Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB119368.001		Methidathion	mg/kg	0.5	<0.5
		Ethion	mg/kg	0.2	<0.2
		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	88
		d14-p-terphenyl (Surrogate)	%	-	102

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB119377.001		Dichlorvos	µg/L	0.5	<0.5
		Dimethoate	µg/L	0.5	<0.5
		Diazinon (Dimpylate)	µg/L	0.5	<0.5
		Fenitrothion	µg/L	0.2	<0.2
		Malathion	µg/L	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2
		Parathion-ethyl (Parathion)	µg/L	0.2	<0.2
		Bromophos Ethyl	µg/L	0.2	<0.2
		Methidathion	µg/L	0.5	<0.5
		Ethion	µg/L	0.2	<0.2
		Azinphos-methyl	µg/L	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	84
		d14-p-terphenyl (Surrogate)	%	-	98

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB119681.001	Arsenic, As	mg/kg	1	<1
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.5	<0.5
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	2	<2

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE162369.003	LB119431.011	% Moisture	%w/w	0.5	3.26704545453	3.1645696620	61	3
SE162373.003	LB119431.022	% Moisture	%w/w	0.5	4.6	4.5	52	1
SE162375.003	LB119431.033	% Moisture	%w/w	0.5	4.9	4.2	52	17
SE162383.003	LB119431.044	% Moisture	%w/w	0.5	11	12	39	3
SE162383.012	LB119431.054	% Moisture	%w/w	0.5	8.4	8.9	42	5

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE162373.006	LB119368.025		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	0	200	0
			Alpha BHC	mg/kg	0.1	<0.1	0	200	0
			Lindane	mg/kg	0.1	<0.1	0	200	0
			Heptachlor	mg/kg	0.1	<0.1	0	200	0
			Aldrin	mg/kg	0.1	<0.1	0	200	0
			Beta BHC	mg/kg	0.1	<0.1	0	200	0
			Delta BHC	mg/kg	0.1	<0.1	0	200	0
			Heptachlor epoxide	mg/kg	0.1	<0.1	0	200	0
			o,p'-DDE	mg/kg	0.1	<0.1	0	200	0
			Alpha Endosulfan	mg/kg	0.2	<0.2	0	200	0
			Gamma Chlordane	mg/kg	0.1	<0.1	0	200	0
			Alpha Chlordane	mg/kg	0.1	<0.1	0	200	0
			trans-Nonachlor	mg/kg	0.1	<0.1	0	200	0
			p,p'-DDE	mg/kg	0.1	<0.1	0	200	0
			Dieldrin	mg/kg	0.2	<0.2	0	200	0
			Endrin	mg/kg	0.2	<0.2	0	200	0
			o,p'-DDD	mg/kg	0.1	<0.1	0	200	0
			o,p'-DDT	mg/kg	0.1	<0.1	0	200	0
			Beta Endosulfan	mg/kg	0.2	<0.2	0	200	0
			p,p'-DDD	mg/kg	0.1	<0.1	0	200	0
			p,p'-DDT	mg/kg	0.1	<0.1	0	200	0
			Endosulfan sulphate	mg/kg	0.1	<0.1	0	200	0
			Endrin Aldehyde	mg/kg	0.1	<0.1	0	200	0
			Methoxychlor	mg/kg	0.1	<0.1	0	200	0
			Endrin Ketone	mg/kg	0.1	<0.1	0	200	0
			Isodrin	mg/kg	0.1	<0.1	0	200	0
			Mirex	mg/kg	0.1	<0.1	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.12	0.112	30	3
SE162376.005	LB119368.023		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	0	200	0
			Alpha BHC	mg/kg	0.1	<0.1	0	200	0
			Lindane	mg/kg	0.1	<0.1	0	200	0
			Heptachlor	mg/kg	0.1	<0.1	0	200	0
			Aldrin	mg/kg	0.1	<0.1	0	200	0
			Beta BHC	mg/kg	0.1	<0.1	0	200	0
			Delta BHC	mg/kg	0.1	<0.1	0	200	0
			Heptachlor epoxide	mg/kg	0.1	<0.1	0	200	0
			o,p'-DDE	mg/kg	0.1	<0.1	0	200	0
			Alpha Endosulfan	mg/kg	0.2	<0.2	0	200	0
			Gamma Chlordane	mg/kg	0.1	<0.1	0	200	0
			Alpha Chlordane	mg/kg	0.1	<0.1	0	200	0
			trans-Nonachlor	mg/kg	0.1	<0.1	0	200	0
			p,p'-DDE	mg/kg	0.1	<0.1	0	200	0
			Dieldrin	mg/kg	0.2	<0.2	0	200	0
			Endrin	mg/kg	0.2	<0.2	0	200	0
			o,p'-DDD	mg/kg	0.1	<0.1	0	200	0
			o,p'-DDT	mg/kg	0.1	<0.1	0	200	0
			Beta Endosulfan	mg/kg	0.2	<0.2	0	200	0
			p,p'-DDD	mg/kg	0.1	<0.1	0	200	0
			p,p'-DDT	mg/kg	0.1	<0.1	0	200	0
			Endosulfan sulphate	mg/kg	0.1	<0.1	0	200	0
			Endrin Aldehyde	mg/kg	0.1	<0.1	0	200	0
			Methoxychlor	mg/kg	0.1	<0.1	0	200	0
			Endrin Ketone	mg/kg	0.1	<0.1	0	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE162376.005	LB119368.023		Isodrin	mg/kg	0.1	<0.1	0	200	0
			Mirex	mg/kg	0.1	<0.1	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.11	0.107	30	1

