Appendix A **Local Water Management Strategy**

HARLEY DYKSTRA

LOT 564 GARVEY RD CROOKED BROOK

LOCAL WATER MANAGEMENT STRATEGY

April 2025
11815-C-R-001-A

WML
Consulting Engineers

Document History and Status				
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A	Vincent Rodgers	Luke Rusconi	Draft Issued to client	11/08/2024

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CONTENTS

1 INTRODUCTION

WML has been engaged by Harley Dykstra Pty Ltd to prepare a Local Water Management Strategy (LWMS) for the proposed development at Lot 564 Garvey Road, Crooked Brook, hereafter referred to as "the site." The site, encompassing 40.5 hectares, is situated 2.5 kilometres southwest of the Dardanup townsite and is currently zoned for general farming.

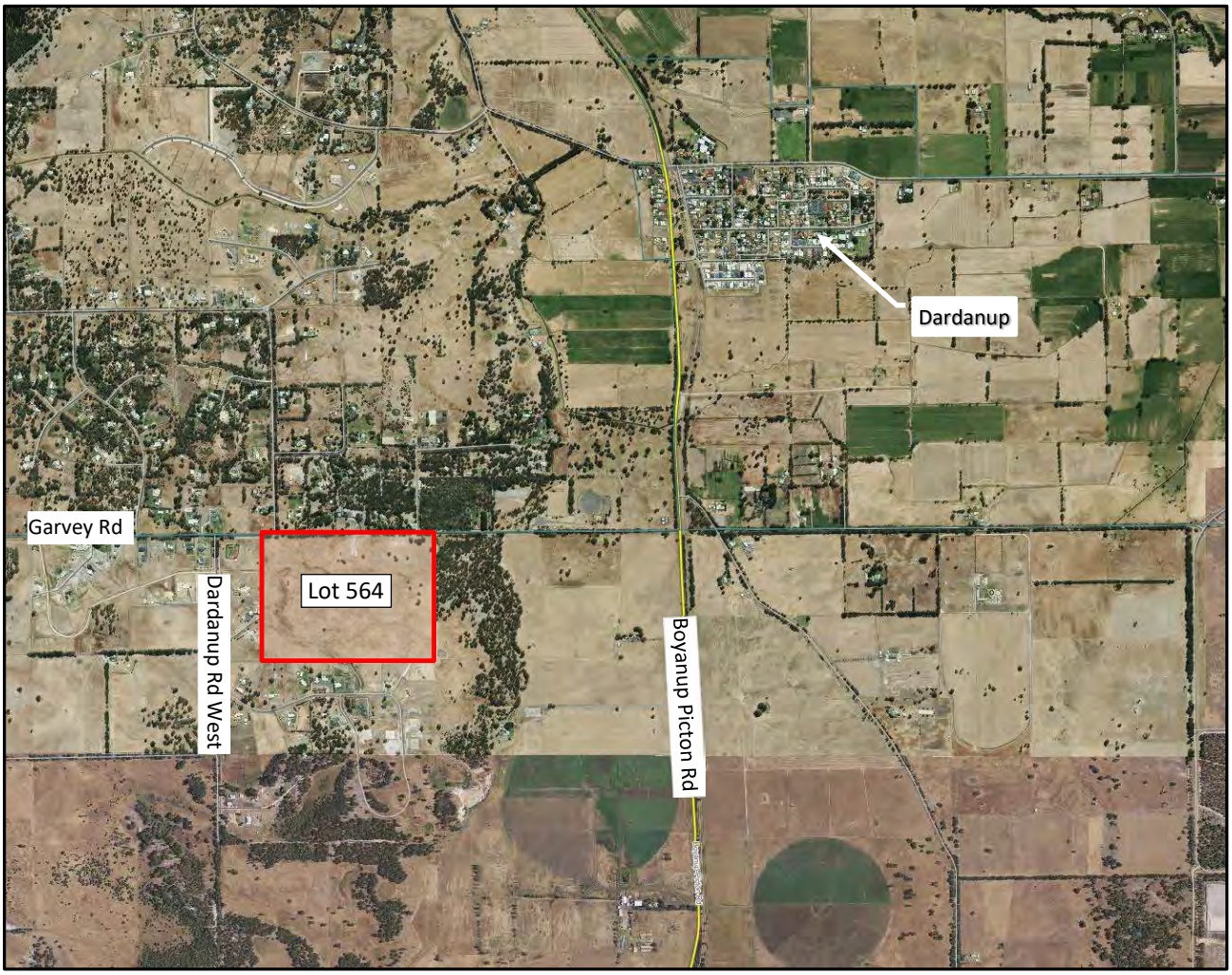

Figure 1: Locality Plan

1.1 Development Details

The proposed concept plan involves subdividing the site into 20 rural residential lots of varying sizes. Swales will be constructed along the new internal road to intercept upstream surface flows, which will be conveyed via culverts through designated drainage reserves. The existing channel will be realigned slightly to facilitate access to the lots. All building pads will be engineered to sit at least 500 mm above the estimated 1% AEP flood levels.

An illustration of the development concept plan is provided in Figure 2 and included in Appendix A.

