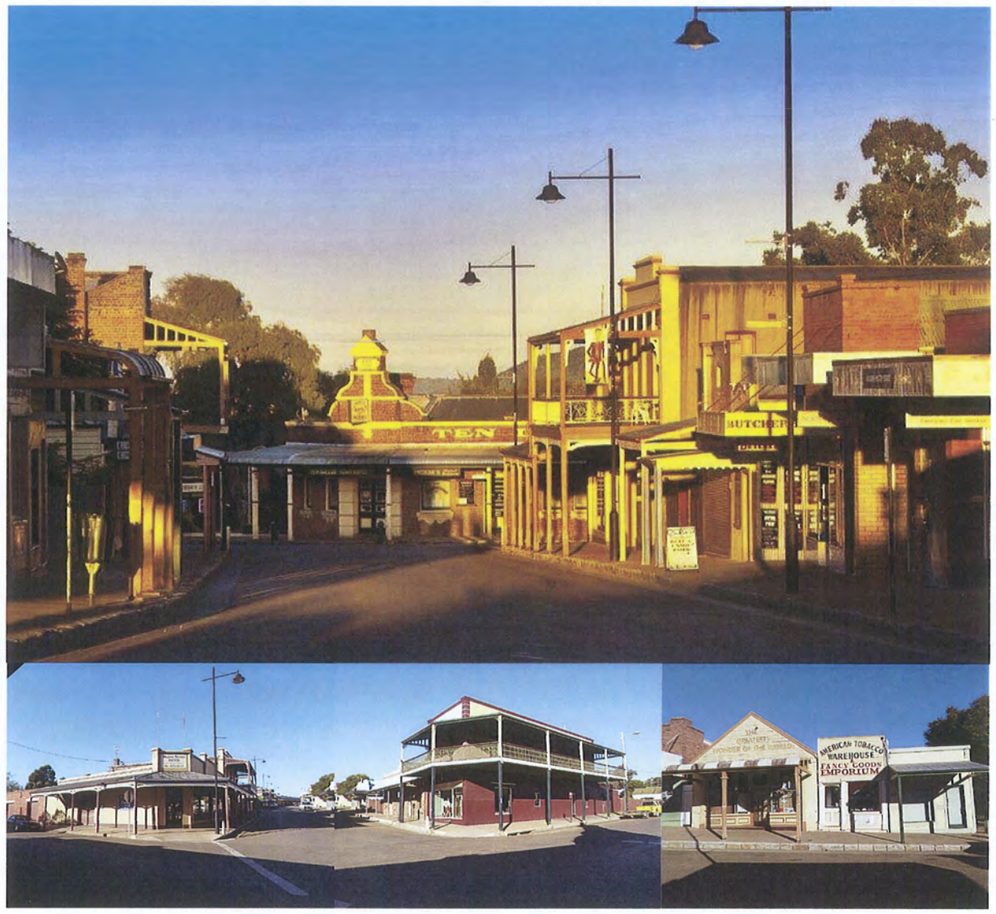


Grimshaw Lane Gulgong

Planning Proposal

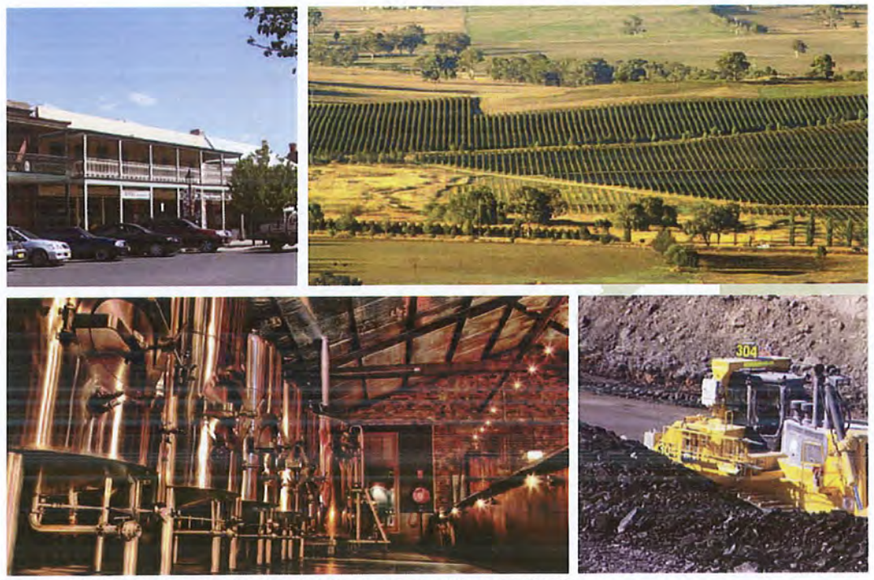
Submission to Mid-Western Regional Council

June 2012

WHELANS INSITES

Foreword:

This Planning Proposal has been prepared by Whelans InSites Pty Ltd, on behalf of Rathfobe Pty Ltd and owners of adjacent properties at Grimshaw Lane, Gulgong. It supports previous submissions and discussions with Mid-Western Regional Council regarding the optimal future zoning and use of property at Grimshaw Lane, immediately to the south of the established Gulgong urban area.



Source: Mid-Western Regional Council, Economic and Business Profile

Key Findings:

Investigations carried out to date indicate that the proposal for residential zoning and subdivision of land at Grimshaw Lane, Gulgong, has significant planning merit, and now warrants Council support.

Key findings of initial investigations indicate that:

- There is an identified need for the provision of additional housing within the Mid-Western Regional Area generally, and in proximity to the established urban centres of Gulgong and Mudgee in particular.

- A key driver of economic growth across the region has been the recent expansion in employment in coal mining and other local infrastructure and resource-based projects. The strategic location of the Grimshaw Lane site, in close proximity to Gulgong and adjacent to the Gulgong-Mudgee corridor, is ideal in relation to nearby established mine sites at Ulan, Moolarben and Willpinjong, and the proposed new mine at Cobbora. Accordingly, access to employment at local mines, and to the services and facilities of Mudgee itself, is both convenient and direct from this point.

- The site at Grimshaw Lane immediately adjoins the existing Gulgong urban area, and represents a logical extension to the established town fabric. Connections to utility services are available at the periphery of the site, and subject to agreement with Council, may be upgraded to support the proposal.

- A significant component of the site has previously been identified within the Mid-Western Regional Comprehensive Land Use Strategy and the subsequent Draft Mid-Western Regional Environmental Plan 2011 as suitable for residential development, with an associated minimum lot size of 4,000 square metres. The proposal is therefore generally consistent with Council's established strategic planning for the area.

- Additional recent investigations now identify the site as likely to be suitable to support residential development at a density in the order of 8 dwellings / hectare, with a corresponding minimum allotment size of 600 square metres.

- The Grimshaw Lane site presents a unique opportunity for coordinated residential development, in that it is largely held in one consolidated ownership. Accordingly, development could proceed with minimal delay, following rezoning and development approval, and thence supply a continuity of serviced urban land to meet future market demand.

Contents:

1. Background, Objectives & Intended Outcomes

Background

Gulgong occupies a significant place in Australia's history, initially as a pastoral and Gold Rush Town in the 1870s, and more recently as a noted tourist attraction within the Mid-Western Regional Council area. Following the amalgamation of Mudgee Shire and parts of the former Shires of Merriwa and Rylstone, Council embarked on a strategic land use planning task, which culminated in the preparation and public exhibition of the Draft Mid-Western Regional Comprehensive Land Use Strategy in 2008. Since that time, Council has been working towards completion of a single comprehensive Local Environmental Plan (LEP) in accordance with the "Standard Format" now prescribed by legislation. Draft Mid-Western Regional Local Environmental Plan (LEP) 2011 was subsequently prepared and exhibited in 2011, and is expected to be finalised in the near future.

While the current Draft LEP 2011 acknowledges the broad framework established by the Comprehensive Land Use Strategy, there have been significant recent changes in levels of demand and take-up of residential accommodation in Mudgee and the Mid-Western Regional Council area generally. The bulk of this increase in demand has been attributed to increasing employment opportunities created by the expansion of local mining activity, and other resource-based industries. The need to respond appropriately to these changes has recently been recognised by both Council and the local community (Figure 1.1).

Objectives & Intended Outcomes

The objective and intended outcome of this planning proposal is to enable the development of identified lands at Grimshaw Lane, Gulgong, for the purposes of residential subdivision.

This report provides a description of the site and its context, initial review of local environmental factors, and justification to support formal consideration of the benefits of rezoning the subject lands for the purposes of residential development.

Preparation of this report has taken into account:

- The aims and objectives of Mid-Western Comprehensive Land Use Strategy;
- Prior discussions and consultations with Council officers during exhibition of the Draft Mid-Western Comprehensive Land Use Strategy and the subsequent Draft Mid-Western Regional Local Environmental Plan 2011;
- Recent population and economic growth forecasts for the Mid-Western Regional Local Government Area;
- Relevant State, Regional and Local strategic planning policies; and
- Results of preliminary investigations with regard to the potential of the site to support residential subdivision, including review of its topography, potential servicing arrangements, salinity and traffic impacts.

regional snapshot

Overview

The Mudgee Region is located just over 3 hours from Sydney in Central West NSW. It has a dynamic and friendly community and a strong and diverse economic base, providing opportunities for future business development and growth. The Region also attracts more than 460,000 visitors each year to experience local wine, food, sporting and cultural events.

Population: 23,000

Area: 9,000 sq km

Major towns and centres

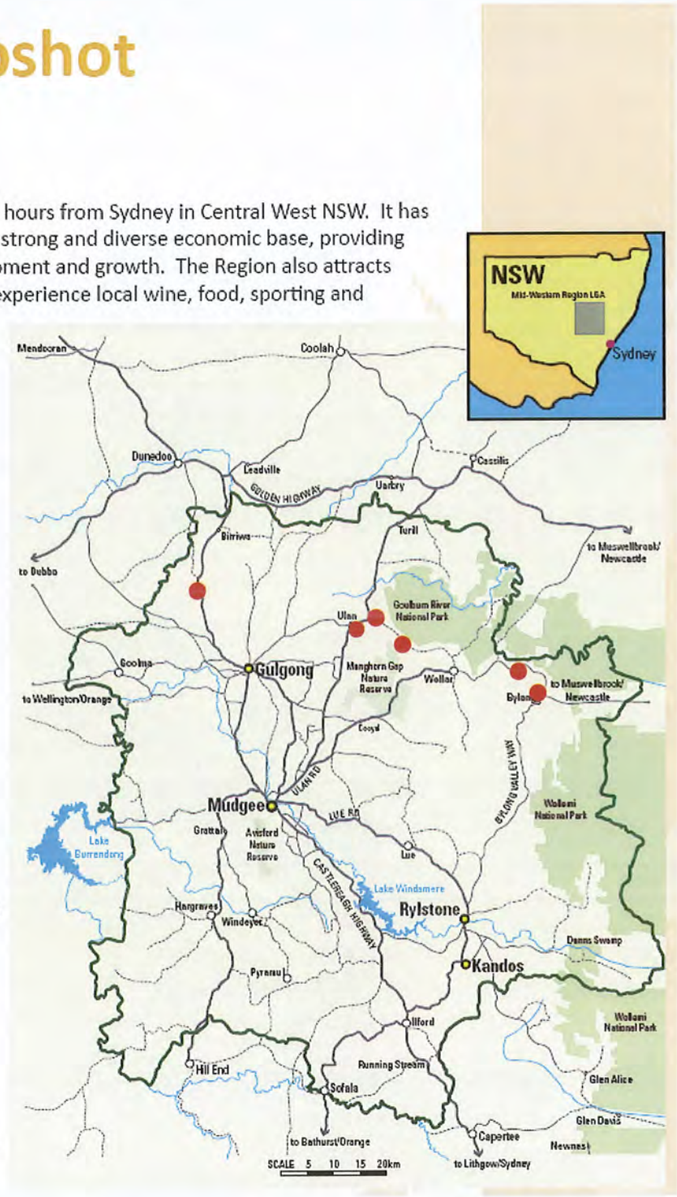
- Mudgee
- Gulgong
- Kandos
- Rylstone

Major industries

- Agriculture
- Mining
- Tourism
- Viticulture

Competitive advantages

- Diverse and growing economic base
- Centrally located to Sydney and Newcastle and major regional centres in NSW
- Strong transport links – daily air and coach services
- Skilled workforce
- Strong business services sector
- Great lifestyle benefits
- Thriving tourism, arts and cultural sectors
- Adequate water supply



Current and proposed mine and project sites

Figure 1.1: Mid-Western Regional Local Government Area

Source: Mid-Western Regional Council, Economic and Business Profile

2. Site Location and Context

Local Context

The subject site, identified as "Grimshaw Lane" is located less than one kilometre from the centre of the historic township of Gulgong, and lies generally between Ridout Lane on the east, and Grimshaw Lane on the west (Figure 2.1).

The subject title parcels comprise:

- Lots 9 and 10 in DP 251803 and Lots 72, 150 to 159 164 to 167 in DP 755433 (held by Rathfobe Pty Limited);
- Lot 158 in DP 755433 (held in the name of Jan Therese Cunningham); and
- Lot 159 in DP 755433 (held by Colin John Bennett and Patricia Anne Gledhill).

All owners have provided their consent for inclusion in this planning proposal.

The remaining land parcels, comprising Lots 229, 231, 233, 234, 235, 294 in DP 755433 and Lot 519 in DP 725032 are identified as Crown Land held by the State of New South Wales. The northern boundary of these land parcels is contiguous with the existing southern boundary of the Gulgong urban precinct, represented by the alignment of Fisher Street.

