Appendix C

Engineering Service Report

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CONSULTING ENGINEERS



Lot 12 Sultana Road East
Forrestfield

May 2024

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1. INTRODUCTION

The following report has been prepared by Cossill & Webley and summarises the results of a preliminary assessment of the engineering aspects of the proposed urban development over Lot 12 Sultana Road East, Forrestfield, which for the purposes of this report shall be referred to as "the Site".

The area of land is identified by the red boundary presented in **Figure 1** below, on the City of Kalamunda Planning Scheme 3 map.

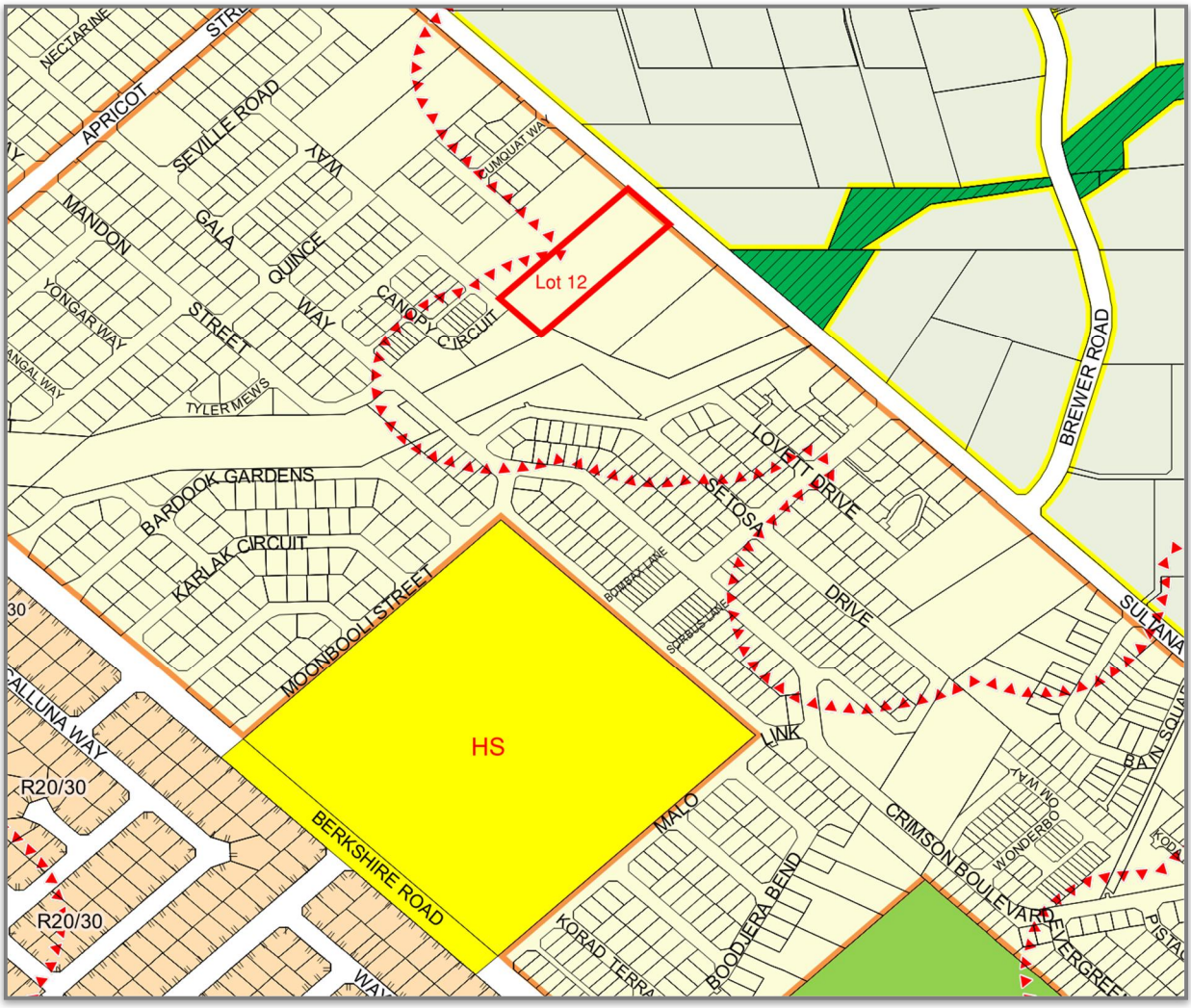


Figure 1 – Town Planning Scheme 3 (City of Kalamunda, 2023)

The Site is bound by an existing mix of residential housing, including a mix of new developments with standard residential lots and existing 1-hectare semi-rural properties.

We understand that the landholding is currently zoned for urban development as shown in **Figure 1**. An Outline Development Plan (ODP) was prepared by Gray & Lewis for the Shire of Kalamunda in 2007, with the most recent update of the ODP occurring in October 2020. No further rezoning is required.

The City of Kalamunda has confirmed that the Site does not fall within a Developer Contribution Scheme.

Figure 2 depicts the existing road network surrouding the Site. Access to the Site is from Sultana Road East and Canopy Circuit from the previous 'The Hales' development in the south-west.

