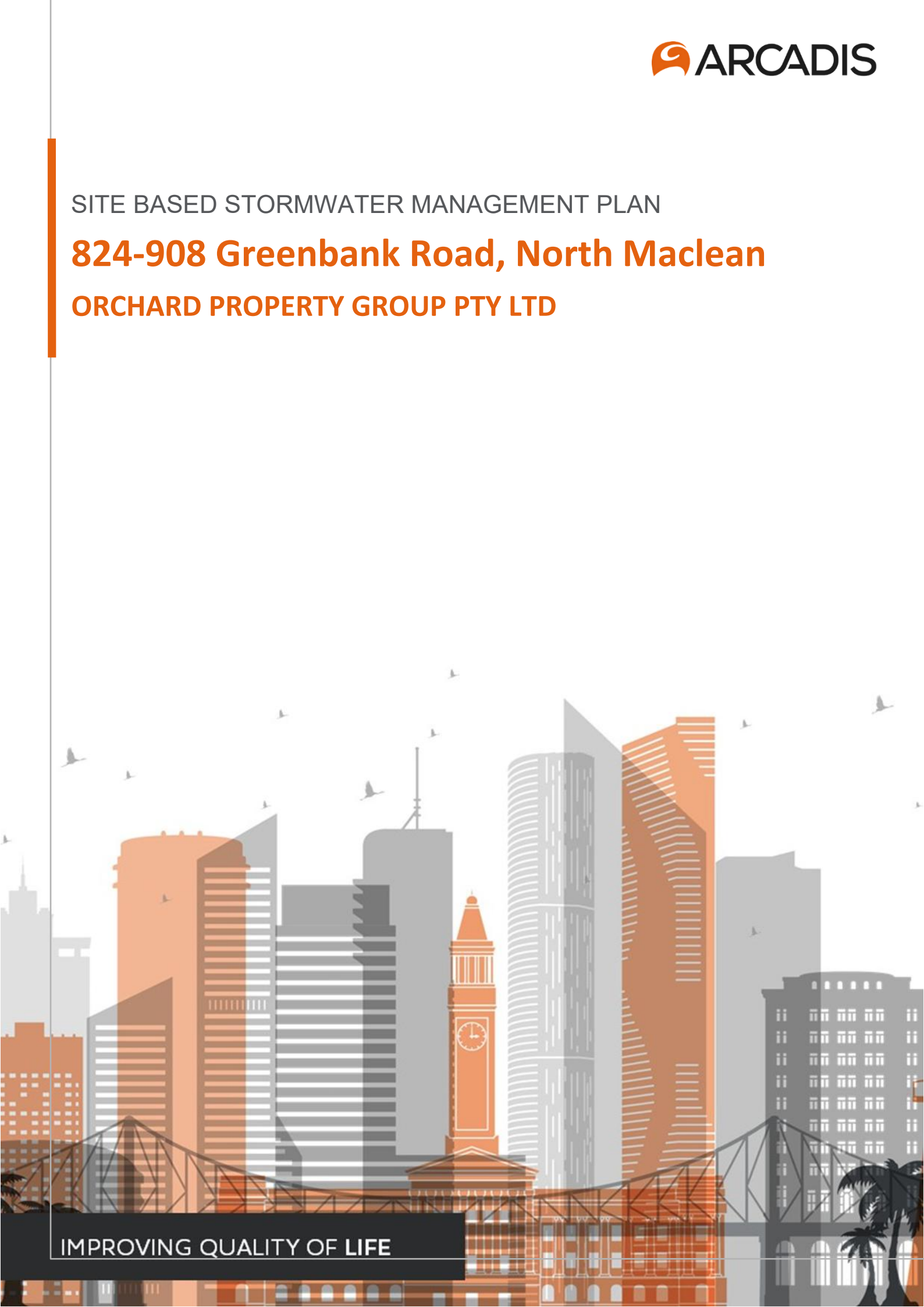


SITE BASED STORMWATER MANAGEMENT PLAN

824-908 Greenbank Road, North Maclean

ORCHARD PROPERTY GROUP PTY LTD



IMPROVING QUALITY OF LIFE

824-908 Greenbank Road, North Maclean – Stage 1

SITE BASED STORMWATER MANAGEMENT PLAN

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Project No 30340582

Report No GA0002

Revision 01

Date 13/08/2026

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Revision	Date	Description
01	13/08/2026	Issue for Approval

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APPENDICES

APPENDIX A

Engineering Drawings

APPENDIX B

Bioretention Typical Details

APPENDIX C

TLPI Flood Hazard Overlay Code

GLOSSARY OF TERMS

Australia Rainfall and Runoff (ARR) 2019 recommends adaptation of new terminology relating to storm events summarised in Table A below. As recommended, this report documents data with respect to AEP (%).

The following definitions should be noted:

- EY = Number of exceedances per year.
- AEP = Annual Exceedance Probability.
- AEP (1 in x) = 1/AEP.
- ARI = Average Recurrence Interval (years).

The below table should be referred to for a comparison of storm events.

Table A – Storm Events Terminology

EY	AEP (%)	AEP (1 in)	ARI
1	63.21	1.58	1
0.69	50	2	1.44
0.5	39.35	2.54	2
0.22	20	5	4.48
0.2	18.13	5.52	5
0.11	10	10	9.49
0.05	5	20	20
0.02	2	50	50
0.01	1	100	100

ASSOCIATED MODELLING FILES

For internal reference, the following modelling file packages are associated with this report.

- 30340582-5-EDG0001-01 - DRAINS
- 30340582-5-EDE0001-02 - MUSIC

1 EXECUTIVE SUMMARY

Orchard Property Group Pty Ltd has commissioned Arcadis to prepare a Site Based Stormwater Management Plan (SBSMP) for a development application for the site located over the following allotment:

- Lot 1 on RP121663 (824-908 Greenbank Road, North Maclean QLD 4280).

The proposed development involves a combined Reconfiguration of a Lot and Material Change of Use application, comprising Stage 1 of an industrial subdivision. Stage 1 includes the creation of 16 industrial lots, the corresponding length of the proposed internal road required to service those lots, and associated infrastructure. The remainder of the site will be retained as a balance lot under the current application.

This SBSMP establishes the overarching stormwater management strategy for the Stage 1 development and will form the basis for subsequent Operational works applications and detailed design of the proposed infrastructure and individual industrial allotments.

This report demonstrates the proposed development will be constructed and operated in accordance with the Water Sensitive Urban Design (WSUD) Requirements of Council, the South-East Queensland State Planning Policy (SPP), the Queensland Development Code, the Queensland Urban Drainage Manual (QUDM), Australian Rainfall and Runoff (2019) and the Environmental Protection (Water and Wetland Biodiversity) Policy 2019.

The primary objectives of this Site Based Stormwater Management Plan (SBSMP) are achieved as follows:

Lawful Point of Discharge (LPoD)

The site proposes to discharge stormwater to the existing ultimate lawful points of discharge (LPoD) being the local Council stormwater drainage infrastructure within Greenbank Road to the south of the site, and natural overland flow paths towards the north of the site.

Stormwater Quantity

This report includes stormwater hydrological modelling investigations which determine the peak runoff from the site in the existing and developed scenarios. Each future industrial allotment will provide lot-based on-site detention. The preliminary storage volume per hectare and permissible discharge rate presented in this report are to be applied to each lot during detailed design. These requirements have been derived to achieve no worsening at the lawful points of discharge while explicitly accounting for runoff from the Stage 1 road reserve, which is not proposed to be detained.

Stormwater Quality

Stormwater quality treatment will be provided separately for the road reserve and future industrial allotments. Runoff from the Stage 1 road reserve will be treated by distributed Biopod bioretention systems, with the required treatment area established by the MUSIC assessment. Each future industrial allotment will provide its own treatment measures and demonstrate compliance with the adopted pollutant reduction objectives as part of its subsequent approval and detailed design.

Flooding and Access

The proposed developable area is outside the regional 1% AEP flood extent. However, regional flooding may affect Greenbank Road and temporarily isolate the development. A site-specific Flood Emergency Management Plan is to be prepared before occupation, with the primary response comprising early site closure and departure before Greenbank Road becomes unsafe.

2 SITE CHARACTERISTICS

2.1 Location Details

The subject site is located at 824-908 Greenbank Road, North Maclean, Queensland and comprises:

- Lot 1 on RP121663

Stage 1 generally occupies the western portion of the subject site and has an area of approximately 55731 m². The eastern portion of the site has potential to accommodate future development but is excluded from the current application, though allowance is provided for potential infrastructure connections and staging interfaces.

Logan City Council acts as the assessment manager and performs the functions of the Minister for Economic Development Queensland (MEDQ) for the subject site, which is located within a Priority Development Area (PDA).

2.2 Land Usage

In its current state, the project site has been cleared. Figure 2-1 below provides a current locality plan of the site.



Figure 2- 1 Site Locality Plan (Aerial Imagery Courtesy of Nearmap)

2.3 Topography and Features

The site is characterised by moderate slopes adjacent to the Greenbank Road frontage and a ridgeline extending through the site. This ridgeline separates the site's grading in different directions. The south-western portion of the site generally falls towards Greenbank Road at gradients of approximately 5%, while the north-western portion slopes eastward towards an existing dam at approximately 4%. Land located east of the dam is comparatively flat and gently grades towards the north-eastern corner of the site.

Site elevations range from approximately RL 36m AHD at the western extent of the site to approximately RL 27m AHD along the eastern boundary.

3 PROPOSED DEVELOPMENT

The proposed stage 1 development involves the creation of 16 lots and a portion of New Road to service stage 1.

A plan extract of the proposed development has been provided in Figure 3-1

A full set of Architectural plans are provided within the development application package and should be referred to for further information.

