



## Appendix H **Servicing Report**

HARLEY DYKSTRA

# LOT 564 GARVEY ROAD CROOKED BROOK

## SERVICING REPORT

August 2024

11815-C-R-002-A\_Lot 564 Garvey Road - Servicing  
Report.docx



| Document History and Status |                 |              |                  |            |
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## EXECUTIVE SUMMARY

This report details the availability of services and support for the proposed rural residential development on Lot 564 Garvey Road, Crooked Brook, hereafter referred to as “the site.” It also addresses necessary service upgrades, road network considerations, and drainage management concepts.

### Infrastructure Overview

#### Water and Sewerage

- The site, due to its remote location, lacks access to potable water and water-borne sewerage.
- Onsite sewage disposal will be required, given the varying lot sizes (ranging from 1.04 to 3.97 hectares).
- During the development stage, a minimum separation of 1.5 meters from the highest groundwater level to the base of the effluent disposal system must be maintained due to seasonal inundation.
- Each Lot owner is responsible for their own rainwater collection
- Each lot owner to have their house built at the minimum finished floor level determined by the 1% AEP Flood.

#### Flood Management

- Each lot owner must ensure their house is built at the minimum finished floor level determined by the 1% Annual Exceedance Probability (AEP) flood level.

#### Power and NBN Connectivity

- Plans include the provision of power and National Broadband Network (NBN) access to the lots.

#### Road Network

- A 25-meter road reserve is planned, featuring a typical 6-meter-wide road with table drains, connecting Ayrshire Road to Garvey Road.

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11815-C-R-001

### APPENDIX C

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11207-G-R-001

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11207-G-R-002

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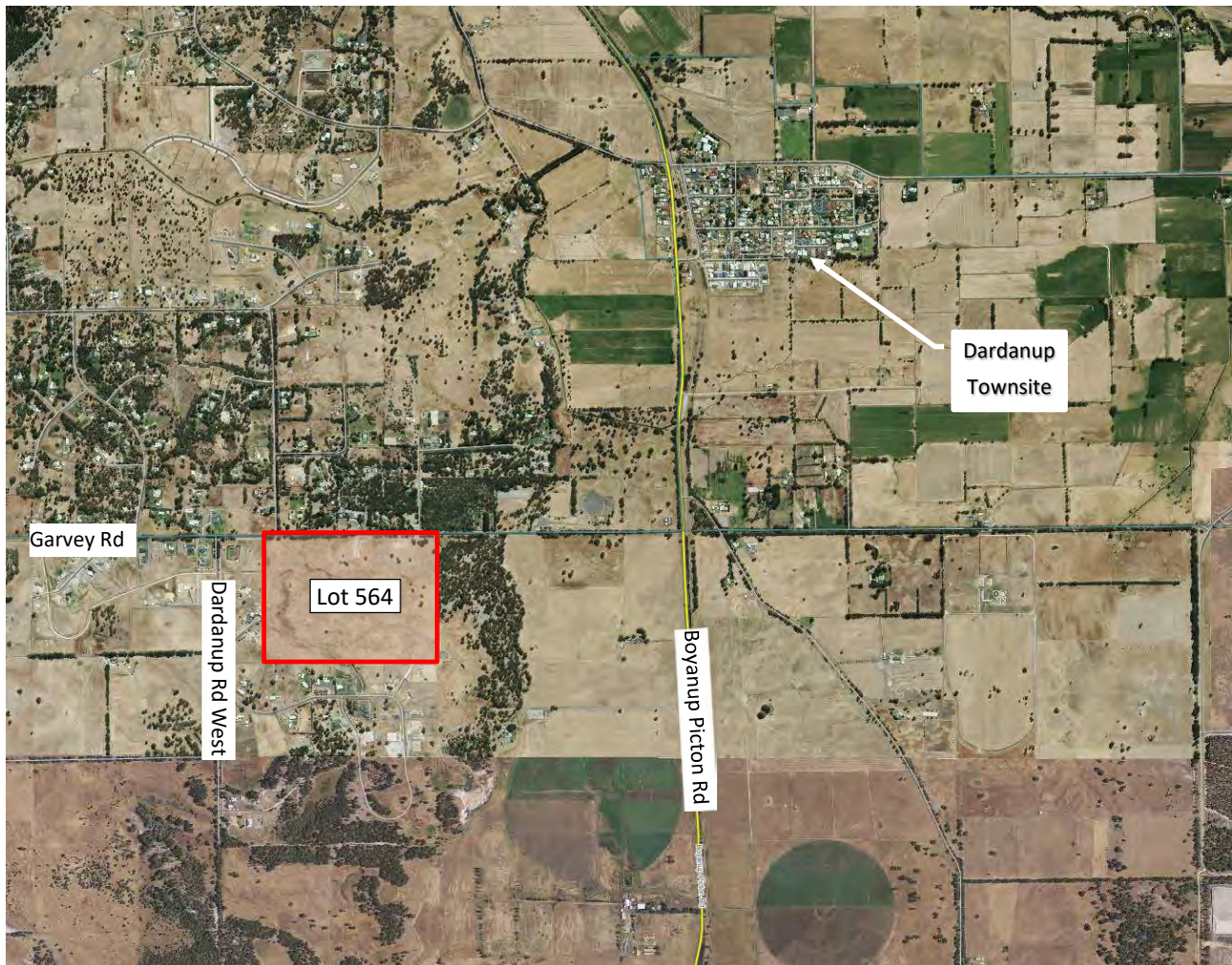
Site and Soil Evaluation (SSE)