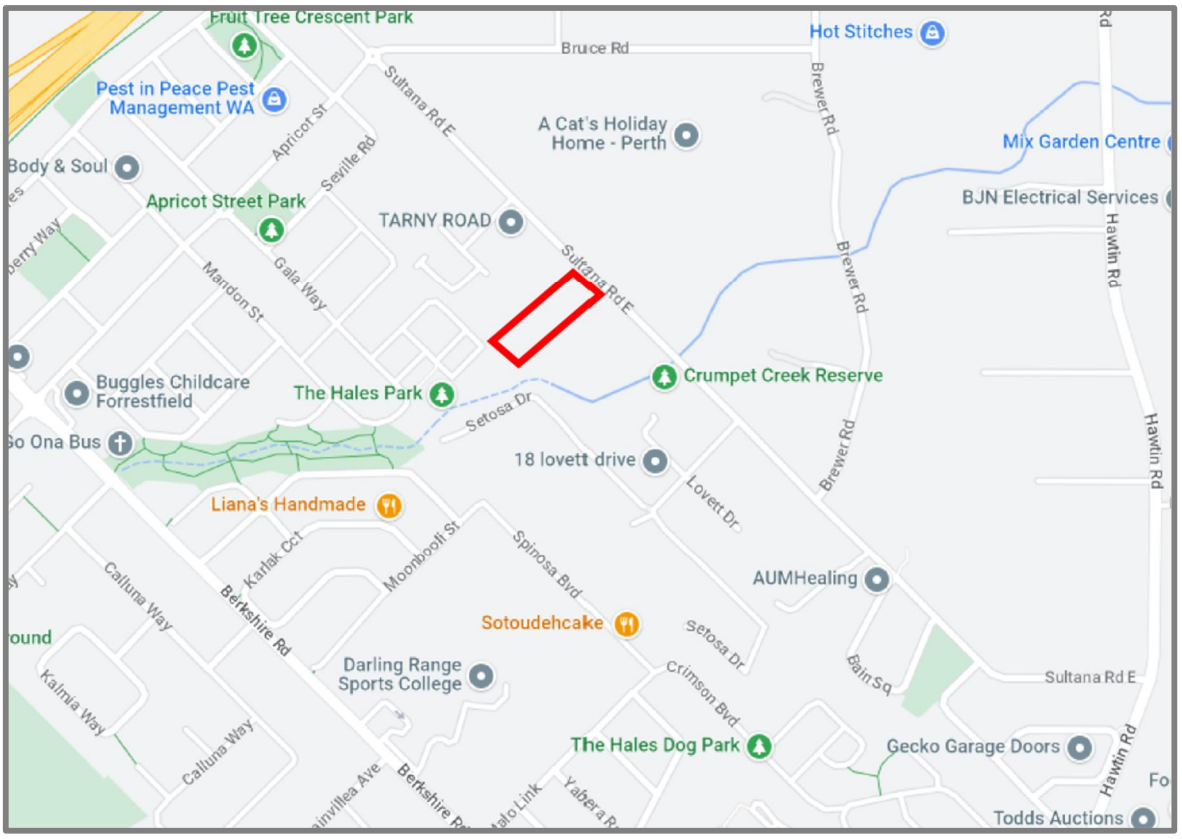


Figure 2 – Existing Road Network (Google Maps, 2023)

2. SITE DESCRIPTION

2.1 SITE VEGETATION

The entire site is approximately 1 hectare in area and is located within the City of Kalamunda, in the suburb of Forrestfield. The land contains residential buildings with several smaller outbuildings with most of the site covered in grass as shown in the recent aerial photography of the site presented in **Figure 3** below.

2.2 EXISTING BUILDINGS

There is a house and sheds on the Site which require demolition, as shown in **Figure 3**. There are a number of existing homes adjacent to the Site which will require additional consideration during construction. Dilapidation surveys and a comprehensive dust management plan will be required prior to the commencement of works.