The site presents as appropriate for urban development, with a prior history of use as grazing land on Gulgong's rural-urban fringe. Occasional farm dams, scattered trees and some contour banks remain evident, Open grazing lands lie to the south and east, while the established Gulgong urban area is immediately contiguous to the north (Figure 2.1)

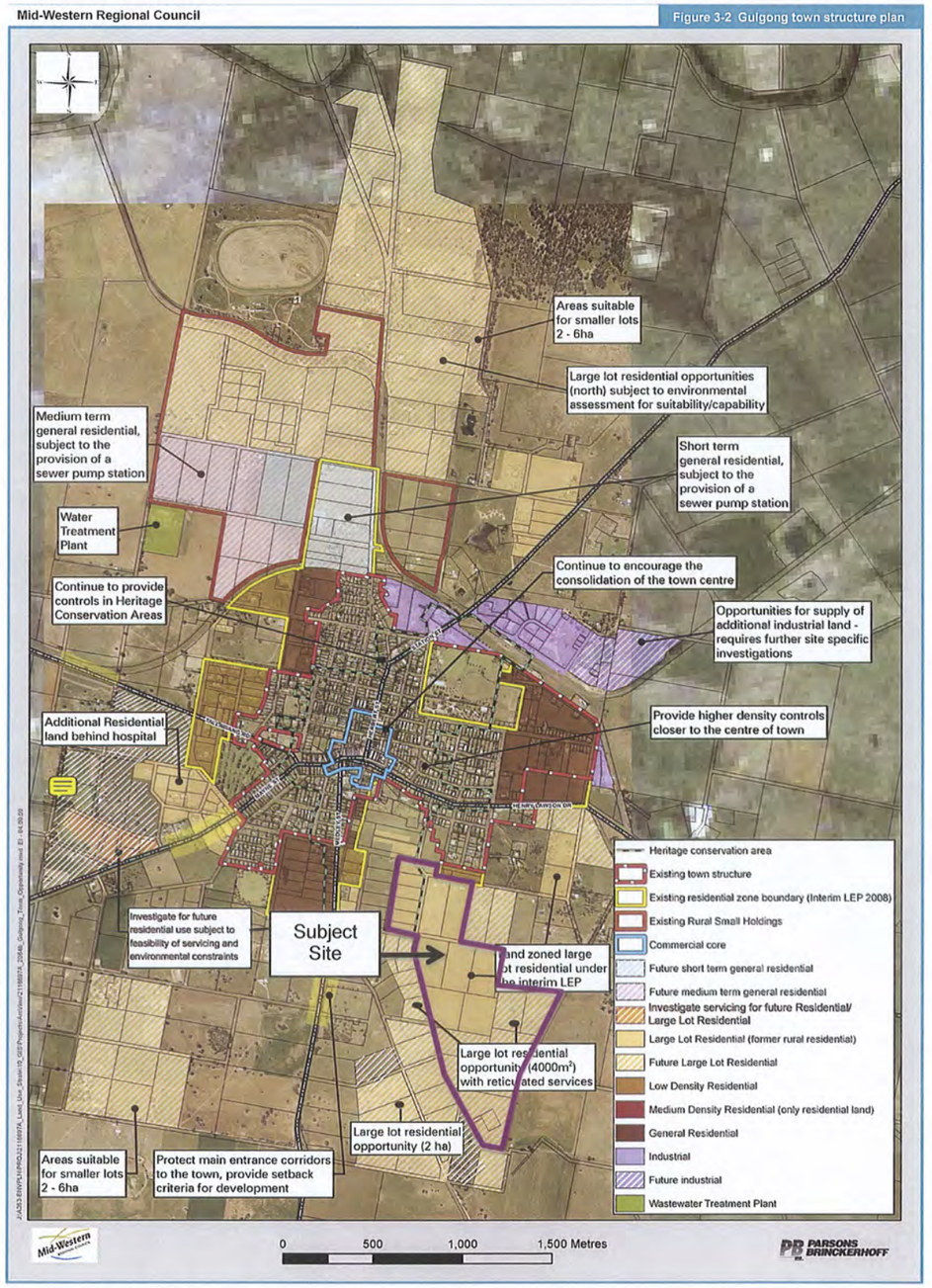


Figure 2.1: Draft Mid-Western Regional Comprehensive Land Use Strategy

Source: Mid-Western Regional Council,

The Site - Current Land Use Zoning

Mid-Western Regional Interim Local Environmental Plan (LEP) 2008 currently applies to the subject landholdings. Under this LEP, Lots 72, 150 to 152 and 164 to 167 in DP 755433 are zoned "Agriculture", while the balance of the site is zoned "Rural Residential". In addition, Lots 9 and 10 in DP 251803 and 153-159 in DP 755433 are designated as an "Urban Release Area" under the most recent version of the current planning instrument (Figure 2.2).

The Site – Strategic Context

Council has for some time recognised the future urban potential of the Grimshaw Lane precinct. At the meeting of Council's Planning & Development Committee on February 2010, a notice of motion was put:

> *"That staff investigate and present a report to the March Council meeting identifying areas of land in and around Gulgong with the potential to rezone as medium density residential, as well as areas currently zoned medium density residential but not supported for development by the current land owners"*

Background to this motion was described in the following terms:

> *"It is becoming clear that insufficient available land exists for medium density zoned residential development in Gulgong. Although land is zoned for this type of development to take place there does not seem to be a commitment from the existing land owners to undertake the development. Real estate agents in Gulgong have stated publicly that based on current enquiries they could sell 25 lots over the next six months if they were available. There are no lots for medium density residential development available in Gulgong now.*
>
> *We are all aware of the pending development occurring in our region, particularly associated with coal mining. There is a huge demand for new housing across the region now, including Gulgong. There are minimal rental houses available in Gulgong to accommodate current strong demands The Comprehensive LEP is probably at least two years away from being gazetted. That is too long to meet the immediate demand. We need to act now.*
>
> *This Notice of Motion seeks that staff urgently address this issue and report back to the March 2010 meeting on options. We must address the housing development shortage now."*

As an outcome of Council's ongoing deliberations, land at Grimshaw Lane, Gulgong was subsequently identified as a potential future urban precinct within the Draft Comprehensive Land Use Strategy (Figure 1.1 above). A current Development Approval for subdivision of the site to create allotments of 4,000 square metres in area has also previously been issued by Mid-Western Regional Council as DA 0166/2010.

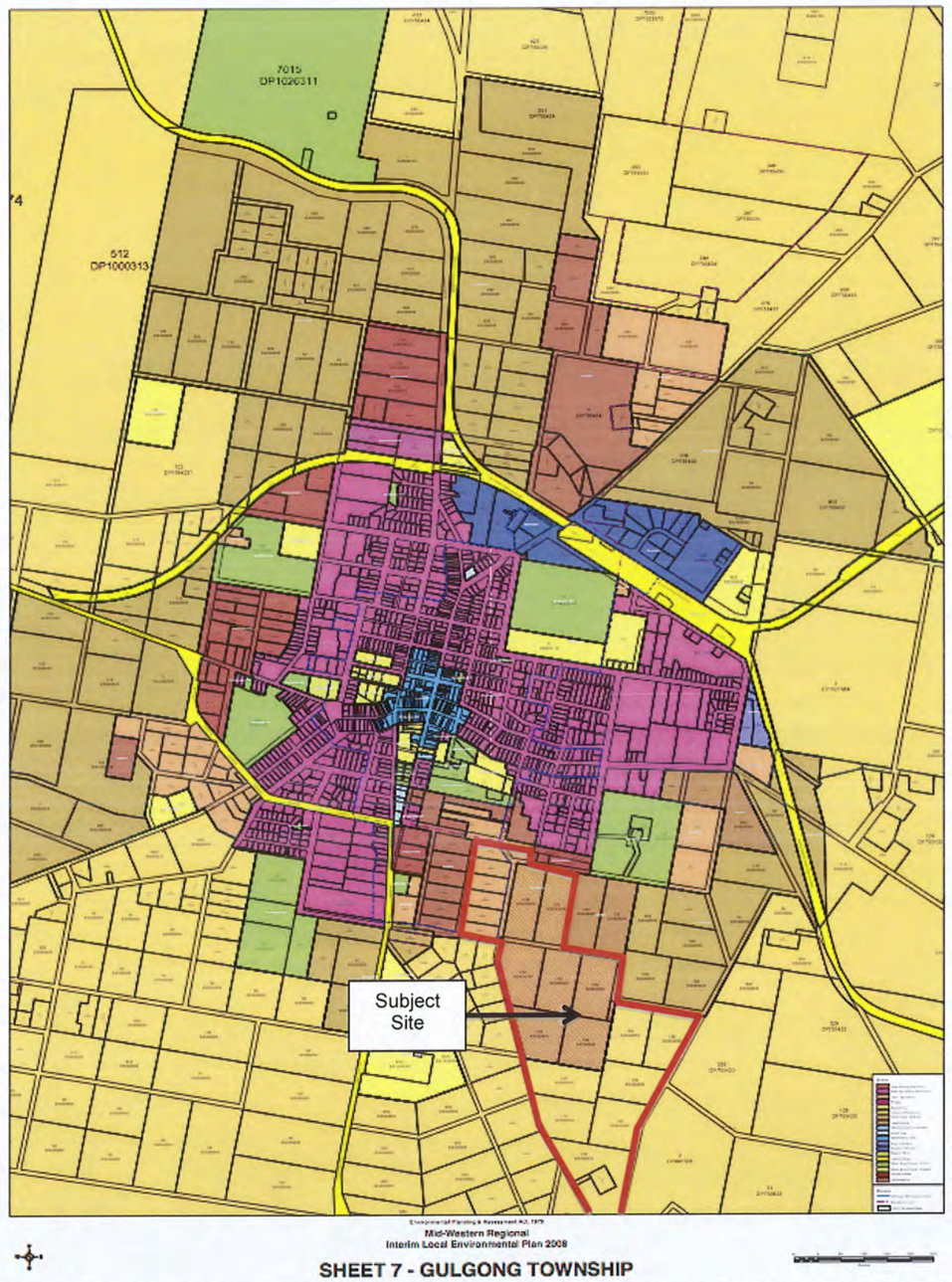


Figure 2:2 Mid-Western Regional Interim Local Environmental Plan 2008 (Extract)
Source: Mid-Western Regional Council,

Draft Mid-Western Regional Local Environmental Plan 2011

Draft Mid-Western Regional Local Environmental Plan (LEP) 2011 was placed on public exhibition in 2011. It will replace the current Mid-Western Regional Interim LEP 2008 (MWRILEP 2008) and will apply to the whole of the Mid-Western Regional Local Government Area, including the subject site at Gulgong.

The subject site is proposed to be zoned partly R2 Low Density Residential (the northern component) and partly RU1 Primary Production under Draft LEP 2011 (the south and eastern components). These designations are broadly equivalent zones to the current *Rural Residential* and *Agricultural* zones designated under MWRILEP 2008 (refer Figure 2.2 above).

Within the proposed R2 Low Density Residential zone, the Draft LEP Lot Size map indicates an applicable minimum lot size of 4,000 square metres, consistent with previous approvals for subdivision of the northern component of the site (Figure 2.3).

It is also noted that Council has included adjacent Crown Land parcels (comprising Lots 229, 231, 233, 234, 235, 294 in DP 755433 and Lot 519 in DP 725032) within the proposed R2 Low Density Residential zone. While this inclusion represents a logical extension of the Gulgong urban area, it is understood that residential development of these lands could only proceed following Stage Government approval and/or sale.

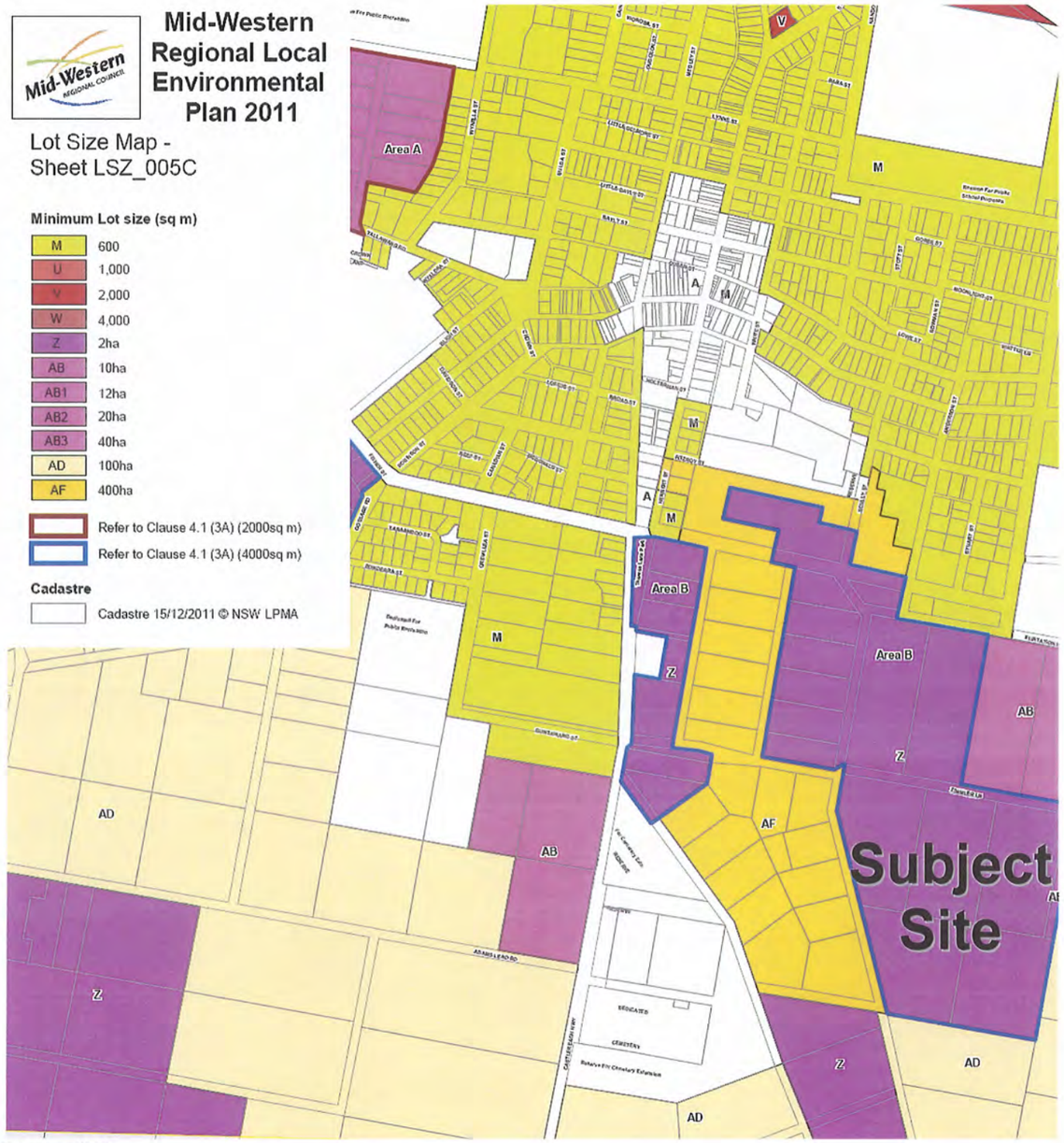


Figure 2.3:
Lot Size Map
Draft Mid-Western Regional Local Environmental Plan 2011
Source: Mid-Western Regional Council,

3. Proposed Development Concept

3.1 Subdivision Layout

In response to perceived growth in demand for housing and residential allotments in the Gulgong area generally, development of the Grimshaw Lane Estate is now proposed to provide a long-term total yield of approximately 400 lots (Figure 3.1).

A residential density in the order of 8 dwellings per hectare (net) is proposed, providing opportunities for construction of detached dwellings in a manner that is considered to be consistent with the predominant character of Gulgong itself.

The conceptual estate layout proposes a "skewed grid" road pattern, with an integrated network of open space linkages, drainage reserves and managed detention basins. A high-standard of design and finish is proposed, to facilitate the creation of a high quality residential environment in close proximity to the established facilities of Gulgong.

Key features of the concept proposal include:

- Generous residential allotments, generally in excess of 600 sq.m in area, and therefore of a size that is both appropriate for the prevailing urban context, and readily able to facilitate good solar orientation of detached residential dwellings.

- Parkland and open space will generally be located within 400 metres of all lots in accordance with Council requirements.

- The layout responds the topography of the site. A natural drainage line runs NW to SE with the balance of the property sloping to this central corridor, both on the east and the west, and is to be incorporated within the proposed open space system.

- The layout includes an efficient drainage system, incorporating a central 40m wide green space reserve, which connects two open detention areas to the north and south. This reserve system will operate together with the proposed other parklands and open space linkages to encourage walking and cycling throughout the site.

Staging:

- Development is intended in 4 stages, comprising between 87 and 108 lots in each stage (a total of 386 lots over stages 1 to 4). Each stage will provide the opportunity to create a community precinct. A separate area located to the northern end of the site contains a further potential 105 lots that can be constructed at any time following Stage 1 completion (Stage Areas A-D).

- The total overall potential lot yield (including stages 1 to 4 and areas A-D in the north) is therefore expected to exceed 400 lots (Figure 3.1).