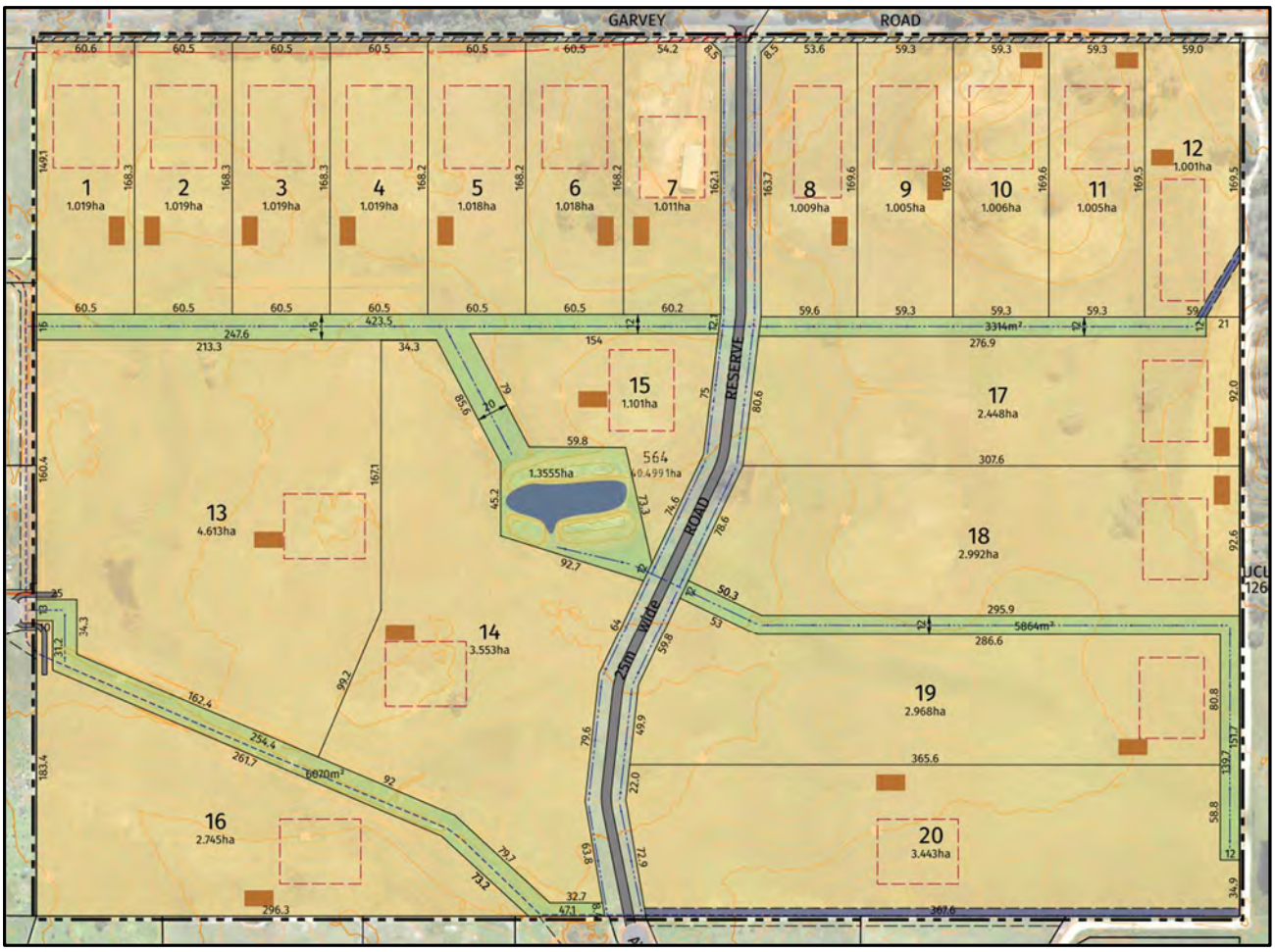

Figure 2: Site concept plan

1.2 LWMS Key Design Principles and Objectives

This LWMS employs the following key documents to define its content, key principles and objectives:

- Stormwater Management Manual for Western Australia (DWER 2022)
- Better Urban Water Management (WAPC (now DPLH) 2008)
- Stormwater Discharge from Buildings (Policy No. CP060, Shire of Dardanup)

Principle objectives for managing urban water in WA are stated in the DWER manual in the Chapter 1 Preface as follows:

- Water Quality: to maintain or improve the surface and groundwater quality within development areas relative to pre-development conditions.
- Water Quantity: to maintain the total water cycle balance within development areas relative to predevelopment areas.
- Water Conservation: to maximise reuse of water.
- Ecosystem Health: to retain natural drainage systems and protect ecosystem health.
- Economic Viability: to implement stormwater systems that are economically viable in the long-term.
- Public Health: to minimise public risk, including risk of injury or loss of life to the community.
- Protection of Property: to protect the built environment from flooding and water logging.
- Social Values: to ensure that social aesthetic and cultural values are recognised and maintained when managing stormwater.
- Development: to ensure the delivery of best practice stormwater management through planning and development of high-quality development areas in accordance with sustainability and precautionary principles.

2 PRE-DEVELOPMENT ENVIRONMENT

2.1 Site Features and Pre-Development Catchments

The subject site is rectangular, bordered by Garvey Road to the north and existing rural lots to the south and west. To the east, the property adjoins predominantly native bushland. The site contains poorly defined drainage lines and large areas prone to localised inundation. The proposed development areas are largely cleared, with several isolated mature trees located in the northeastern portion.

The topography is generally flat, with subtle undulations formed by sand ridges rising approximately 1 to 3 metres above the surrounding ground, exhibiting slopes of 3–5%. Site elevations range from 24 m AHD to 27 m AHD, with one prominent sand ridge reaching 30 m AHD. An open earth drainage channel, currently registered to the Water Corporation, traverses the site and is intended to be transferred to the Shire of Dardanup as part of the development.

Refer to Figure 3 and Appendix B for details on the pre-development catchment layout and existing culvert locations.