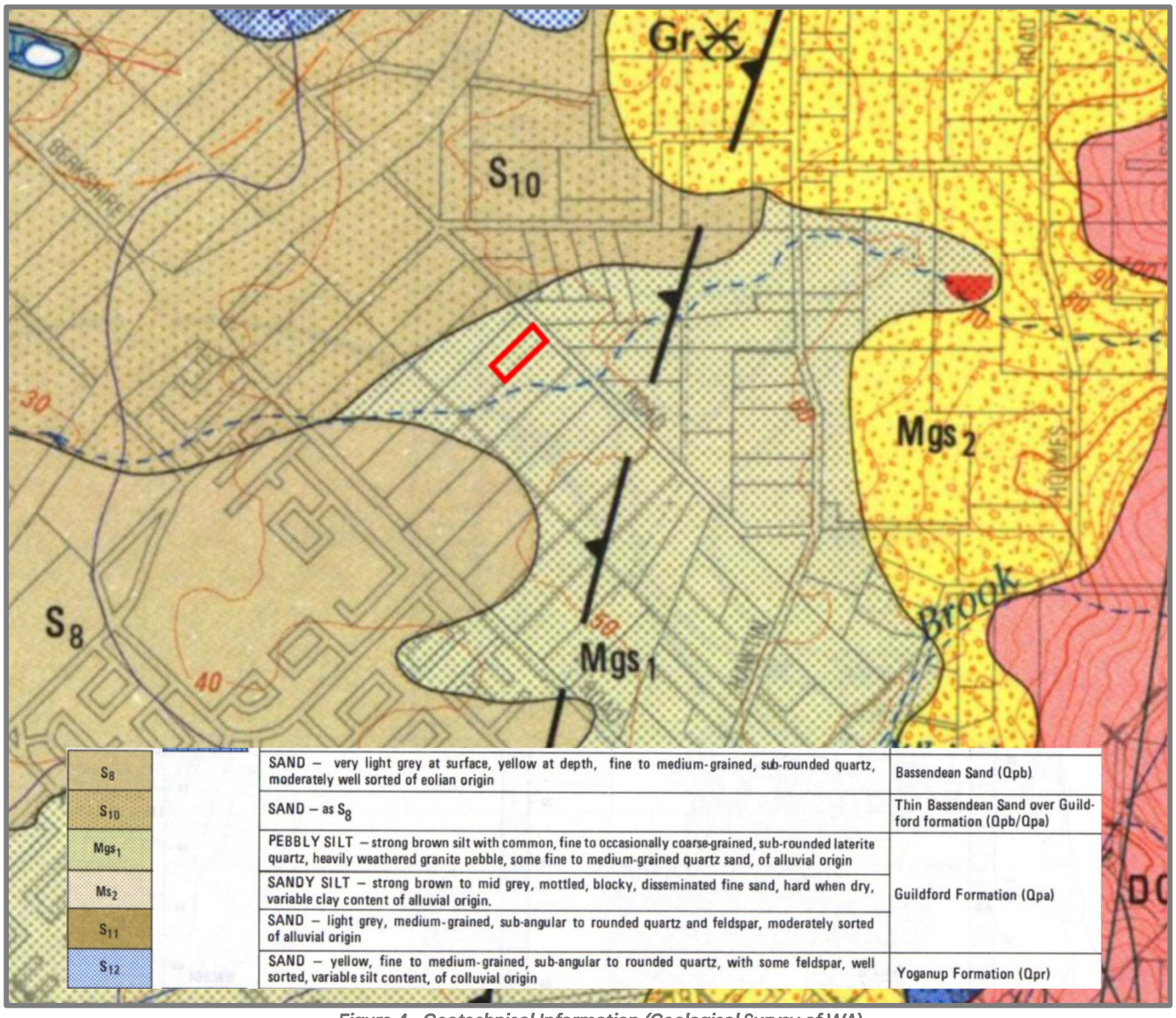


Figure 3 – Aerial Photography (MNG Access, 2023)

2.3 GEOLOGY

The Geological Survey of Western Australia Perth Metropolitan Region soils map for Perth (part 2034II & 2134III) indicates that the majority of the Site is characterised by Pebbly Silt (refer to **Figure 4**).

This soil type is generally characterised by Guildford Formation clays near the surface. The presence of Guildford Formation is likely to result in low shrink swell potential, which may have an impact on the future site classification of the lots. A geotechnical investigation will be required to better identify the soil make-up of the site and to help determine the site's classification prior to detailed engineering design.



S_8	SAND – very light grey at surface, yellow at depth, fine to medium-grained, sub-rounded quartz, moderately well sorted of eolian origin	Bassendean Sand (Qpb)
S_{10}	SAND – as S_8	Thin Bassendean Sand over Guildford formation (Qpb/Qpa)
Mgs_1	PEBBLY SILT – strong brown silt with common, fine to occasionally coarse-grained, sub-rounded laterite quartz, heavily weathered granite pebble, some fine to medium-grained quartz sand, of alluvial origin	Guildford Formation (Qpa)
Ms_2	SANDY SILT – strong brown to mid grey, mottled, blocky, disseminated fine sand, hard when dry, variable clay content of alluvial origin.	
S_{11}	SAND – light grey, medium-grained, sub-angular to rounded quartz and feldspar, moderately sorted of alluvial origin	
S_{12}	SAND – yellow, fine to medium-grained, sub-angular to rounded quartz, with some feldspar, well sorted, variable silt content, of colluvial origin	Yoganup Formation (Qpr)

Figure 4 - Geotechnical Information (Geological Survey of WA)

2.4 ACID SULPHATE SOILS

A desk top review of the Acid Sulphate Soil Risk Map (MNG Access, 2023) for the Central Metropolitan Region for potential for acid sulphate soils (ASS) indicates the Site is classed as having no known risk of ASS occurring within 3m of the natural soil surface (or deeper) over the Site as depicted in **Figure 5** below.