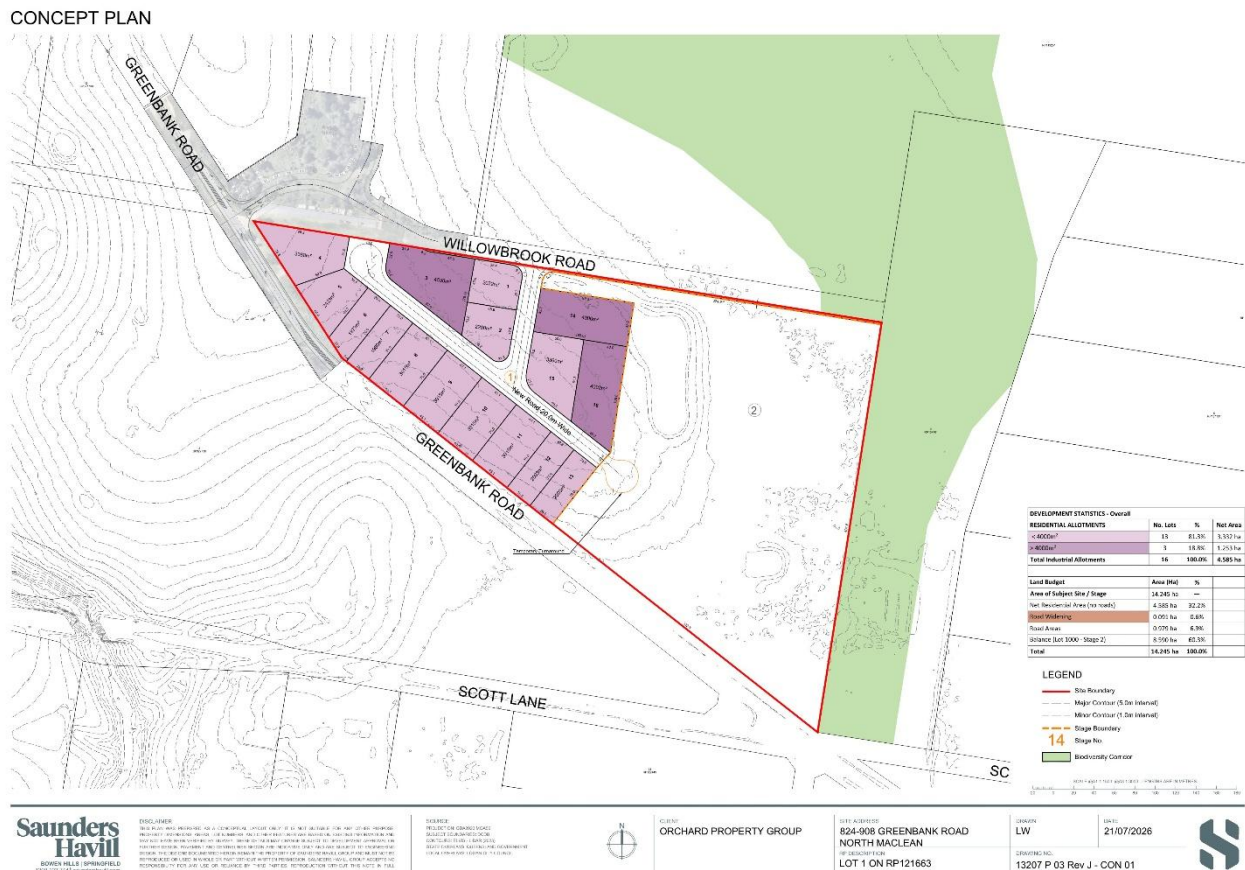


Figure 3- 1 Proposed Development

4 STORMWATER MANAGEMENT OBJECTIVES

In accordance with the Logan City Council Planning Scheme, the Planning Scheme Policy – Integrated Water Management and the Water by Design MUSIC Modelling Guidelines for South East Queensland (Version 3), the following stormwater management components have been assessed as part of this Site Based Stormwater Management Plan:

- Lawful point of discharge (LPoD) | Section 5 of this report.
- Stormwater Quantity | Section 6 of this report.
- Stormwater Quality | Section 7 of this report.
- Flooding and emergency management | Section 8 of this report.

5 LAWFUL POINT OF DISCHARGE AND DRAINAGE

5.1 Existing Stormwater Drainage

Existing runoff from the site generally drains in two directions in response to the natural topography.

A ridgeline extending through the central portion of the site divides the site into northern and southern drainage catchments. Runoff from the southern portion of the site generally drains towards the existing roadside drainage system along Greenbank Road, while runoff from the northern portion follows the existing surface grades towards the northern site boundary and adjoining drainage corridor. Based on the available survey and concept information, no significant external catchments are understood to discharge through the site.

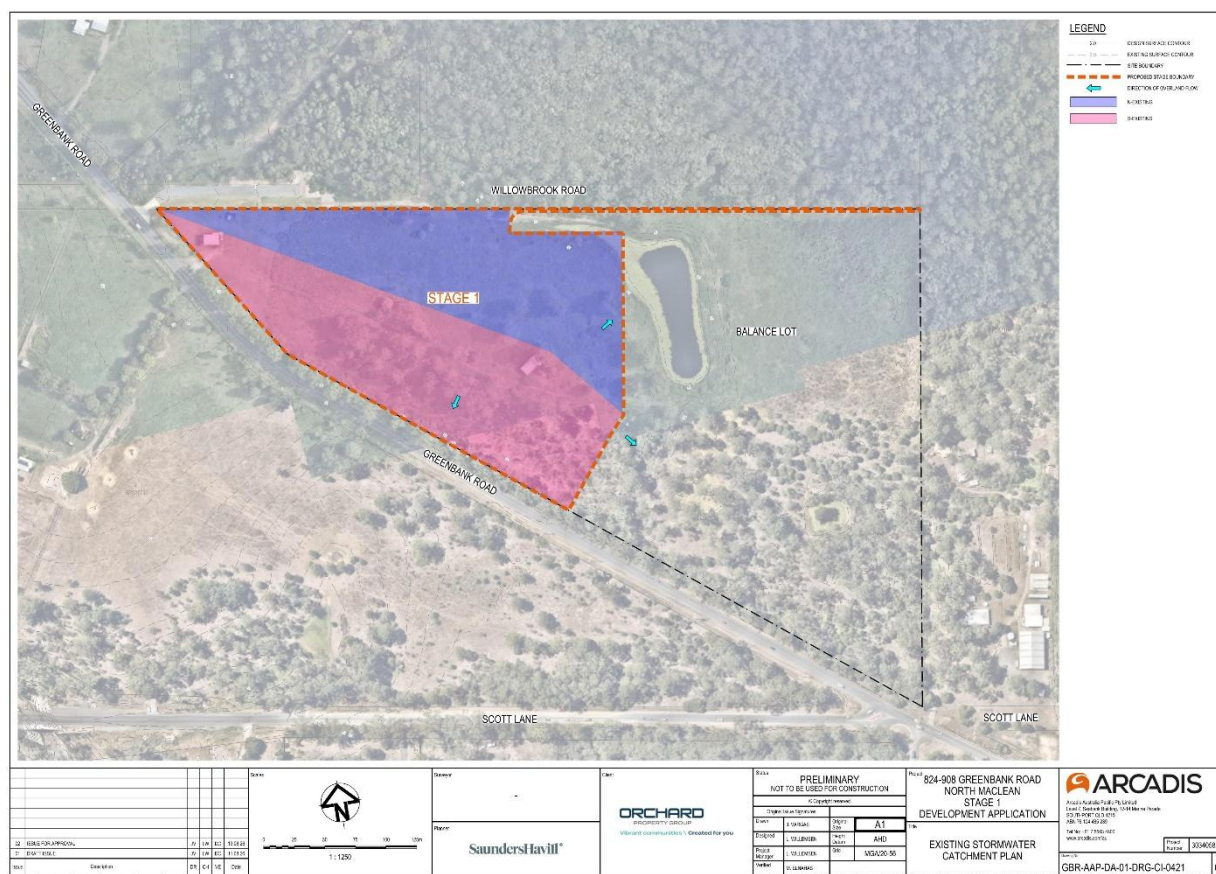


Figure 5- 1 Existing Site Discharge

5.2 Proposed Drainage Characteristics and LPOD

The proposed Stage 1 stormwater drainage strategy generally maintains the existing north–south drainage split established by the site's natural topography. Runoff will continue to discharge to the existing northern and southern lawful points of discharge, with no new discharge locations proposed.

The proposed drainage strategy comprises the following:

- Runoff from the northern industrial allotments will be managed through individual on-site detention systems before discharging towards the existing drainage corridor along the northern and north-eastern site boundaries.
- Runoff from the Stage 1 road network will be directed by the proposed road grading to stormwater pits and distributed Biopod systems located within the road reserve.

[illegible]

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6 STORMWATER QUANTITY

6.1 Objective

The objective of the stormwater quantity assessment is to demonstrate that peak discharge from the Stage 1 development can be managed so that post-development peak flows do not exceed the corresponding pre-development peak flows at the northern and southern lawful points of discharge.

Stormwater quantity management has been assessed for the applicable design events up to and including the 1% Annual Exceedance Probability (AEP) event. Where the proposed development results in an increase in peak discharge, conceptual lot-based on-site detention has been incorporated to mitigate the increase.

The assessment has been undertaken at a conceptual level to demonstrate the feasibility of the proposed drainage and detention strategy in support of the development application. The detailed configuration of the drainage infrastructure, lot-based detention tanks and outlet arrangements will be confirmed as part of subsequent Operational Works applications and detailed design.

6.2 Methodology and Assessment

The stormwater quantity assessment has been undertaken in accordance with the principles of Australian Rainfall and Runoff 2019.

Hydrologic modelling was undertaken using DRAINS, with design rainfall data obtained from the ARR Data Hub.

An ensemble rainfall approach was adopted, with ten temporal patterns assessed for each storm duration. The median peak flow from each ensemble was adopted for comparison between the following scenarios:

- existing;
- developed without detention; and
- developed with lot-based detention.

Storm durations ranging from 10 minutes to 6 hours were assessed to determine the critical storm duration for each AEP event.

The assessment considers the Stage 1 development only. The existing and developed catchments were delineated based on the existing site topography and proposed development grading, respectively. Peak flows were assessed at the corresponding northern and southern lawful points of discharge.

Conceptual detention systems were incorporated into the DRAINS model to:

- demonstrate that the adopted stormwater quantity objectives can be achieved;
- establish preliminary lot-based detention storage rates; and
- establish permissible discharge rates for future industrial allotments.

The Stage 1 road catchment was modelled separately and was not provided with detention. The entire road catchment drains to the northern lawful point of discharge. Accordingly, the northern lot-based detention requirements were derived to compensate for the undetained road runoff so that the combined discharge from the northern industrial lots and the Stage 1 road catchment does not exceed the corresponding pre-development peak flow.

The conceptual detention systems are intended to establish the performance requirements for future industrial allotments. They do not represent the final size, geometry or configuration of the detention tank required within any individual lot.

6.2.1 Catchment Locality

Design rainfall information was obtained from the ARR Data Hub for the subject site using the adopted project coordinates summarised in Table 1

Table 1 Catchment Locality

Parameter	Value
Latitude	27.771866
Longitude	153.006880

6.2.2 Catchment Summary

The site was assessed under three cases

- **Existing Scenario** – Existing undeveloped Stage 1 Catchments
- **Developed (Unmitigated) Scenario** – proposed Stage 1 development without detention
- **Developed (Mitigated) Scenario** – The proposed Stage 1 development incorporating conceptual on-site detention measures.

Existing and developed catchments have been represented using the IL-CL hydrologic model within DRAINS.

The developed catchments comprise:

- northern industrial lots;
- northern road bypass catchment;
- southern industrial lots.

The northern road catchment has been modelled separately to represent the proposed road drainage strategy.

The adopted catchment characteristics are summarised in Table 2.

Table 2 Adopted Catchment Characteristics

Scenario	Catchment Name	Area (ha)	Impervious Fraction (%)	Time of Concentration Pervious (min)	Time of Concentration Impervious (min)
North Existing	N-E	2.67	5	15	-
South Existing	S-E	2.8	5	24	-
South Developed	S-D	2.6	90	5	10
North Developed	N-D	2.0	90	5	10
North Road & bypass	N-D2	0.9	75	5	10

6.3 Conceptual Detention Strategy

The stormwater quantity strategy requires each future industrial allotment to provide a lot-based on-site detention tank. Each tank is to be designed in accordance with the applicable preliminary storage rate and permissible discharge rate established by this assessment.