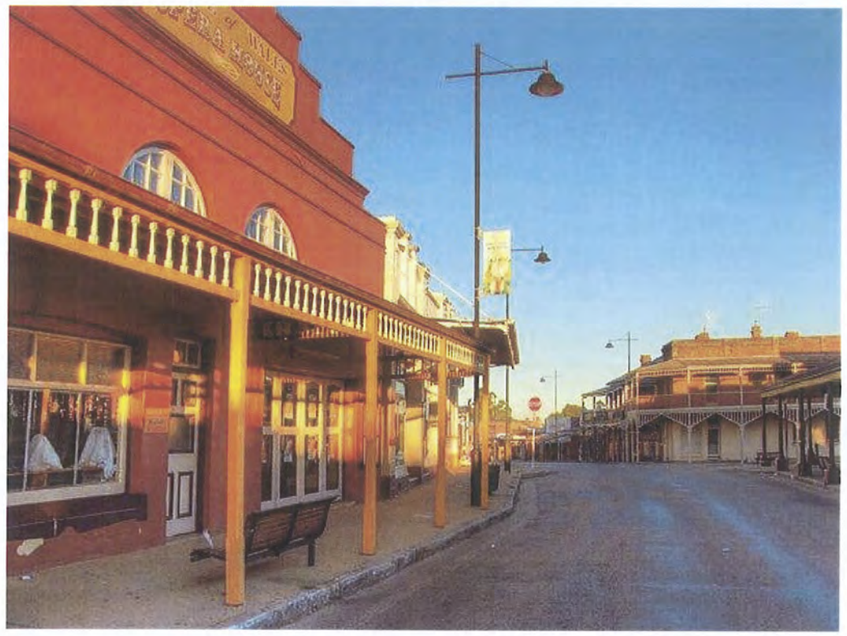
Figure 3.1: Conceptual Subdivision Layout

3.2 Traffic & Transport Management

Grimshaw Lane has been identified as the primary link road, and will form a spine along the western edge of the estate providing direct access to the Gulgong Town Centre.

The road pattern is considered to be sufficiently "permeable" and "legible", with a number of smaller local roads connecting with the Grimshaw Lane spine.

The provision of cul-de-sac roads has been minimised. However, to meet anticipated market demand, several have been provided within the internal network. All cul-de-sacs proposed are to be substantially less than 100 metres in length and will generally service less than 1 lots, in compliance with Council requirements (Figure 3.2).



The site is located less than one kilometre from the Gulgong Town Centre

Figure 3.2: Conceptual Road Hierarchy

3.3 Servicing

Sewerage

Preliminary investigations indicate that provision of sewer and water connections to the site is likely to be technically feasible, subject to sufficient local treatment capacity being available. Council's existing sewage treatment plant (STP) is located to the north of the Gulgong Township, off Spring Creek Road.

The proposed development will therefore require installation of a new sewer reticulation system, including a new sewer pump station to be positioned on the eastern side of the site, and a rising main to connect with the existing STP (Figure 3.3).

Water

Gulgong's water supply is currently extracted from the Cudgegong River, treated, and then pumped to the reservoirs on Flirtation Hill. It is therefore intended to construct a new water main for the estate which will connect to Gulgong's current supply point on Flirtation Hill. It is understood that progressive upgrading of Gulgong's potable water supply to support the development may be negotiated with Mid-Western Regional Council.

Electricity and Telecoms

Electricity and Telecoms are currently available at the perimeter of the site. Further consultation will be undertaken with Essential Energy and relevant Telco providers, at the appropriate stages of estate approval and development.

Existing water supply - Flirtation Hill

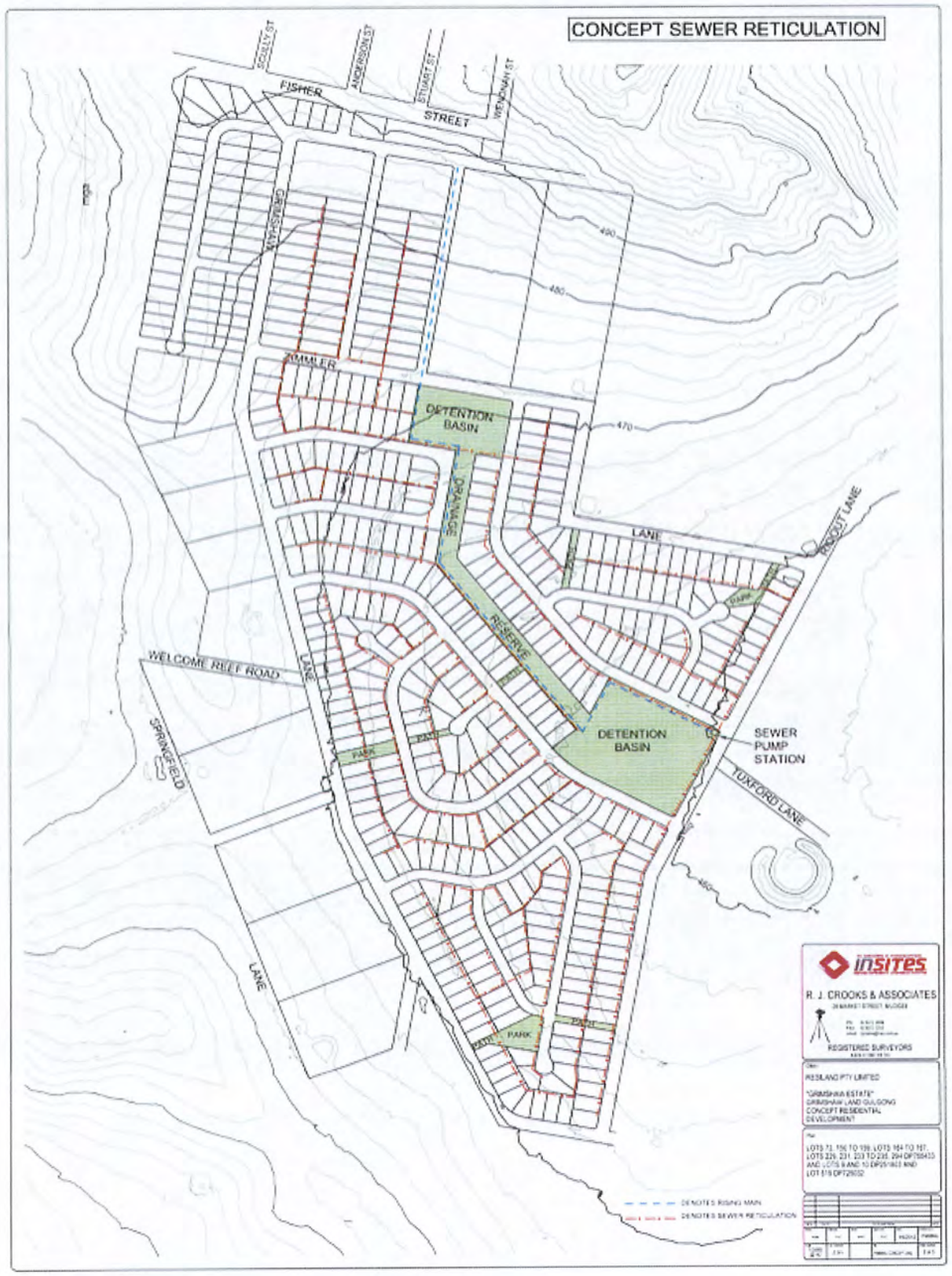


Figure 3.3: Concept Sewerage Reticulation

Site Drainage

As noted above, it is intended to integrate the natural central drainage path as a key open space component of the site. The proposed open space reserve is intended to accommodate both pedestrian and bicycle usage, and the control of drainage.

Piping will be constructed in an economically efficient manner in order to accommodate the stormwater flows. It is expected that individual drainage catchment area will generally be 5 to 10 hectares at the point of discharge into the drainage channel.

Two detention basins are proposed, connected by a drainage reserve. These comprise approximately one hectare and three hectares respectively. It is intended that the basins accommodate runoff from the total catchment of approximately 150 hectares, with provision for the 1 in 100 ARI flow leaving the site to be maintained at a level not exceeding that which is currently existing.

The site drains naturally in a South-easterly direction

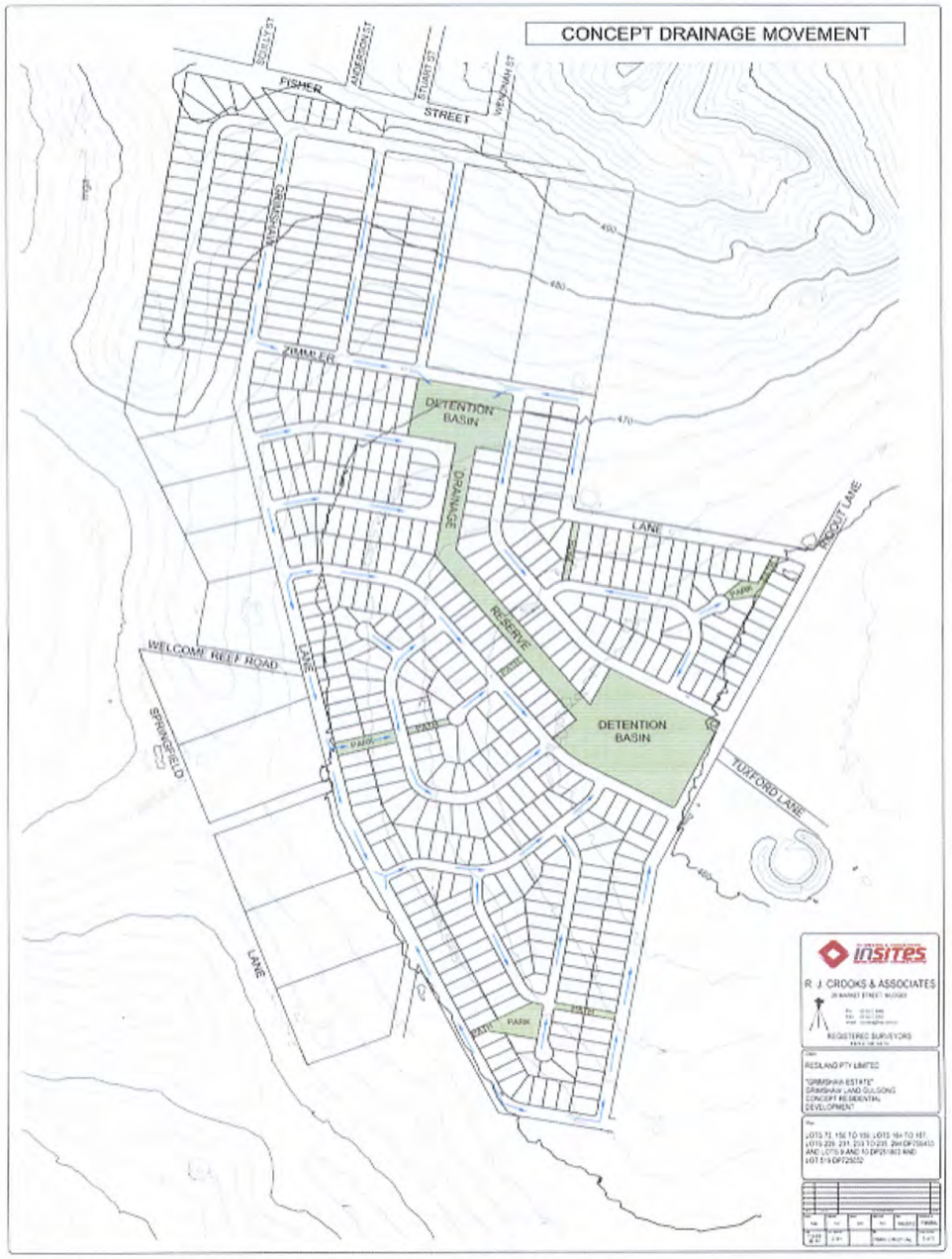


Figure 3.4: Conceptual Drainage Movement

Staging & Timeline for Delivery

The Grimshaw Lane site presents a unique opportunity for residential development, in that it is largely held in one consolidated ownership. Accordingly, development could proceed with minimal delay, following rezoning and development approval. Development would then potentially proceed in 4 stages, comprising some 386 lots in total, with each stage being completed in approximately 12 months (refer Figure 3.5).

Areas A-D adjoining to the north (comprising 105 lots in total) could potentially be completed any time after Stage 1 is constructed.

Depending on the rate of take-up and future levels of housing demand, it is understood that the development could potentially be completed over a 5 – 10 year time-frame, subject to the availability of potable water and sewage treatment capacity.

Stage 1
Stage 1 involves the construction of all services for the initial 97 lots, including construction of a new sewerage pump station, the largest detention basin and drainage reserve, sealed accessways from Gulgong to the site, and the new water main from Flirtation Hill.

Stage 2
Stage 2 would require further services for 108 lots. In addition the smaller detention basin will also be built. Pocket parks and paths will also be created.

Stage 3
Stage 3 encompasses the construction of services and works to create for 87 lots. Pocket parks and pedestrian paths are also included.

Stage 4
Stage 4 involves the construction of services for the remaining 94 lots, and associated pocket parks and pedestrian pathways

Areas A,B,C,D
The areas labelled as A, B and C are parcels of land that are separately owned, as noted above. Future residential development of these lots will be contingent on the construction of the new sewerage pumping station and sealed road access from the Gulgong Town Centre. It may not be economically feasible to approach development of these areas prior to the commencement of the Stage 1 works noted above. Development of areas A and B could potentially occur at any time following the completion of Stage 1, and would be expected to yield approximately 50 lots.

It is considered that development of area C is unlikely in the short term, due to the low potential lot yield.

Area D is Crown Land, and future development would be subject to NSW State Government approval.