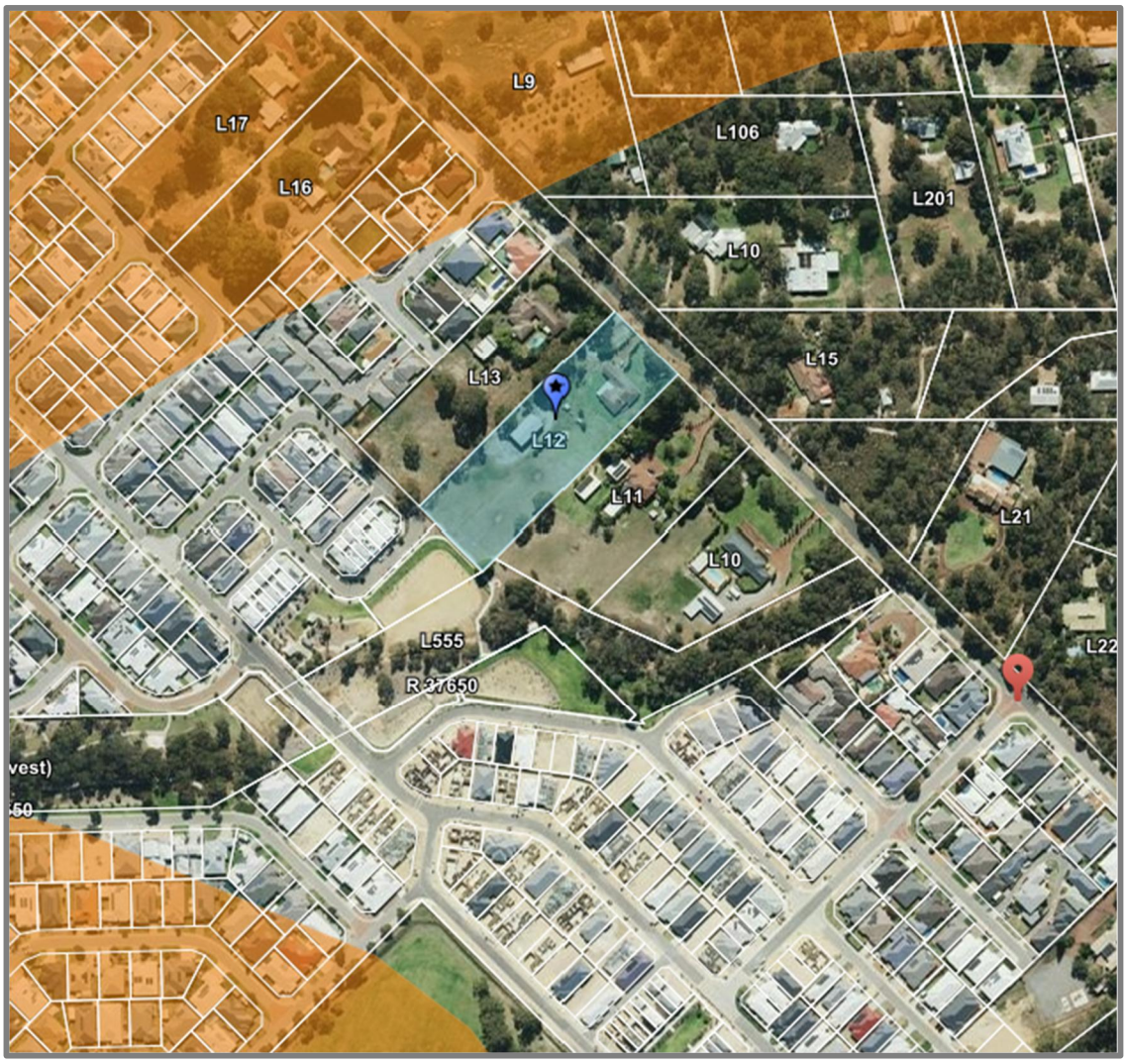


Figure 5 – Acid Sulphate Soils Risk Mapping (MNG Access, 2023)

2.5 SITE CONTOURS

Based on aerial contour information obtained from MNG Access, the Site has minor fall from the North Eastern boundary adjacent to Sultana Road East at a level of approximately RL 48m AHD to a low of approximately RL 46m AHD at Canopy Circuit as depicted below in **Figure 6**. Crumpet Creek is located to the south of the Site, at an elevation between RL45m and RL46m AHD.

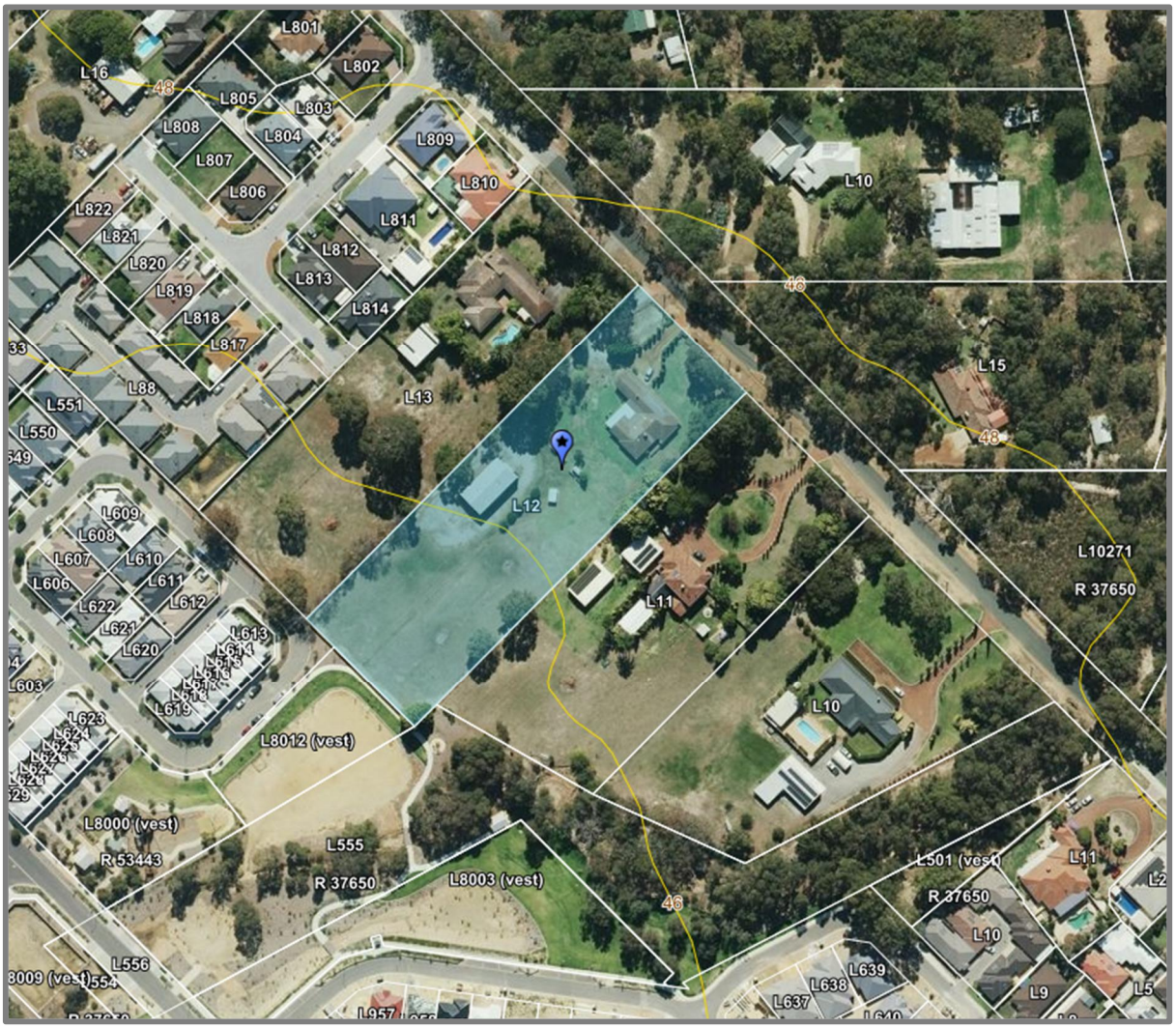


Figure 6 – Existing Ground Contours of The Site (MNG Access, 2023)