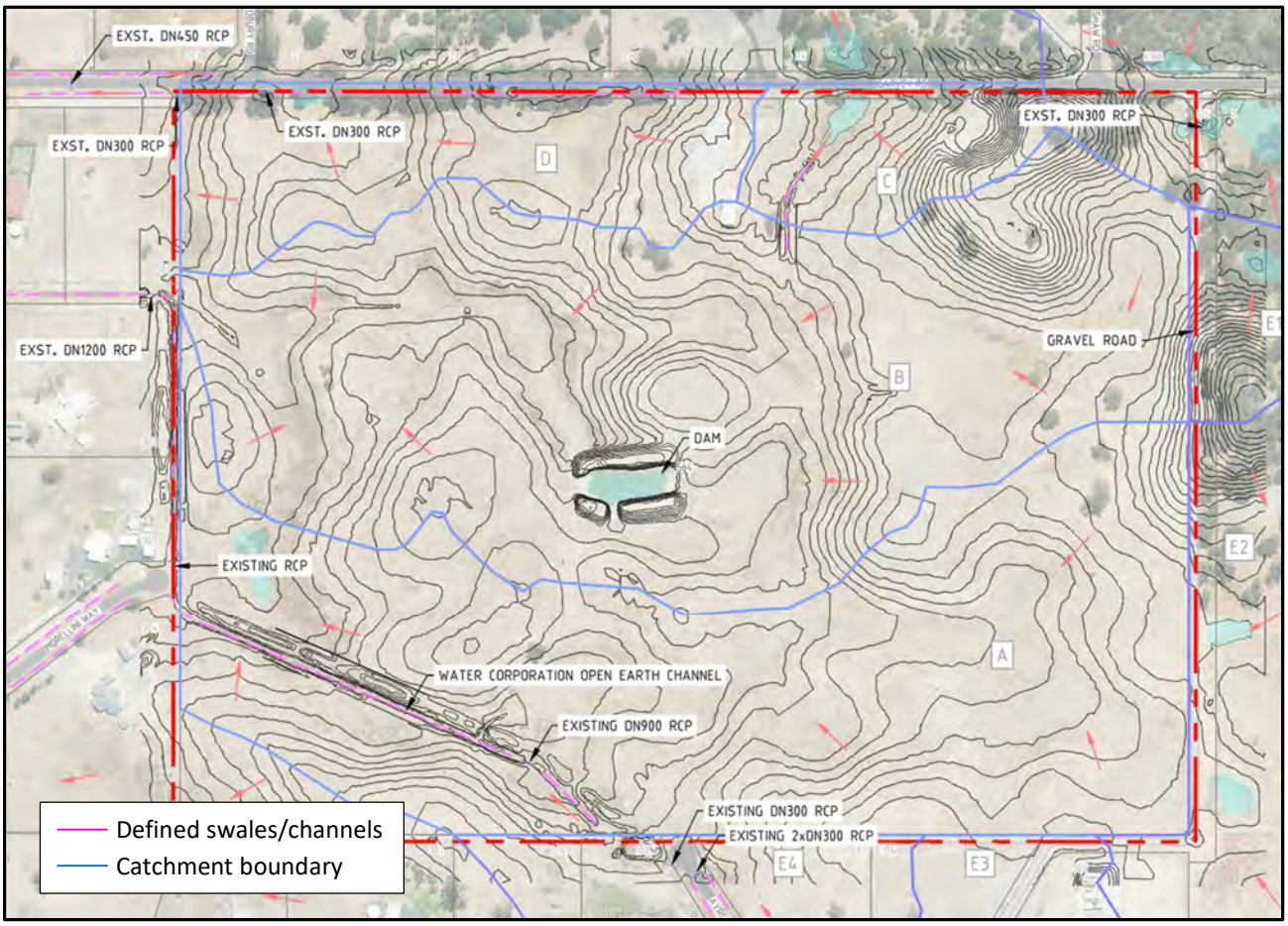

Figure 3: Catchments

Catchment details

- The site is divided into four prominent catchments, labelled A to D.
- Four external catchments were identified using available lidar data, labelled E1 to E4.
- Catchments E2, E3, and E4 convey runoff into the southern half of the site, known as Catchment A.
- Catchment E1 is unlikely to convey any runoff into Catchment B due to a large depression in elevation within Catchment E1.
- Similarly, Catchment E2 has large flat areas with minor elevation depressions. However, this catchment significantly impacts groundwater levels, causing waterlogging conditions that cross into Catchment A1.

- Catchments A and B convey runoff towards the western side of the site, both meeting at the same point and discharging into an open earth channel registered to the Water Corporation.
- Catchment C is subject to significant ponding due to a depression. Drainage rectifications, such as swales, have been made to alleviate these issues. Contour data suggests that without the swale, ponding would eventually cross over Garvey Road. This catchment conveys runoff to Catchment B.
- Catchment D conveys runoff towards the earth channels adjacent to Garvey Road.

2.2 Database Search

The Department of Biodiversity Conservation and Attractions Geomorphic Wetland Database indicates that portions of the site are classified as multiple use wetlands are present on the site, as well as a portion of "Not assessed Wetland". A screenshot from the Geomorphic Database is shown in Figure 4.

Figure 4: Geomorphic Wetland Database

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.

Samples from the ASS investigation carried out indicates that potential acid sulphate soils (PASS) are present on the site. Furthermore, the study recommends carrying out confirmatory laboratory testing on those samples to confirm if Actual ASS (AASS) is present and if an ASS management plan is required.

2.3 Geotechnical and Groundwater

Geotechnical Investigations were carried out for the site by WML (reference to 11207-G-R-002).

The investigation fieldwork was carried out in May and November 2023:

- 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 5 indicating the test locations.

Figure 5: Geotechnical Investigation Test Locations

The subsurface profile is typically consistent across the site. Three subsurface profiles have been identified on site with similar material compositions but varying sand thickness. The site has been divided into three subsurface profiles, denoted by zones 1-3, refer to Figure 6 below, an excerpt from drawing 11207-G1-DG-002.