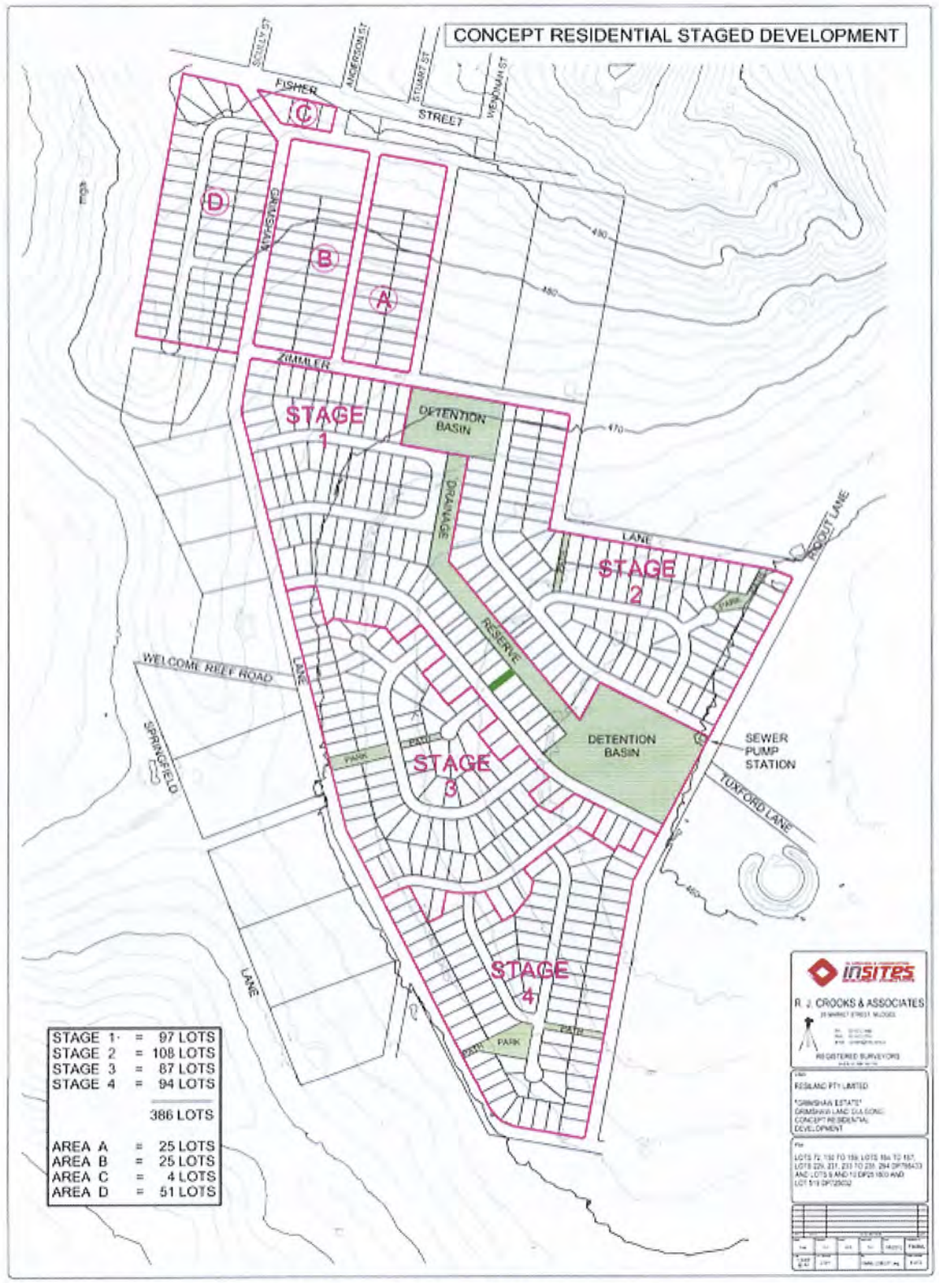


Figure 3.5: Concept Residential Staged Development

4. Explanation of Provisions

Intended Outcomes

The objective and intended outcome of this planning proposal is to enable the development of the subject land parcels at Grimshaw Lane, Gulgong, for the purposes of residential subdivision.

Subject to the completion of the relevant formal studies, conceptual planning indicates that the Grimshaw Lane site has potential to accommodate residential development at a density in the order of 8 dwellings per hectare.

Key aspects include:

- Approximately 386 new allotments in stages 1-4;
- Approximately 105 new allotments in areas A-D;
- New detention basins and drainage reserve;
- New sewerage pump station; and
- New road network.

Provisions to be included

Two amendments to prevailing environmental planning instruments will be required to facilitate the development as currently proposed.

These comprise:

- Rezoning of all subject land parcels to *R1 General Residential Zone* (or a similar zone that allows conventional detached housing); and
- Provision of a minimum lot size which reflects the concept layout (i.e. 600 square metres).

These two matters are discussed briefly below.

Recommendation No 1:

Rezone the Land to a Zone to R1 – General Residential (or similar zone)

The subject site currently falls across of two zones - *Rural Residential* and *Agriculture* under the provision of Mid-Western Interim Local Environmental Plan 2008 (see Figure 2 above). However, it is understood that this Interim LEP will soon be superseded by Mid Western Regional Local Environmental Plan 2011, as recently exhibited.

Under Draft Mid-Western Regional Local Environmental Plan 2011(as recently exhibited) the subject site is currently proposed to be zoned part *R2 Low Density Residential* and part *RU1 Primary Production*. These are broadly equivalent zones to the current *Rural Residential* and *Agricultural* zones on the site under MWRILEP 2008. A minimum lot size of 4,000 square metres has historically been intended for the northern component of the site, as indicated on the relevant Draft Lot Size Map. Whilst the R2 zone could potentially be beneficial if applied to the whole site (with an applicable minimum lot size of 600 square metres), it is considered that the most appropriate zone to support development as now proposed is ***R1 – General Residential.***

This planning proposal therefore recommends, as the preferred option, that the whole of the subject site be rezoned to ***R1 – General Residential.***

Recommendation No 2:

Amendment of Minimum Lot Size

It is proposed to provide minimum lot size in the order of 600 square metres, to support a net residential density of approximately 8 dwellings per hectare.

This planning proposal therefore recommends that the designated minimum lot size for whole of the subject site be 600 square metres.

5. Strategic Justification

5.1 – Need for the planning proposal

Significant sustained demand and take-up of residential allotments within the Mid Western regional Local Government Area has become apparent over the past three years as a result of increased employment opportunities with local mining activity and other resource based projects.

The Mid-Western Regional Comprehensive Land Use Strategy aims to identify environmental, social and economic opportunities and constraints and weigh these against land demand and supply pressures for the Mid-Western Regional Local Government Area as a whole.

More specifically, identified underlying purposes of the Strategy include:

- *To determine the optimal location for development – the strategy ensures that future development is appropriately located and sensitive to surrounding land uses*
- *To achieve infrastructure certainty – the strategy will assist Council in determining infrastructure and service requirements for future development and plan with certainty future infrastructure and servicing needs*
- *To achieve more liveable communities – the Strategy will promote vibrant, high amenity communities, enforced by local planning controls.*

In continuing to develop a responsive land use strategy to support its Regional Vision for 2031, it is apparent that Council will need to take into account the optimal balance between urban and rural land uses - not only in the short term, but also over a twenty-five year time horizon. Inevitably, this will require the balancing of competing objectives.

It is also recognised that the local housing market within the Mudgee/ Gulgong area is segmented not only by product type and price range, but also by geographic sector. "One size" does not fill all. Demand for housing within one geographic location or market sector cannot be assumed to be met by an excess of supply in a different sector, or at a disparate geographic location.

The Mid-Western Regional Comprehensive Land Use Strategy has previously foreshadowed Council's intention for future residential releases in the Gulgong area. Specifically, the Grimshaw Lane precinct is located immediately adjacent to the established Gulgong urban precinct, and can therefore provide lifestyle opportunities that are not precisely replicated elsewhere in the LGA. Accordingly, given the identified market demand, future rezoning of this land for residential development is considered generally consistent with the broad strategic directions established in the Comprehensive Land Use Strategy.

FUTURE GROWTH

The Mudgee Region is expecting significant population growth in the next 3 to 5 years based on the rapid expansion of the coal mining industry in the local area and more than 2,000 new direct employment opportunities at the mines. Recent experience indicates that given the shortage of relevantly skilled mining personnel, the majority of these mining positions will be filled by new residents to the Region.

Table 1: Population Impact of Mining Expansion

Mine	New Positions	New Residents to Region: Minimum - 50% Jobs	Minimum - 50% Family	Maximum - 90% Jobs	Maximum - 90% Family
Ulan	401	201	602	361	1,083
Moolarben	122	61	183	110	329
Wilpinjong	50	26	75	45	136
Cobbora	850*	425	1,275	765	2,295
Mt Penny	250	125	375	225	675
Bylong	250	125	375	225	675
Inglenook	200	100	300	180	540
TOTAL	**2,123**	**1,062**	**3,185**	**1,911**	**5,732**

Source: Environmental Assessments Submitted by Individual Mines and Presentations to Council

The table above shows the number of new positions that will be available at the various mines in the next 3 to 5 years. If 90 percent of these jobs are filled by new residents, the population impact could lead to more than 5,700 people (both employees and families) moving to the Region. This would increase the population of the Mudgee Region to above 28,000 people (representing a 24 percent increase) in the next 3 to 5 years.

Source: Mid-Western Regional Council, Economic and Business Profile, 2010

Source: Mid-Western Regional Council, Economic and Business Profile

Need for the planning proposal (Cont)

Initial analysis indicates that there is substantial justification for proposing rezoning of the subject land parcels to *R1 – General Residential*, with corresponding provision of a minimum lot size of 600 sq.m.

Such zoning and lot size controls will:

- Assist in satisfying the increase in housing demand bought about by the growth in mining and resource based employment
- Complement and reinforce proposed adjoining zones under the Draft LEP
- Be in accordance with Council's current understanding of local area growth and demand.
- The new estate will better support the role of the Gulgong Town Centre.
- Provide lot sizes appropriate for the development form proposed.

Site Suitability for Development

Part of Council's role in determining and recommending appropriate zonings and controls is to ensure that all land parcels can be developed for uses, and at a scale, that suits their positions, the environmental conditions, regional context, local character, scale and density and the community's expectations. To this end, the subject site is considered suitable for the proposed use in relation to the criteria indicated below:

- **Local Context and Setting**

  The Mid-Western Regional Local Government Area is expected to experience substantial growth in employment opportunities as a result of the current mining boom. Given that Council envisages ongoing local population growth, there is now a pressing need to address the availability of land for new housing. In particular, sites should be chosen which:

  (a) have good access to services and facilities and
  (b) are manageable in terms of ownership and land fragmentation.

  The subject site meets both of these criteria.

- **Visual Appearance**

  Given the setting of the proposed development within close proximity of Gulgong's established *Medium Density Residential Zone*, it is considered that the proposed building form, in the nature of detached dwellings, will be in context with its surroundings. Details of future design controls, may be developed within the context of a future DCP.

- **Natural Site Features**

  While formal studies are yet to be completed, initial investigation suggests that the site does not have any immediately apparent natural features that would preclude residential development.

- **Transport, Traffic, Access and Parking**

  The Mid Western regional Local Government Area can be conveniently accessed by air and by road. The concept layout demonstrates that appropriate access will be able to be provided to support a new residential area of the scale proposed.

- **Utilities and Services**

  Utilities and services are currently available at the periphery of the subject site. It is understood that amplification of existing water and sewer capacities may be approached progressively, in conjunction with each proposed development stage.

- **Solar Access & Shadow**

  The proposed minimum of 600 square metres for residential allotments makes provision for flexible orientation of dwellings to provide appropriate solar access and limit the potential for overshadowing.

- **Noise**

  The site will not be developed for a noise generating use. To date, the land has not been identified as located in proximity to any land use that would render it unsuitable for residential use due to noise impacts.

- **Air Quality**

  Development of the site for residential purposes would not be expected to give rise to any issues related to air quality. Nor is it positioned within proximity to any potential uses likely to affect local air quality.

- **Safety, Security and Crime Prevention**

  The proposed estate layout provides good internal visibility and sight lines, and will support passive surveillance in accordance with established Crime Prevention through Urban Design (CPTED) principles.

- **Heritage**

  While formal studies are yet to be undertaken, it is acknowledged that the town of Gulgong is very historic, being renowned as a gold rush town in the 1870s, and that a conservation zone exists adjacent to the site. In recognition of its location, there is a significant opportunity for the proposed Grimshaw Lane Estate be developed in a manner that fully respects its history, setting and context.

Need for the Planning Proposal (Cont)

Strategic study or report

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

Response:

While no site specific strategic study has been prepared to date, the planning proposal is generally consistent with the intent of the future direction of urban growth identified for Gulgong within the Mid-West Regional Comprehensive Land Use Strategy and the subsequent Draft Mid Western Regional Local Environmental Plan 2011. The proposal is also considered to be generally consistent with the recently exhibited Upper Hunter Draft Strategic Regional Land Use Plan.

Best means of achieving objectives/outcomes

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

Response:

The planning proposal is considered to be the most appropriate means of achieving the intended outcomes because it will facilitate an appropriate development that is sympathetic and complementary to the existing adjoining land uses.

Net Community Benefit

Is there a net community benefit?

Response:

Section A3 of the Department of Planning's recently released *"Guide to Preparing Planning Proposals"* outlines principles for carrying out a Net Community Benefit Test. In particular, it is noted that the assessments should be carried out *"in a manner proportionate to the likely impact of the planning proposal"*. In this regard a Net Community Benefit Test has been used to assess the merits of the planning proposal using the questions in the draft Centres Policy.

It is intended that the proposal will deliver a net community benefit. In summary, the community benefits are:

Net Community Benefit Test Evaluation Criteria	**Response**
Will the LEP be compatible with agreed State and regional strategic direction for development in the area (e.g. land release, strategic corridors, development within 800m of a transit node)?	This planning proposal is considered to be compatible with the State and Regional strategic direction for the Mid-Western Regional local government area. The proposed Grimshaw estate will provide much needed housing as a result of new people moving to the area because of the mining boom. The subject site is in a well-positioned area, in close proximity to the Gulgong town centre
Is the LEP located in a global/regional city, strategic centre or corridor nominated within the Metropolitan Strategy or other regional/subregional strategy?	The subject site is located within the Mid-Western Regional local government area. A Comprehensive Land Use Strategy was prepared for the council area, however there has been recent significant acceleration in economic activity, associated with the mining industry, which are having flow-on effects in terms of increasing housing demand.
Is the LEP likely to create a precedent; or create or change the expectations of the landowner or other landholders?	The proposed Grimshaw estate is a direct response to the acknowledged increase in housing demand . The concept layout plan has been designed to address the adjacent lands, however it is also a stand-alone concept that can enable development independent of adjacent landowners.
Have the cumulative effects of other spot rezoning proposals in the locality been considered? What was the outcome of these considerations?	No other spot rezonings which are of relevance to this proposal are currently apparent.
Will the LEP facilitate a permanent employment generating activity or result in a loss of employment lands?	The recommended zoning changes will facilitate provision of housing for new residents wishing to move to the area. Therefore, the proposal will support this significant economic industry.
Will the LEP impact upon the supply of residential land and therefore housing supply and affordability?	The proposal involves rezoning the land from rural to a residential zone and reducing the minimum lot size to enable creation of a new residential estate. This will present opportunity to provide a variety of housing types and forms that respond to the local housing market.
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?	The proposed concept layout plans indicate that an effective and efficient internal road network system can be created to connect to existing roads Existing utility services such as water, electricity and sewerage are currently available to the site. However, it is acknowledged that progressive upgrading of facilities, in conjunction with a program to be established with Mid-Western Regional Council, will be required. The proposed concept layout includes pedestrian and bicycle linkages throughout the site .

Will 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?	The subject site is located adjacent to Gulgong Township, which contains a variety of services and facilities. As the area does not currently have a strong public transport system, there will be more of a reliance on private vehicle usage. However this increase in private vehicle usage is not anticipated to have a significant negative effect on existing road network
Are there significant Government investments in infrastructure or services in the area whose patronage will be affected by the proposal? If so, what is the expected impact?	None Apparent
Will the proposal impact on land that the Government has identified a need to protect (e.g. land with high biodiversity values) or have other environmental impacts? Is the land constrained by environmental factors such as flooding?	While formal studies are yet to be completed, to date, no issues have been identified which would preclude the site from residential development. The subject site is not considered to be environmentally sensitive or contain any significant vegetation. Potential stormwater flows can be managed through the proposed drainage reserve and detention basin system. The site is considered to be suitable for development.
Will the LEP be compatible/complementary with surrounding land uses? What is the impact on amenity in the location and wider community? Will the public domain improve?	It is considered that the proposed recommendations included within this planning proposal will be compatible with the adjacent land uses in Gulgong. In essence the proposed Grimshaw Lane Estate is considered to represent a logical extension to the Gulgong urban area.
Will the proposal increase choice and competition by increasing the number of retail and commercial premises operating in the area?	The proposal includes rezoning the subject land and a reduction in the minimum lot size in order to create a new residential estate. It is expected that an increase in population will promote and encourage further retail and commercial premises.
If a stand-alone proposal and not a centre, does the proposal have the potential to develop in a centre in the future?	If the Gulgong town was to expand in the future, the options and recommendations within this planning proposal provide the opportunity for the subject site to easily transition to become part of Gulgong itself
What are the public interest reasons for preparing the draft plan?	This planning proposal is in the public interest for the following reasons: - The proposal will directly respond to housing demand arising from expansion in employment in the local mining industry - The subject site is considered to be an appropriate location, in line with the previously established local strategic direction for the expansion of Gulgong; - It presents the opportunity to increase the housing supply within close proximity to an established urban area; - Provide a variety of housing choice;
What are the implications of not proceeding at that time?	There are many implications that may results if this planning proposal does not proceed including: - the opportunity will be lost to provide residential housing that meets the needs of current and future residents of Gulgong; - The continued expansion and viability of mining activity in the area will be negatively affected as a result of not being able to increase residential land supply; - Housing and rental affordability in the local government area will not increase if there is no increase in residential land supply; - New open spaces for the community will not be created.