11207-G-R-003



## 1 INTRODUCTION

WML Consultants (WML) has been engaged by Harley Dykstra Pty Ltd to prepare an Engineering Services Report for a proposed rural residential development. The site, Lot 564 Crooked Brook, is located within the Shire of Dardanup, adjacent to Garvey Road as shown in **Figure 1**.



**Figure 1: Locality Plan.**



## 1.1 Development Details

The proposed concept plan for this development involves subdividing the land into 20 rural residential lots. These lots range in size from approximately 1.04 to 3.97 hectares. For visual reference, see Error! Reference source not found. below and refer to **Appendix A** for the concept plan provided by Harley Dykstra.

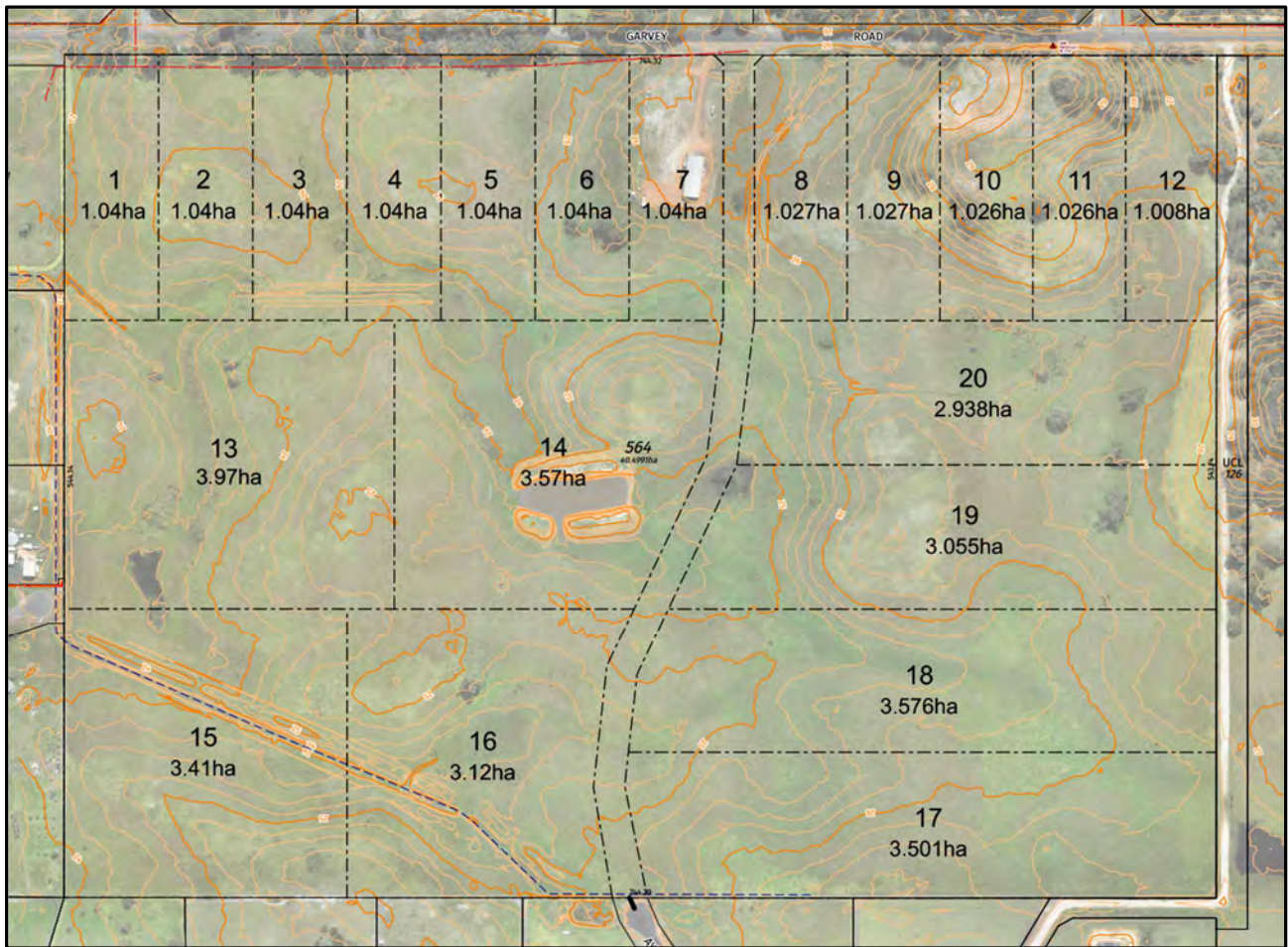


Figure 2: Site Plan

### Internal Roads:

- The plan includes a 25m road reserve connecting Ayrshire Road to Garvey Road.

### Stormwater Management:

- Runoff from upstream the proposed local road will be directed into swales adjacent to the road.
- These swales will treat the runoff before it is discharged into the watercourses.

## 1.2 Supporting Documentation

Supporting documentation and data from the following reports was used to compile the Engineering Servicing Report:

- Local Water Management Strategy WML (ref 10815-C-R-001)
- Groundwater Monitoring Program WML (ref 11207-G-R-001)
- Geotechnical Investigation WML (ref 11207-G-R-002)
- Site and Soil Evaluation WML (ref 11207-G-R-003)