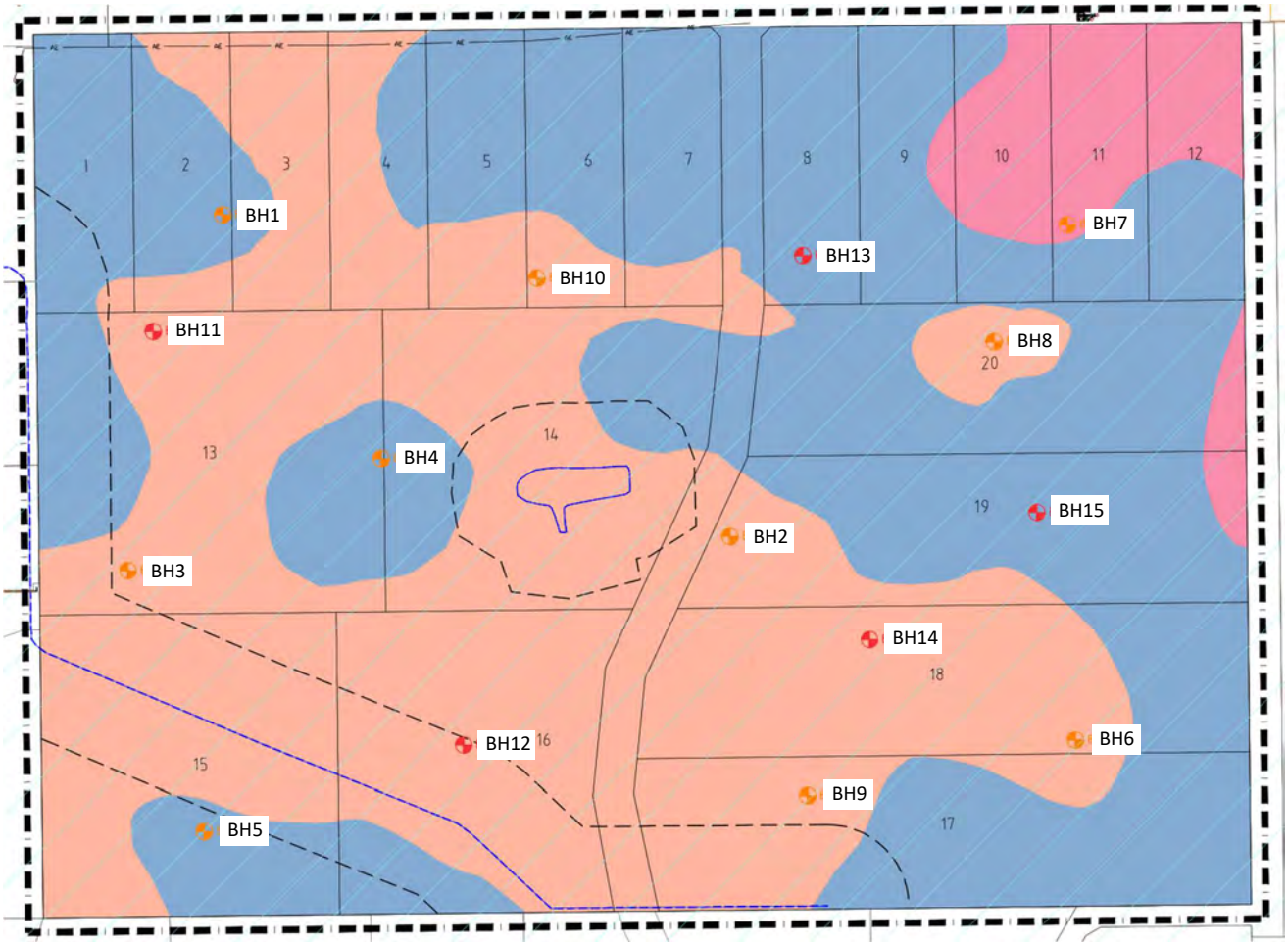

Figure 6: Soil profile zoning map

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	**SAND**/silty **SAND:** 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	**SAND**/silty **SAND:** 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 **CLAY**/**CLAY**: 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	**SAND**/silty **SAND**: 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 **CLAY**/**CLAY:** 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.

During initial fieldwork in May 2023, ten monitoring wells were installed, BH1-10. Readings and measurements throughout winter indicated either shallow water table generally within 0.6 m or local inundation. The detailed summary of groundwater recorded during four different inspections during wet and dry seasons is presented below in **Table 4** and **Figure 7.**

Table 4: Summary of groundwater depths

Test ID	Depth of Groundwater (m)				[2]Expected peak groundwater level range (m ADH)
	Observed 1/06/2023	Observed 10/8/2023	Observed 15/9/2023	Observed 31/10/2023	
BH1	1.4	0.76	0.71	1.3	23.43
BH2	GNE	0.18	0.04	1.05	24.73
BH3	3.8	-0.10 (above ground)	-0.20 (above ground)	GNE	23.47
BH4	1.2	0.63	0.63	1.22	24.29
BH5	1.8	0.80	0.89	1.29	24.21
BH6	GNE	0.00[1]	0.00[1]	GNE	25.78
BH7	GNE	GNE	GNE	GNE	-
BH8	1.0	0.00	0.00	GNE	26.12
BH9	GNE	0.00	0.00	1.19	24.70
BH10	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,
[1]Groundwater not encountered in the borehole, but ponding was present in the area around the monitoring well.
[2] Based off RL of well location picked up by Thompson surveyor minus observed peak water table