5.2 Relationship to Strategic Planning Framework

Consistency with Strategies

Is the planning proposal consistent with the objectives and actions contained within the applicable regional or sub-regional strategy (including the Sydney Metropolitan Strategy and exhibited draft strategies)?

Response:

The planning proposal is considered to be generally consistent with the recently exhibited Upper Hunter Draft Strategic Regional Land Use Plan.

Community and Local Strategic Plans

Is the planning proposal consistent with the local Council's Community Strategic Plan, or other local strategic plan?

Response:

Mid-Western Regional Council has recently completed a Comprehensive Land Use Strategy. The strategy aims to *"provide clear direction and guide future change in the area for the next 15 to 20 years"*. An extract from page 4 of that document is shown below:

> *The preliminary estimated resident population for the local government area in June 2006 is approximately 21,980 persons. This is projected to rise to 22,570 persons by 2011, approximately 24,130 persons by 2021, and to 26,220 persons by 2031.*
>
> *Mudgee Township is likely to see the majority of this growth (approximately 87%) with Gulgong to see a 3% increase in growth over the same period to 2031.*

The above extract indicates that the population projection expectations were in the order of an additional 4,000 people over a 25 year period starting in 2006 and ending in 2031. However, due to significant expansion of employment related to local mining activity, it is now expected that these projections will be exceeded.

This Grimshaw Lane Estate planning proposal is considered to be generally consistent with Council's long term strategic vision for the area, as it proposes residential development in an area already identified and earmarked for residential zoning and urban release.

SEPP's

Is the planning proposal consistent with applicable SEPP's?

Response:

The following SEPP's are listed as being relevant to the land to which the Mid-Western Regional Interim Local Environmental Plan 2008 applies:

- *State Environmental Planning Policy (Affordable Rental Housing) 2009 (including provision for secondary dwellings)*
- *State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004*
- *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*
- *State Environmental Planning Policy (Housing for Seniors of People with a Disability) 2004*
- *State Environmental Planning Policy (Infrastructure) 2007 – relating to infrastructure facilities such as those that comprise, or are for, air transport, correction, education, electricity generating works and solar energy systems, health services, ports, railways, roads, waste management and water supply system*
- *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*
- *State Environmental Planning Policy (Rural Lands) 2008*

To date, no immediate or direct implications for the proposed rezoning of the subject site have been identified as arising from these policies.

S. 117 Directions

Is the planning proposal consistent with applicable Ministerial Directions (s.117 directions)?

Response:

Section 117 Directions are Directions by the Minister to Council's that must be considered in the preparation new or amending LEP's such as that proposed. Relevant S117 directions are briefly addressed below.

Relevant S 117 Direction	Comment
1.2 Rural Zones	
Objectives (1) The objective of this direction is to protect the agricultural production value of rural land.	The Mid-Western Regional Council currently contains a substantial areas of land zoned rural. The development is proposed on land which currently has a rural zone. At present it is not considered that the subject site has a significant role in contributing to the agricultural production of the area. It is considered that development for residential purposes is now appropriate
Where the direction applies (2)(a) Clause 4(a) of this direction applies to all councils. (3) This direction applies when a council prepares a draft LEP that affects land within an existing or proposed rural zone (including the alteration of any existing rural zone boundary).	Noted
What a council must do if this direction applies (4) A draft LEP shall: (a) not rezone land from a rural zone to a residential, business, industrial, village or tourist zone. (b) not contain provisions that will increase the permissible density of land within a rural zone (other than land within an existing town or village).	There is justification included throughout this submission as to why the zones of the subject site should change from rural to residential, particularly due to its close proximity to Gulgong Township and local housing demand.
Consistency (5) A draft LEP may be inconsistent with the terms of this direction only if council 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 draft LEP 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 draft LEP (if the draft LEP relates to a particular site or sites), and (iii) is approved by the Director-General of the Department of Planning, or (b) justified by an environmental study (prepared in accordance with section 57 of the *Environmental Planning and Assessment Act 1979*) 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.	This submission aims to rezone part of the subject site from "rural" to "residential" and reduce the minimum lot size. Therefore it is inconsistent with the objective of this direction, as the site will no longer be zoned rural. The Mid-Western Regional Council has developed multiple strategies for the local government area such as a comprehensive land use strategy, economic development strategy, and a rural residential, industrial and residential strategy. Each strategy identifies that the population of the local government area will increase and that appropriate land needs to be identified in order to accommodate the growth for particular purposes. However , previous strategies have not taken into account the more recently observed increase in local economic activity and employment growth. It is not considered that this development will have a negative effect on the existing rural lands of the area as the strategy identifies land which will be specifically preserved for areas to *"protect the agricultural value of rural land"*.
1.5 Rural Lands	
Objectives (1) The objectives of this direction are to: (a) protect the agricultural production value of rural land, (b) facilitate the orderly and economic development of rural lands for rural and related purposes.	This planning proposal intends to rezone land from "Rural Residential" and "Agriculture" to "Residential". Therefore the rural land will disappear as a result of the development. This inconsistency with the objectives is addressed against clause 6 below.
Where this direction applies Ashfield, Auburn, Bankstown, Baulkham Hills, Blacktown, Blue Mountains, Botany Bay, Burwood, Camden, Campbelltown, Canada Bay, Canterbury, City of Sydney, Fairfield, Gosford, Hawkesbury, Holroyd, Hornsby, Hunters Hill, Hurstville, Kogarah, Ku-ring-gai, Lake Macquarie, Lane Cove, Leichhardt, Liverpool, Manly, Marrickville, Mosman, Newcastle, North Sydney, Parramatta, Penrith, Pittwater, Randwick, Rockdale, Ryde, Strathfield, Sutherland, Warringah, Waverley, Willoughby, Wollondilly, Woollahra, Wollongong, Wyong (2) (a) This direction applies to all councils to which State Environmental Planning Policy (Rural Lands) 2008 applies which includes all councils in the State other than the following local government areas:	Noted.
When this direction applies (3) This direction applies when: (a) a council prepares a draft LEP that affects land within an existing or proposed rural or environment protection zone (including the alteration of any existing rural or environment protection zone boundary) or (b) a council prepares a draft LEP that changes the existing minimum lot size on land within a rural or environment protection zone.	Noted
What a council must do if this direction applies: (4) A draft LEP 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*. (5) A draft LEP to which clause 3(b) applies must be consistent with the Rural Subdivision Principles listed in *State Environmental Planning Policy (Rural Lands) 2008*.	This planning proposal seeks to change a rural zone to a residential zone, therefore reducing the amount of rural land in the local government area. Despite this, the proposal is considered to be consistent with the *Rural Planning Principles* listed in *State Environmental Planning Policy (Rural Lands) 2008* and the associated *Rural Subdivision Principles*.

Note: *State Environmental Planning Policy (Rural Lands) 2008* does not require a council to review or change its minimum lot size(s) in an existing LEP. A council can transfer the existing minimum lot size(s) into a new LEP. However, where a council seeks to vary an existing minimum lot size in an LEP, it must do so in accordance with the Rural Subdivision Principles listed in *State Environmental Planning Policy (Rural Lands) 2008.*	
Consistency (6) A draft LEP may be inconsistent with the terms of this direction only if council 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 draft LEP 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 draft LEP (if the draft LEP relates to a particular site or sites), and (iii) is approved by the Director-General of the Department of Planning and is in force, or (b) is of minor significance.	This planning proposal to change the nature of land from rural to residential and reduce the minimum lot size is inconsistent with the objectives of this direction. The Mid-Western Regional Council have had to ensure that as a result of the mining boom, that rural land in the local government area will be preserved, despite the required demand resulting in the increase of development of land for residential purposes.
3.1 Residential Zones	
Objectives (1) The objectives of this direction are: (a) to encourage a variety of choice of housing types to provide for existing and future housing needs, (b) to make efficient use of existing infrastructure and services and ensure that new housing has appropriate access to infrastructure and services, and (c) to minimise the impact of residential development on the environment and resource lands.	The proposal involves rezoning the subject site and reducing the minimum lot size for residential development. It is considered that the proposal is consistent with the objectives of this zone. The new estate would make efficient use of existing infrastructure and services including water, electricity and sewerage, which are already available to the site. In addition the proposal will not have a detrimental effect on the environment or surrounding resource lands such as rural agricultural land.
Where this direction applies (2) This direction applies to all councils	Noted
When this direction applies (3) This direction applies when a council prepares a draft LEP that affects land within: (a) an existing or proposed residential zone (including the alteration of any existing residential zone boundary), (b) any other zone in which significant residential development is permitted or proposed to be permitted.	Noted
What a council must do if this direction applies (4) A draft LEP shall 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. (5) A draft LEP shall, 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 Grimshaw Lane Planning Proposal is a direct response to the acknowledged demand for housing in the Mid-Western regional Local Government Area. The proposal will facilitate future opportunities to incorporate a variety of housing types to suit the housing market. The site's location is appropriate considering its close proximity to Gulgong Town. The proposed concept layout is efficient in its design in terms of the road network, stormwater and drainage network as well as pedestrian and cycling connections throughout the site. In addition, the proposed staging of development i will ensure proper management of development and associated infrastructure.
Consistency (6) A draft LEP may be inconsistent with the terms of this direction only if council 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 draft LEP 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 draft LEP (if the draft LEP relates to a particular site or sites) and (iii) is approved by the Director-General of the Department of Planning, or (b) justified by an environmental study prepared in accordance with section 57 of the *Environmental Planning and Assessment Act 1979* 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 proposal is considered to be consistent with the objectives in this direction, as justified throughout this planning proposal submission. In addition it is also consistent with the council's vision as a response to local employment growth and resulting increase in population.

3.4 Integrating Land Use and Transport	
Objective (1)The objective of this 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 of 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.	The Mid-Western Regional local government area does not have a strong and frequent public transport system. Gulgong has access to various bus services. The proposed concept layout plans illustrate a road network which will provide good internal service to housing lots and parks. In addition there will be good internal pedestrian and bicycle linkages through the site which will reduce the reliability of car usage. The layout of the estate ensures it will connect to key roads providing access to Gulgong Town and other surrounding areas.
Where this direction applies (2) this direction applies to all councils	Noted
When this direction applies (3) this direction applies when a council prepares a draft LEP that creates, alters or removes a zone or a provision relating to urban land, including land zoned for residential, business, industrial, village or tourist purposes.	Noted
What a council must do if this direction applies (4) A draft LEP shall locate zones for urban purposes and include provisions that give effect to and are consistent with the aims, objectives and principles of: (a) *Improving Transport Choices – Guidelines for planning and development* (DUAP 2001), and (b) *The Right Place for Business and Services – Planning Policy* (DUAP 2001).	It is considered that the current proposal has adequately addressed principles from *Improving Transport Choices – Guidelines for planning and development* and *The Right Place for Business and Services – Planning Policy* Once developed, the estate will perform efficiently in terms of transportation.
Consistency (5) A draft LEP may be inconsistent with the terms of this direction only if council 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 draft LEP 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 draft LEP (if the draft LEP relates to a particular site or sites), and (iii) is approved by the Director-General of the Department of Planning, or	The proposal is considered to be consistent with the objectives of this direction. Justification is provided above in terms of the proposed concept layout and potential transport network connections both internally on the site and to surrounding areas.
(b) justified by an environmental study prepared in accordance with section 57 of the *Environmental Planning and Assessment Act 1979* 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.	

5.3 Environmental, Social and Economic Impact

Critical Habitat and Threatened Species

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

Response:

While formal studies are yet to be completed, the site has not been identified to date as containing any critical habitat, threatened species, populations, or ecological communities.

Other Environmental Effects

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

Response:

A salinity assessment of the site is currently being prepared. To date, there are no currently known significant environmental effects that would preclude residential development.

Social and Economic Effects

How has the planning proposal adequately addressed any social and economic effects?

Response:

The proposal will facilitate housing affordability by providing significant opportunity for new residential development, including a variety of housing types . Providing serviced urban land will provide opportunity for a housing mix which directly responds to the local market. The development will therefore function to encourage a social mix through housing choice.

The rezoning of the site and provision of serviced urban land will help meet the needs of the community by facilitating the provision of more housing for the Gulgong area generally. It will also encourage the economic use of existing services available in the surrounding area, including retail services, public transport services and other infrastructure available in the community.

5.4 State and Commonwealth Interests

Infrastructure

Is there adequate public infrastructure for the planning proposal?

Response:

The subject site is located within close proximity to the Gulgong town centre and associated bus services. The proposal for a new residential estate will take greater advantage of the proximity of the subject site to the town centre, and associated public transport services.

It is acknowledged that expansion of local water and sewerage systems will be necessary to support staged development as currently proposed.

State and Commonwealth Public Authorities

What are the views of State and Commonwealth public authorities consulted in accordance with the gateway determination?

Response:

No State or Commonwealth public authorities have been consulted at this stage, pending further response from Council.

Draft Strategic Regional Land Use Plan

6. Community Consultation

Current land owners and project proponents have previously engaged positively with Council and the local community in developing the planning proposal to date, and remain committed to work cooperatively with both Council and the community, should the proposal proceed.

In conclusion, preliminary investigations carried out to date indicate that the concept layout presented with this proposal has potential to be successfully accommodated on the Grimshaw Lane site. The proposal has significant planning merit and warrants the support of Mid-Western Regional Council for further investigation.

Summary of Key Findings:

Investigations carried out to date indicate that the proposal for residential zoning of land at Grimshaw Lane, Gulgong, has significant planning merit, and now warrants Council support. Key findings of initial investigations indicate that:

- There is an identified need for the provision of additional housing within the Mid-Western Regional Area generally, and in proximity to the established urban centres of Gulgong and Mudgee in particular.

- A key driver of economic growth across the region has been the recent expansion in employment in coal mining and other local infrastructure and resource-based projects. The strategic location of the Grimshaw Lane site, in close proximity to Gulgong and adjacent to the Gulgong-Mudgee corridor, is ideal in relation to nearby established mine sites at Ulan, Moolarben and Willpinjong, and the proposed new mine at Cobbora. Accordingly, access to employment at local mines, and to the services and facilities of Mudgee itself, is both convenient and direct from this point.

- The site at Grimshaw Lane immediately adjoins the existing Gulgong urban area, and represents a logical extension to the established town fabric. Connections to utility services are available at the periphery of the site, and subject to agreement with Council, may be upgraded to support the proposal.

- A significant component of the site has previously been identified within the Mid-Western Regional Comprehensive Land Use Strategy and the subsequent Draft Mid-Western Regional Environmental Plan 2011 as suitable for residential development, with an associated minimum lot size of 4,000 square metres. The proposal is therefore generally consistent with Council's established strategic planning for the area.