2.6 GROUNDWATER

A review of available groundwater contour information from the Department of Water and Environmental Regulations' Groundwater Atlas (September 2023) indicates the minimum groundwater levels are approximately RL24m AHD as depicted below in **Figure 7.** There is significant separation between the prevailing groundwater levels and natural surface levels (approximately 20 metres).

Given the likely presence of Guildford Formation clay soils across the Site, we anticipate there is likely to be issues with water perching on the surface, which will need to be dealt with by the installation of a subsoil network, generally discharging to the south.

The presence of Guildford Formation clay is likely to impact the ability to infiltrate stormwater at source. This will be addressed as part of the Urban Water Management Plan process to inform detailed design.



Figure 7 - Groundwater Levels (Perth Atlas 2023)

3. DRAINAGE AND GROUNDWATER MANAGEMENT

A UWMP has been prepared by JDA Consultant Hydrologists dated May 2024 which has been prepared in accordance with Better Urban Water Management (WAPC, 2008).

The following is a summary of the proposed stormwater drainage design as detailed in the UWMP:

- The first 15mm of rainfall from lots is to discharge into the road drainage network via lot connections. Stormwater runoff from initial events is to be directed to roadside swales.
- Minor events are designed as a system of drains, pipes, kerbs, gutters, etc to convey stormwater flows from the up to 20% AEP.
- Major events are to be directed along overland flow paths.

The Site falls within two drainage catchments. The proposed lots fronting Sultana Road East drains to the Sultana Road East stormwater system. The balance of the site drains to the Hales Estate Detention Storage basin.

Stormwater is to discharge directly into the adjacent Hales Estate Detention Storage area adjacent to Canopy Circuit. The total allowable discharge from Lots 12 and 13 is 19L/s based on the allowance in the hydrology model for the Hales Estate.

All lots will have a 500mm clearance from the 1% AEP top water level of the detention storage area and 300mm from the adjacent road flood level.

Subsoil drainage is proposed to be installed in road reserves to protect infrastructure in the event of any perched groundwater rise.

4. ROADWORKS & FOOTPATHS

Figure 2 depicts the existing road network surrounding the Site. Access to the Site is from Sultana Road East to the northeast and Canopy Circuit to the southwest.

Sultana Road East is an un-kerbed road in good condition with no piped drainage, with a rural style open channel on the south bound traffic lane verge to collect Stormwater runoff.

Canopy Circuit provides connection to the south west of the development and is a kerbed sealed road with a pedestrian footpath. Canopy Circuit also provides a conventional pit and pipe stormwater system.

All newly created roads would need to be designed and constructed to the satisfaction of the City of Kalamunda.

5. WATER RETICULATION

There are a number of reticulation sized mains surrounding the Site which can be extended through the future development to service the Site. The existing water network is shown on **Figure 8.**

Currently Lot 12 is serviced via a private connection from the 205mm Cast Iron water main running within the Sultana Road East verge. Canopy Circuit contains a 100P-12 water reticulation main which currently services properties to the south-west. These networks can be extended to and supply water to the Site.

Based on Water Corporation advice, there is sufficient capacity in the water network to serve the proposed development.