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE162376.005	LB119368.023		Dichlorvos	mg/kg	0.5	<0.5	0.01	200	0
			Dimethoate	mg/kg	0.5	<0.5	0	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	0.01	200	0
			Fenitrothion	mg/kg	0.2	<0.2	0.01	200	0
			Malathion	mg/kg	0.2	<0.2	0	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	0.02	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	0.03	200	0
			Bromophos Ethyl	mg/kg	0.2	<0.2	0.01	200	0
			Methidathion	mg/kg	0.5	<0.5	0	200	0
			Ethion	mg/kg	0.2	<0.2	0.01	200	0
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	0.02	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.43	30	2
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.52	30	4

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE162376.002	LB119681.014	Arsenic, As	mg/kg	1	140	160	31	10
		Cadmium, Cd	mg/kg	0.3	0.3	0.3	124	9
		Chromium, Cr	mg/kg	0.5	18	21	33	16
		Copper, Cu	mg/kg	0.5	14	15	33	5
		Lead, Pb	mg/kg	1	17	15	36	12
		Nickel, Ni	mg/kg	0.5	4.5	5.3	40	16
		Zinc, Zn	mg/kg	2	250	250	31	3
SE162384.004	LB119681.024	Arsenic, As	mg/kg	1	6.52679837167.2692989215		44	11
		Cadmium, Cd	mg/kg	0.3	0.19487753830.2013926581		181	0
		Chromium, Cr	mg/kg	0.5	11.090823754710.281914049(		35	8
		Copper, Cu	mg/kg	0.5	20.230833333326.2312287254		32	26
		Lead, Pb	mg/kg	1	54.060416666646.638415196(		32	18
		Nickel, Ni	mg/kg	0.5	7.18532327586.6524281127		37	8
		Zinc, Zn	mg/kg	2	39.618726053670.6661092647		33	1

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB119368.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	91
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	83
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	81
		Dieldrin	mg/kg	0.2	<0.2	0.2	60 - 140	80
		Endrin	mg/kg	0.2	<0.2	0.2	60 - 140	81
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	99
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.11	0.15	40 - 130	74