## 2 SITE DESCRIPTION

The development site is currently zoned for general farming. It consists of grassland and several isolated trees in the northeast corner. The site is predominantly flat, with a few slightly elevated sand ridges approximately 1-3 meters above the surrounding areas, featuring slopes of 3-5%. Elevations range from 24m AHD to 27m AHD, with one sand ridge reaching 30m AHD. The site includes a man-made dam and is prone to local inundation. Additionally, there is an open earth channel registered to the Water Corporation.

Two poorly defined watercourses were identified on the site, marking two internal catchments that need to be accounted for. Both watercourses connect with the open earth channel downstream on the western side of the property. Overall, the general topography drains toward the west. Garvey Road (a local distributor) runs adjacent to the northern boundary, while Ayrshire Road (local) terminates at the southern boundary. On the eastern side, there is an open public access (emergency) via a gravel road.

## 3 GEOTECHNICAL AND HYDROLOGY

WML has undertaken a geotechnical investigation of the site (11207-G-R-002).

### 3.1 Site Assessment

The investigation fieldwork was carried out on May and November 2023 by WML and comprised:

- Five solid auger boreholes were drilled extending to depths of 2.65 m, designated BH11 to BH15.
- Five dynamic cone penetrometer tests adjacent to each borehole.
- Three in-situ permeability tests using the Talsma-Hallam permeability method.
- The collection of soil samples for laboratory testing.

Refer to **Figure 3** indicating the test locations.