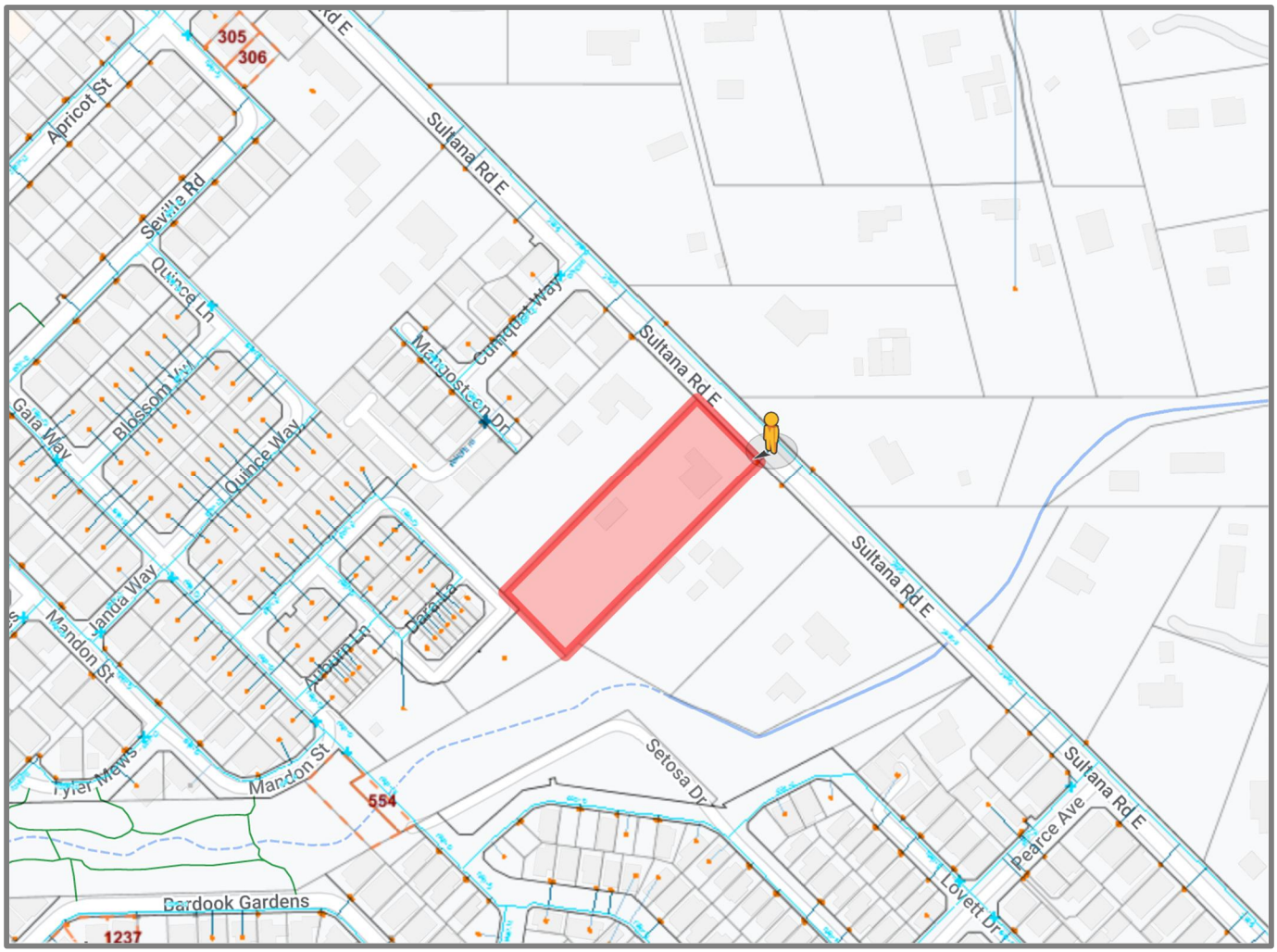


Figure 8 - Existing Water Reticulation (Water Corporation Esinet, 2023)

6. SEWER RETICULATION

The Site falls within the Gooseberry Hill Sewer District. **Figure 9** - Existing Sewer Reticulation (Water Corporation Esinet, 2023) depicts the existing sewerage reticulation within the area.

There are a number of reticulation sized mains surrounding the Site which could be extended through the future development to service the site. Canopy Circuit contains a 150PVC-U sewer network which currently services properties to the south west. This network can be extended to and supply sewer to the internal properties of the Site.

Sultana Road East contains a 150PVC-U which currently services lots to the north-west. However, this sewer main may be too shallow to service lots fronting Sultana Road East. If this is the case, the Sultana Road East lots will need to be serviced from Canopy Circuit which will require easements for any sewer mains located in lots.

The Water Corporation has indicated there is sufficient capacity in the current sewer reticulation system to service the development.