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB119377.002		Heptachlor	µg/L	0.1	0.2	0.2	60 - 140	102
		Aldrin	µg/L	0.1	0.2	0.2	60 - 140	93
		Delta BHC	µg/L	0.1	0.2	0.2	60 - 140	102
		Dieldrin	µg/L	0.1	0.2	0.2	60 - 140	95
		Endrin	µg/L	0.1	0.2	0.2	60 - 140	94
		p,p'-DDT	µg/L	0.1	0.2	0.2	60 - 140	125
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	µg/L	-	0.12	0.15	40 - 130	80

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB119368.002		Dichlorvos	mg/kg	0.5	2.2	2	60 - 140	108
		Diazinon (Dimpylate)	mg/kg	0.5	1.5	2	60 - 140	75
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	1.7	2	60 - 140	83
		Ethion	mg/kg	0.2	1.4	2	60 - 140	72
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	88
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	94

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB119377.002		Dichlorvos	µg/L	0.5	7.4	8	60 - 140	92
		Diazinon (Dimpylate)	µg/L	0.5	6.6	8	60 - 140	83
		Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	6.3	8	60 - 140	79
		Ethion	µg/L	0.2	5.3	8	60 - 140	66
	Surrogates	2-fluorobiphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	80
		d14-p-terphenyl (Surrogate)	µg/L	-	0.5	0.5	40 - 130	98

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB119681.002	Arsenic, As	mg/kg	1	49	50	80 - 120	98
	Cadmium, Cd	mg/kg	0.3	49	50	80 - 120	97
	Chromium, Cr	mg/kg	0.5	50	50	80 - 120	100
	Copper, Cu	mg/kg	0.5	51	50	80 - 120	102
	Lead, Pb	mg/kg	1	49	50	80 - 120	98
	Nickel, Ni	mg/kg	0.5	51	50	80 - 120	102
	Zinc, Zn	mg/kg	2	50	50	80 - 120	100

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number	Parameter	Units	LOR	Original	Spike	Recovery%
SE162373.003	LB119368.024	Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	-	-
		Alpha BHC	mg/kg	0.1	<0.1	-	-
		Lindane	mg/kg	0.1	<0.1	-	-
		Heptachlor	mg/kg	0.1	<0.1	0.2	95
		Aldrin	mg/kg	0.1	<0.1	0.2	86
		Beta BHC	mg/kg	0.1	<0.1	-	-
		Delta BHC	mg/kg	0.1	<0.1	0.2	85
		Heptachlor epoxide	mg/kg	0.1	<0.1	-	-
		o,p'-DDE	mg/kg	0.1	<0.1	-	-
		Alpha Endosulfan	mg/kg	0.2	<0.2	-	-
		Gamma Chlordane	mg/kg	0.1	<0.1	-	-
		Alpha Chlordane	mg/kg	0.1	<0.1	-	-
		trans-Nonachlor	mg/kg	0.1	<0.1	-	-
		p,p'-DDE	mg/kg	0.1	<0.1	-	-
		Dieldrin	mg/kg	0.2	<0.2	0.2	82
		Endrin	mg/kg	0.2	<0.2	0.2	80
		o,p'-DDD	mg/kg	0.1	<0.1	-	-
		o,p'-DDT	mg/kg	0.1	<0.1	-	-
		Beta Endosulfan	mg/kg	0.2	<0.2	-	-
		p,p'-DDD	mg/kg	0.1	<0.1	-	-
		p,p'-DDT	mg/kg	0.1	<0.1	0.2	107
		Endosulfan sulphate	mg/kg	0.1	<0.1	-	-
		Endrin Aldehyde	mg/kg	0.1	<0.1	-	-
		Methoxychlor	mg/kg	0.1	<0.1	-	-
		Endrin Ketone	mg/kg	0.1	<0.1	-	-
		Isodrin	mg/kg	0.1	<0.1	-	-
		Mirex	mg/kg	0.1	<0.1	-	-
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.12	-	76

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE162373.003	LB119681.004	Arsenic, As	mg/kg	1	37	3	50	69 ⑨
		Cadmium, Cd	mg/kg	0.3	41	0.4	50	81
		Chromium, Cr	mg/kg	0.5	99	60	50	77
		Copper, Cu	mg/kg	0.5	67	20	50	94
		Lead, Pb	mg/kg	1	50	13	50	74
		Nickel, Ni	mg/kg	0.5	87	49	50	77
		Zinc, Zn	mg/kg	2	68	23	50	91

MATRIX SPIKE DUPLICATES

SE162376 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover tthe performance of this service.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to Analytical Report comments for further information.