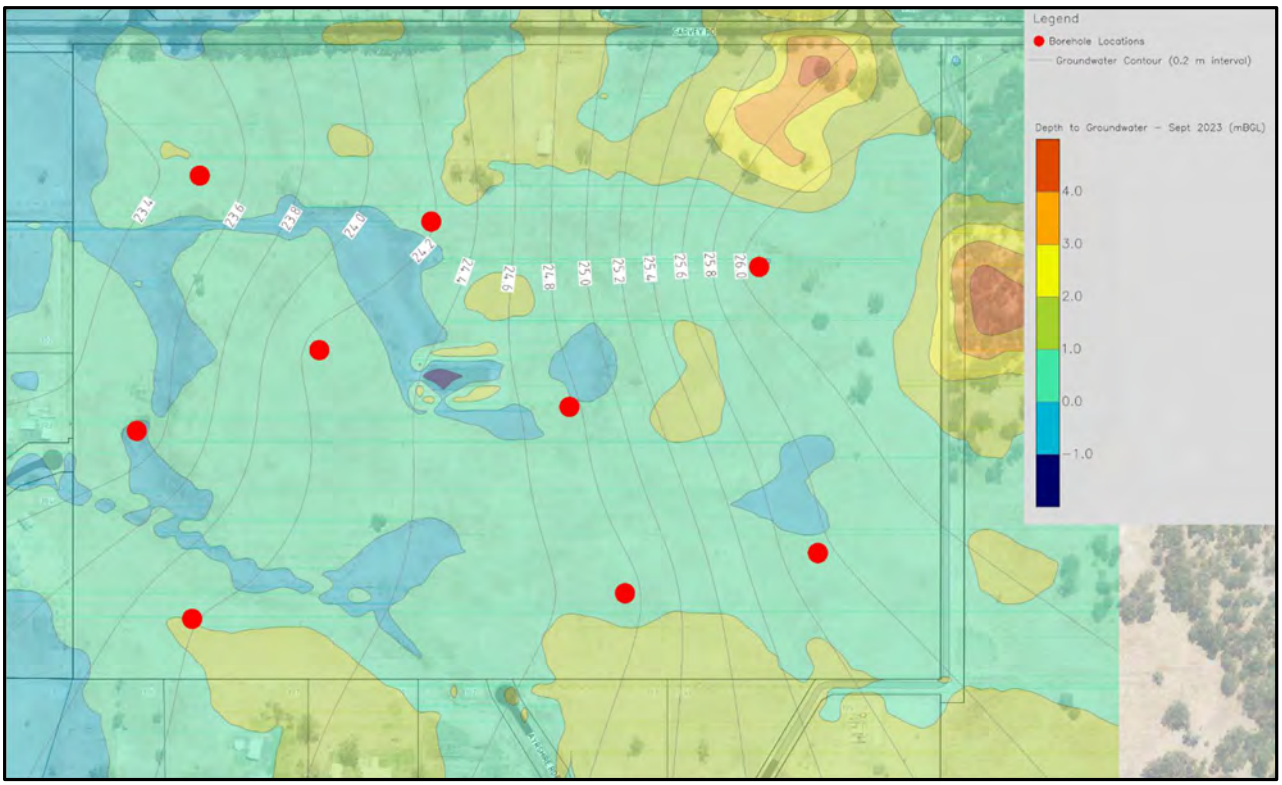

Figure 7: Groundwater depths

Three permeability tests were undertaken adjacent to BH11, BH14, and BH15 on the material layer at the expected depth for on-site effluent treatment systems. A response zone of 250 mm from the base of the boreholes was applied at each test location. Testing was conducted at each location until a consistent flow rate of water through the soils was measured. A summary of the test results is presented below in Table 5.

Table 5: In-situ permeability test results

Location ID	Test soil	In-situ Permeability Test	
		m/s	m/day
BH11	SAND with clay (SP)	2.54×10^{-5}	2.20
BH14	Silty SAND (SM)	1.92×10^{-6}	0.17
BH15	SAND trace silt (SP)	7.30×10^{-5}	4.50[1]

Note: 1- conservative conversion

2.4 Pre-Development Runoff (Surface Hydrology)

Appendix B details four internal catchments and four external catchments associated with the site, as outlined in Section 4.1.

A site investigation conducted in July 2024 assessed the drainage conditions during the wet season. It is evident that the wider region is susceptible to waterlogging, with drainage channels along most roads containing standing water.

The photos below illustrate prominent hydrological entry and exit features of the site:

Photo 1: DN300 culvert within Ayrshire Rd discharging runoff into basin within catchment E4.

Runoff from external catchment E4 entering a basin as shown in **Photo 2** before discharging into the southern side of the site.

Photo 2: Basin bordering the site adjacent to Ayrshire Rd

Photo 3: Channel along western boundary at Morellini Way facing downstream

Photo 4: Channel along western boundary at Morellini Way facing upstream.

Photo 5: Surface condition inside boundary at Morellini Way.

Photo 6: DN300 culvert and Channel along Garvey Rd at northwest corner of site boundary facing downstream.

Photo 7: Channel along Garvey Rd at northwest corner of site boundary facing upstream.

Photo 8: DN450 Culvert entry point crossing Garvey Rd at Northwest corner of Lot 501.

Photo 9: DN450 Culvert exit point crossing Garvey Rd at southeast corner of Lot 202.

Photo 10: DN300 at northwest corner of site near Padbury Rd.

Photo 11: DN300 at southeast corner of site crossing gravel road into basin.

Photo 12: Surface conditions of southeast corner of site.

2.5 Pre-development Model Assumptions

Pre-development modelling assumes that external inflows will remain in its pre-development state and that additional runoff resulting from the development would be managed prior to entering the drainage structures downstream.

