XEROS PICCOLO
CONSULTING ENGINEERS

INFRASTRUCTURE AND SERVICING FEASIBILITY ASSESSMENT

Proposed Subdivision at the Corner of Roedigers Lane, Albert Street, and Girrawheen Lane Lot 2 DP 609524 and Lot 70 DP 751425

Client:	John Higginson
Planning Consultant:	Habitat Planning Wagga Pty Ltd
Xeros Piccolo Project No.:	250287
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PROPOSED SUBDIVISION AT THE CORNER OF

ROEDIGERS LANE, ALBERT STREET, AND GIRRAWHEEN LANE

LOT 2 DP 609524 AND LOT 70 DP 751425

HAREFIELD NSW 26

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1 INTRODUCTION

1.1 BACKGROUND AND SCOPE OF REPORT

Xeros Piccolo were engaged by Habitat Planning on behalf of John Higginson to undertake an infrastructure feasibility assessment for a proposed re-zoning and subdivision at a property in Harefield, NSW.

The purpose of this assessment and report is to determine the infrastructure and servicing requirements for the proposed subdivision of the subject land, and to assess if there are any critical implications or limitations to providing services to the proposed subdivision. This report will support a planning proposal for the re-zoning of the subject land.

The information provided in this report is preliminary in nature and may change subject to a detailed investigation and design of the subdivision and services, which is beyond the scope of this report.

1.2 CONTACTS

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2 PROPOSED DEVELOPMENT DESCRIPTION

2.1 SUBJECT LAND DESCRIPTION

2.1.1 Locality and Existing Site Description

The subject land is located within the Junee Shire Council LGA, at the corner of Roedigers Lane, Albert Street, and Girrahween Lane, in Harefield NSW, south of the main township of Junee. The subject land details are outlined below, and shown in Figure 1.

- Existing lot numbers: Lot 2 DP 609524 and Lot 70 DP 751425
- Site area: Approximately 129.9 ha
- Current land zoning: RU1 - Primary Production Land

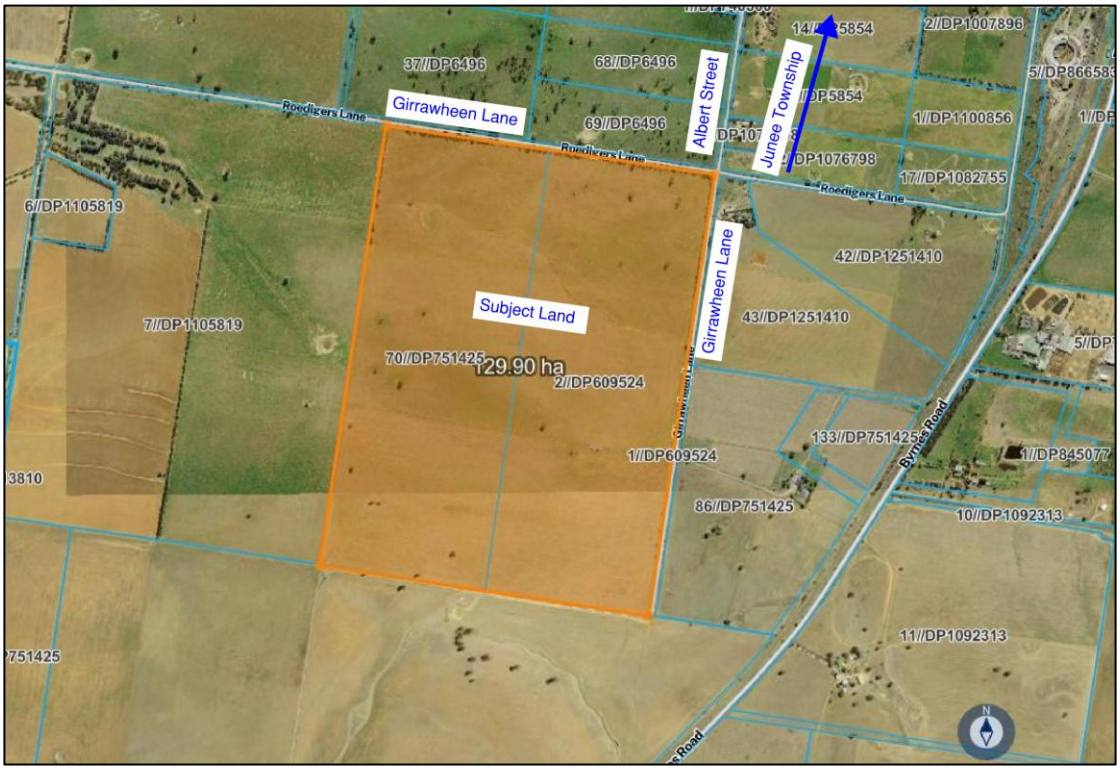

Figure 1: Subject land

2.1.2 Site Topography

The subject land is located in an undulating, hilly area, with general fall from east-to-west. There are a number of drainage culverts located under Roedigers Lane and Girrawheen Lane, and two road crests along Girrawheen Lane, as shown in Figure 2 below.