Chain of Custody Form – Ref 7983

Ref: 7983
Investigator: Envirowest Consulting
9 Cameron Place
PO Box 8158
ORANGE NSW 2800
Telephone: (02) 6361 4954
Facsimile: (02) 6360 3960
Email: greg@envirowest.net.au
Contact Person: Greg Madafiglio
Invoice: accounts@envirowest.net.au

Laboratory: SGS SYDNEY
16/33 Maddox Street
ALEXANDRIA NSW 2015

Quotation #:
Courier/CN:

	Sample ID	Container*	Sampling Date/Time	Sample matrix: Water	Soil	Sludge	Sample preservation: Cool	HNO3/HCl	Unpreserved	Analysis (SGS Method Code): CL1 – 7 metals	SV3 – OPP, OCPesticides			
1	B1	A	23/02/2017		X		X		X	X	X			
2	B2	A	23/02/2017		X		X		X	X	X			
3	B3	A	23/02/2017		X		X		X	X	X			
4	B4	A	23/02/2017		X		X		X	X	X			
5	B5	A	23/02/2017		X		X		X	X	X			
6	B6	A	23/02/2017		X		X		X	X	X			
7	BDA	A	23/02/2017		X		X		X	X	X			
8	B7	A	23/02/2017	X			X		X		X			

SGS EHS Alexandria Laboratory

SE162376 COC
Received: 24 – Feb – 2017

Investigator: I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler name: Greg Madafiglio
Date : 23/02/2017 Time:

Relinquished by: (print and signature)	Date	Time	Received by: (print and signature)	Date	Time
Virginia Bragg	23/02/2017	17:00		24/02/17	@ 10:30

Please return completed form to Envirowest Consulting, *A = Solvent rinsed glass jar with Teflon lined lid and orange label

Appendix E

REGULATORY PRELIMINARY COMMENTS

2 February 2017

SF2017/019930; WST17/00010

David Walker
Geolyse
PO Box 1963
ORANGE NSW 2800

Dear Mr Walker

Planning Proposal: Lot 4 DP 1023024; 2519 O'Connell Road (MR253), O'Connell; Proposed amendment to Oberon Local Environmental Plan 2013

Thank you for your emails on 25 January 2017, 16 November 2016 and 2 November 2016 seeking Roads and Maritime comments in relation to a proposed amendment to the *Oberon Local Environmental Plan 2013* (LEP). I apologise for the delay in my reply.

I note the proposal involves rezoning land from RU1 (Primary Production) to R5 (Large Lot Residential). The land to be rezoned is approximately 194 hectares in area and has frontage to O'Connell Road, Box Flat Road and Beaconsfield Road. O'Connell Road is a classified road whilst Box Flat and Beaconsfield Roads are local roads. A draft subdivision plan has been prepared which shows four lots having frontage to and gaining vehicular access from O'Connell Road.

To assist you in the development of the planning proposal, Roads and Maritime provides the following advice:

- The future subdivision of the land needs to be designed so that all vehicular access to new lots is obtained directly from Box Flat Road or Beaconsfield Road. Vehicular access to future lots from these local loads is desirable for the following reasons:
    - Clause 101 of *State Environmental Planning Policy (Infrastructure) 2007* requires, where practicable, all vehicular access to future allotments to be from Beaconsfield or Box Flat Roads.
    - Access via either Beaconsfield Road or Box Flat Road allows motorists to enter O'Connell Road in a low speed environment with existing intersection treatments, providing a high level of safety for turning and through traffic.
    - New vehicular accesses to O'Connell Road would need to be in a high speed environment which would necessitate the construction of intersection treatments to provide a high level of safety for turning and through traffic.