Modelling was completed as follows:

- Hydraulic flood assessment for the site using HEC-RAS 2D rain on grid modelling software.
- Pre-development modelling was undertaken using DRAINS software by Watercom to determine the current volumes of runoff discharged from the site.

Table 6 below shows the pre-development parameters and assumptions used in the modelling.

Table 6: Pre-Development Losses

Surface Type	Initial Loss (mm)	Continual Losses (mm)
Impervious Areas	1.0	0
Pervious Areas	26.0	4.2

Pre-development losses are based on ARR recommended losses for this area.

Table 7: Roughness Coefficient for HEC-RAS

Surface Type	Roughness Coefficient n*
Channel	0.025
Adjacent to flood channels – Pasture, no brush – Short grass	0.03

Table 8: Roughness Coefficient for Drains

Surface Type	Roughness Coefficient n
Channel	0.025
Short Grass Prairie (Veldt or Scrub)	0.2*

Notes: n is similar to Manning's n value but applied to shallow flow over a plane, rather than flow in a channel.*

2.6 Pre-development Model Results

Table 9 details the peak flows exiting the site from the combined upstream catchment areas.

Table 9: Pre-Development Modelling Results

Storm Event	Catchment	Area (ha)	Critical Storm Duration	Peak Flow, Q (m^3/s)
20% AEP pre-development	A + B + C + External (Channel Outlet)	66.74	4.5 hr	0.74
	D (Garvey Rd Outlet)	4.43	3.0 hr	0.11
1% AEP pre-development	A + B + C + External (Channel Outlet)	66.74	3.0 hr	2.75
	D (Garvey Rd Outlet)	4.43	1.5 hr	0.25

3 SURFACE WATER MANAGEMENT

The post-development runoff plan is provided in Appendix C. Key elements of the proposed surface water management strategy are summarised below.

3.1 Drainage Channel

The existing open channel, currently a Water Corporation asset, will be retained with minor realignment to facilitate access crossovers. This channel will continue to convey runoff through the existing DN1200 culvert located at the western boundary. As part of the development, the channel will be transferred to the Shire of Dardanup, with drainage reserves allocated accordingly.

3.2 Additional Drainage Reserves

Additional drainage channels are proposed, as shown in the Post-Development Plan, to manage upstream surface runoff. These channels will be refined through detailed design to align with proposed remedial earthworks.

3.3 Proposed Lot Drainage

Stormwater from individual lots will be managed using conventional soakwells. In accordance with the Shire of Dardanup's requirements, all lots must provide soakwell storage at a rate of 1 m^3 per 65 m^2 of impervious area, where the total impervious area exceeds 250 m^2. For areas affected by high groundwater levels, including this site, an additional 1 m^3 per 65 m^2 is required.

To ensure effective infiltration, sufficient depth of free-draining sand must exist above the average annual groundwater level. The recommended design permeability values are as follows:

- Imported clean sand: k = 4 m/day
- Site-won sand (trace to some fines): k = 2 m/day
- Site-won silty sand: k = 0.17 m/day

Supplementary lot drainage measures, as shown in the Post-Development Plan (Appendix C), are proposed to reduce the risk of localised inundation.

3.4 Conceptual Earthworks

Preliminary earthworks plans are included, particularly in relation to integration with the proposed gully. No bulk earthworks are anticipated.

The accompanying geotechnical report (Ref. 11207-G-R-002) outlines recommendations for slab preparation, shallow footings, and low-height retaining walls. Key requirements include:

- Minimum 500 mm clearance below footings in Zones 2 and 3
- 1.5 m clearance between the base of any on-site effluent disposal system and natural ground (Ref. 11207-G-R-003)

Additionally, all building pads must be constructed at least 500 mm above the 1% AEP flood levels. Estimated flood levels are included in Appendix C.

3.5 Runoff Treatment

Road runoff will be managed using vegetated roadside swales, which will also provide attenuation. The proposed road construction introduces an estimated 3,340 m² of new impermeable surface. The designed swales offer a combined storage capacity of 1,570 m³.

These swales will discharge at two identified low points and connect with the downstream swale system, as detailed in the Post-Development Plan (Appendix C).

3.6 Post-Development Model Assumptions

Post-development modelling assumes that the existing channel will remain in its pre-development state and that additional runoff from the development will be managed before entering the channel. The modelling was completed as follows:

- Hydraulic flood assessment for the site using HEC-RAS 2D rain-on-grid modelling software.
- Post-development modelling was undertaken using DRAINS software by Watercom to determine the expected volumes of runoff discharged from the site post development.

Table 10 below shows some of the pre-development parameters and assumptions used in the modelling.

Table 10: Post-Development Losses

Surface Type	Initial Loss (mm)	Continual Losses (mm)
Impervious Areas	1.0	0.0
Pervious Areas	26.0	4.2

Losses for the lots are based on the following:

- Average lot impervious area is approx. 250m^2. Allowing for 2m^3/65m^2 storage on each lot results in a storage volume of 7.7m^3. The storage volume divided by the impervious area results in 1.0 mm initial loss.
- No continuous losses were assumed for impervious areas.

Table 11: Roughness Coefficient for HEC-RAS

Surface Type	Roughness Coefficient n*
Channel / Creek	0.025

Adjacent to flood channels – Pasture, no brush – Short grass	0.03
Adjacent to flood channels – Light Brush and Trees	0.06
Other	0.035

Table 12: Roughness Coefficient for DRAINS

Surface Type	Roughness Coefficient n
Roofs and paving	0.013
Gravel surfaces	0.02
Lawns	0.17*
Short Grass Prairie (Veldt or Scrub)	0.2*
Channel / Creek	0.025

Notes: n is similar to Manning's n value but applied to shallow flow over a plane, rather than flow in a channel.*

3.7 Post-development Model Results

Table 13 details the post development flows contributing runoff towards the channel and Garvey Rd.