The Stage 1 road catchment is not proposed to be detained. As the entire road catchment drains to the northern lawful point of discharge, the detention requirements for the northern industrial lots have been derived to compensate for the undetained road runoff. The northern assessment therefore considers the combined discharge from:

- the northern industrial allotments following detention; and
- the undetained Stage 1 road and bypass catchment.

The southern detention requirements apply to the southern industrial allotments, which discharge independently to the southern lawful point of discharge along Greenbank Road.

Conceptual detention systems were incorporated into the DRAINS model to demonstrate that lot-based detention can be provided so that the combined post-development peak discharge does not exceed the corresponding pre-development peak discharge at either lawful point of discharge.

The conceptual detention systems establish performance requirements only and are not intended to represent the final detention tank layout, geometry or outlet configuration for any individual allotment. These details will be confirmed through subsequent lot-specific stormwater assessments and Operational Works applications.

The preliminary lot-based detention requirements are summarised in Table 3.

Table 3 Conceptual Detention Storage Requirements

Parameters	North	South
Catchment Area	2.0	2.6
Conceptual Storage Used (m3)	720	976
Preliminary Storage Rate (m3/ha)	360	375
Example Storage Requirement (m3) 0.3ha lot	108	113

The modelled conceptual storage and preliminary lot storage rate presented in Table 3 serve different purposes and should not be interpreted as a direct conversion of total modelled storage divided by the industrial lot catchment area. In particular, the northern modelled storage reflects the hydraulic response required to offset the undetained discharge from the Stage 1 road catchment.

The preliminary lot storage rates, together with the permissible discharge rates presented in Tables 4 and 5, form the design basis for future lot-specific stormwater assessments. Each future industrial allotment will be required to demonstrate compliance with the applicable storage and discharge requirements through its subsequent Operational Works application and detailed design..

6.4 Model Results

Tables 4 and 5 summarise the median peak flows for the existing, developed without detention, and developed with lot-based detention scenarios across the assessed AEP events.

The developed with detention results include:

- the discharge from the industrial allotments following conceptual lot-based detention; and
- any undetained catchment contribution draining to the corresponding assessment point.

For the northern catchment, the developed with detention results therefore represent the combined discharge from the detained northern industrial allotments and the undetained Stage 1 road and bypass catchment.

The permissible lot discharge rates shown in Tables 4 and 5 were derived from the model developed with detention flows. These rates are to be applied to future lot-specific detention design in conjunction with the preliminary storage rates presented in Table 3.

Table 4 Northern Catchment Peak Flow Results

Scenario	AEP (%)	50%	20%	10%	5%	2%	1%
Existing	Median Flow (m ³ /s)	0.258	0.439	0.663	0.825	1.05	1.18
Developed	Median Flow (m ³ /s)	0.723	1.081	1.287	1.497	1.778	2.006
Mitigated	Median Flow (m ³ /s)	0.228	0.386	0.615	0.753	0.991	1.11
Permissible lot discharge rate	Discharge rate (m ³ /s/ha)	0.114	0.193	0.3075	0.3765	0.4955	0.555

Table 5 Southern Catchment Peak Flow Results

Scenario	AEP (%)	50%	20%	10%	5%	2%	1%
Existing	Median Flow (m ³ /s)	0.2	0.396	0.548	0.692	0.825	0.965
Developed	Median Flow (m ³ /s)	0.684	1.02	1.22	1.41	1.67	1.88
Mitigated	Median Flow (m ³ /s)	0.199	0.338	0.504	0.61	0.809	0.959
Permissible lot discharge rate	Discharge rate (m ³ /s/ha)	0.077	0.130	0.194	0.235	0.311	0.369

6.5 Objective Discussion

The hydrologic assessment demonstrates that lot-based on-site detention can be incorporated into the future Stage 1 industrial allotments so that post-development peak flows do not exceed the corresponding pre-development peak flows at either lawful point of discharge.

For the northern catchment, the assessment includes the undetained discharge from the entire Stage 1 road and bypass catchment. The storage and permissible discharge requirements established for the northern industrial lots have therefore been derived to compensate for this undetained contribution. The model results demonstrate that the combined discharge from the detained northern industrial allotments and the undetained road catchment remains below the corresponding existing northern catchment peak flow for all assessed design events.

For the southern catchment, the lot-based detention requirements limit the discharge from the southern industrial allotments so that the developed peak flow remains below the corresponding existing southern catchment peak flow for all assessed design events.

The assessment therefore demonstrates that the proposed stormwater quantity strategy can achieve the adopted no-worsening objective for events up to and including the 1% AEP event. Compliance will be confirmed for each future industrial allotment through the application of the relevant preliminary storage rate and permissible discharge rate as part of subsequent Operational Works applications and detailed design.

7 STORMWATER QUALITY ASSESSMENT

7.1 Objectives

The operational stormwater quality strategy has been developed to achieve the following pollutant load reduction objectives:

- Gross pollutants greater than 5 mm: 90% reduction in mean annual load.
- Total Suspended Solids (TSS): 80% reduction in mean annual load.
- Total Phosphorus (TP): 60% reduction in mean annual load.
- Total Nitrogen (TN): 45% reduction in mean annual load.

The stormwater quality strategy separates the treatment responsibilities for the Stage 1 road reserve and the future industrial allotments. Runoff from the road reserve will be treated by common Biopod infrastructure, while each future industrial allotment will provide treatment for runoff generated within that allotment.

7.2 Proposed Stormwater Treatment Strategy

The proposed operational stormwater quality strategy comprises:

- distributed bioPOD bioretention systems within the Stage 1 road reserve to treat runoff generated by the internal road network; and
- lot-based stormwater quality treatment within each future industrial allotment to treat runoff generated within that allotment.

The MUSIC assessment presented in this section considers the Stage 1 road reserve only. It has been undertaken to establish the conceptual Biopod treatment area required for the road catchment and demonstrate that the adopted operational stormwater quality objectives can be achieved for road runoff.

Runoff from the future industrial allotments has not been included in the road-reserve MUSIC assessment. Each future allotment will be responsible for providing its own stormwater quality treatment and demonstrating compliance with the adopted pollutant reduction objectives through the relevant subsequent approval and detailed design.

The road-reserve treatment system has been developed at a conceptual level in support of the development application. The final number, size, configuration and location of the Biopods will be confirmed during detailed design in coordination with the road layout, underground services, driveways and landscape design.

7.3 Road Reserve Music Assessment

Operational stormwater quality modelling for the Stage 1 road reserve was undertaken using MUSIC.

The model considers runoff generated by the Stage 1 internal road network only. The road catchment was represented using a mixed source node with parameters adopted with reference to the Water by Design MUSIC Modelling Guidelines for South East Queensland, Version 3.

The conceptual treatment train comprises distributed Biopod bioretention systems within the road reserve. The Biopods collectively provide the treatment required for road runoff before discharge from the site.

7.3.1 Pollutant Source Node Details

The source node parameters adopted in the MUSIC model were selected with reference to the Water by Design MUSIC Modelling Guidelines for South East Queensland, Version 3.

The adopted hydrologic and pollutant concentration parameters are summarised in Tables 6 and 7, respectively. The Stage 1 road reserve was represented as a mixed source node with a contributing catchment area of approximately 0.90 ha, as summarised in Table 8.

Figure 5- 2 shows the Stage 1 road catchment adopted in the MUSIC assessment.

Table 6 MUSIC Source Node Hydrologic Parameters

Parameter	Industrial
Rainfall Threshold (mm)	1
Soil Storage Capacity (mm)	18
Initial Storage (%)	10
Field Capacity (mm)	80
Infiltration Capacity coefficient a	243
Infiltration Capacity coefficient b	0.6
Initial Depth (mm)	50
Daily Recharge Rate (%)	0
Daily Baseflow Rate (%)	31
Daily Seepage Rate (%)	0

Table 7 MUSIC Pollutant Concentration Parameters

Flow Type	Pollutant Source	TSS Log Values		TP Log Values		TN log values	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Baseflow	Roads	0.78	0.45	-1.11	0.48	0.14	0.20
Stormflow	Roads	2.43	0.44	-0.30	0.36	0.25	0.32

Table 8 Summary of Source Node Parameters

Catchment	MUSIC Source Node	Impervious (%)	Area (ha)
Stage 1 Road Network	Mixed	75	0.9

7.3.2 Treatment Device Details – Bioretention Pod

Runoff from the Stage 1 road reserve will be treated by distributed Biopod bioretention systems located within the road reserve.

The Biopods will filter stormwater through vegetated filter media before the treated flow is collected by an underdrain and conveyed to the downstream drainage system. Appropriate vegetation will be incorporated as part of the treatment function, with final plant selection to be confirmed during detailed design.

The conceptual Biopod parameters adopted in the MUSIC model are summarised in Table 9.

Table 9 Modelling Parameters

Parameter	Value
Road Catchment	0.90 ha
Treatment System	Distributed Biopods
Total Filter media area	95m ²
Extended Detention Depth	0.20m
Filter Media Depth	0.70m
Saturated Hydraulic Conductivity	200mm/hr
Underdrain	Provided
Lined System	Yes

The conceptual MUSIC assessment indicates that approximately 95 m² of bioretention filter media is required to treat runoff generated from approximately 450 linear metres of the proposed Stage 1 road network.

This treatment area is proposed to be provided through distributed Biopod systems located within the road reserve. The final number, dimensions and locations of the Biopod systems will be confirmed during detailed design following coordination with road geometry, utility services, driveway locations and landscape requirements.