Roads & Maritime welcomes the opportunity to comment on the proposed amendment and looks forward to providing final comments upon completion of the Planning Proposal.

Should you require any further information please contact the undersigned on 02 6861 1453.

Yours faithfully

Andrew McIntyre
Manager Land Use Assessment
Western

cc General Manager
Oberon Council
PO Box 84
OBERON NSW 2787

David Walker

From: Alice Buckley <alice.buckley@dpi.nsw.gov.au>
Sent: 3 April 2017 11:05 AM
To: David Walker
Subject: Re: Proposed rezoning and future subdivision - O'Connell Village 115281
Attachments: licensing_approvals_controlled_activities_veg_mgt_plans.pdf

Hi David,

Thank you for providing DPI Water the opportunity to provide advice at this early stage of the proposal.

DPI Water is supportive of the proposed lot size and minimising the need for watercourse crossings. Please not that crossings over the 3rd or 4th order watercourses requires a controlled activity approval from DPI Water.

You note DPI Water's riparian buffers, it is appreciated that provisions for DPI Water riparian buffers are included at this rezoning stage, so they may be included through the entire development process.

DPI Water encourages grazing restrictions/fencing of watercourses and rehabilitation of watercourses, please see DPI Water guidelines for Vegetation Management Plans.

Happy to discuss further.

Kind regards

Alice Buckley (nee Clifton) | Water Regulation Officer
Department of Primary Industries | DPI Water
209 Cobra Street | PO Box 717 | Dubbo NSW 2830
T: 02 6841 7469 | F: 02 6884 0096 | E: alice.buckley@dpi.nsw.gov.au
W: www.water.nsw.gov.au

On 29 March 2017 at 16:51, David Walker <dwalker@geolyse.com> wrote:

> Hi Alice
>
> Geolyse is currently preparing reporting to support a planning proposal to Oberon Council and onward to the Dept of Planning & Environment in relation to rezoning of land from RU1 – Primary Production to R5 – Large Lot Residential. The intention is to create approximately 10 hectare lots across the 200 hectare land parcel. Attached is a conceptual lot layout. The site is the portion of Lot 4 DP1023024 south of Box Flats Road, O'Connell and has an area slightly in excess of 200 hectares.
>
> There is a number 3rd order streams which join to form a 4th order stream in the eastern extent of the site.
>
> We have designed the subdivision so that the lots in this area would access the lots from the new road to the west (rather than from O'Connell Road, which RMS was not supportive of) and building envelopes would also be provided to the west, so that crossings of the creeks are avoided. We also propose to limit the grazing of animals on these specific lots via restrictions, as the current grazing activity has degraded the

creek. We have the capacity in the context of the lot sizes to provide appropriate riparian corridors within the lots to satisfy the DPI Water guidelines for 3rd and 4th order waterways. Rehabilitation of the creek is also being considered although this would need to form a measure of the DA, rather than being dealt with at planning proposal stage.

Given these are higher order creeks we would appreciate some early feedback on the project.

Any comments would be gratefully received.

Attached is the early concept plan for the site.

Your comments would be appreciated.

Kind regards,

David Walker

Senior Town Planner

Geolyse Pty Ltd

154 Peisley St

PO Box 1963

Orange NSW 2800

Ph: 02 6393 5000

Fx: 02 6393 5050

Mob: 0437 621 057

Email: dwalker@geolyse.com

Web: www.geolyse.com

Facebook | LinkedIn

.....

IMPORTANT

Department of Primary Industries
Office of Water

CONTROLLED ACTIVITIES ON WATERFRONT LAND

Guidelines for vegetation management plans on waterfront land

Controlled activities carried out in, on or under waterfront land are regulated by the *Water Management Act 2000* (WM Act). The NSW Office of Water administers the WM Act and is required to assess the impact of any proposed controlled activity to ensure that no more than minimal harm will be done to waterfront land.