Table 13: Post-Development Lot 6 Results (DRAINS)

Storm Event	Catchment	Area (ha)	Critical Storm Duration	Peak Flow, Q (m^3/s)
20% AEP pre-development	A + B + C + External (Channel Outlet)	66.74	4.5 hr	0.74
	D (Garvey Rd Outlet)	4.43	3.0 hr	0.11
1% AEP pre-development	A + B + C + External (Channel Outlet)	66.74	3.0 hr	2.47
	D (Garvey Rd Outlet)	4.43	1.5 hr	0.26

4 1% AEP FLOOD LEVELS

Preliminary flood modelling indicates that during a 1% AEP event, water levels will generally remain contained within the proposed drainage channels. However, some shallow overtopping is expected into lower-lying areas of proposed Lots 13 and 19.

The Post-Development Plan includes indicative building envelopes that are to maintain a minimum vertical separation of 0.5 metres above the adjacent swale or gully—measured from the upstream side. This clearance is intended to mitigate flood risk and ensure adequate freeboard above predicted flood levels.

5 GROUNDWATER MANAGEMENT STRATEGY

Swales will capture and divert runoff to protect the road sub-base and will flow put at low points.

Individual house pads and land application areas will be engineered to ensure adequate separation from groundwater.

6 SUSTAINABLE WATER SERVICES STRATEGY

6.1 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.

Water Requirements over and above potable supply could be harvested by way of bore abstraction. Lot owners would be required to make application to Department of Water and test the underground quality to ensure that it is fit for the intended purpose.

6.2 Sewerage

Lot owners are to apply for on-site effluent disposal through a registered plumber and meet the requirements set out in the Site and Soil Evaluation (Ref 11207-G-R-003).

7 MONITORING

7.1 Construction Phase

Drainage control structures will be constructed with each stage of development to ensure water quality. This will include temporary stilling/attenuation basins, outlet sediment curtains (i.e. staked hay bales), lot and verge stabilisation and regular monitoring, if required.

7.2 Post-Construction Phase

The stormwater drainage system is designed to collect stormwater at source and integrates a network of vegetated drainage swales and basins that facilitates effective sediment control and water quality treatment before stormwater exits the site, eliminating the need for post-development surface water monitoring.

7.3 Implementation Plan

Attenuation/Treatment Basin			
Item	**Action**	**Frequency**	**Responsibility**
Irrigate planting	By hand	As required during summer and autumn months	Developer for two years year
Weed control	Manual removal and targeted waterway approved herbicide treatment	Bi-monthly for the first year and quarterly or as required for second year.	Developer for two years
Infill planting	Check plant condition and replace as required to achieve minimum 80% original plant density prior to handover	April / May of each year	Developer for two years
Inspection and Cleaning of drainage infrastructure	Remove any build-up of sediment and drainage infrastructure. Undertake road sweeping if required.	Quarterly	Developer for one year

Sediment Removal	Remove any build-up of sediment and in basin/swale areas.	Annually at the end of winter each year or more frequent if required.	Developer for one year
Litter Removal	Removal of litter and windblown builders waste etc.	Monthly	Developer for two years
Checks to inlets, outlets, weirs and swales	Check for erosion and potential blockages on all basin infrastructure. Remediate as required	Every three months	Developer for one year

8 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

State Planning Policy 2.5 (Rural Planning)

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

Lot 546 on DP250872 Garvey Road,
CROOKED BROOK

YIELD SUMMARY			
Size	No. Lots	% Total Lots	Avg. Lot Size
1 ha - 2 ha	13	65%	1.0192ha
2 ha - 5 ha	7	35%	3.252ha
Number of Lots	**20**		
Reserve for Drainage			2.8803ha
Road Widening			2235m²
Road Reserves			1.3801ha
Minimum Lot Size 1.0006ha		Average Lot Size 1.8008ha	
Maximum Lot Size 4.6133ha		Total Area (20 Lots) 36.0152ha	

LEGEND

- Subject Area (40.4991ha)
- Proposed Residential Lot
- Proposed Reserve for Drainage
- Proposed Drainage Easement
- Indicative Building Envelope (2000m²)
- Indicative LAA (140m²-180m²)
- Road Widening
- Existing Lot Boundaries
- Existing Easement
- Existing Open Channel Drain
- Proposed Open Channel Drain
- E — Underground Electricity (BYDA)
- AE — Overhead Electricity (BYDA)
- T — Telecommunications (BYDA)

Plan No.	23858-02
Date	24/02/25
Drawn	NP
Checked	KS
Revision	A
Scale	1:2000@A2

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0 20m 40m 60m

NOTE: This plan has been prepared for planning purposes. Areas, Contours and Dimensions shown are subject to survey

Harley Dykstra
PLANNING & SURVEY SOLUTIONS

APPENDIX B

PRE-DEVELOPMENT PLAN

LEGEND

- EXISTING CULVERT AND HEADWALL/PIT
- EXISTING SURFACE CONTOUR (0.2m INTERVAL)
- EASEMENT
- CADASTRAL
- DRAINAGE CATCHMENTS AREA
- SUBJECT LAND
- WATERCOURSE / CHANNEL
- DRAINAGE FLOW (SHOWN INDICATIVELY)
- PAVED ROAD
- GRAVEL ROAD
- E — CATCHMENT NAME