- Additional recent investigations now identify the site as likely to be suitable to support residential development at a density in the order of 8 dwellings / hectare, with a corresponding minimum allotment size of 600 square metres.

- The Grimshaw Lane site presents a unique opportunity for coordinated residential development, in that it is largely held in one consolidated ownership. Accordingly, development could proceed with minimal delay, following rezoning and development approval, and thence supply a continuity of serviced urban land to meet future market demand.

RJ CROOKS & ASSOCIATES
INSITES
DEVELOPMENT CONSULTANTS

GRIMSHAW ESTATE

RESIDENTIAL SUBDIVISION

GULGONG

TRAFFIC ANALYSIS

Prepared For:
Rathfobe Pty

PROJECT ID: F968MU

Prepared by:
Insites

June 2012

OUR VISION IS YOUR FUTURE

CONTENTS

1.0 BACKGROUND

R.J Crooks and Associates Insites (Insites) has been engaged by Rathfobe Pty Ltd to analyse the traffic impacts of the proposed residential subdivision at Grimshaw Lane, Gulgong.

The residential subdivision includes the planned construction of 386 residential lots within an area of land south of Gulgong, with another 105 lots becoming available for development under the proposed rezoning. Plans of the development have been prepared by Insites Pty Ltd and include an indicative lot layout, proposed staging of the development, and preliminary servicing plans for the water, sewer and stormwater drainage including detention basins.

The purpose of this report is to provide information on the effects of traffic generated from the development to accompany the "Grimshaw Lane Gulgong" planning proposal submission to Mid Western Regional Council and should be read in conjunction with that submission.

In assessing the traffic to be generated from the proposed subdivision, the Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development (Austroads 2009) has been used as a basis for the report structure and content.

2.0 DESCRIPTION OF DEVELOPMENT

In the preparation of the indicative lot layout plan (ILP) for the subdivision, some thought has been given to the traffic generation and likely paths taken by motorists, pedestrians and cyclists. Feedback from Mid Western Regional Council produced changes to the draft plans to reduce the number of cul-de-sacs and increase the number of through roads in the development. The indicative lot layout plan has limited the number of lots serviced by any one cul-de-sac to a maximum of 8.

The ILP also includes local parks and reserves at a maximum of 400m from any lot. These parks are included in a network of pedestrian pathways that will limit the number of pedestrian-motorist interactions and provide safer passage for pedestrians and cyclists moving throughout the subdivision.

The road network through the subdivision has been included in figure 3 in this report. The plan identifies the local traffic network and clearly distinguishes between the intended collector roads and local roads.

3.0 EXISTING AREA CONDITIONS

3.1 Area of Influence

The most immediate areas to be affected by the traffic generated from the development will be the central business district, as well as major traffic routes such as the Castlereagh Highway, Gulgong-Ulan Road, and Henry Lawson Drive. For the purposes of this report, the area of influence will extend from the subdivision and incorporate the central Gulgong area. Major traffic routes such as Ulan Road and Castlereagh Highway will also be included in the area of influence.

3.2 Study Area and Land Uses

The study area and land uses have been described in the Grimshaw Lane planning proposal prepared by Insites Pty Ltd.

3.3 Site Accessibility

Currently the site is accessed by Welcome Reef Road, Ridout Lane or Anderson Street. All three of these roads are unsealed and have narrow carriageways.

The site will be accessed from three main collector roads. The main access point to the Gulgong CBD to the North will be via an upgrade to Scully Street, which will connect with Mayne Street.

Access via the West will be via Welcome Reef Road, which connects with Springfield Lane. Springfield Lane then continues on further until it reaches the Castlereagh Highway.

Access via the North East will be via Ridout Lane, which leads on to Homer Street to connect with the Gulgong-Ulan Road, and Wilbertree Road which leads to Henry Lawson Drive to the South East.

Access to the subdivision from the South will not be provided, as the road network South of the subdivision consists of minor laneways that are unsealed and only used for private access to rural properties.

3.4 Traffic Volumes and Conditions

Traffic data available on the nearest roads to the subdivision comes from the 2006 RTA Western Region traffic data and data obtained from the Gulgong Centre Traffic Management Report (2008). The particular streets of interest are:

Street	Between	AADT (Average)	Peak Hour
Mayne Street	Medley & Herbert	1688	193
Medley Street	Short & Robinson	935	111
Castlereagh Highway	Robinson Street	1172	-
Herbert Street	Holtermann & Robinson	1535	-
Robinson Street	Medley & Herbert	348	44
Queen Street	Herbert & White	281	-

Table 1: Existing traffic data for Gulgong

4.0 TRAFFIC GENERATED BY DEVELOPMENT

4.1 Site Traffic

4.1.1 Trip Generation

The traffic to be generated by the development was determined in accordance with The RTA Guide to Traffic Generating Developments (2002) and Austroads Guide to Traffic Management Volume 12: Traffic Impacts of Development.

Both of these guidelines recommend the following for a residential subdivision:

- Daily vehicle trips = 9 per dwelling
- Weekday peak hour trips = 0.85 per dwelling.

As per the guidelines, 25% of total trips are assumed to be internal to the subdivision and therefore do not impact on the surrounding road network. No allowance has been made for the use of public transport, as it is envisaged that residents will use private vehicles for the majority of trips. This estimate is considered very conservative especially in light of the fact that there is a school bus route that travels through the subdivision at the moment. It is expected that this bus route would service the developed subdivision but as a worst-case scenario we have not allowed for a reduction in the number of peak hour vehicle trips.

4.1.2 Trip Distribution

The traffic generated by the development was split into slightly different travel directions for the peak hour and AADT traffic volumes. For the peak hour volumes, a higher percentage of traffic was assumed travelling towards major employment locations, such as the three major coal mines around Ulan, as well as the Gulgong town centre. The peak hour volumes calculated from each of these assumptions in travel direction is shown below in Figure 1.

It is worthwhile to note that in determining the trip distribution no consideration was given to the future development of Cobbora Mine, which would be a significant trip generator for the area. The trip distribution would change significantly with a far greater percentage of daily and peak hour trips exiting the subdivision from Welcome

Reef Road to the Castlereagh Highway towards Dunedoo, avoiding the Central Gulgong area completely.

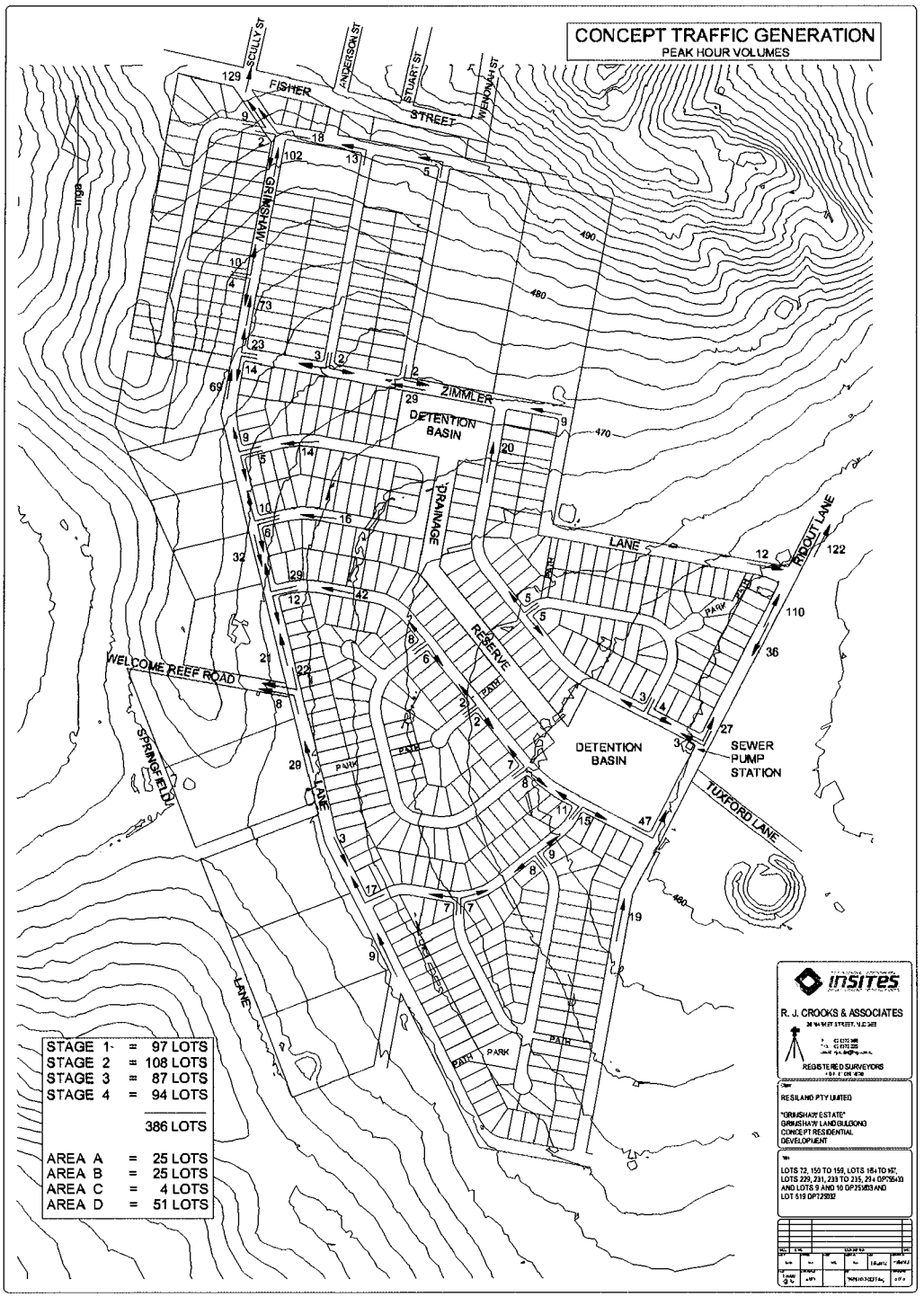


Figure 1: Peak hour volumes and directional split throughout the subdivision

For the average annual daily traffic (AADT) traffic volumes, the percentages were revised to reflect the expected trip distribution on a normal weekday, with a greater percentage of trips allocated to the town centre (to engage in social activities and school pick ups, etc). The percentages assumed for each of these directions are shown on Figure 2 with the daily traffic volumes for each of the main collector roads in the subdivision.

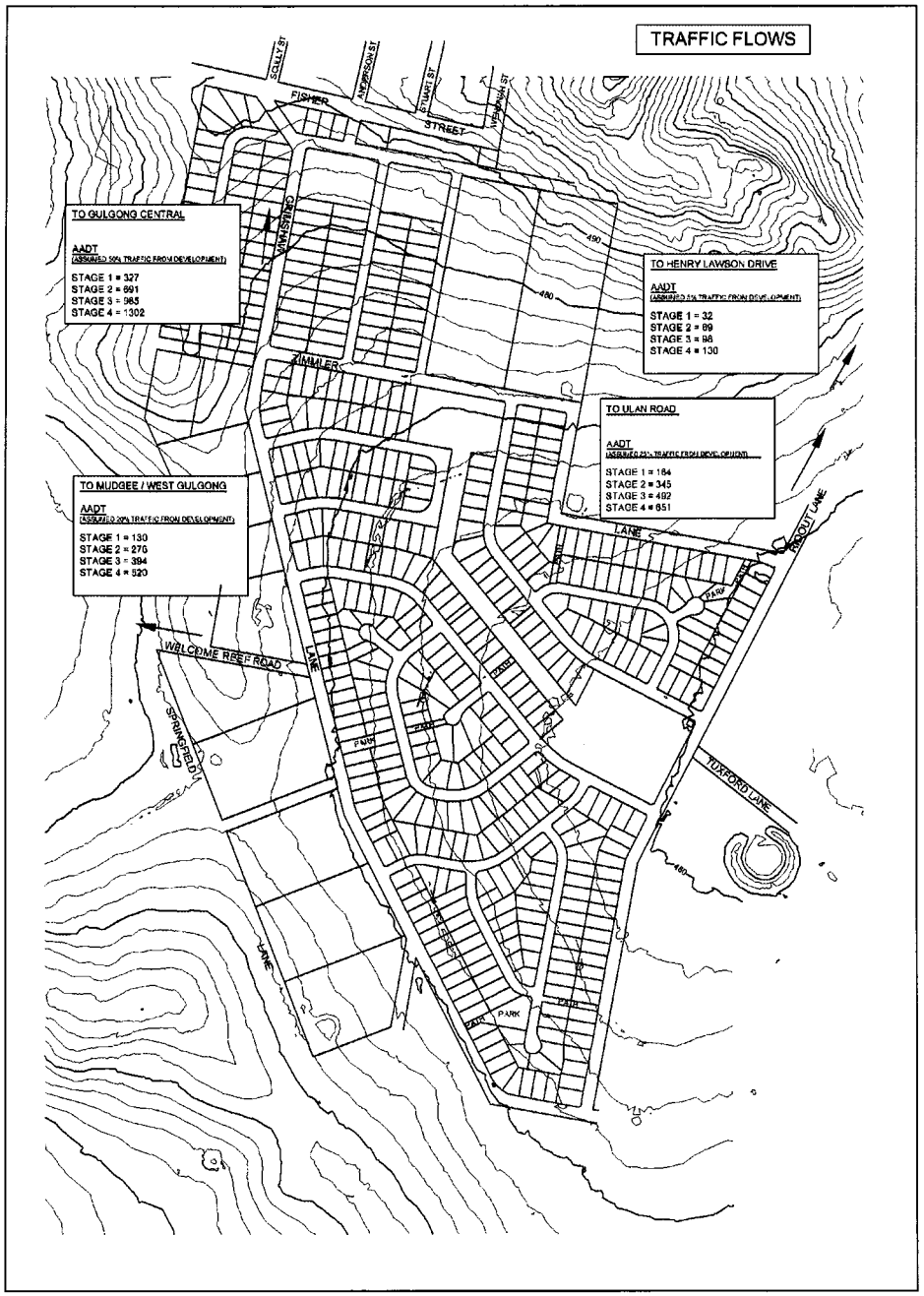


Figure 2: AADT from the proposed development in travel direction

4.1.3 Transport Modal Split

The majority of the trips taken in the subdivision are assumed to be via private passenger vehicle. The distance from the Northern end of the subdivision is approximately 1km, which is within easy walking or cycling distance, while the distance from the Southern end of the subdivision measures approximately 2.7km from to the town centre. This end of the subdivision will not lend itself to walking trips to the town centre, so a conservative estimate of 10% was adopted for trips made other than by private cars. This estimate will also conservatively allow for trips made by school bus that will service the subdivision.

4.1.4 Trip Assignment

Trip assignment for the subdivision was completed using the percentages described in Figure 1. Peak hour trip volumes are shown on Figure 2.

4.1.5 Vehicle Classification

The majority of traffic generated by the development is expected to be light passenger vehicles. The development will not increase numbers of heavy or medium heavy vehicles onto the Gulgong road network. It is worthwhile to note that while the overall traffic volumes on these roads will undoubtedly increase, the percentage of heavy vehicles travelling on the roads will not. In most cases it will decrease.