Waterfront land includes the bed and bank of any river, lake or estuary and all land within 40 metres of the highest bank of the river, lake or estuary.

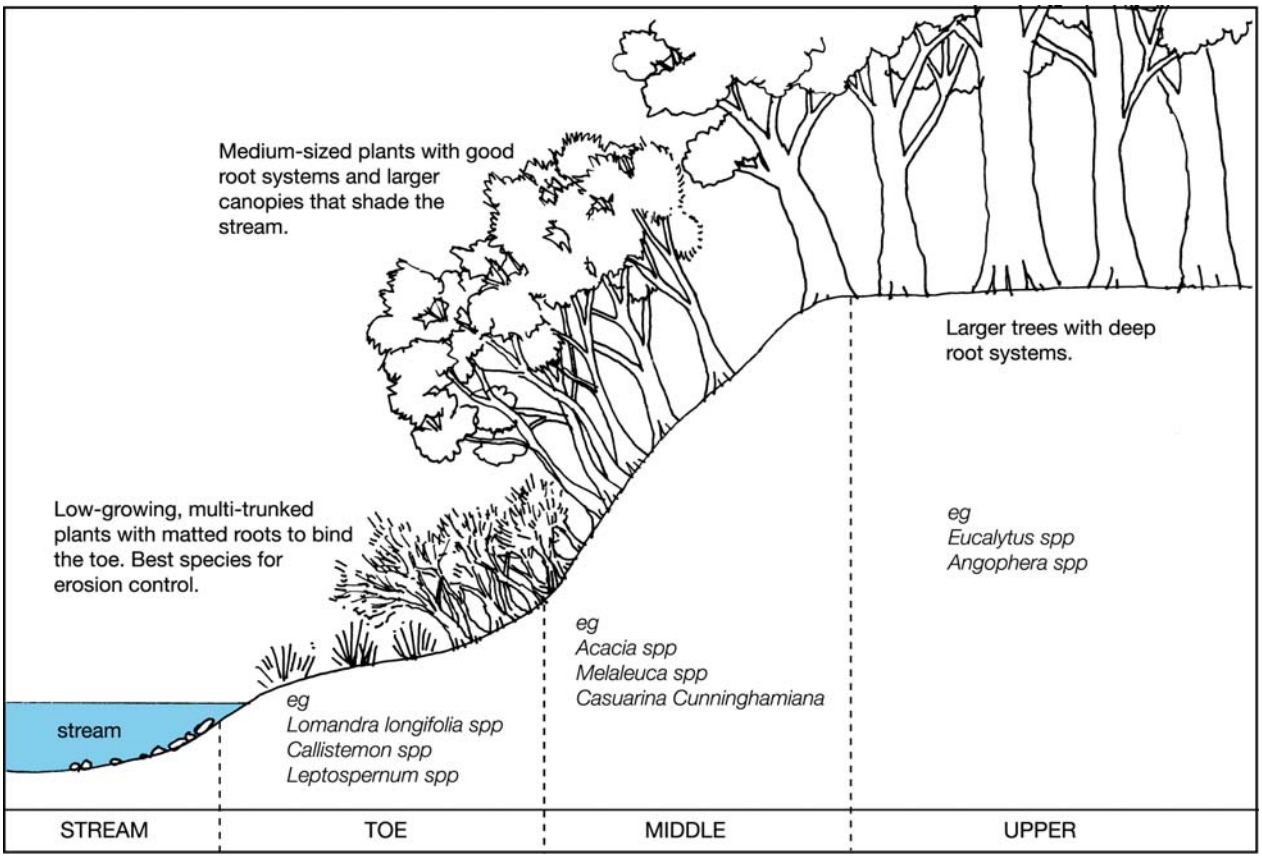
This means that a controlled activity approval must be obtained from the NSW Office of Water before commencing the controlled activity.