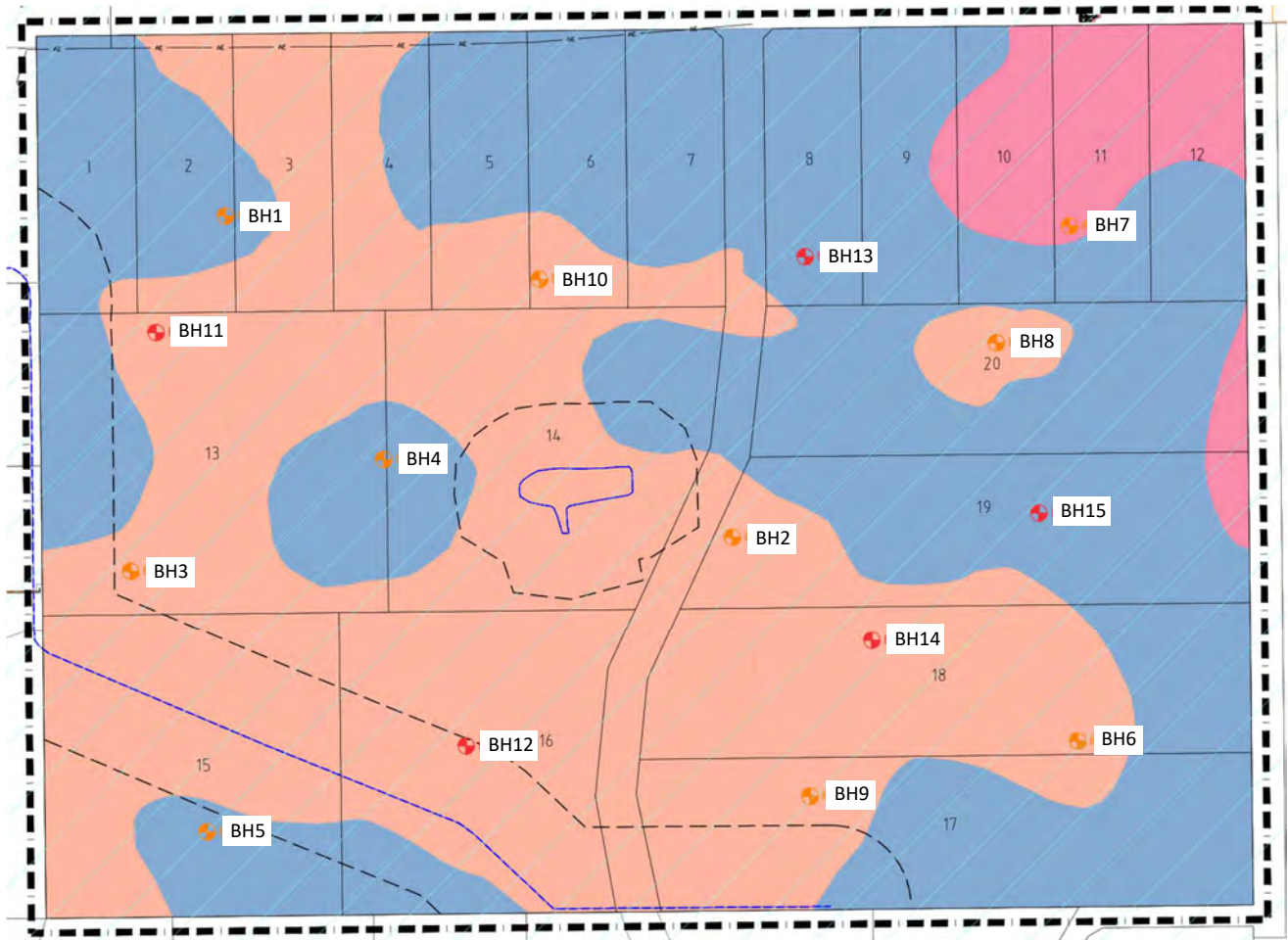


**Figure 3: Borehole test locations**



### 3.2 Interpreted Subsurface Profile

The subsurface profile is generally consistent across the site. Three distinct subsurface profiles have been identified, each with similar material compositions but varying sand thicknesses. The site has been divided into three zones, labelled Zones 1-3. Refer to **Figure 4** below, an excerpt from drawing 11207-G1-DG-002, for details.



**Figure 4: Soil profile zoning map**

The encountered soil profiles for each zone are summarised below in Table 1, Table 2 and Table 3.

**Table 1: Generalised sub-surface soil profile for Zone 1**

| Depth (m) | Unit | Description   |
|-----------|------|---|
| 0.1 – 2.5 | A    | <b>SAND/silty SAND:</b> fine to medium-grained, moist, pale grey to dark orange, and loose to medium dense. |

**Table 2: Generalised sub-surface soil profile for Zone 2**

| Depth (m) | Unit | Description   |
|-----------|------|---|
| 0.1 – 1.0 | A    | <b>SAND/silty SAND:</b> fine to medium-grained, varying colour including pale to dark grey and brown-orange, moist, loose to medium dense. Some areas have slightly cemented lateritic sand.  |
| 1.0 – 2.6 | B    | Sandy <b>CLAY/CLAY:</b> medium to high plasticity, varying colour including yellow and brown/grey mottled red, trace medium-grained subrounded to subangular gravel, trace to some slightly cemented lateritic gravel, moist to wet, generally stiff to very stiff. |