Typical Biopod details are shown below in Figure 7 - 1 and Figure 7 - 2 and provided in Appendix B

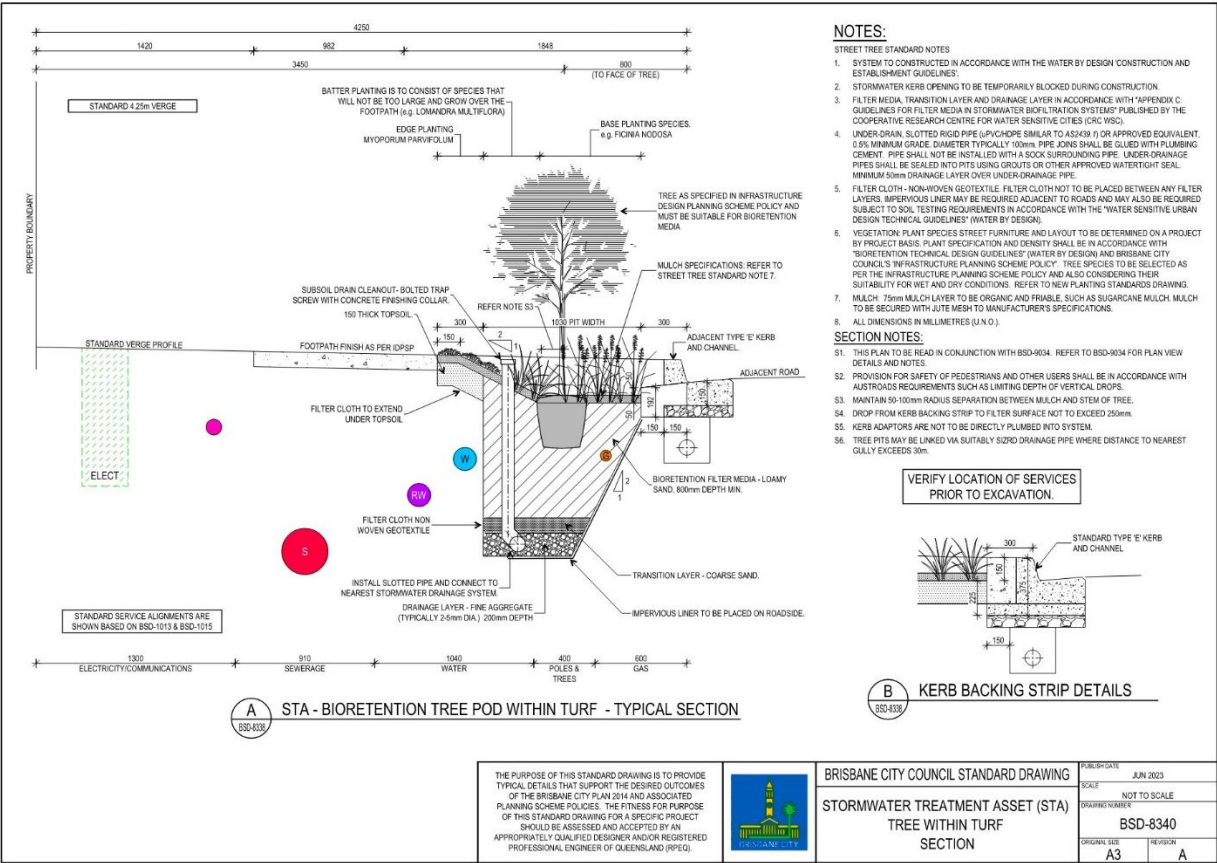


Figure 7 - 1 Bioretention tree pod typical section

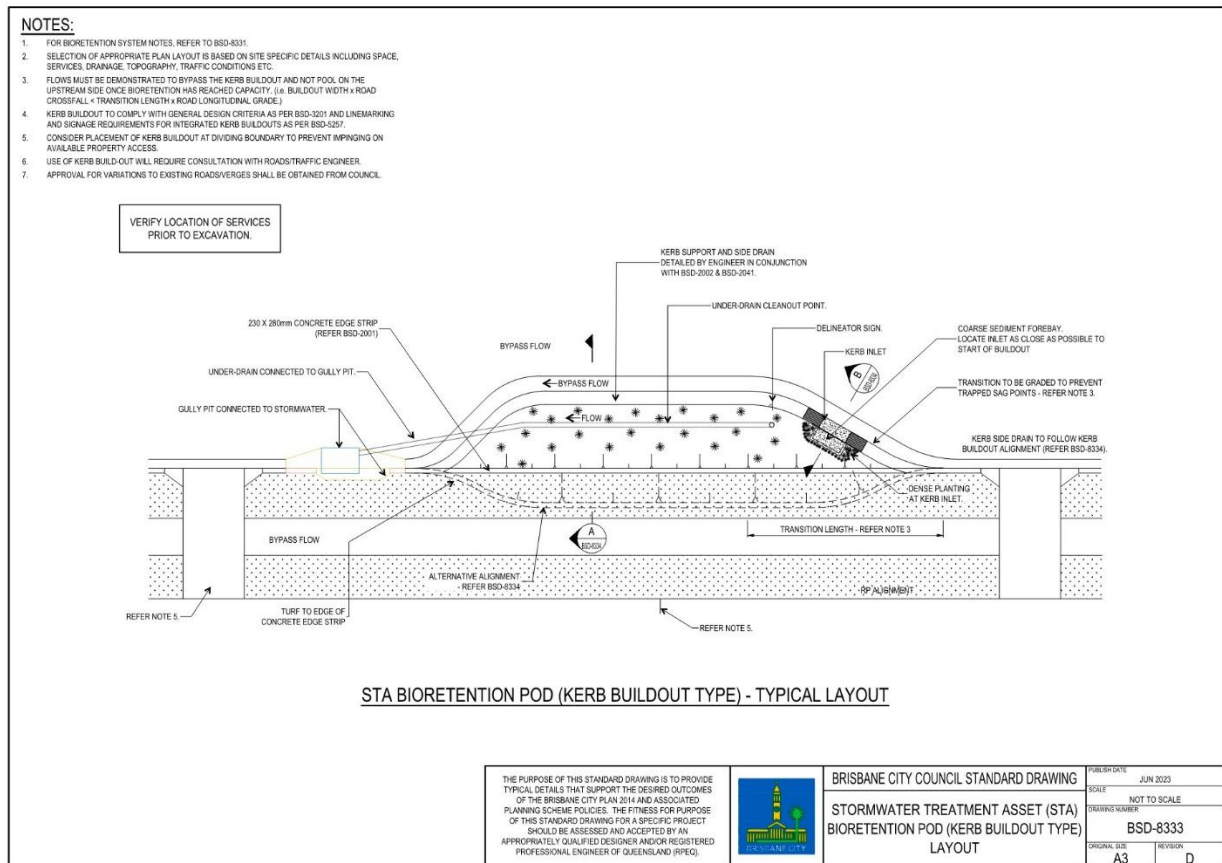


Figure 7 - 2 Bioretention tree pod typical layout

7.3.3 Model Layout and Results

A diagrammatical view and pollutant reduction results can be found in Figure 7 below.

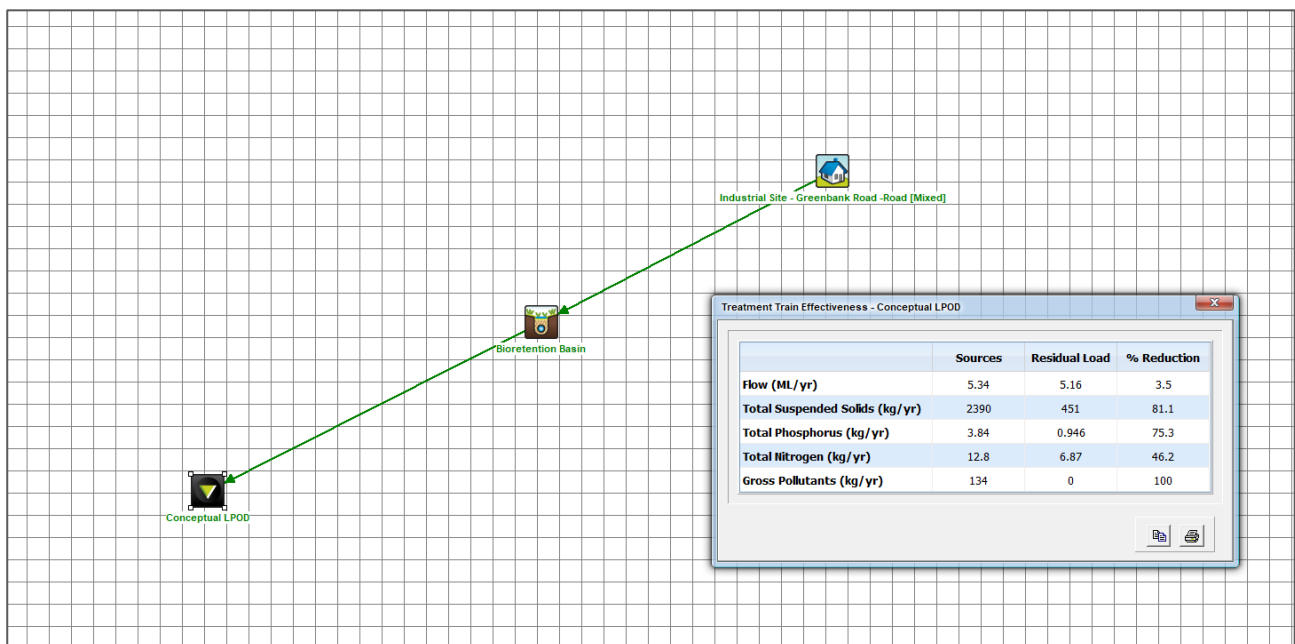


Figure 1 Music Model Layout and Results

7.4 Stormwater Quality Assessment (Allotments)

The MUSIC assessment presented in Section 7.3 applies only to runoff from the Stage 1 road reserve. It does not include runoff generated within the future industrial allotments.

Each future industrial allotment will be required to provide lot-based stormwater quality treatment for runoff generated within that allotment. The treatment system for each allotment is to be designed to achieve the operational pollutant reduction objectives stated in Section 7.1 before discharge to the downstream drainage system.

The type, size and configuration of the lot-based treatment measures will depend on the final development layout and land use within each allotment. Compliance is to be demonstrated through an appropriate lot-specific stormwater quality assessment submitted as part of the relevant subsequent approval and detailed design.

Where MUSIC modelling is used, the assessment should appropriately represent the proposed allotment development and treatment train. Where a proprietary stormwater treatment device is proposed, its adopted treatment performance should be supported by appropriate independent verification.

The road-reserve bioPODs are not intended to offset or replace the stormwater quality treatment required within the future industrial allotments.

7.5 Objective and Discussion

The operational stormwater quality strategy separates the treatment of runoff from the common road reserve and future industrial allotments.

The conceptual MUSIC assessment demonstrates that distributed Biopods can be incorporated within the Stage 1 road reserve to provide the required treatment for road runoff. Approximately 95 m² of total filter media has been identified at the development application stage, with the final Biopod arrangement to be confirmed during detailed design.

Stormwater quality treatment for future industrial allotments will be provided separately within each lot. Each allotment will demonstrate compliance with the adopted pollutant reduction objectives through its relevant subsequent approval and detailed design.

The proposed strategy therefore establishes a clear allocation of stormwater quality responsibilities across the Stage 1 development:

- Common Biopod infrastructure will treat runoff from the Stage 1 road reserve; and
- lot-based treatment measures will treat runoff from each future industrial allotment.

8 FLOOD ASSESSMENT

8.1 Assessment Overview

The proposed development has been reviewed with regard to regional flood conditions affecting the site and the proposed access via Greenbank Road.

The assessment indicates that the proposed developable area is located outside the regional 1% Annual Exceedance Probability (AEP) flood extent. Accordingly, the proposed industrial lots are not expected to be affected by regional flood inundation during the 1% AEP event.

Notwithstanding the flood immunity of the developable area, regional flooding may affect Greenbank Road, which provides access to and from the proposed development. The flood risk relevant to the development is therefore associated primarily with potential access constraints and site isolation, rather than direct inundation of the proposed industrial lots.