Why is a vegetation plan required?

When a proposed controlled activity disturbs or substantially modifies the riparian corridor, its restoration or rehabilitation will be a requirement of the controlled activity approval. A vegetation management plan (VMP) details how the restoration or rehabilitation will be carried out.

The main objective of a VMP is to provide a stable watercourse and riparian corridor which will emulate local native vegetation communities.

Figure 1. Typical riparian cross section - Adapted from Rivercare: Guidelines for Ecological Sustainable Management of Rivers and Riparian Vegetation: Raine, A.W & Gardiner, J.N, (1995), Land and Water Resources Research and Development Corporation, Canberra.



How should a vegetation management plan be prepared?

A VMP should be prepared by a suitably qualified person and should clearly address the following criteria.

- An appropriate width for the riparian corridor should be identified by consulting either the development consent, the relevant environmental planning instrument or the NSW Office of Water guidelines for riparian corridors. The VMP should consider the full width of the riparian corridor and its functions including accommodating fully structured native vegetation.
- Maps or diagrams which clearly identify the riparian corridor; the existing vegetation; the vegetation to be retained; the vegetation to be cleared; the footprint of construction activities; and areas of proposed revegetation etc. should be prepared.
- The location of the bed and banks or foreshore of waterfront land and the footprint of the riparian corridor should be clearly identified. Vegetated riparian zones must be indicated.
- Photographs of the site should be supplied and photo points should be identified. To assist with future monitoring and reporting requirements, the photo points should be identified by GPS coordinates or by survey. This is particularly important for large scale earthworks or extractive industries.
- Measures for controlling long term access and encroachments (bollards, fences, etc.) into the riparian corridor should be identified.
- Vegetation species composition, planting layout and densities should be identified. The required mix of plant species relates to the actual community to be emulated and the size of the area or areas to be rehabilitated but mature vegetation communities are generally well structured, comprising trees, shrubs and groundcovers species. Planting densities should achieve quick vegetative cover and root mass to maximise bed and bank stability along the subject watercourse.
- Costs associated with high density planting will be recovered through reduced maintenance costs for weeding or replacement planting in the maintenance period specified in the controlled activity approval (CAA).
- Seed or plant sources should be identified. Where possible, native plants and seed sources of local provenance should be used.
- Exotic vegetation should be avoided. The use of exotic species for temporary soil stabilisation is permitted provided they are sterile, non-invasive and easily eradicated when permanent vegetation is established.
- Details of the planting program, rehabilitation methods and staging should be provided. Techniques such as hydro-seeding, direct seeding, brush matting or assisted natural regeneration may be considered.
- Maintenance requirements should extend for a minimum of two years after the completion of works or until such time as a minimum 80 per cent survival rate of each species planted and a maximum 5 per cent weed cover for the treated riparian corridor controlled activity is achieved.
- Project tasks should be defined and described, including a schedule detailing the sequence and duration of works necessary for the implementation of the VMP.
- Costings for the implementation of all components and stages of the work including materials, labour, watering, maintenance which includes plant replacement, monitoring and reporting should be prepared.
- Processes for monitoring and review, including a method of performance evaluation should be identified. This should include replacing plant losses, addressing deficiencies, problems, climatic conditions and successful completion of works.
- Regular reporting on the implementation and status of works covering progress, success or failures and completion should be provided. The number and duration of reporting periods will be identified in the CAA. Works as executed plans and reports detailing how the components of the VMP have been implemented will be required prior to the release of any security held by the NSW Office of Water.
- Security such as bank guarantees may be required before a controlled activity involving the implementation of a VMP is commenced. The amount of security is usually based on the costings provided.

Where do I go for additional information?

Find out more about controlled activities at the Office of Water website www.water.nsw.gov.au.

Contact us

Contact a water regulatory officer as listed on the Office of Water website www.water.nsw.gov.au, free call the licensing information on 1800 353 104 or email information@water.nsw.gov.au.

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