**Table 3: Generalised sub-surface soil profile for Zone 3**

| Depth (m) | Unit | Description   |
|-----------|------|---|
| 0.1– 0.7  | A    | <b>SAND/silty SAND:</b> fine to medium-grained, pale grey to brown, with silt/clay, moist, loose to medium-dense. BH12 had shallow sands to the depths of 0.25 m. BH14 consisted of silty SAND with low to medium plastic clay to the depths of 1.25 m.   |
| 0.7 – 5.5 | B    | Sandy <b>CLAY/CLAY:</b> medium plasticity, varying colour including orange-brown and grey mottled orange; sand is fine to medium-grained, moist, generally stiff. Traces of lateritic orange sand clumps are occasionally present. BH3 and BH6 drilled from 2.6-5.5 m identified some gravel was identified within the stiff sandy clays. |

### 3.3 Groundwater

During initial fieldwork in May 2023, ten monitoring wells (BH1-10) were installed. Readings and measurements taken throughout winter indicated either a shallow water table, generally within 0.6 meters, or local inundation. A detailed summary of groundwater levels recorded during four different inspections in both wet and dry seasons is presented below in **Table 4**.

**Table 4: Summary of groundwater depths**

| Test ID     | Depth of Groundwater (m) |                      |                      |                     | <sup>2</sup> Expected peak groundwater level range (m ADH) |
|-------------|--------------------------|----------------------|----------------------|---------------------|--|
|             | Observed 1/06/2023       | Observed 10/8/2023   | Observed 15/9/2023   | Observed 31/10/2023 |  |
| <b>BH1</b>  | 1.4                      | 0.76                 | 0.71                 | 1.3                 | 23.43  |
| <b>BH2</b>  | GNE                      | 0.18                 | 0.04                 | 1.05                | 24.73  |
| <b>BH3</b>  | 3.8                      | -0.10 (above ground) | -0.20 (above ground) | GNE                 | 23.47  |
| <b>BH4</b>  | 1.2                      | 0.63                 | 0.63                 | 1.22                | 24.29  |
| <b>BH5</b>  | 1.8                      | 0.80                 | 0.89                 | 1.29                | 24.21  |
| <b>BH6</b>  | GNE                      | 0.00 <sup>1</sup>    | 0.00 <sup>1</sup>    | GNE                 | 25.78  |
| <b>BH7</b>  | GNE                      | GNE                  | GNE                  | GNE                 | -  |
| <b>BH8</b>  | 1.0                      | 0.00                 | 0.00                 | GNE                 | 26.12  |
| <b>BH9</b>  | GNE                      | 0.00                 | 0.00                 | 1.19                | 24.70  |
| <b>BH10</b> | 2.3                      | 0.60                 | 0.35                 | 0.99                | 24.16  |

Notes: All depths are relative to the existing ground surface. Green cells highlight peak groundwater values for each location.

GNE = Groundwater not encountered,

<sup>1</sup>Groundwater not encountered in the borehole, but ponding was present in the area around the monitoring well.

<sup>2</sup> Based off RL of well location picked up by Thompson surveyor minus observed peak water table

### 3.4 Acid Sulphate Soils

The Department of Water and Environmental Regulation (DWER) Acid Sulphate Soil Risk Map for the proposed development area shows Moderate to low risk of ASS occurring within 3 m of natural soil surface but high to moderate risk of ASS beyond 3m of natural soil surface.

## 4 ROAD NETWORK SUMMARY

Proposed access to the development will be off Garvey Road with a secondary entry point from Ayrshire Road.

Where the design of flexible pavements is undertaken, a preliminary subgrade California Bearing Ratio (CBR) of 10% may be assumed for the natural sand materials at the site and 6% for silty/clayey SAND. This CBR value assumes that the site preparation measures outlined have been completed on all pavement subgrades and that adequate drainage will be included in future pavement designs.

## 5 STORMWATER MANAGEMENT

The drainage system will be designed to maintain surface flow rates and volumes both within and emanating from the development, ensuring they remain at or below their predevelopment levels. With the development being of low density and featuring a small increase in impervious area, any variance between predevelopment and post-development flow rates will be negligible. To address this, storage and treatment will be integrated into the infrastructure, primarily through the utilization of roadside swales and detention basins. For a comprehensive understanding of the proposed drainage system, refer to the Local Water Management Strategy (ref. 11815-C-R-001) and attached to Appendix B the Post development Drainage Plan.