4.2 Estimated Volumes

The table below shows the predicted total traffic generated by the development against the current volumes. The

Street	Between	AADT (Average)	*AADT (Post Developed)			
			Stage 1	Stage 2	Stage 3	Stage 4
Mayne Street	Medley & Herbert	1688	1884	2103	2279	2469
Medley Street	Short & Robinson	935	974	1018	1053	1091
Castlereagh Highway	Robinson Street	1172	1211	1255	1290	1328

Herbert Street	Holtermann & Robinson	1535	1574	1618	1653	1691
Robinson Street	Medley & Herbert	348	478	624	742	867

Table 2: Existing traffic volumes and after each stage of the development

* Note: Peak hour and AADT volumes are estimated on worst case scenario basis for all roads.

The figures were obtained by assuming that 60% of all traffic travelling in that general direction was using the road in question on the same day, a very conservative estimate.

5.0 TRANSPORTATION ANALYSIS

5.1 Capacity and Level of Service

The method used to determine the capacity of a roadway is the "Level of Service" criteria as described in Austroads (2011). It is a qualitative measure that ranks the performance of each road and uses this ranking to determine if upgrades are needed and if so, determine the appropriate level of treatment.

Levels of service range from Level A (free flow, almost no delays) to Level F (forced flow, jammed). It is recommended in Austroads that levels of service for arterial and sub-arterial roads do not exceed Level C, where operating speeds are still reasonable and some acceptable delays are experienced.

Existing Levels of service for the Gulgong Centre at peak hour are shown below, along with the expected increase in traffic volumes and corresponding Levels of service for the same roads after construction of the development.

Street	Between	Peak Hour Existing	L.O.S Existing	Peak Hour Post Developed	L.O.S (Post Developed)
Mayne Street	Medley & Herbert	193	N/A	268	N/A
Medley Street	Short & Robinson	111	A	185	A
Castlereagh Highway	Robinson Street	-	A	+10	A
Herbert Street	Holtermann & Robinson	121	A	195	A
Robinson Street	Medley & Herbert	44	A	81	A
White Street	Robinson & Mayne	60	A	97	A

Table 3: Peak hour volumes and level of service for major roads.

The post-developed levels of service are judged on the criteria listed in Austroads for a 2 Lane, 2 way undivided road. There are no criteria available to judge the adequacy of a one lane, two way road, such as Mayne Street.

6.0 RECOMMENDATIONS

6.1 Internal to the Subdivision

The traffic generated by the subdivision will be channeled through the major identified roads in the subdivision as shown on Figure 3. These roads will be treated with measures to ensure that they can easily be identified by motorists as a major road.

Figure 3: Major collector roads in the new Subdivision.

6.2 External to the Subdivision

The effect of the traffic generated by the development will be felt outside the subdivision in the Gulgong area. Recommendations for improvements to the existing Gulgong Street Network include:

- Extension of Scully Street through to the intersection with Cooyal Street.
    - The extension will provide access to central Gulgong from the subdivision. The intersection of Cooyal and Scully Street should also be upgraded to include Give Way controls and priority to traffic travelling on Scully Street.
    - The intersections before Cooyal Street (heading North from the subdivision) are not proposed to be major intersections (Fisher Street and Fitzroy Street road reserves) as construction of these roads within the existing road reserve is not proposed at this time.

- The existing intersection at Scully Street and Mayne Street currently has give way signal control. It is not envisaged that the traffic due to this subdivision will require any further upgrade to the intersection.

- Ridout Lane and Wilbertree Road
  - Ridout Lane will require upgrading and sealing of the intersection with Wilbertree Road at Stage 2 of the development. Currently Ridout Lane is unsealed and has a narrow carriageway. It will require upgrading as the majority of the traffic travelling East from the subdivision to the Ulan mines will likely use this route.
  - The intersection of Ridout Lane and Wilbertree Road is located in a 100km/hr speed zone. Stage 2 of the development will see an increase in traffic using this intersection and to improve safety it is recommended that the 50km/hr speed zone be extended to include this intersection when stage 2 of the development is being constructed.

- Welcome Reef Road
  - Welcome Reef Road will require upgrading and sealing as it is to be the minor arterial road to convey residents West from the subdivision to Medley Street and beyond, especially when the Cobbora Mine begins operation. Currently the road is formed but unsealed, with a school bus using the road.
  - The intersection with Medley Street currently sits just inside (approximately 100m) the Gulgong 50km/hr speed zone. Appropriate intersection treatment with give way signs in accordance with Austroads requirements will be sufficient to accommodate the expected traffic.

- Mayne Street and Town Centre
  - The increase in traffic due to the subdivision will have an impact on the Gulgong town centre, especially Mayne Street with one travel lane, two direction travel and parking on both sides of the street. The Gulgong Centre Traffic Management Study outlines several circulation options to improve the traffic flow through Mayne Street and the town centre. These options will improve traffic flow, some with the reduction of

parking spaces and introduction of one-way streets. In our opinion the preferred option is Option 6, which will improve traffic flow, remove head on conflict on Mayne and Medley Streets and increase parking spaces on Queen and Robinson Streets. The downside is that parking spaces would be reduced along Medley Street.

- Treatments to the Gulgong town centre would not have to occur with the onset of the first stage of the development. Traffic conditions should be monitored as the stages of the subdivision are completed and the recommendations in the Gulgong Centre Traffic Management study implemented if required.

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28 June 2012

Rathfobe Pty Limited
c/o Wheelans Insites
Market Street
Mudgee NSW 2850

Dear Mr Summers,

RE: Preliminary Salinity Assessment of land within Lots 150, 151, 152, 164, 165, 166, 167 DP 75433, Grimshaw Lane, Gulgong, NSW.

Minespex was engaged by Whelans Insites Pty Ltd on behalf of Rathfobe Pty Limited to carry out a preliminary salinity assessment on the above mentioned land and provide an assessment on the salinity levels. This assessment was based on a site inspection, soil testing and desktop salinity review. This interim letter has been prepared to provide the client with a summary of findings from the site inspection and results currently available from laboratory analysis of soil samples prior to the issue of the Preliminary Salinity Assessment Report.

This report will be provided to the client on receipt and examination of the entire laboratory analysis results.

BACKGROUND

Lots 150, 151, 152, 164, 165, 166 and 167 DP 75433, Grimshaw Lane, Gulgong, New South Wales is located within the Mid-Western Regional Local Government Area as shown on the map in **ATTACHMENT 1: Preliminary Salinity Assessment Area (Lots 150, 151, 152, 164, 165, 166, 167 DP 75433, Grimshaw Lane, Gulgong, NSW)**. A parcel of land including Lots 153, 154, 155, 156 and 157 DP 755433 is located adjacent to the land subject of this preliminary salinity assessment. These lands are currently zoned part Agriculture and partly for residential subdivision. An application is being made to council for Gateway Determination to have all of these lands rezoned to allow for potential future residential subdivision.

The land subject of this preliminary salinity assessment, Lots 150, 151, 152, 164, 165, 166 and 167 DP 75433, is approximately 28 hectares and is located south east of Gulgong. The land is bordered by Grimshaw Lane to the west, Zimmer Lane to the north and Ridout Lane to the east. Access to the subject land is currently from Grimshaw Lane.

This salinity assessment has been requested for the purpose of gaining an insight into preliminary indications of a salinity hazard at the site and to obtain guidance regarding any site salinity issues which may restrict the suitability of the land for future residential uses. The assessment would seek to consider the interactions particular to this site combined with the likely impacts of urban development.

A salinity investigation was carried out previously for Lots 153, 154, 155, 156 and 157 DP 755433 by Environmental and Earth Sciences (2007) as part of a the 'Mid Western Regional Council Comprehensive Land Use Strategy – Salinity Constraints Investigation for Mudgee and Gulgong, New South Wales'. Therefore this land has not been included in this preliminary salinity assessment.

This interim letter report provides a brief desktop review of known salinity in the area, laboratory analysis of the electrical conductivity and soil texture of soil samples from 3 soil pits across the investigation area and provides a summary of field observations recorded during the site inspection. A water sample was also taken from a dam at the site and taken to ALS Mudgee for laboratory analysis of electrical conductivity. Further details of the preliminary investigation and laboratory analysis results of pH, exchangeable sodium percentage (ESP), cation exchange capacity (CEC) and chloride levels for the soil samples will be provided in a full report on recept of laboratory results.

BRIEF DESKTOP REVIEW

Sites can become saline if salts in subsurface layers of the soil are mobilised and brought to the surface through rising groundwater or development of perched watertables due to an impediment to water drainage. If these salts are carried to soils surrounding infrastructure, they can have an impact on the durability of some building material such as degradation of bricks, pipes and roads affecting the lifespan of construction materials including bitumen, concrete, masonry and metal. Salinity also affects many flora species in the environment. It is a significant consideration for planning urban land use and investigation of salinity risks are an important prelude to further development assessments.

A review of the '*Mid Western Regional Council Comprehensive Land Use Strategy – Salinity Constraints Investigation for Mudgee and Gulgong, New South Wales*' (Environmental and Earth Sciences, 2007) has been included as part of the desktop review for this preliminary salinity assessment. An area referred to in the report as Gulgong Area 3 is land adjacent to that subject of this investigation and is shown on the map in **ATTACHMENT 2: Gulgong Area 3 Apparent Conductivity and Location of Bore Sites**. Gulgong Area 3 includes Lots 153, 154, 155, 156 and 157 DP 755433. According to the report, the soils were generally found to vary from non-saline to moderately saline in samples taken down to 10 – 13m. Table 3 of the report provides a salinity rating for 1:5 soil solution sourced from an unpublished document by Nicholl and Scrown (1993) used in the salinity investigation to assess the salinity rating of soils sampled.

The following salinity ratings were applied:

- $EC_{1:5}$ (dS/m) 0 – 0.2 are non-saline soils,
- $EC_{1:5}$ (dS/m) 0.2 – 0.6 are moderately saline soils,
- $EC_{1:5}$ (dS/m) 0.6 – 2.0 are highly saline soils,
- $EC_{1:5}$ (dS/m) >2.0 are extremely saline soils.

One of the bores (GW17) recorded elevated soil salt levels at the surface with $EC_{1:5}$ at 0.43dS/m and higher salinity levels obtained between 11-13m at 0.6 – 0.62 dS/m. Further upslope at GW18 salinity levels varied from 0.03 to

0.41dS/m in the upper 1.5m with maximum salinity levels of 0.51dS/m – 0.50 dS/m recorded between 4.5m and 10m.

The Environmental and Earth Sciences report (2007) found that although elevated salt levels were recorded in the topsoil, the levels were not affecting the development of the pasture and grasses. The report also states that 'salinity levels found in groundwater at GW 18 (5.94 dS/m – 8.31 dS/m) were high by comparison to the moderately saline soil. Given this and the depth to groundwater where moderately saline topsoil was found, it is likely drainage is the main issue rather than shallow local or intermediate groundwater. The possibility exists of a perched watertable in the vicinity of GW17 which is being confined by clays above 10m. Groundwater was encountered intermittently in GW18 (>12m) during the monitoring period, with no groundwater encountered in GW17. The main processes driving salinity across the area are consequently difficult to identify.'

Furthermore, the report states that 'The elevated salinity level of groundwater indicates a risk of salinisation of soils through the profile if groundwater levels rise. However, results obtained from groundwater monitoring (at that time) did not indicate the presence of a rising local watertable at the site. The EM surveys returned high conductivity results, possibly indicating the presence of waterlogging along a depression running through the site. This may be a consequence of surface runoff to the depression during a wet period; however any future development should still consider maintaining surface flow and drainage. Offsite impacts of any waterlogging up gradient of the access road may also include the development of discharge sites further down slope at any changes to the slope. As the main salinity process was difficult to establish across the site, any offsite impact of the proposed development is difficult to predict.'

The *Soil Landscapes of the Dubbo 1:250 000 Sheet Map* (1998) identifies soils within the subject area as Gulgong (**gu**). According to the associated report, Gulgong soils generally have low levels of salinisation with isolated low levels of soil salinity occurring along some drainage lines and depressions. The report states that the land is generally suitable for urban development but care needs to be taken to minimse runoff onto the highly erodible subsoils in depressions.

SITE INVESTIGATION

On 6th June 2012 Minespex carried out a site inspection with site observations recorded including topography, existing vegetation type and density, and soil condition. At this time Minespex also carried out top and subsoil sampling and a water sample was taken from a dam on the site to assist with an overall preliminary salinity assessment. The soil samples were forward to ALS Laboratory in Sydney for analysis to determine electrical conductivity ($EC_{w\ 1:5}$), cation exchange capacity (CEC), sodium (ESP % and sodium mg/kg), pH_w, chlorides (meq/100g) and soil texture. The water samples was taken directly from the dam into a sterile container and delivered immediately to the laboratory at ALS Mudgee for analysis of electrical conductivity @25°C.

Soils across the subject area were very moist to saturated during the site inspections. Rainfall for the twelve months prior to the site inspections was above average with the Bureau of Meteorology recording 906.6mm from May 2011 to April 2012. Average annual rainfall for Gulgong is 651.9mm. Further rainfall in the week prior to soil sampling caused conditions during the initial site inspection and soil sampling to be very wet restricting access to some small areas to the south and south west of the site. A subsequent site inspection was carried out on 19 June 2012 to make observations of vegetation and soil conditions in these areas.

No significant bare patches, saline scalds or obvious saline seepage areas were visible during the site inspection. There were small areas of slight black staining on the soil surface in the north and northwest areas of the site. A small

area of shallow gully erosion could be seen in the northern area of the site within Lot 165 where a drainage depression runs from the northwest in a south west direction. The site had a number of relatively wet areas following recent rain, in particular along the contour banks and in the northeast area of the site in the broad drainage depression.

Vegetation across the majority of the site was perennial native grasses that are moderately tolerant of saline soils including red grass, paspalum and native rat's tail grass. Subterranean clover was also found growing vigorously across most of the subject land. However, different grass species dominated the groundcover vegetation in the north and north west areas of the site including Lots 164, 165 and 166. Small patches of rush plants were also found growing in these areas. Clear identification of these plants was difficult at the time of the field inspection as the vegetation had been severely affected by frost and grazing and only remnants of seed heads could be found to assist with identification in the field. However, it appeared that two of these plants were salinity indicator species particularly windmill grass and water couch. A small bright green patch of vegetation was also found near the central gates within the area of Lot 165 that may be indicative of a natural spring. Ryegrass was the dominate species within this green patch and therefore is unlikely to be a highly saline area given that ryegrass is only moderately tolerant of soil salinity.

On this basis, and for the purpose of the field investigations, 3 (3) sites were selected within the subject land that were determined to be areas where soil salinity may exist due to topography, vegetation and existing water movement within the landscape. Soil samples were taken at each of these sites and are identified throughout this letter as Sites 1 – 3. The locations of the soil pit sites were recorded using a handheld GPS device and will be provided on a map in the final report. As a guide, Site 1 was located near the centre of the subject land close to the border between Lot 152 and Lot 166. Site 2 was near the main bottom dam close to the fence between Lot 166 and Lot 164. Site 3 was located on the northern side of the drainage line between Lot 164 and 165.

SITE OBSERVATIONS

Topography

The land generally slopes down from the north in a south easterly direction to a broad drainage depression in the north eastern area of the site. Two dams capture run-off water in the northern area of the site within this depression line. Further south of this drainage depression the land slopes from the west in an easterly direction with the central area of the subject land being relatively flat. Contours run mainly north to south across the site and a third dam has been constructed near the eastern boundary of the subject land.