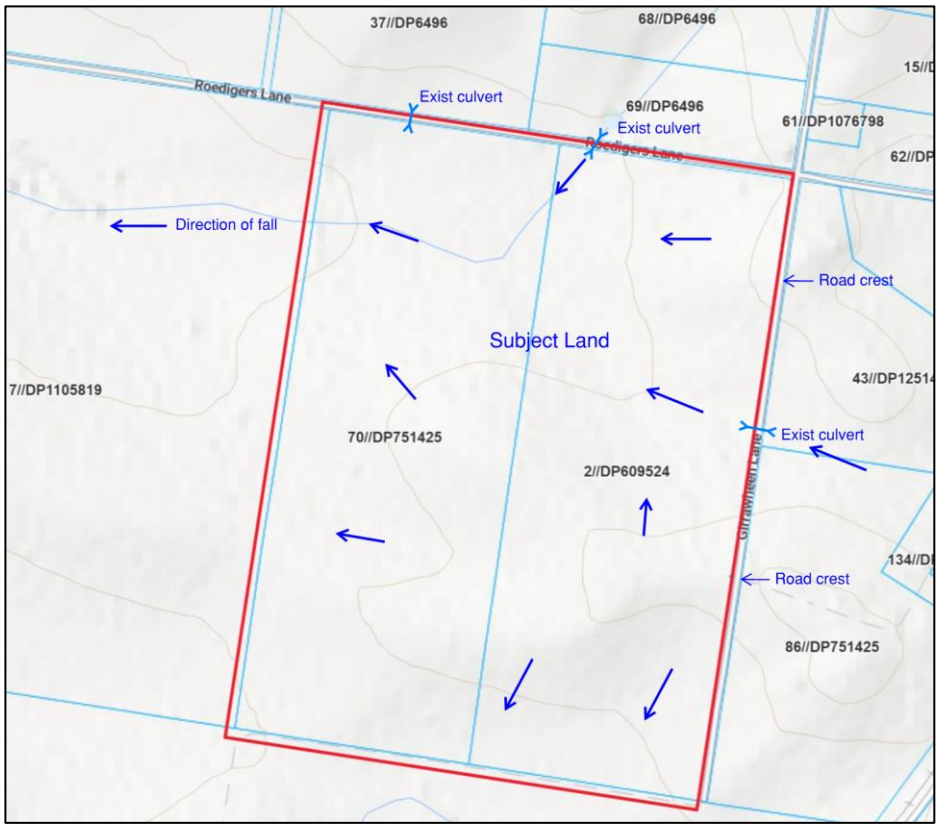

Figure 2: Site topography and drainage

2.1.3 Surrounding Area

The surrounding area to the east, west, and south is currently zoned RU1, whilst the land north of Roedigers Lane is zoned R5.

2.2 PROPOSED DEVELOPMENT DESCRIPTION

2.2.1 Proposed Re-Zoning and Lot Yield

It is proposed to re-zone the subject land to RU2 – Rural Landscape and reduce the minimum lot size to approximately 8 ha, resulting in a lot yield of up to around 15-16. The intent is for the land to be subdivided into Torrens Title lots for land use consistent with RU2 zoning.

2.2.2 Concept Lot Layouts

Two preliminary lot layouts have been developed by Wagga Surveyors. It is noted that these layouts are conceptual only, to demonstrate proof of concept with sufficient detail to inform the planning proposal and allow assessment of the infrastructure and servicing feasibility.

2.2.2.1 Proposed Lot Layout 1

Proposed Lot Layout 1 shown in Figure 3 is a 16-lot subdivision with all proposed lots having direct frontage to Girrawheen Lane. With this layout, all lot access and servicing would be via Girrawheen Lane, with the western lots accessing Girrawheen Lane via battle-axe driveways.

The potential benefits of this layout are:

- It maximises lot yield by avoiding new internal roads

- It <u>may</u> limit capital costs for road and servicing as it would utilise the existing road corridor; however, this may not actually be the case as outlined below.

This layout has a number of issues and potential limitations, being:

- It requires 500m long battle-axe lots, which has a number of implications:
  - Council do not support long battle axe handle lots
  - Council do not support the percentage of lots with battle axe arrangements compared to the total number of proposed lots
  - The battle-axe handles require 500m long driveways, the cost of which is borne by future land owners, reduces property values, and can result in drainage and erosion issues
  - The battle-axe handles require long internal service lines, which would extend approximately 500m further than normal. This is a cost that would be borne by future land owners, and may reduce property values
- The road condition and geometry on Girrawheen Lane is poor, in particular the two sharp crest vertical curves and steep grades. Noting that a road upgrade would be required by Council, this may make compliant road geometry difficult and costly to achieve
- The existing Girrawheen Lane corridor width is narrow at 20m, which may not be sufficient to accommodate all required services, the road and drainage upgrades
- During construction, temporary access to existing properties along Girrawheen Lane would need to be maintained. This would add cost and time to the road upgrades
- The existing driveways located at the two crest curves may require significant re-construction to reconnect to the new road. This adds further cost to the upgrades

In summary it is likely that this lot layout won't obtain Council support as it is currently drawn, and may be costly to achieve all access and servicing requirements.

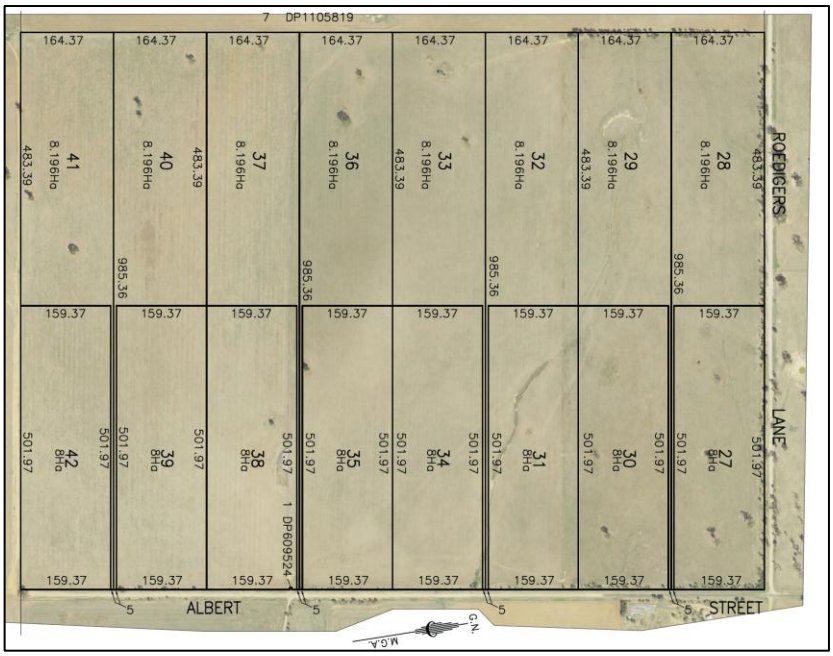

Figure 3: Preliminary Proposed Lot Layout 1

2.2.2.2 Proposed Lot Layout 2

Proposed Lot Layout 2 shown in Figure 4 is a 15-lot subdivision, with a new road connecting to Roedigers Lane. All lots would have frontage to and be serviced via the new road. The potential benefits of this layout are:

- It eliminates long battle-axe lots
- The new road can be made fully compliant in a greenfield environment, which may reduce road construction costs
- The road corridor width would accommodate all required services
- Internal service lines would be kept shorter, reducing costs for future land owners and avoiding reduction in land values
- It may cost less than Layout 1, although this is only speculative at this stage

The main drawbacks of this layout are:

- A reduction in lot yield, as achieving 16 lots at 8 ha each is not possible
- Approximately 500m of upgrading of Roedigers Lane would be required, which would not be required with Layout 1
- Construction of a new road to Council standards
- Generally, longer servicing mains would be required

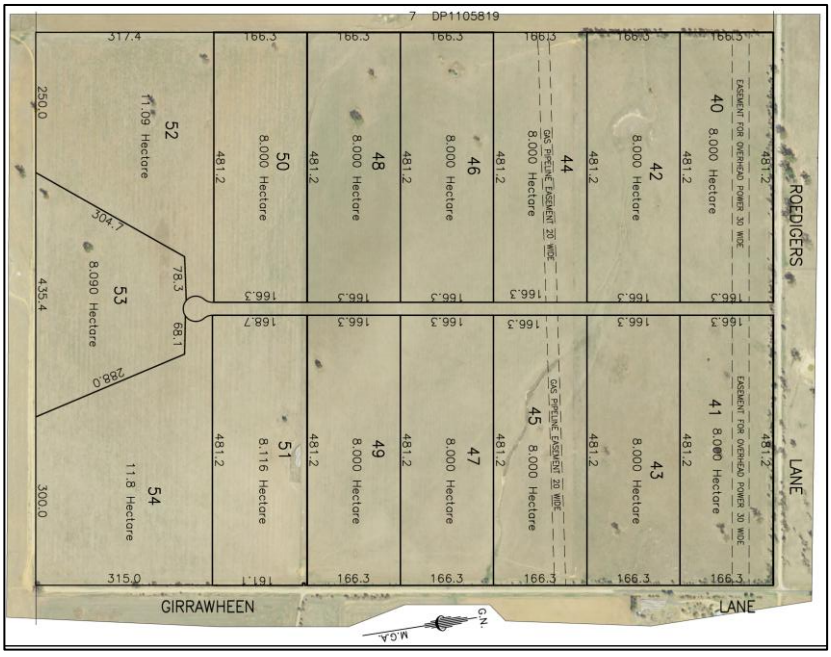

Figure 4: Preliminary Proposed Lot Layout 2

3 INFRASTRUCTURE AND SERVICING ASSESSMENT

3.1 GENERAL

3.1.1 Infrastructure and Services Included in Assessment

Infrastructure and services included in this assessment are:

- Roads and vehicle access
- Stormwater
- Sewer
- Water supply
- Electrical supply
- Communications system
- Gas supply
- Existing high pressure gas main passing through the subject land
- Existing overhead electrical system passing through the subject land

The above includes the critical infrastructure and servicing for the proposed development, and critical existing infrastructure that may impact the development.

3.1.2 Methodology

The following generally methodology has been used in preparation of this report:

- Undertake a site investigation
- Review available topographical information
- Obtaining Before You Dig Australia (BYDA) plans and information of the existing services
    - Where a service authority does not supply plans through BYDA, direct requests to the authority were made
- Engaging in discussions with the relevant service authorities and Council
    - All service authorities and Council were provided a description of the proposed re-zoning and subdivision and conceptual lot layout.
- Obtaining additional information and plans provided by the service authorities and Council
- Providing a summary and assessment of findings and implications for the development

The following sections of this Report outline the findings of this assessment.

3.2 ROADS AND VEHICLE ACCESS

Junee Shire Council has jurisdiction regarding roads and vehicle access requirements for this development.

3.2.1 Existing Road Infrastructure

Existing roads adjacent to the subject land are outlined below:

- Roedigers Lane is located north of the subject land in a 20m corridor, and consists of 5-6m wide unsealed road with roadside table drains. Roedigers Lane has a gradual gradient sloping toward the west.
- East of the subject land is Girrawheen Lane, which has a 20m corridor, and consists of approximately 290m of 4-4.5m wide bitumen seal at the northern end, changing to an unsealed, degraded road of a similar width to the south and terminating at the southern end of the subject land. It has roadside table drains and steep vertical geometry, including two sharp crests with limited sight distance.
- North of Girrawheen Lane is Albert Street which heads toward the Junee township, and consists of the same 4-4.5m bitumen sealed road with roadside table drains. This is the primary access from the subject land to Junee and linking to the surrounding area via the Olympic Highway.