The drainage system will be designed to maintain surface flow rates and volumes both within and emanating from the development, ensuring they remain at or below predevelopment levels. Given the low density of the development and the small increase in impervious area, any variance between predevelopment and post-development flow rates will be negligible. To address this, storage and treatment will be integrated into the infrastructure, primarily using roadside swales and detention basins. For a comprehensive understanding of the proposed drainage system, refer to the Local Water Management Strategy (ref. 11815-C-R-001) and the Post-Development Drainage Plan attached in Appendix B.

## 6 SITE EARTHWORKS REQUIREMENTS

No Bulk Earthworks or filling is proposed other than minor works that will be completed by lot purchasers to create build pads.

## 7 SERVICES

### 7.1 Sewer

The site is located within a sewerage-sensitive area, the estuary catchments on the Swan and Scott Coastal plains and therefore the following applies.

- All lots requiring on-site effluent disposal must have a minimum lot size of 1 ha.
- A minimum vertical groundwater separation of 1.5 m from the base of any on-site effluent disposal is required for all lots in accordance with GSP 2019.
- Effluent must be treated to a secondary level using a secondary treatment system with nutrient removal.

### 7.2 Water

No public drinking water sources are located on-site or within 100 m of the site. The nearest public drinking water source is approximately 700 m east of the subdivision (Public Drinking Water Source Areas Boundaries: Dardanup Water Reserve).

Lot owners will be responsible for the harvesting and treatment of roof runoff for potable water. Supplementary top-up supply may be required from time to time from accredited potable water suppliers.

### 7.3 Utilities

Based on the Western Power (WP) UDS manual requirements the lots are to be served at 5kVA per lot, as Special Rural Lot subdivision. Therefore, the load requirement for the subdivision is 100kVA.



Western Power's network mapping tool indicates that the area has sufficient power available to meet the development's needs, from the Picton Zone Substation. The map indicates there is 20-25 MVA available in this area up to 2027. The development requires less than 0.5MVA.

### 7.3.1 Additional information

Power:

HV pole termination required with the nearest three phase HV on Shaw Road



Figure 5: HV termination on Shaw Rd.

The overhead poles will need to be removed from the proposed lots and lot 501 (181) will need to be reconnected most likely with a new substation required.



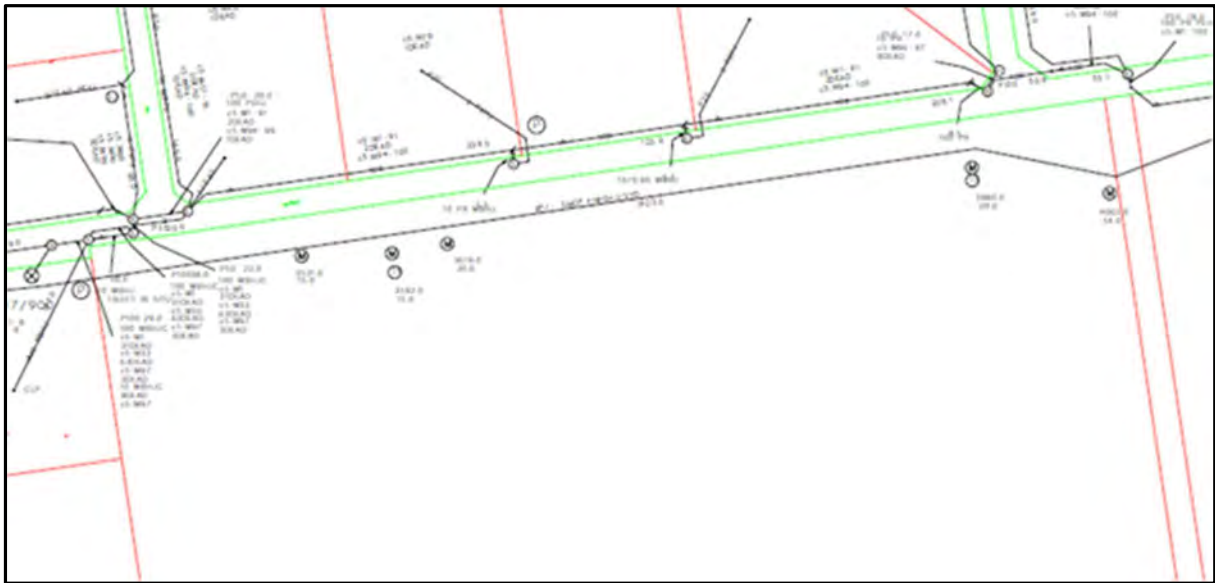
Figure 6: Overheads along norther boundary

HV to supply switch gear and transformer on lot 7 or 8. The HV run to go to proposed lot 1 for future stages to comply with the UDS manual, this cable has been added to the above costs.