Vegetation Type and Density

The subject land has been cleared with few remaining trees. As discussed previously, vegetation consists of a variety of perennial and annual native and introduced grasses and subterranean clover. The western and southern end of the site is dominated by vigorously growing dense stands of native rats tail grass, red grass and paspalum which are species that are moderately tolerant of saline soils with subterranean clover. The northern and north eastern areas of the site consisted of a number of native grass species, and field identification suggests some of these were salinity indicator species including windmill grass and water couch. Groundcover in the northern and north eastern areas was also observed to be more sparsely populated and growing less vigorously than in other areas of the subject land.

Soil Sampling

Soil pits were excavated using a 5t excavator to approximately 1.3m at the three sample sites referred to as Sites 1 – 3. Observations of the soil profile were made and soil samples taken from the subsoil at each pit. Ten (10) topsoil

cores were taken at 1m intervals along a transect in an easterly direction from the soil pit at Site 1. These cores were aggregated to provide a representative sample. Due to sampling difficulties caused by the wet conditions, topsoils at Sites 2 and 3 were sampled from within the pit. The topsoil (A Horizon), upper subsoil (B Horizon) and lower subsoil (C Horizon) layer depths sampled at each site are provided in **Table 1: Soil Sample Depths**.

Table 1: Soil Sample Depths

Soil Sample Site Name	Topsoil (A Horizon) Depth (cm)	Upper Subsoil (B Horizon) Depth (cm)	Lower Subsoil (C Horizon) Depth (cm)
Site 1	0 – 15	15 – 50	50 - 115
Site 2	0 – 10	10 – 60	60 - 130
Site 3	0 – 35	35 – 75	75 – 110

The 9 soil samples were then taken from the site and laboratory tested.

Samples were stored in sterile sealed bags. One sampler performed all collection procedures. Sampling equipment was cleaned after sampling of each site to prevent cross contamination of samples.

In summary, quality controls that Minespex employed forming the field quality assurance were:

- Duplicate samples collected for each of the sample sites for the sampling event,
- Sampling personnel were consistent throughout field sampling,
- Logs were kept and sampling locations were recorded using a handheld GPS mapping device at the time of sample collection.

Sample holding times were acceptable, with the samples being delivered to the laboratory within 24 hours of collection and transported in an esky.

The duplicate has been held by Minespex in case re-sampling is required. Identical methods of preservation, storage and transportation were used and the duplicate is stored in cool, dry conditions.

All samples were forwarded to ALS Sydney for analysis via the Mudgee ALS laboratory. ALS has NATA accreditation for all analyses performed (ALS NATA Accreditation Number 825 – Work order no.: ES1214166). ALS also performed tests under a quality system complying with AS17025.

Water Sampling

A water sample was collected from a dam in the northern area of the site closest to the eastern boundary, approximately 50m upslope of Site 2. Water from the dam was collected directly into a sterile container and delivered immediately to the laboratory at ALS Mudgee for analysis of electrical conductivity @25°C. ALS has NATA accreditation for all analyses performed (ALS NATA Accreditation Number 825 – Work order no.: ME1200974).

Soils and Site Condition

Erosion across the subject area is minimal with a small area of erosion observed in the drainage depression located in the northern area.

Topsoils (A horizons) were loamy at Sites 1 and 3 with Site 2 having medium clay topsoil. The subsoils were light to heavy mottled clay soils across the three sites. Soil texture was confirmed by laboratory analysis with results summarised below in **Table 4: Soil Electrical Conductivity and Soil Texture Analysis Results**.

SOIL AND WATER LABORATORY ANALYSIS RESULTS

The analytes tested to provide preliminary information on salinity at the sites sampled include electrical conductivity ($EC_{1:5}$), cation exchange capacity (CEC), sodium and exchangeable sodium percentage (ESP%), soil pH, chlorides and soil texture. At the time of this interim letter report results are available for the laboratory analysis of soil salinity and soil texture. Soil salinity is a measure of the total soluble salts in a soil. A saline soil is one with an accumulation of free salts at the soil surface and/or within the profile affecting plant growth and/or land use. It is generally attributed to changes in land use or natural changes in drainage or climate, which affects the movement of water through the landscape. Salinity levels of soil were tested by determining the electrical conductivity (EC) of a mixture of soil and water at 1:5 ratio (Electrical Conductivity, 1:5 soil in water expressed as µS/cm –$EC_{1:5}$).

The effects of salinity levels expressed as $EC_{1:5}$ at 25° (*u*S/cm), on plants are:

- 0 to 1,000 very low salinity, effects on plants mostly negligible.
- 1,000 to 2,000 low salinity, only yields of sensitive crops are restricted.
- > 2,000 saline soils, yields of many crops restricted.

The impact of $EC_{1:5}$ at 25° is then considered taking into account the inherent electrical conductivity of the soil minerals which can be described as the soil texture. Soil texture is an important factor as the impacts of salt on building materials such as concrete depends on the rate of water movement (and therefore salts) through the soil and how rapidly salts can be supplied/replenished at the face of the material (Cement Concrete and Aggregates Australia, 2005). Relatively impermeable soils such as heavy clays do not allow as rapid flow of electrical current as more permeable soils such as sands. To allow for such an assessment, the $EC_{1:5}$ result may then be converted to EC_e using a multiplier factor based on the texture of the soil as shown in **Table 2: Factors for Converting EC1:5 to** ECe below.

Table 2: Factors for Converting EC1:5 to ECe

Soil texture group	Multiplication factors
Sands	17
Sandy loams	14
Loams	10
Clay loams	9
Light clays	8.5
Light medium clays	8
Medium clays	7
Heavy clays	6

Source: 'Site Investigations for Urban Salinity', Department of Land and Water Conservation (2005)

Table 3: ECe Values of Soil Salinity Classes provides assessment of EC_e values as referred to by Hazelton, P. and Murphy, B. (2007). These relationships are largely based on chloride salts.

Table 3: ECe Values of Soil Salinity Classes

Class	EC_e (dS/m)	Comments
Non-Saline (NS)	<2	Salinity affects most negligible
Slightly Saline (SS)	2-4	Yields of most sensitive crops may be affected
Moderately saline (MS)	4-8	Yield of many crops affected
Very Saline (VS)	8-16	Only tolerant crops yield satisfactorily
Highly Saline (HS)	>16	Only a few very tolerant crops yield satisfactorily

Source: Department of Land and Water Conservation: Site Investigation for Urban Salinity 2002

Results of the laboratory analysis of the soil $EC_{1:5}$ and soil texture for each soil sample are provided in **Table 4: Soil Electrical Conductivity and Soil Texture Analysis Results** in addition to the relevant conversion factors and calculated EC_e values.

Table 4: Soil Electrical Conductivity and Soil Texture Analysis Results

Analyte	Unit	Site 1 Topsoil	Site 1 Upper Subsoil	Site 1 Lower Subsoil	Site 2 Topsoil	Site 2 Upper Subsoil	Site 2 Lower Subsoil	Site 3 Topsoil	Site 3 Upper Subsoil	Site 3 Lower Subsoil
$EC_{1:5}$ @ 25°	µS/cm	29	92	499	61	330	918	21	91	211
Soil Texture		Loam	Medium Clay	Medium Clay	Medium Clay	Heavy Clay	Medium Clay	Loam	Light Clay	Light Clay
Conversion Factor Applied		10	7	7	7	6	7	10	8.5	8.5
Calculated EC_e	(dS/m)	0.29	0.64	3.49	0.43	1.98	6.43	0.21	0.77	0.79

The $EC_{1:5}$ recordings within the study area range from 21 µS/cm (Site 3 topsoil) to 918 µS/cm (Site 2 lower subsoil). Taking into account the soil textures and applicable conversion factors, the EC_e of the soil samples ranges from approximately 0.21 to 6.43 dS/m.

Utilising the values provided in **Table 3: ECe Values of Soil Salinity Classes** the current salinity situation for the three sites can be classed as:

- Site 1 – non-saline topsoil and upper subsoil with slightly saline lower subsoil,
- Site 2 – non-saline topsoil with EC increasing at depth to become moderately saline in the lower subsoil,
- Site 3 – non-saline.

The water sample results were interpreted utilising the Australian Drinking Water Guidelines (NHMRC & ARMCANZ, 1996). The amount of salt is in a solution is called total dissolved solids (TDS) and is measured in milligrams/litre (mg/L). According to the guidelines, a Guideline Value for Health purposes:

- <500mg/L is regarded as good quality drinking water based on taste,

- 500 – 1000 mg/L is acceptable based on taste
- >1000 mg/L may be associated with excessive scaling, corrosion, and unsatisfactory taste.

Table 5: Guidelines for Interpretation of Water Quality Tests for Irrigation and Garden Use provides an indication of the relative level of salinity in relation to irrigation and garden use.

Table 5: Guidelines for Interpretation of Water Quality Tests for Irrigation and Garden Use

TEST	PROBLEM	NONE	INCREASING	SEVERE
Irrigation and Garden use				
Electrical Conductivity (salinity)	Reduction in yield	Less than 700 µS	700 to 3000 µS	Greater than 3000 µS

Source: ALS Mudgee (extract from NSW Agriculture Agfact AC.2 (2003) 'Farm water quality and Treatment')

Note that EC_w units can be converted to TDS by multiplying EC by 0.64. TDS can be converted to EC units by multiplying TDS by 1.5626.

EC_w for the dam water sample was found to be 150 µS/cm or 96 TDS therefore the dam water at the time of sampling was found to have very low levels of salinity.

CONCLUSIONS AND RECOMMENDATIONS

The subject land drains primarily towards the east with a broad drainage depression extending from the north-west to eastern boundary of the subject land. There were some visual indicators of saline soil observed during the site inspections including dark staining and a small area of erosion within the drainage depression in the north eastern area of the subject land. Vegetation was found to be less vigorously growing and more sparse in the vicinity of Site 2 and the drainage depression than across other areas within the subject land. Dominant groundcover species included species tolerant of moderately saline soils and salinity indicator species, particularly in the north and north eastern areas of the site. Topsoils sampled were loam to light clay. Subsoils were light to heavy mottled clays indicating a restriction to deep drainage.

Based on the site observations and soil laboratory analysis results for soil salinity and soil texture, current soil salinity levels above 1m appear to range from low to moderate with non-saline topsoils and non-saline to moderately saline subsoils. The salinity investigation carried out by Environmental and Earth Sciences (2007) in the area immediately north west of the subject land found soils ranging from moderately to slightly saline, recording higher salinity levels within the root zone at one of the two bores tested. The Environmental and Earth Sciences (2007) report also states that groundwater was obtained sporadically at depth (>10m) at one of the bores with elevated salinity levels recorded however groundwater monitoring did not indicate the presence of a rising local watertable at the site. Laboratory analysis of the dam water sample indicates the dam contained non-saline water at the time of sampling.

Given the salinity levels recorded and on the basis that the site is located within a regional area that has known salinity expressions, it is considered that there is a low to moderate salinity hazard to development in the area and a precautionary approach to salinity management is recommended for future urban development within the subject land. Any future urban developments should focus particularly on water management at the site. Future developments would also need to consider salinity tolerance in selection of garden plants. Adoption of the principles

of '*Building in a Saline Environment*' (DIPNR, 2003) is recommended to mitigate against potential salinity impacts in proposed future developments at the site.

Further details of the preliminary salinity assessment and full laboratory analysis of soil samples results will be provided in a report to follow this interim letter. If you have any queries with regard to this interim letter report, please do not hesitate to contact Minespex on (02) 63729512.

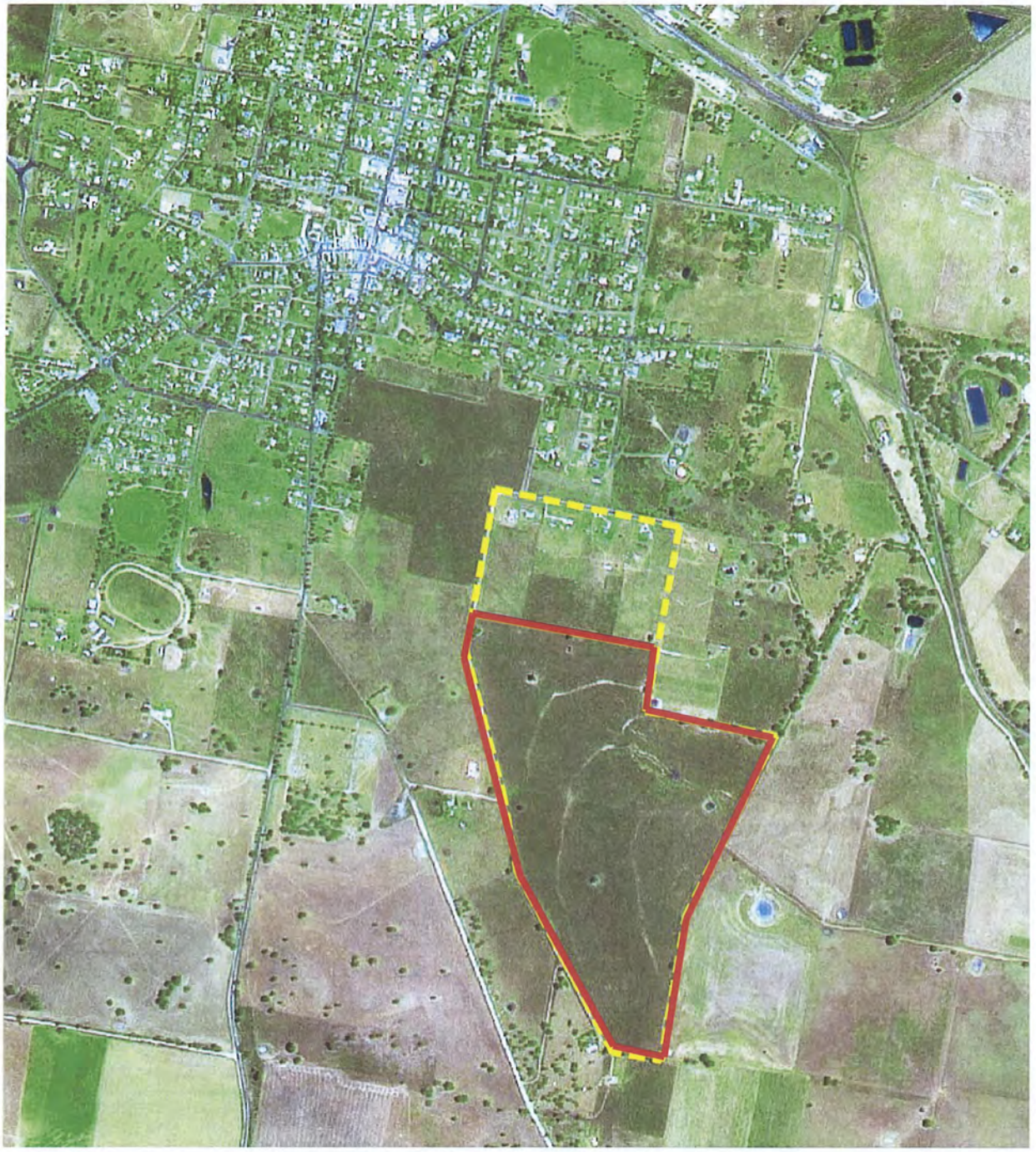
Yours faithfully,

Christie L Brown.

CHRISSY BROWN
Agronomist
MINESPEX

ATTACHMENT 1: Preliminary Salinity Assessment Area (Lots 150, 151, 152, 164, 165, 166, 167 DP 75433, Grimshaw Lane, Gulgong, NSW).

The land subject of this investigation is outlined in red.



ATTACHMENT 2: Gulgong Area 3 Apparent Conductivity and Location of Bore Sites