3.2.2 Road and Vehicle Access Requirements

Council advised the following would be required for subdivision of the subject land:

- A sealed, rural standard road will be required to the furthest lot access point (driveway)
- Road to consist of minimum 6.5m carriageway with 5.5m seal
- The road must comply with Austroads guidelines for the proposed speed, including vertical and horizontal geometry and sight distances
- Suitable roadside drainage will be required
- Detailed design of proposed road works would be required by a suitably qualified engineer
- Services to extend to the lots, with service mains to be located within the road corridor
- All costs would be borne by the developer
- Council do not support long battle-axe driveways due to erosion and maintenance issues

In considering the above, the following two options would meet these requirements:

Option 1: Girrawheen Lane Upgrade

- Girrawheen Lane could be upgraded, including widening and sealing the road, lowering the vertical crest curves, improving roadside drainage, and installing new service mains as required. This would suit Proposed Lot Layout 1.
- However, as noted previously, key issues with this option are:
    - It requires 500m long battle-axe lots, which Council does not support and adds costs for servicing and driveways to future lot owners
    - The road conditions and geometry on Girrawheen Lane are poor, which will make road upgrades costly to achieve Austroads compliance
    - The road corridor is narrow at 20m, and may not necessarily accommodate all required services and road upgrades

- During construction, temporary access to existing properties along Girrawheen Lane would need to be maintained. This would add cost and time to road upgrades
- The existing driveways located at the two crest curves may require significant re-construction to reconnect to the new road once the crests have been lowered. This would add cost to the upgrades

Option 2: New Internal Road and Roedigers Lane Upgrade

- A new internal subdivision road could be provided, approximately 1.1km long and connecting to Roedigers Lane. This option would suit Proposed Lot Layout 2.
- For this option, Roedigers Lane would also require upgrading, from the new road to the intersection of Girrawheen Lane (approx. 500m). This upgrade would likely consist of:
  - Widening to achieve minim 6.5m carriageway
  - Minimum 150mm gravel overlay over existing pavement
  - Sealing a 5.5m carriageway
- Whilst this requires a relatively long length of road upgrade and a new road, there are the following potential benefits:
  - No long battle axe lots, therefore Council will support this layout
  - More readily achievable road geometry that complies with Austroads
  - Minimal impacts on existing and neighbouring property owners
  - Servicing will be more readily accommodated

Based on preliminary assessment, this Option 2 appears the more feasible and potentially more cost-effective option; however, detailed design and investigation would be required to fully assess the overall costs of each option.

3.2.3 Existing Road Network Capacity

Council did not advise of any known road network or intersection capacity issues that would be affected by this development. Whilst a detailed Traffic Impact Assessment (TIA) has not been undertaken, the following general comments are made:

- The proposed development will result in a relatively minor increase in vehicle trips, with approximately only 15-16 new lots proposed
- The intersection of Albert Street with the Olympic Highway could be upgraded to cater for increased vehicle movements if required
- A TIA may be conducted for future Development Applications to further assess any road network issues

3.2.4 Conclusion

Based on the above, there are not expected to be any insurmountable limitations with regards to driveways and vehicle access for this development, and Council is generally supportive of the development in this regard. It is noted, however, that road upgrades and new road construction will be a significant cost for the development.

3.3 STORMWATER

Junee Shire Council has jurisdiction regarding stormwater drainage requirements for this development.

3.3.1 Existing Stormwater Infrastructure and Conditions

Stormwater flows through the site from a number of existing culverts as outlined below:

- From the east, a single culvert under Girrawheen Lane flows into the site, along a gully, and discharges to the neighbouring property to the west as overland flow. This flow path is the primary flow path through the site, and some erosion is occurring
- From the north, two culverts under Roedigers Lane discharge into the site, and flow to the primary flow path.

The upstream catchments are relatively small, and the site is relatively steep. This means that flows appear to be largely contained within the existing gully and along fairly narrow flow paths. The site does not appear to be significantly affected by flooding, and Council did not advise of any known stormwater issues. A Flood Impact Assessment is not required at this stage.

3.3.2 Stormwater Management Requirements

In relation to stormwater management for future subdivision of the subject land, the following would be required, based on assessment of the site and Council comments:

- Existing flow paths to be retained, and future buildings and infrastructure must not impede the flow of stormwater
- Individual property stormwater runoff to be managed as per standard practice, such as:
    - Ensuring runoff is direct away from buildings
    - Ensuring runoff is managed such as to minimise erosion and impacts on neighbouring sites
- Noting the large lot sizes, the above is considered achievable and non-prohibitive
- Roads to have suitable roadside drainage and culverts to safely convey stormwater flows

3.3.3 Conclusion

It is assessed that there are no significant issues relating to stormwater management for this proposed development.

3.4 SEWER

Junee Shire Council has jurisdiction regarding sewer drainage requirements for this development.

3.4.1 Existing Sewer Infrastructure

There is no existing sewer infrastructure within close proximity to the subject land.

3.4.2 Proposed On-Site Wastewater Treatment

As no sewer infrastructure is within close proximity to the site, it is proposed to utilise on-site wastewater management for future lots within this subdivision, noting the large lot sizes allow sufficient space for required wastewater treatment areas and buffers. Further assessment of soil and treatment area requirements would be made at Development Application stage.

Council advised that they have no objection in principle to the use of on-site wastewater management for the proposed future zoning and subdivision.

3.4.3 Conclusion

As on-site wastewater treatment is considered suitable for this development, there are no impediments regarding sewer and wastewater for this development.

3.5 WATER SUPPLY

Goldenfields Water County Council (GWCC) are the water supply authority in this area.

3.5.1 Existing Water Network

Existing water infrastructure near the subject land is outlined below, and shown in Figure 5:

- A 525mm diameter MSCL trunk main on the western side of Girrawheen Lane, extending along the full eastern frontage of the subject land
- A 200mm diameter reticulation main on the southern side of Roedigers Lane, extending along the full northern frontage of the subject land. This main connects to the trunk main
- Water reservoirs located on the hill north of the development site, west of Albert Street.

GWCC advised that the subject land has one existing allowable connection to the water network.