Comms:

- Potential Telstra relocation of cable in existing lot.
- The locate NBN network will be fixed wireless.
- This means that there will be no fibre to the premise, but NBN pit and pipe will still need to be installed as per the act and for future comms developments.





**Figure 7: Telstra along northern boundary**

#### 7.4 GAS Reticulation

There is no natural gas reticulation in the area and no supply will be available for this development.

## 8 SUMMARY

The structure plan area identified in this report is capable of being serviced by the essential infrastructure required for rural residential development. No logistical engineering reasons have been identified as to why the site cannot be serviced with the required services.

The viability of servicing the site will be subject to more detailed design and cost feasibility analysis.

## 9 REFERENCES

Stormwater Management Manual for Western Australia (DWER 2022)

Better Urban Water Management (WAPC (now DPLH) 2008)

Government of Western Australia, State Planning Policy 2.9 – Water Resources

Bureau of Meteorology Climate Data

The Government Sewerage Policy (DPLH 2019)

The Department of Biodiversity Conservation and Attractions Geomorphic Wetland Database

Department of Water and Environmental Regulation (DWER) Acid Sulphate Soil Risk Map

National Water Quality Management Strategy (Australian and New Zealand Environment and Conservation Council 2000)



# APPENDIX A

## CONCEPT PLAN





CONCEPT PLAN  
OPTION C

|             |             |             |               |
|-------------|-------------|-------------|---------------|
| rev         | details     | approved    | date          |
| survey      | PH 21/09/23 | cad file    | 23858-02B.dgn |
| drawn       | KS 16/05/23 | checked     |               |
| horiz datum | PCG2020     | level datum | AHD           |

scale at A1  
1 : 1500  
all distances are in metres  
0 20 40 60

plan type  
CONCEPT PLAN

client  
R. Wright

description  
Lot 564 on DP250872  
Garvey Road  
CROOKED BROOK

drawing no  
23585-02C

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NOTE:  
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| LOT YIELD            |          |              | LOT AREA     |                 |         |
|----------------------|----------|--------------|--------------|-----------------|---------|
| Size                 | No. Lots | % Total Lots | Average Size | % of Total Area | Area    |
| 1.000ha - 4.000ha    | 20       | 100.00%      | 1.977ha      | 100.00%         | 39.55ha |
| Total Number of Lots | 20       |              |              |                 |         |

Average Lot Size 1.977ha  
Total Lot Area 40.523ha

**DISCLAIMER**  
This plan has been prepared for R. Wright from a combination of field survey and existing records for the purpose of showing the physical features of the land to assist in developing future development. It should not be used for any other purpose.

The title boundaries shown hereon were not verified or made at the time of survey but are derived from the SCB September 2023. They are estimated to be accurate only to +/- 0.1m. This plan should not be used for building to boundary, or to prescribed setbacks, without further boundary survey.

AND connection made to SSM Dardang 2.

Underground services shown on this drawing have been plotted from service authority records obtained from: Before You Dig Australia or a similar source. Unless indicated otherwise only surface features have been located by survey.

Before starting any demolition, excavation or construction on the site, the relevant person should make an independent and updated enquiry of 'Before You Dig Australia' and any relevant service providers to ascertain the existence of further services (if any) and the accurate location of those not surveyed at the time of preparing this plan for data.

No responsibility can be accepted by Harley Dykstra for any damage caused to any underground service or any loss or injury suffered if enquiry and verification have not been completed in accordance with this note.

Contractors to verify all survey control marks to be correct (by field checks) prior to utilisation for construction purposes.

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**LEGEND**  
— Lot boundary (SCBD)  
— AE Aerial power (BYDA)  
— E Underpower power (BYDA)  
— T Telecommunications (BYDA)  
— Open Channel Drains (BYDA)  
Contour Interval: 0.25m

NOTE:  
See Certificate of Title 462-125A for interests and encumbrances over Lot 564