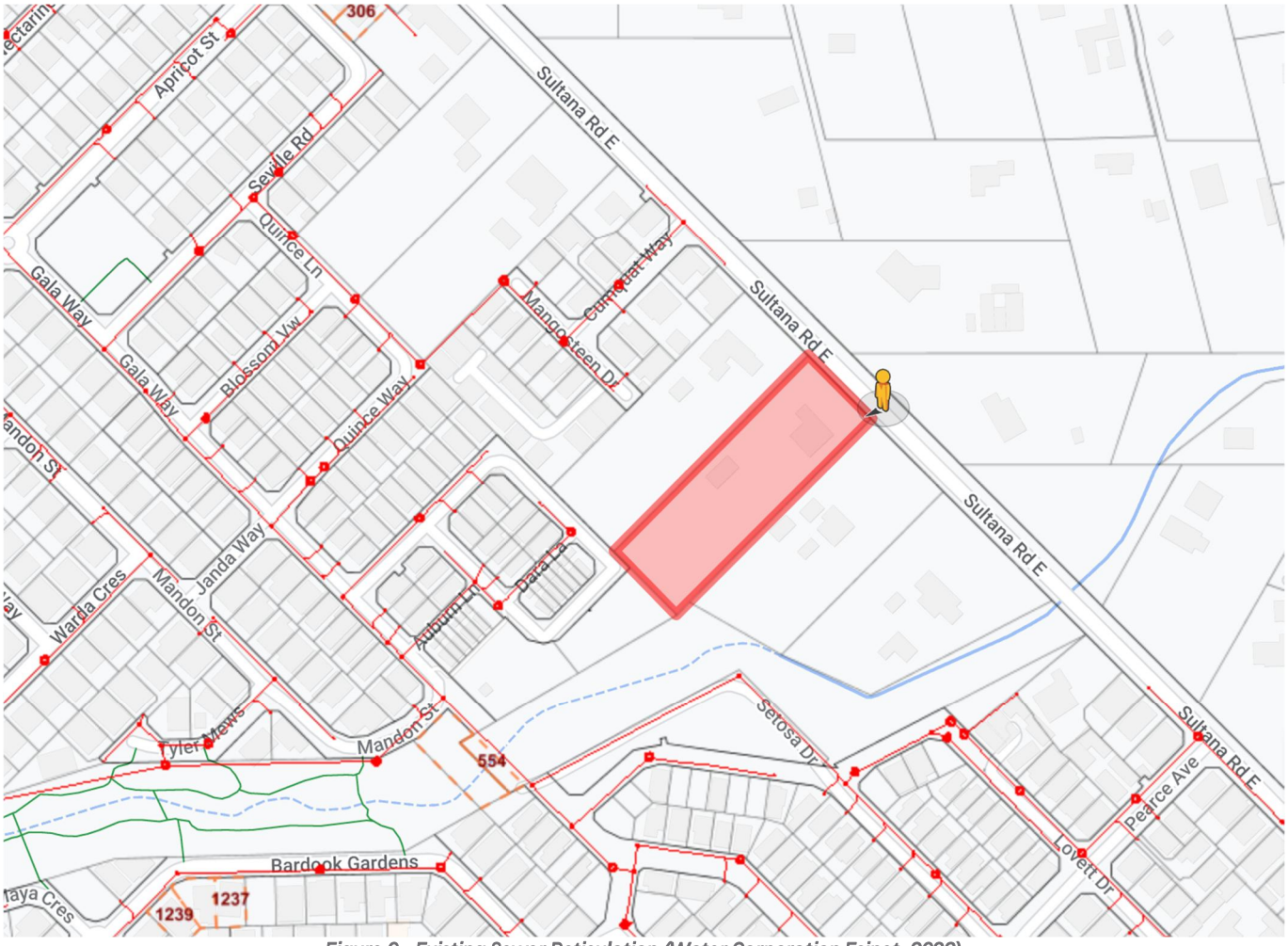


Figure 9 - Existing Sewer Reticulation (Water Corporation Esinet, 2023)

7. POWER

The Western Power Network Capacity Mapping Tool was used to determine future forecast remaining capacity in the electricity network. This indicates that the network will have more than 30MVA remaining capacity from now until 2034. The total power requirement for the proposed residential development is estimated to be in the order of 80kVA, well within the network capacity. This will need to be confirmed formally with Western Power during planning.

The existing overhead power infrastructure is shown in **Figure 10**. There is a High Voltage (11kV-33kV) and Low Voltage (< 1kV) overhead line running along the Sultana Road East Road Reserve, as shown in **Figure 10**. Unless specified under the WAPC conditions the aerial lines can remain, poles may need to be shifted to avoid crossovers.



Figure 10 - Existing Overhead Power Lines (MNG Access Western Power, 2023)

Figure 11 below depicts the existing underground power infrastructure. The underground network surrounding the Site may be extended to service the proposed development, and no further upgrade works are anticipated. If no general capacity is available in the local LV network, a new transformer will be required to be installed.



Figure 11 – Underground Power (MNG Access Western Power 2023)

8. GAS SUPPLY

Figure 12 depicts the existing gas network surrounding the Site. There is an existing gas main in Sultana Road East that is a DN155 PVC main. This main is within the southern verge adjacent to the Site. A smaller DN63 PE main is located within Canaopy Circuit. At the time of writing, a response is still being sought from ATCO Gas about the requirements for gas for this development. However, it is anticipated that there will be sufficient capacity in the surrounding network to service the proposed development, and no gas headwork upgrades will be required.