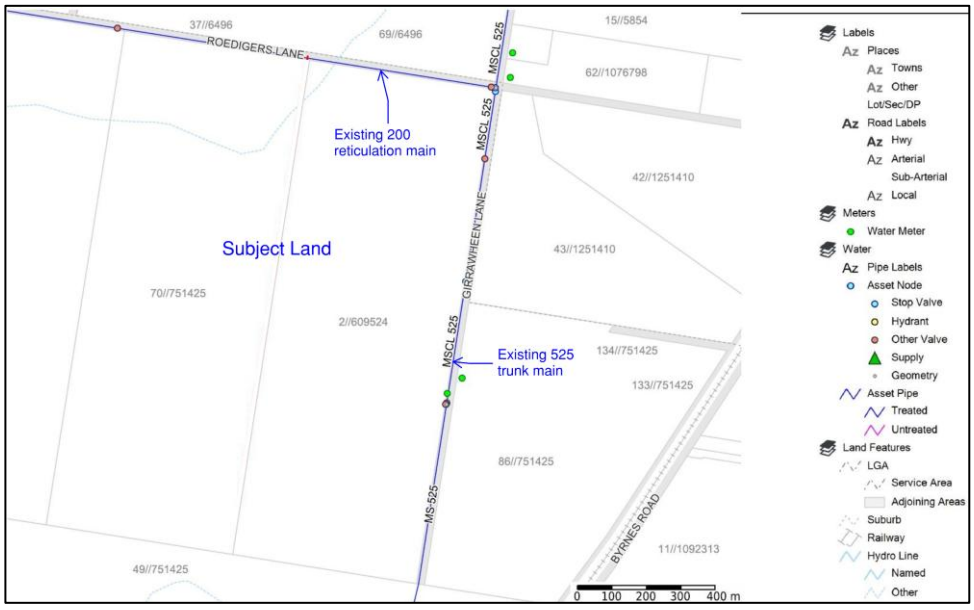

Figure 5: Existing water infrastructure

3.5.1.1 Existing Network Capacity and Pressure

GWCC advised that the existing water network has capacity to service the proposed development, and that no system upgrades or backhaul would be required. They also advised that supply pressures are expected to be sufficient. Regarding this, the approximate RLs of the supply reservoirs on Albert Street and the subject land are outlined below.

- Base of water supply reservoirs: 360m AHD
- Highest elevation of subject land: 340m AHD
- Lowest elevation of subject land: 300m AHD
- The majority of the subject land is below an elevation of 330m AHD.

This indicates that supply pressure is not a limiting factor for this development.

3.5.2 Water Servicing Requirements

To service the proposed subdivision, GWCC advised that there are two main options, being:

- Option 1 (GWCC preferred): extend a new 100mm reticulation main in the road reserve along the length of the development, and provide individual lot service connections from this new main
    - This option would be feasible for both Proposed Lot Layouts 1 and 2
- Option 2 (GWCC not preferred): provide service connections for lots fronting Girrawheen Lane directly to the 525mm trunk main
    - This option would only apply to Proposed Lot Layout 1
    - Connections to the main may be costly due to the presence of an asbestos coating on the pipe, and due to type and size of the main

It is noted that all costs for upgrades and servicing would be borne by the developer, and that detailed design and documentation would be required at the DA stage.

3.5.3 Conclusion

Based on the above and discussions with GWCC, water supply to the proposed subdivision is possible with no significant backhaul expected, beyond the costs associated with installation of new reticulation mains and connections.

3.6 ELECTRICAL SUPPLY

Essential Energy (EssE) are the electrical supply authority in this area.

3.6.1 Existing Electrical Network

As shown in Figure 6, the electrical network within close proximity to the subdivision consists of:

- A three-phase overhead system on Albert Street, terminating approximately 380m north of Roedigers Lane at Pole 300021
- A single-phase overhead system extending from Pole 300021 to the intersection of Roedigers Lane and Albert Street.
- A 66kV overhead transmission line, passing through the northern portion of the site, not suitable for connection (refer Section 3.6.1.1 for further information)

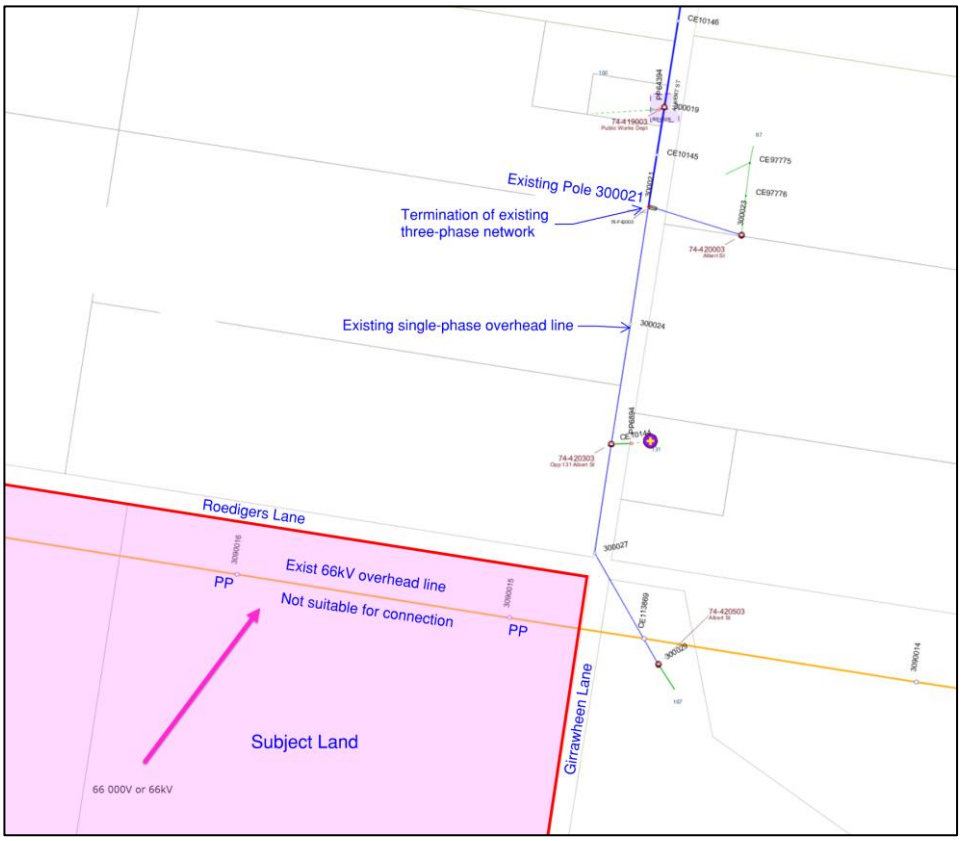

Figure 6: Existing electrical network

3.6.1.1 Existing HV Overhead Electrical Line

As shown in Figure 6, an existing 66kV HV overhead electrical line passes through the northern portion of the existing lots, aligned in an east-west direction. This line would not be suitable for reticulation connection, and is a transmission line only.