8.2 Regional Flooding

The proposed developable area is located outside the regional 1% AEP flood extent and is therefore considered flood free during the regional 1% AEP event.

The proposed development is not expected to result in the placement of buildings or other development infrastructure within the regional 1% AEP flood extent. On this basis, regional flood inundation is not expected to directly affect the proposed industrial lots during the 1% AEP event.

No specific flood mitigation works are proposed within the developable area as part of the Stage 1 development.

8.3 Flood Access and Potential Site Isolation

Access to the proposed development will be provided from Greenbank Road. While the proposed developable area is outside the regional 1% AEP flood extent, sections of Greenbank Road are affected by high-hazard flooding during a regional flood event.

The site may therefore become isolated when flooding affects Greenbank Road, despite the proposed industrial lots remaining flood free. Access to and from the development should not be relied upon once floodwater affects Greenbank Road or the route otherwise becomes unsafe.

The relevant flood emergency management objective is therefore to avoid the need for occupants to travel along Greenbank Road during unsafe flood conditions. Occupants should leave the site before flooding affects the access route and should not attempt to enter or leave the development through floodwater.

8.4 Flood Emergency Management

A site-specific Flood Emergency Management Plan is to be prepared for each industrial lot before occupation of the development. The plan should address the potential isolation of the site resulting from regional flooding affecting Greenbank Road.

Given the proposed industrial land use and the flood immunity of the developable area, the primary emergency management response should be early site closure and orderly departure before Greenbank Road becomes unsafe. The strategy should not rely on evacuation after floodwater has affected the access route.

The Flood Emergency Management Plan should establish appropriate monitoring and closure triggers, define responsibility for initiating the response, provide procedures for notifying site occupants and cease inbound movements before access conditions deteriorate. The plan should clearly instruct occupants not to travel through floodwater and should identify contingency arrangements for any occupants who are unable to safely leave before access is affected.

The final emergency arrangements should be informed by the available flood warning time, the flood behaviour affecting Greenbank Road, the final development layout and the anticipated occupancy of the industrial allotments.

8.5 Flood Risk Management Outcomes

The proposed developable area is flood free during the regional 1% AEP event. Regional flooding is therefore not expected to directly inundate the proposed industrial lots during that event.

However, flooding affecting Greenbank Road may temporarily isolate the development and restrict access to and from the site. This risk can be managed through a site-specific Flood Emergency Management Plan that prioritises early site closure and departure before the access route becomes unsafe.

Subject to the preparation and implementation of the Flood Emergency Management Plan before occupation, the proposed development can provide an appropriate response to the identified regional flood and access-isolation risks.

9 CONCLUSION

This Site Based Stormwater Management Plan (SBSMP) has been prepared to outline the proposed stormwater management strategy for the Stage 1 development at Greenbank.

The primary objectives of this report have been achieved as follows:

Lawful Point of Discharge (LPoD)

- The proposed Stage 1 development maintains the existing drainage pattern, with runoff discharging to the nominated lawful points of discharge along the northern drainage corridor and Greenbank Road.

Stormwater Quantity

- A hydrological assessment has been undertaken using DRAINS to assess the proposed Stage 1 development. The assessment demonstrates that the proposed on-site detention strategy will mitigate post-development peak flows to existing conditions prior to discharge from the site.

Stormwater Quality

- A specifically designed stormwater quality treatment system has been proposed to meet Council's water quality objectives.
- Operational stormwater quality has been assessed using MUSIC. Distributed Biopod bioretention systems are proposed within the Stage 1 road reserve to treat runoff from the internal road network and achieve the adopted stormwater quality objectives. Stormwater quality treatment for future industrial allotments will be provided by each individual allotment

Flooding and Access

- The proposed developable area is flood free during the regional 1% AEP event. However, regional flooding affecting Greenbank Road may temporarily isolate the site. This risk is to be managed through a site-specific Flood Emergency Management Plan that prioritises early site closure and orderly departure before the access route becomes unsafe.

This SBSMP establishes the stormwater management framework for the Stage 1 development and will form the basis for subsequent Operational Works applications and detailed design. Future individual allotments will be required to demonstrate compliance with the stormwater quantity and quality requirements established within this report.

APPENDIX A

Engineering Drawings

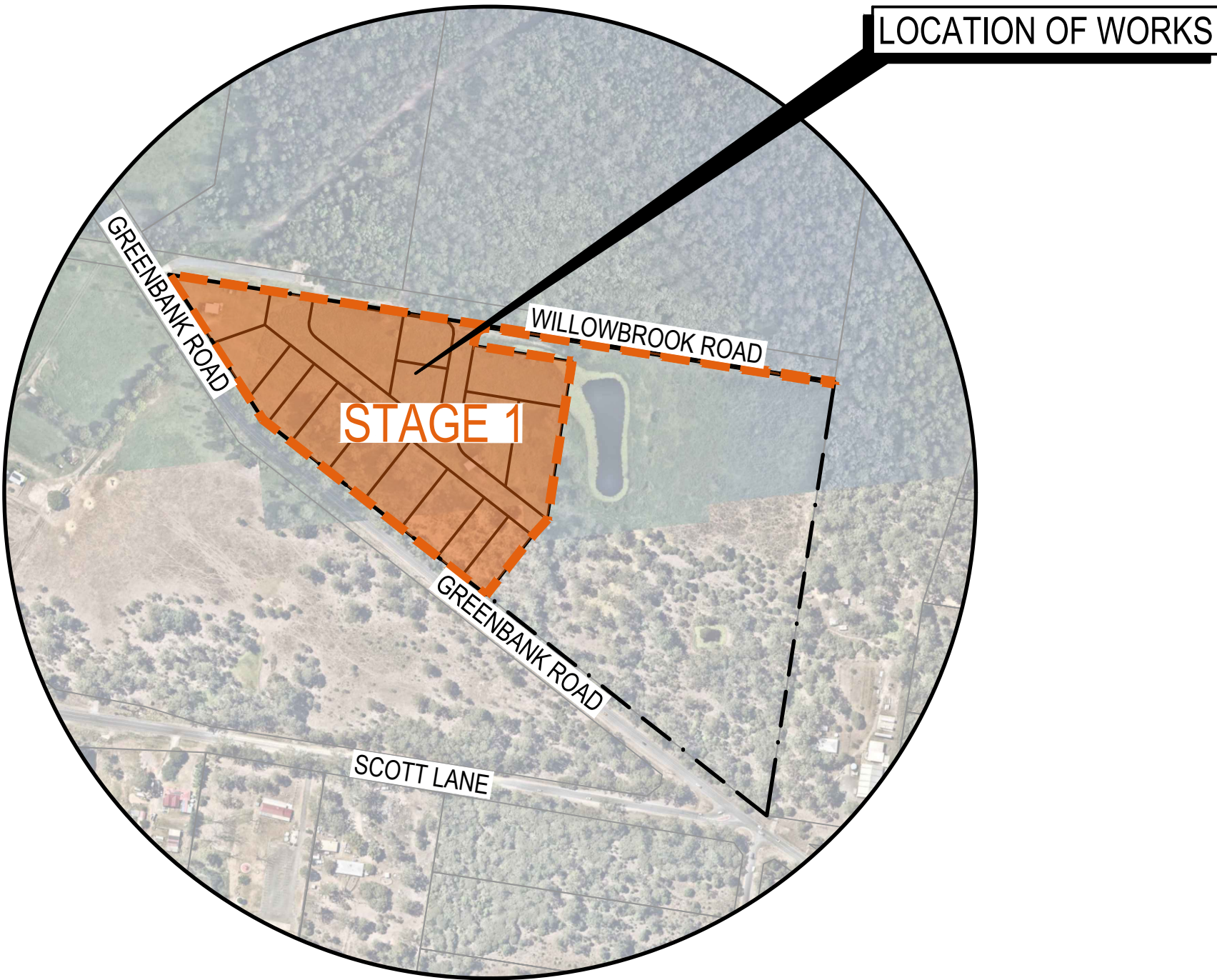
824-908 GREENBANK ROAD, NORTH MACLEAN - STAGE 1

DEVELOPMENT APPLICATION - PRELIMINARY ONLY

LOGAN CITY COUNCIL

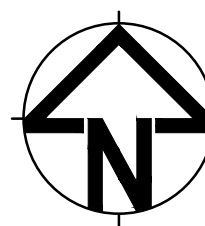
DRAWING SCHEDULE

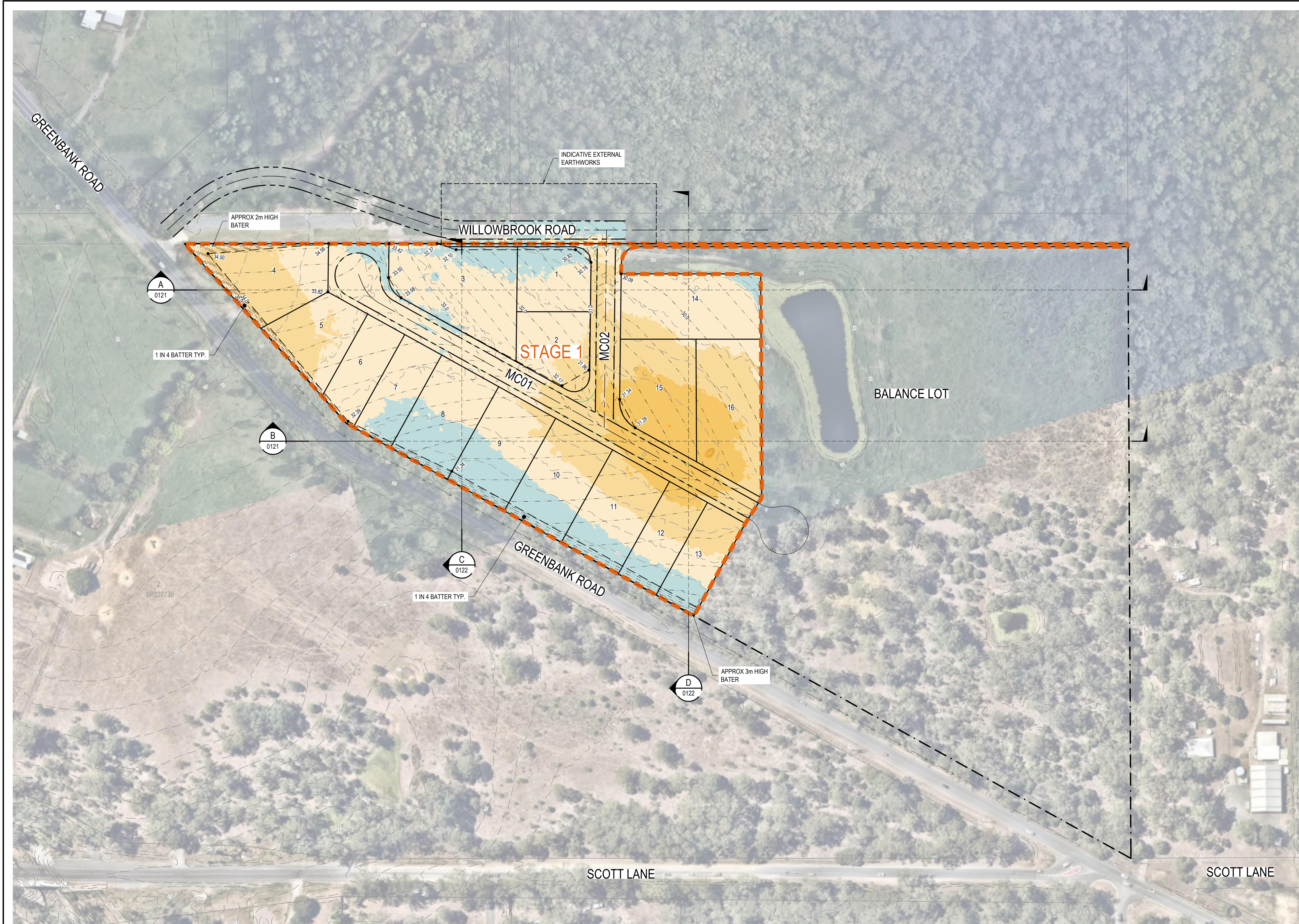
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GENERAL	
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EARTHWORKS	
GBR-AAP-DA-01-DRG-CI-0101	EARTHWORKS PLAN
GBR-AAP-DA-01-DRG-CI-0121	EARTHWORKS SITE SECTIONS SHEET 1
GBR-AAP-DA-01-DRG-CI-0122	EARTHWORKS SITE SECTIONS SHEET 2
ROADWORKS AND DRAINAGE	
GBR-AAP-DA-01-DRG-CI-0201	ROADWORKS LAYOUT PLAN
GBR-AAP-DA-01-DRG-CI-0421	EXISTING STORMWATER CATCHMENT PLAN
GBR-AAP-DA-01-DRG-CI-0422	DEVELOPED STORMWATER CATCHMENT PLAN
GBR-AAP-DA-01-DRG-CI-0423	STORMWATER QUALITY MANAGEMENT PLAN
SERVICES	
GBR-AAP-DA-01-DRG-CI-0521	SEWER RETICULATION LAYOUT PLAN
GBR-AAP-DA-01-DRG-CI-0621	WATER RETICULATION LAYOUT PLAN