EXST. DN450 RCP

PADBURY RD

SHAW RD

GARVEY RD

GARVEY RD FLOW
20% AEP = 0.11 m^3/s
1% AEP = 0.25 m^3/s

EXST. DN300 RCP

EXST. DN300 RCP

EXST. DN300 RCP

D
4.427ha

C
1.864ha

EXST. DN1200 RCP

CHANNEL OUTFLOW
20% AEP = 0.70 m^3/s
1% AEP = 2.75 m^3/s

GRAVEL ROAD

E1 FLOW
20% AEP = 0.02 m^3/s
1% AEP = 0.09 m^3/s

E1
1.925ha

B
19.019ha

DAM

564

E2
16.250ha

E2 FLOW
20% AEP = 0.10 m^3/s
1% AEP = 0.53 m^3/s

EXISTING 1200X900
CULVERT

MORELLINI WAY

WATER CORPORATION OPEN EARTH CHANNEL

EXISTING DN900 RCP

A
14.375ha

EXISTING DN300 RCP

EXISTING 2xDN300 RCP

E4 FLOW
20% AEP = 0.07 m^3/s
1% AEP = 0.27 m^3/s

E4
3.935ha

E3
11.254ha

E3 FLOW
20% AEP = 0.14 m^3/s
1% AEP = 0.54 m^3/s

AYRSHIRE RD

PRELIMINARY DRAWING
NOT TO BE USED FOR CONSTRUCTION PURPOSES

NOTE
THE ORIGINAL OF THIS DRAWING WAS PRODUCED USING COLOUR SEPARATION FOR GREATER CLARITY. IF THIS DRAWING IS NOT IN COLOUR THEN YOU DO NOT HAVE THE CORRECT PRESENTATION.

WARNING:
SERVICES AND CADASTRAL BOUNDARY LOCATIONS SHOWN ARE ONLY INDICATIVE AND MUST NOT BE USED FOR EXCAVATION.
THE "ONE CALL 1100" SYSTEM SHALL BE USED TO OBTAIN ACCURATE SERVICE LOCATIONS.

SCALE 1:1500 A1

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A	ISSUED FOR REVIEW		11.04.2025	V.R

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VERIFIED	L. RUSCONI	04/25
APPROVED		

CLIENT: HARLEY DYKSTRA

PROJECT: LOT 564 GARVEY ROAD CROOKED BROOK

DRAWING TITLE: PRE-DEVELOPMENT PLAN

THIS DRAWING SHALL BE TREATED AS PRELIMINARY AND IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED.

DRAWING NUMBER: 11815-D1-DG-001 A

REVISION

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APPENDIX C

POST-DEVELOPMENT PLAN

LEGEND:

- SUBJECT LAND
- CADASTRAL
- 13.0 CONTOUR (1.0m Interval)
- DEFINED WATERCOURSE
- PROPOSED LOTS
- INDICATIVE BUILDING ENVELOPE (2000m2)
- PROPOSED LOT DRAINAGE
- DRAINAGE CATCHMENT AREA
- DRAINAGE DIRECTION
- ROADSIDE SWALE
- ROAD RESERVE
- PROPOSED DRAINAGE RESERVE
- REMEDIAL EARTHWORKS

PADBURY RD

SHAW RD

GARVEY RD

GARVEY RD FLOW
20% AEP = 0.11 m^3/s
1% AEP = 0.26 m^3/s

CHANNEL OUTFLOW
20% AEP = 0.74 m^3/s
1% AEP = 2.47 m^3/s

D
4.427ha

C
1.864ha

B1
7.021ha

B2
11.819ha

A1
9.391ha

A2
5.306ha

E1
1.925ha

E2
16.250ha

E3
11.254ha

E4
3.935ha

PROPOSED DN450 RCP
20%AEP = 0.07m^3/s
1%AEP = 0.26m3/s

PROPOSED 0.5m DEPTH
SWALE 1:6 BATTERS

PROPOSED 0.8m DEPTH
SWALE 1:6 BATTERS,
4m BASE
1%AEP = 1.64m^3/s

GULLY REALIGNMENT

PROPOSED DN1200X900
20%AEP = 0.29m^3/s
1%AEP = 0.84m^3/s

PROPOSED 2XDN525 RCP
20%AEP = 0.29m^3/s
1%AEP = 0.99m^3/s

PROPOSED 0.5m DEPTH
SWALE 1:6 BATTERS

GULLY

PROPOSED DN450 RCP
20%AEP = 0.18m^3/s
1%AEP = 0.38m^3/s

PROPOSED LOT DRAINAGE

E1 FLOW
20% AEP = 0.02 m^3/s
1% AEP = 0.09 m^3/s

E2 FLOW
20% AEP = 0.12 m^3/s
1% AEP = 0.53 m^3/s

E4 FLOW
20% AEP = 0.07 m^3/s
1% AEP = 0.27 m^3/s

E3 FLOW
20% AEP = 0.14 m^3/s
1% AEP = 0.54 m^3/s

MORELLINI WAY

AYRSHIRE RD

1:1500 SCALE A1

PRELIMINARY DRAWING
NOT TO BE USED FOR CONSTRUCTION PURPOSES

NOTE
THE ORIGINAL OF THIS DRAWING WAS PRODUCED USING COLOUR SEPARATION FOR GREATER CLARITY. IF THIS DRAWING IS NOT IN COLOUR THEN YOU DO NOT HAVE THE CORRECT PRESENTATION.

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NOTE: * INDICATES SIGNATURES ON ORIGINAL ISSUE OF DRAWING OR LAST REVISION OF DRAWING

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DESIGNED	V. RODGERS	APRIL '25
DRAWN	V. RODGERS	04/25
VERIFIED	L. RUSCONI	04/25
APPROVED		

CLIENT: HARLEY DYKSTRA

PROJECT: LOT 564 GARVEY ROAD CROOKED BROOK

DRAWING TITLE: POST-DEVELOPMENT PLAN

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