EssE advised that it is permissible for this overhead line to be located within private property, and it does not prohibit further subdivision and development of the land, subject to the following limitations:

- The main would have a 30m wide legally enforceable easement (15m either side of the centre conductor) with buildings and structures to be kept outside of the easement

Based on the above, and as discussed with EssE, this overhead line is not prohibitive of future development of this land, and does not pose a significant limitation to this development.

3.6.1.2 Existing Network Capacity

EssE advised that the existing network has sufficient capacity, subject to the extension of the system as outlined above.

3.6.2 Electrical Servicing Requirements

3.6.2.1 General

To service the proposed development, EssE advised that the following would be required:

- Extension of the high-voltage (HV), three-phase network from Pole 300021, along Albert Street to the subject land.
- Provide new HV and low-voltage (LV) system along the development frontages to service the lots
- HV lines are likely able to be aboveground, which reduces costs.
- LV may be able to be a combination of above and below ground
- Provide substations as required
- Long battle axe lots may be problematic due to voltage drops in the LV system. This may require HV to be extended into the lots. This would add a notable cost to the development
- Developer to engage suitable ASP to obtain a Design Information Package from EssE, and to design and construction the HV and LV system at full cost to the developer. Assessment of voltage drop will be required, which will determine extent of HV required
- Easements to be provided over any new or existing lines within private property

3.6.2.2 Existing Vegetation

The presence of existing trees along the road corridors on both Roedigers and Girrawheen Lane may be a restriction on the electrical supply layout. These trees would likely need to be removed for an aboveground system (and also potentially for underground) to run along either of these roads. The permissibility and cost of removing this vegetation could be prohibitive. Given this, the option of running the new aboveground HV line to the subdivision within the proposed lots was discussed with EssE.

If Proposed Lot Layout 1 is utilised, then this line would run inside the lots along the eastern side. Noting that this is the highest elevated land, this would have an undesirable restriction on the lots in terms of building envelopes.

For Proposed Lot Layout 2, this would consist of either (1) the new lines being attached to the existing poles 66kV, or (2) a new line installed parallel and norther of the 66kV line in a new 20m wide easement. This would not significantly impact building envelopes for the impact lot.

At this stage, EssE advised that this was a reasonable option, noting that costs of attaching to the existing 66kV poles may also be relatively high.

3.6.2.3 Potential Electrical Supply Layouts

Based on the above, a diagram of the potential proposed arrangements is shown in Figure 7 below, noting the network extension along Girrawheen Lane (shown in green) would not be required if a new, internal subdivision road is provided as per Proposed Lot Layout 2.

Whilst placing the HV aboveground line within private property will require an easement, the lots are large enough that this would not significantly impact the buildable area, and therefore these lots would not be unreasonable burdened.