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Designed	S. BERRY	Height Datum	AHD																																			
Project Manager	L. WILLEMSSEN	Grid	MGA/20-56																																			
Verified	M. ELNAHAS																																					
Project Number	30340582																																					
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Issue	02																																					
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01	DRAFT ISSUE	JV	SB	DC	11.08.26																																	
Issue	Description	DR	CH	VE	Date																																	

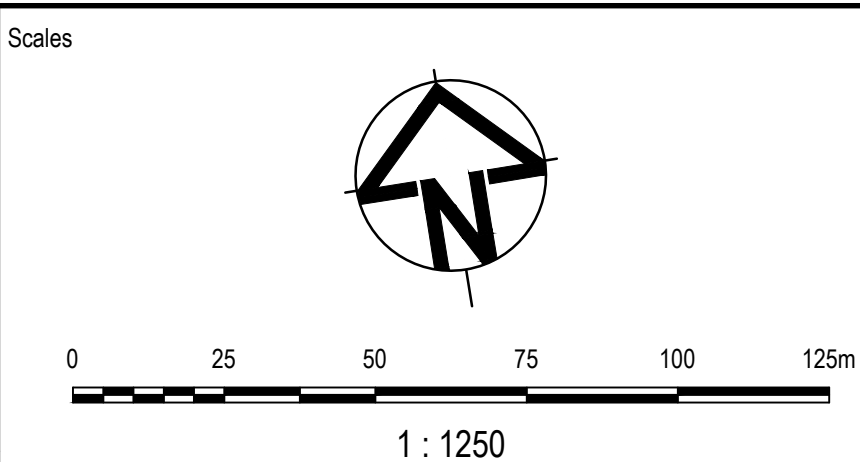


LEGEND	
	DESIGN SURFACE CONTOUR
	EXISTING SURFACE CONTOUR
	SITE BOUNDARY
	PROPOSED STAGE BOUNDARY

- NOTES**
- CUT/FILL VOLUMES**
- | | |
|------------------------|-----------|
| TOTAL CUT | -53,714m³ |
| TOTAL FILL | 50,296m³ |
| TOTAL BALANCE (IMPORT) | -3,418m³ |
- EARTHWORKS NOTES/ASSUMPTIONS**
- PROPOSED CONTOURS REPRESENT BULK EARTHWORKS LEVELS.
 - HATCHING AND ESTIMATED VOLUMES SHOWN REPRESENTS DEPTH RANGE BETWEEN EXISTING TOPO / SURVEY INFORMATION AND DESIGN SURFACE.
 - THE CUT AND FILL VOLUMES DO NOT INCLUDE THE PAVEMENT MATERIALS REQUIRED.
 - NO ALLOWANCE HAS BEEN MADE FOR
 - RETAINING WALLS
 - UTILITIES TRENCHING
 - BUILDING SLABS
 - BRIDGE FOOTINGS, WALLS, SLABS AND FOUNDATION MATERIAL
 - NO COMPACTION OR BULKING FACTORS HAVE BEEN APPLIED.

CUT FILL DEPTH RANGE				
Lower_value		Upper_value		Colour
-999	to	-6	m	
-6	to	-5	m	
-5	to	-4	m	
-4	to	-3	m	
-3	to	-2	m	
-2	to	-1	m	
-1	to	0.00	m	
0.000	to	1	m	
1	to	2	m	
2	to	3	m	
3	to	4	m	
4	to	5	m	
5	to	6	m	
6	to	999	m	

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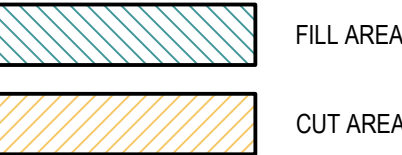
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Title	EARTHWORKS PLAN		

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SOUTHPORT QLD 4215
ABN 76 104 485 289
Tel No: +61 7 5503 4800
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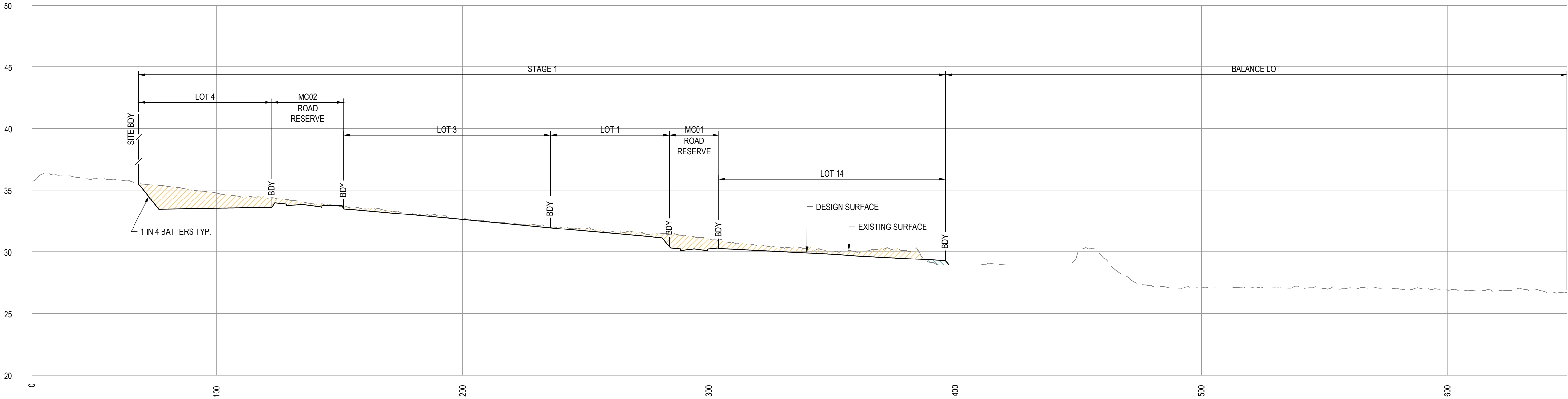
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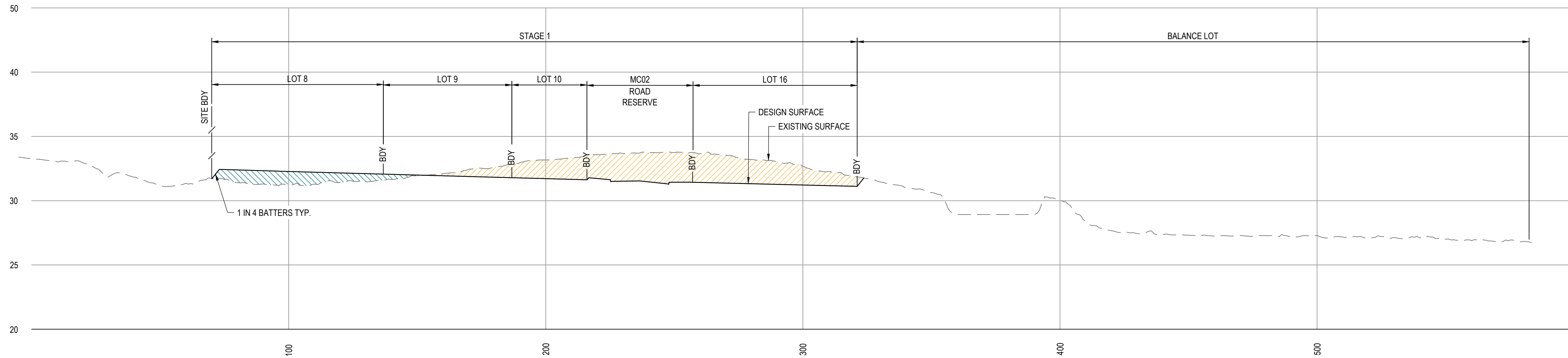
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NOTE:
SECTIONS HAVE 5 TO 1 VERTICAL EXAGGERATION

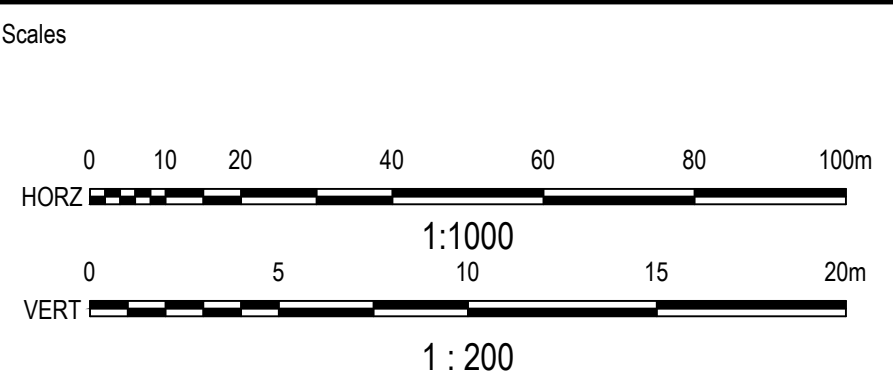


SECTION A
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V - 1 : 200



SECTION B
H - 1 : 1000
V - 1 : 200

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Project 824-908 GREENBANK ROAD
NORTH MACLEAN
STAGE 1
DEVELOPMENT APPLICATION