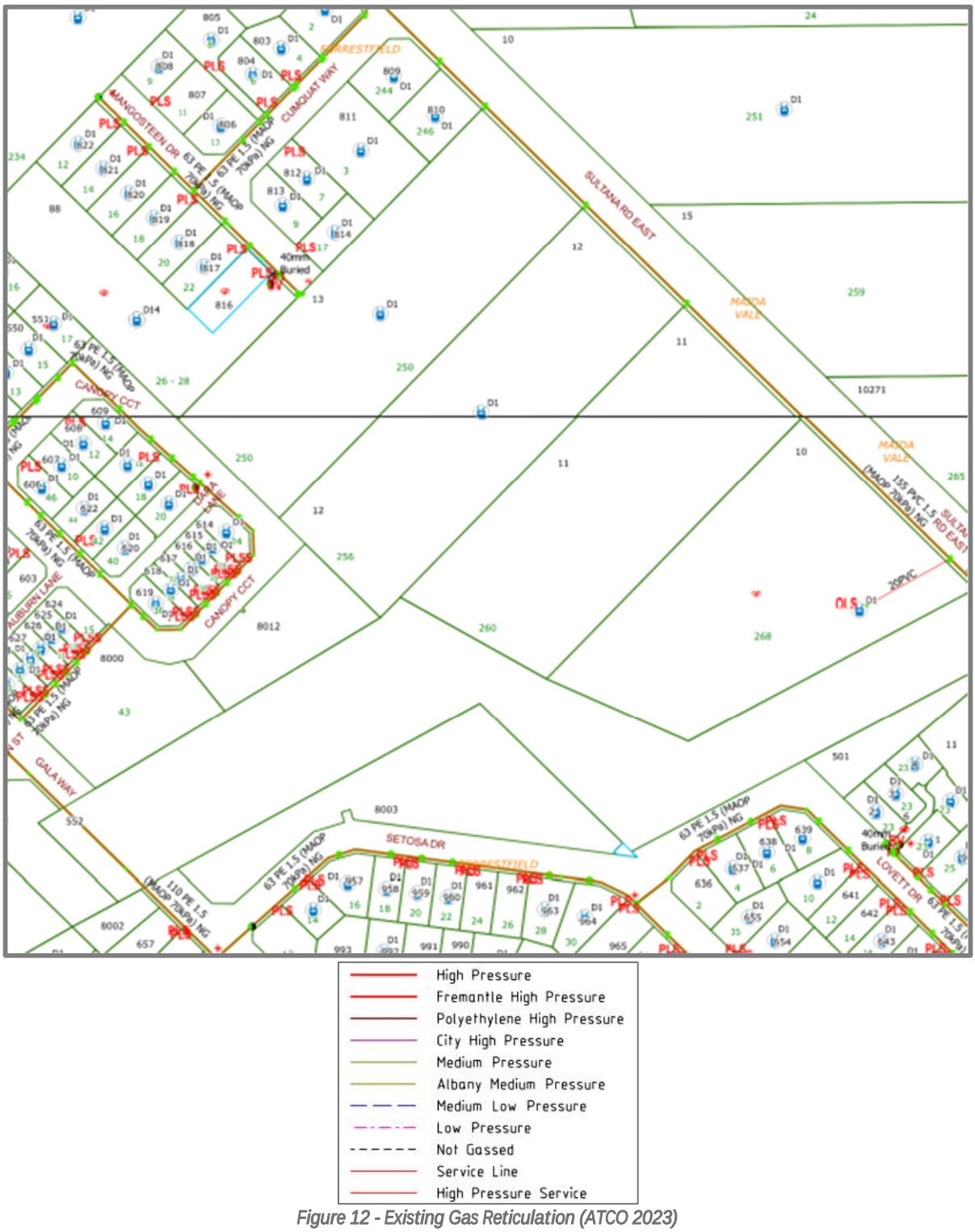


Figure 12 - Existing Gas Reticulation (ATCO 2023)

9. TELECOMMUNICATIONS

The only existing Telstra underground cables in the site run along Sultana Road North-east verge. Lot 12 is provided with a P20 property connection, as shown in **Figure 13**. This will need to be removed as part of any subdivision works prior to the commencement of development.

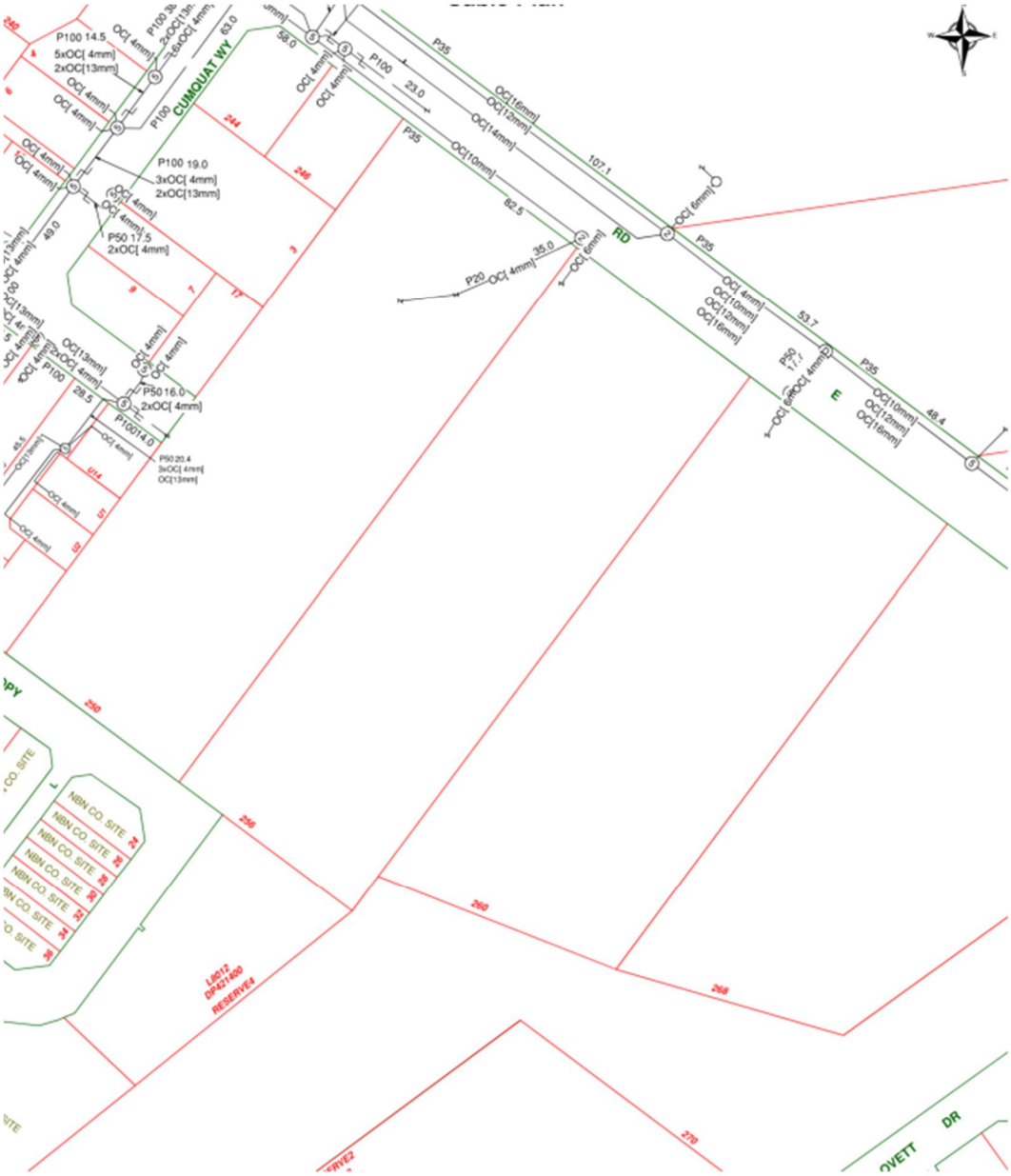


Figure 13: Existing Telstra Network (Telstra 2023)

Figure 14 shows the Site is within an existing NBN Co footprint and there is existing NBN infrastructure within the area. It is not anticipated any headworks upgrades or backhaul will be required to service this development.



Figure 14: NBN Co Rollout Planning (NBN Co 2015)

10. CONCLUSION

The Site is expected to be readily serviced with extensions of existing infrastructure from the surrounding area, including infrastructure extensions from Sultana Road East and Canopy Circuit. Water supply, sewerage and other public utility services are available or can be extended to service the proposed urban area.