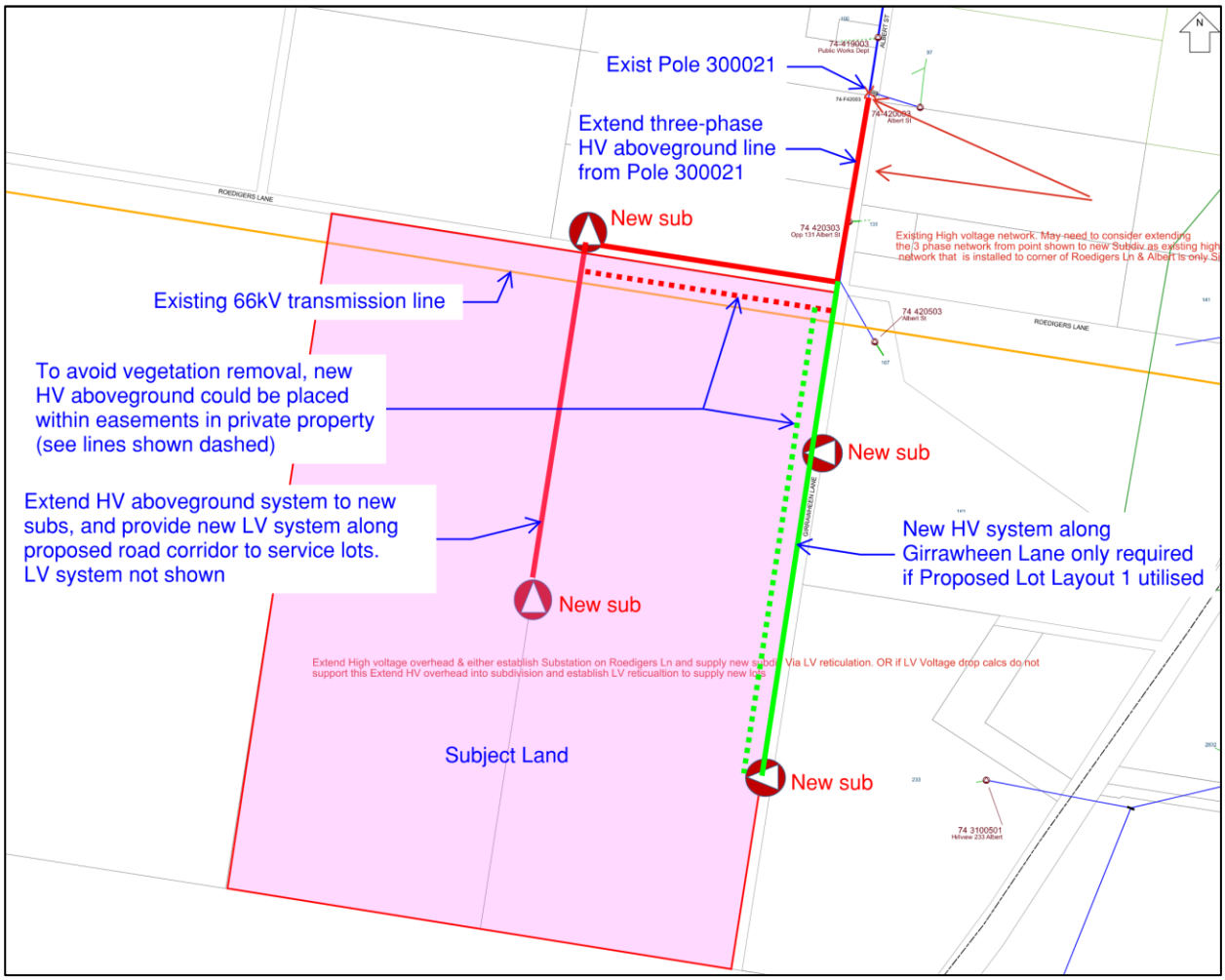

Figure 7: Potential proposed electrical network

3.6.3 Conclusion

Based on the above, electrical supply can be achieved without major backhaul or system upgrades. It is noted, however, that the HV extension will be a significant cost to the development, in addition to the required reticulation network.

3.7 COMMUNICATIONS SYSTEM

As per the Federal Government telecommunications policy for new developments, NBN Co are the Statutory Infrastructure Provider for this area, and will therefore be the telecommunications provider for this subdivision.

3.7.1 Existing Communications Network

The nearest NBN infrastructure to this development is located near the water reservoirs on Albert Street, approximately 480m north of the subject land, as shown in Figure 8 below. There is some existing Telstra infrastructure that extends to and along Roedigers Lane, however it is understood that this system is not suitable for connection to for this development.

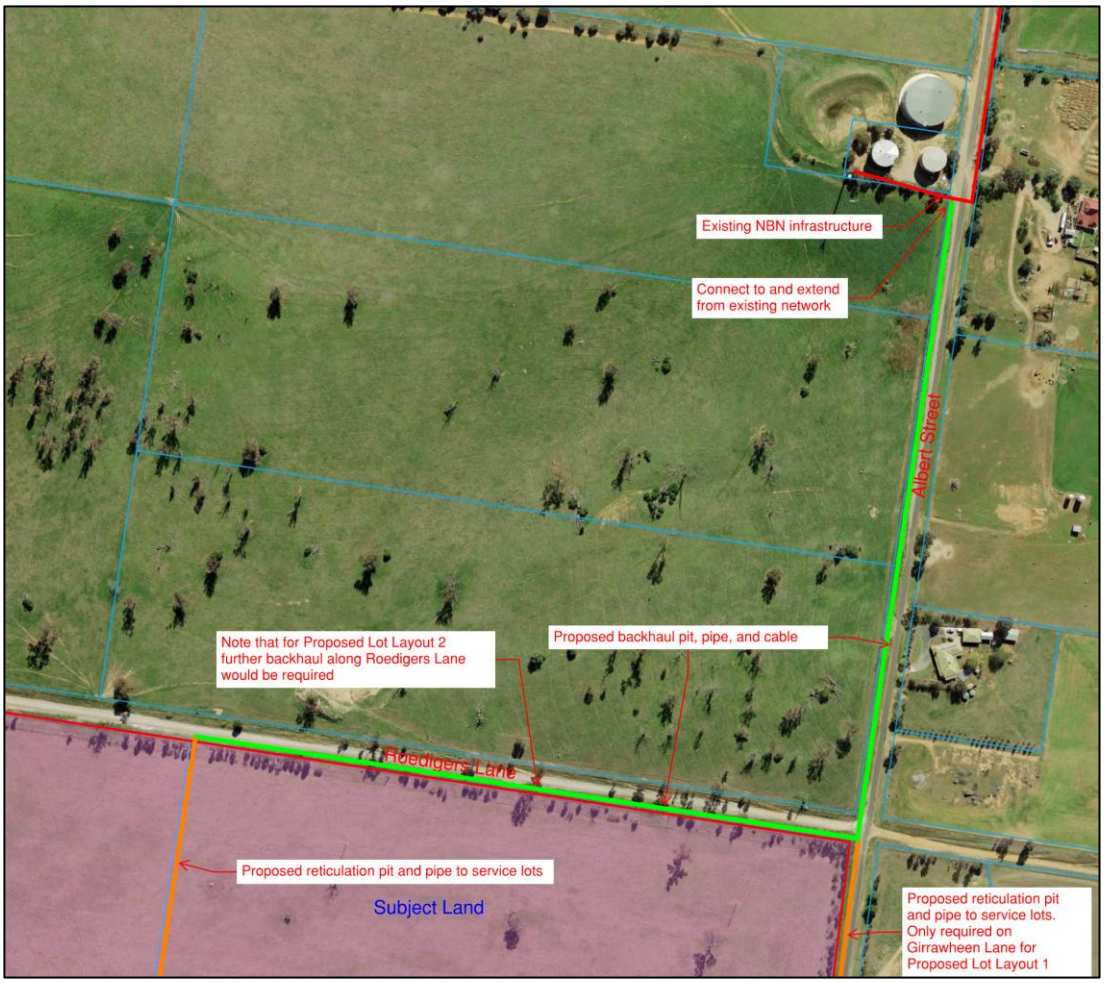

Figure 8: Existing and potential proposed NBN infrastructure

3.7.1.1 Existing Network Capacity

No further backhaul or upgrades would be required beyond those outlined above, and the system would have sufficient capacity for the proposed development.