Title

EARTHWORKS
SITE SECTIONS
SHEET 1

ARCADIS

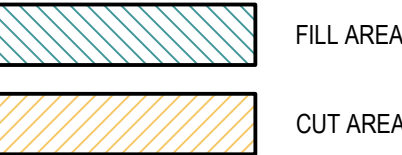
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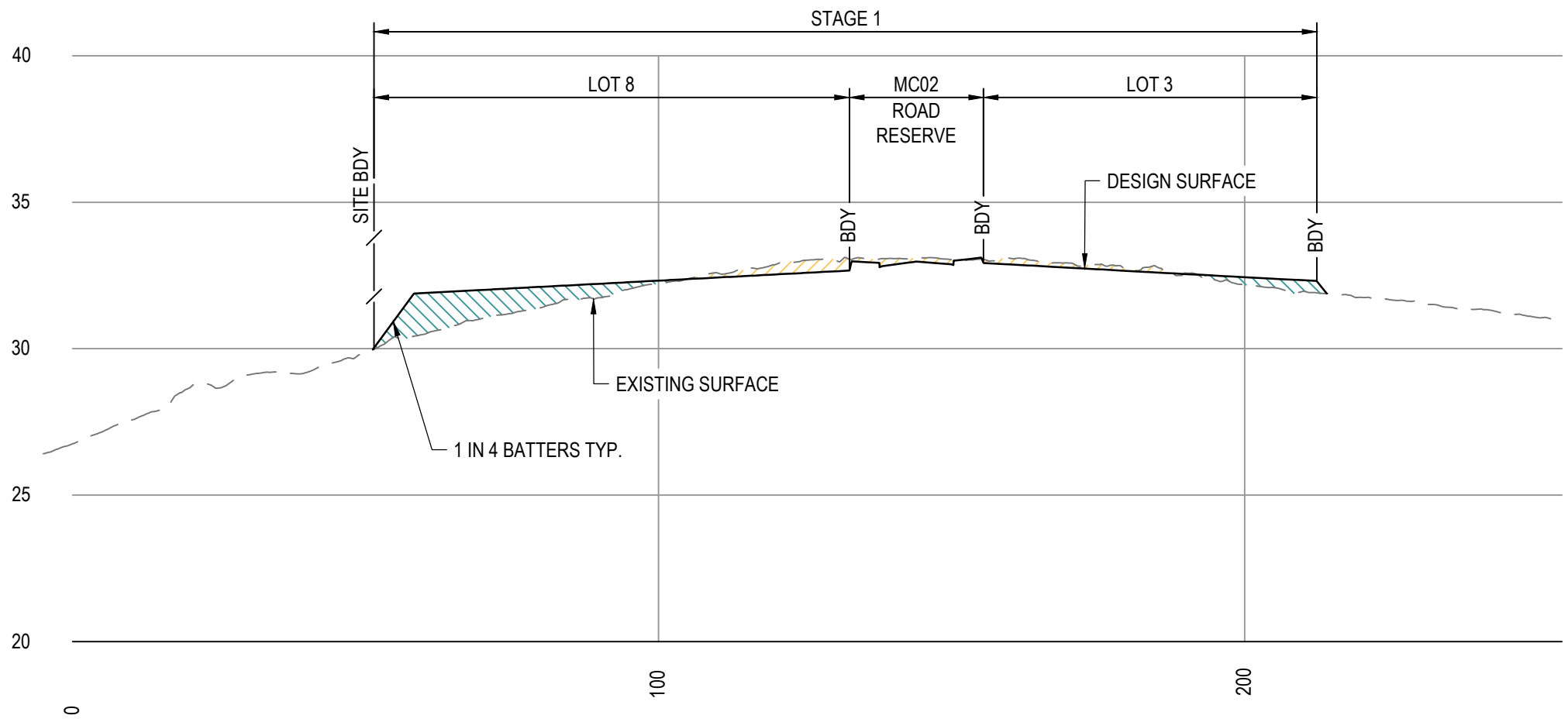
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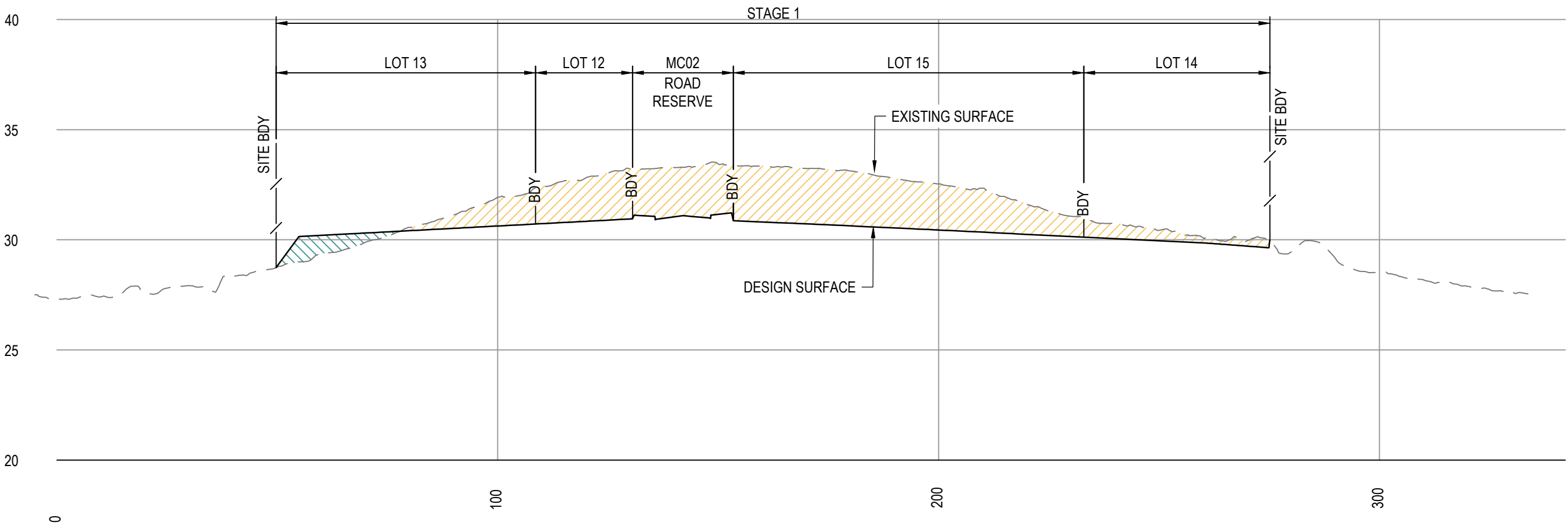
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NOTE:
SECTIONS HAVE 5 TO 1 VERTICAL EXAGGERATION

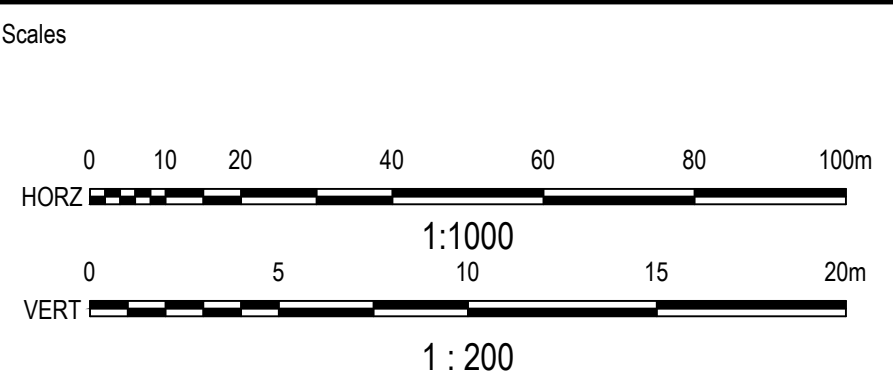


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SECTION D
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Project 824-908 GREENBANK ROAD
NORTH MACLEAN
STAGE 1
DEVELOPMENT APPLICATION