3.7.2 Communications Servicing Requirements

It is noted that whilst the subject land falls within the NBN fixed-wireless area, under the Telecommunications Act 1997, it is not expected that this development would be eligible for an exemption to the provision of pit and pipe infrastructure.

As such, the developer would need to provide backhaul to the existing NBN network and new reticulation pit and pipe to service the proposed lots. NBN advised the following:

- Backhaul to existing pit on Albert Street is required, including new pit, pipe, and cable. The developer will be required to pay a contribution toward this backhaul
- New reticulation pit and pipe would be required, with design and construction of this pit and pipe at full cost to the developer
- A deployment contribution charge would also apply for each proposed lot

A diagram of the potential backhaul and new reticulation pit and pipe is shown in Figure 8.

3.7.3 Conclusion

Based on the above, provision of communications infrastructure to this development is feasible, with some minor backhaul. The costs of these are not insignificant, however are not considered prohibitive in and of themselves.

3.8 GAS SUPPLY

Jemena are the gas supply authority in this area, with Zinfra providing technical support for enquiries of this nature.

An existing high-pressure gas main also passes through the subject land, which is owned and governed by APA.

3.8.1 Existing Gas Network

The nearest reticulated gas infrastructure is located approximately 1.35km away on Percy Street, as shown in Figure 10. Costs to extend the gas reticulation to this subdivision would be borne by the developer, and would be very costly.

Given the above, it is not proposed to extend gas to the proposed subdivision, noting the following:

- It is common for semi-rural areas not to have reticulated gas and gas bottles can be provided to individual lots if required
- Electrical heating and cooking appliances can be used, negating the need to have gas

3.8.1.1 Existing High-Pressure Gas Main

An existing APA owned high-pressure gas main passes through the existing lots, aligned in an east-west direction, as shown in Figure 9. This main would not be suitable for reticulation connection, and is a transmission line only.

Figure 9: Existing high-pressure gas main

APA advised that it is permissible for this main to be located within private property and it does not prohibit further subdivision and development of the land, subject to the following limitations:

- Sensitive land uses (e.g. childcare centres, medical facilities, nursing or aged care homes, etc.) must be kept a minimum of 140m away from the pipe line
- The main would have a 20m wide legally enforceable easement (10m either side of the pipeline) with buildings and structures to be kept outside of the easement
- Line of sight requirements to allow APA to conduct daily patrols must be adhered to. APA general approach is to have APA easement in a linear open space. This would limit planting of some vegetation within the 20m wide easement

Based on the above, and as discussed with APA, this gas main is not prohibitive of future development of this land, and does not pose a significant limitation to this development.

3.8.2 Conclusion

Due to costs to extend the gas network, gas reticulation is not proposed. This is not considered to be an impediment or restriction to the proposed development.

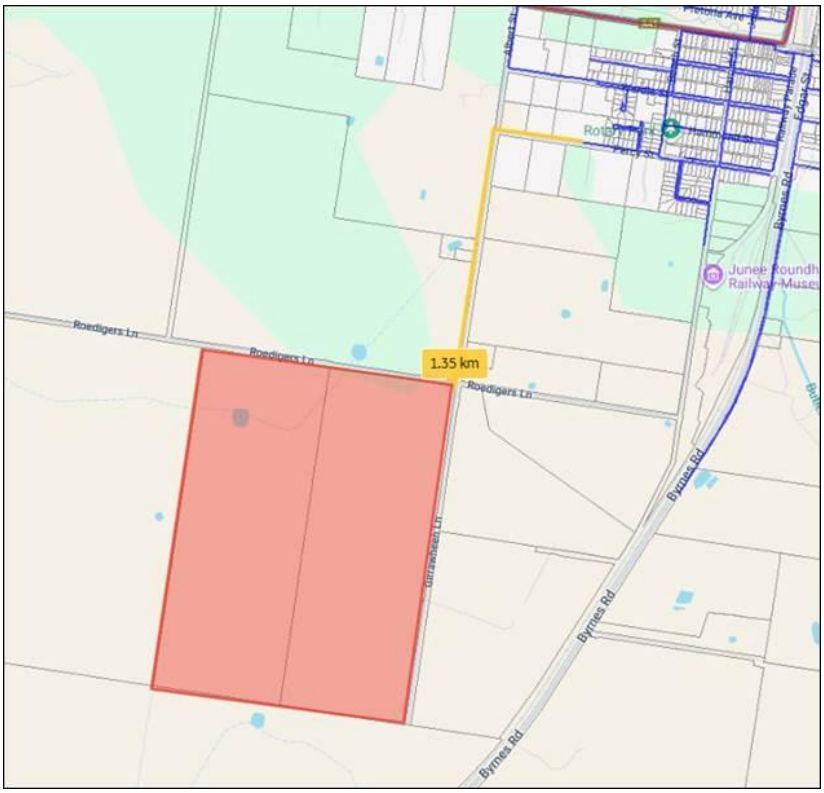

Figure 10: Existing gas reticulation infrastructure

4 CONCLUSION

A feasibility investigation and assessment of required infrastructure and servicing for a proposed re-zoning and subdivision has been undertaken. This investigation including reviewing available information, consulting with relevant authorities, and assessing how the proposed subdivision would be serviced with respect to roads and vehicle access, stormwater, sewer, water, electricity, communications, and gas.

Based on this assessment, there are no significant impediments to servicing the subdivision, beyond capital costs to do so, and all the relevant authorities generally endorsed the potential subdivision.

Notable capital expenditure beyond what would be considered typical for a subdivision such as this includes the following:

- Upgrade of existing roads
- Backhaul for the supply of NBN
- Backhaul for the supply of electricity

It is noted that confirmation of specific requirements and costs would require a detailed design and investigation, which is beyond the scope of this report.