Title

EARTHWORKS
SITE SECTIONS
SHEET 2

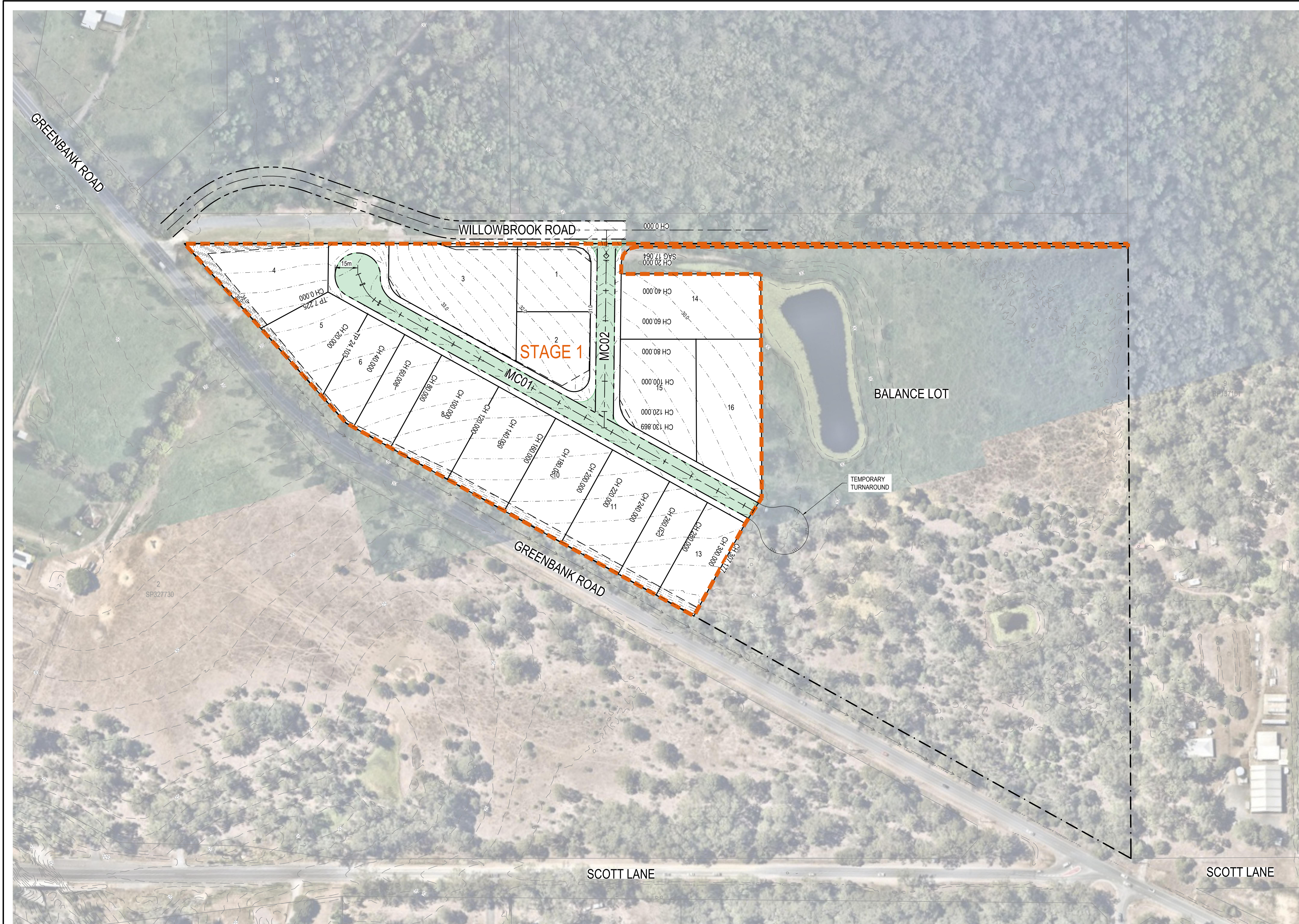
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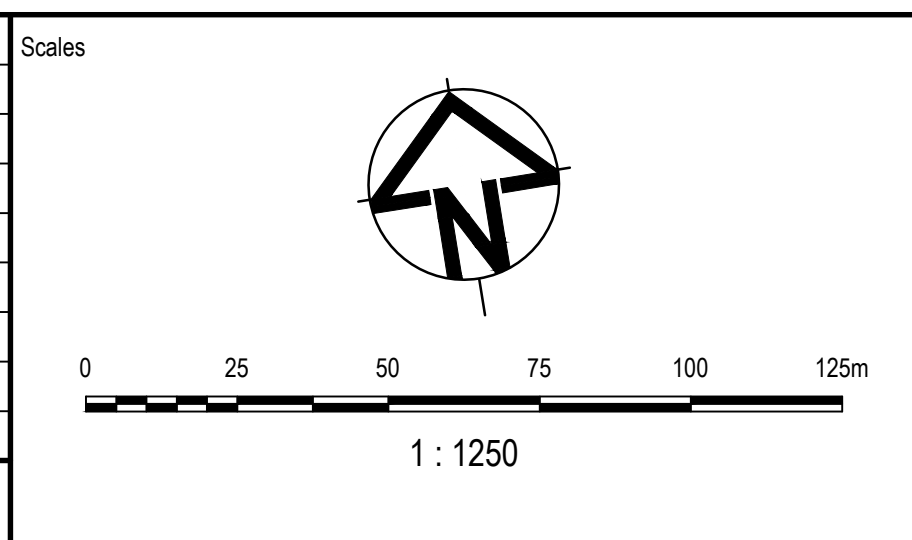
Issue 02

GBR-AAP-DA-01-DRG-CI-0122



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	EXISTING SURFACE CONTOUR
	SITE BOUNDARY
	PROPOSED STAGE BOUNDARY
	CHAINAGE AND CONTROL LINE
	NOMINAL KERB LINE
	EXISTING SWALE

02	ISSUE FOR APPROVAL	JV	LW	DC	13.08.26
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Verified	M. ELNAHAS		

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Title	ROADWORKS LAYOUT PLAN		

		Project Number		30340582
Arcadis Australia Pacific Pty Limited Level 7, Seabank Building, 12-14 Marine Parade SOUTHPORT QLD 4215 ABN 76 104 485 289 Tel No: +61 7 5503 4800 www.arcadis.com.au		Issue		02
Drawing No.		GBR-AAP-DA-01-DRG-CI-0201		



LEGEND

2.0

DESIGN SURFACE CONTOUR

2.0

EXISTING SURFACE CONTOUR

SITE BOUNDARY

PROPOSED STAGE BOUNDARY

DIRECTION OF OVERLAND FLOW

N-EXISTING

S-EXISTING

02	ISSUE FOR APPROVAL	JV	LW	DC	13.08.26
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Issue	Description	DR	CH	VE	Date

Scales

N

0

25

50

75

100

125m

1 : 1250

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Verified	M. ELNAHAS		

Project

824-908 GREENBANK ROAD
NORTH MACLEAN
STAGE 1
DEVELOPMENT APPLICATION

Title

EXISTING STORMWATER
CATCHMENT PLAN

ARCADIS

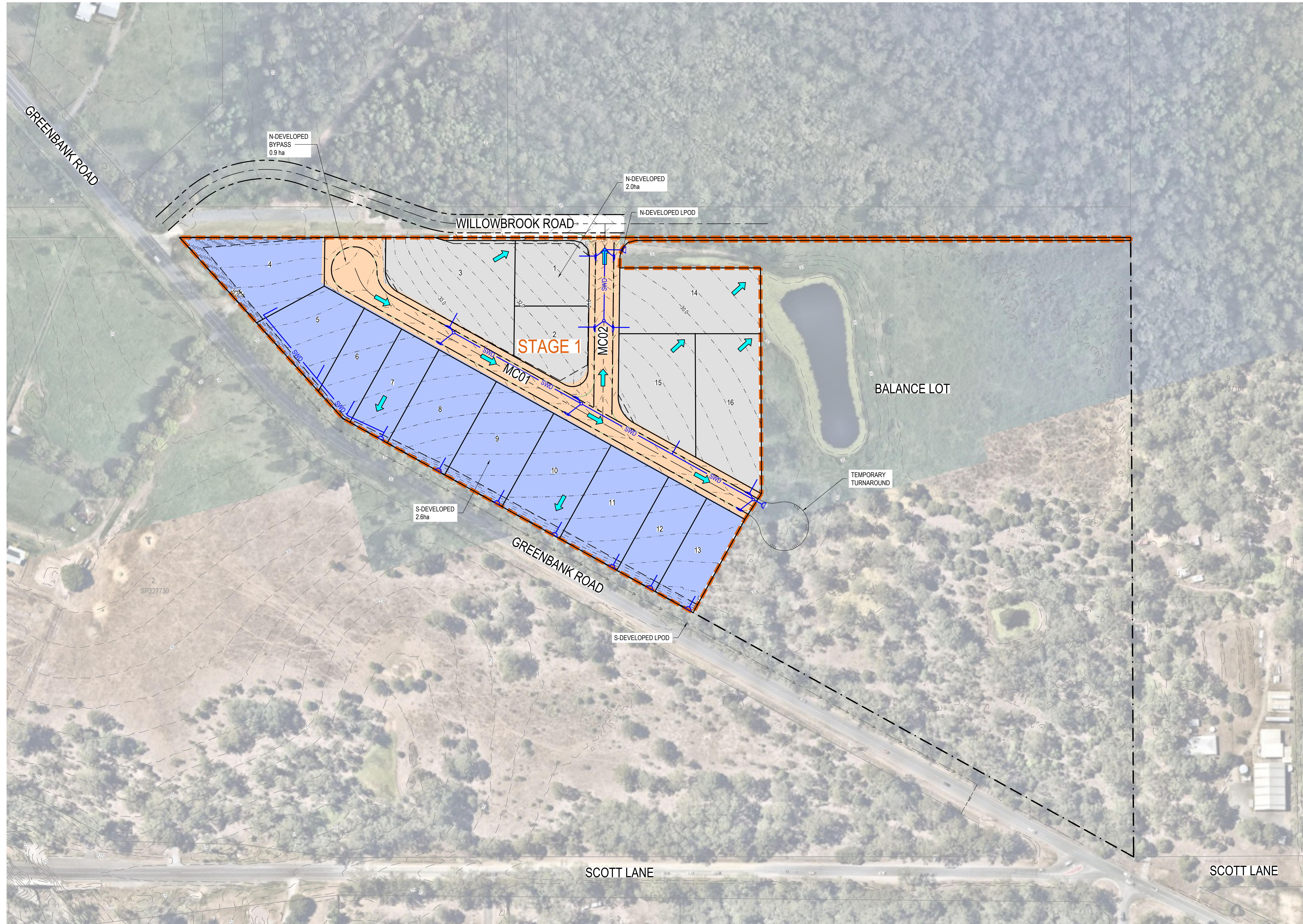
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Issue	02

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Date Plotted: 13 Aug 2026 - 04:24PM

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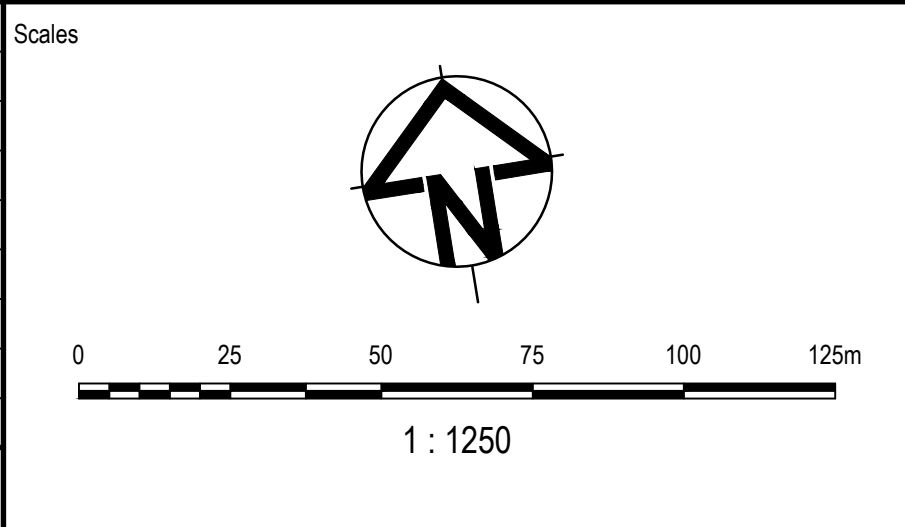
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- 2.0 --- DESIGN SURFACE CONTOUR
- 2.0 --- EXISTING SURFACE CONTOUR
- - - - SITE BOUNDARY
- - - - PROPOSED STAGE BOUNDARY
- ← DIRECTION OF OVERLAND FLOW
- SWD PROPOSED STORMWATER RETICULATION AND STRUCTURE
- - - - NOMINAL KERB LINE
- N-DEVELOPED
- N-DEVELOPED BYPASS
- S-DEVELOPED

NOTES

1. DETAILS SHOWN ARE CONCEPTUAL ONLY, AND SUBJECT TO DETAILED DESIGN AND AUTHORITY APPROVAL.
2. REFER STORMWATER MANAGEMENT REPORT FOR QUALITY DETAILS.

02	ISSUE FOR APPROVAL	JV	LW	DC	13.08.26
01	DRAFT ISSUE	JV	LW	DC	11.08.26
Issue	Description	DR	CH	VE	Date



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Verified	M. ELNAHAS		

Project

824-908 GREENBANK ROAD
NORTH MACLEAN
STAGE 1
DEVELOPMENT APPLICATION

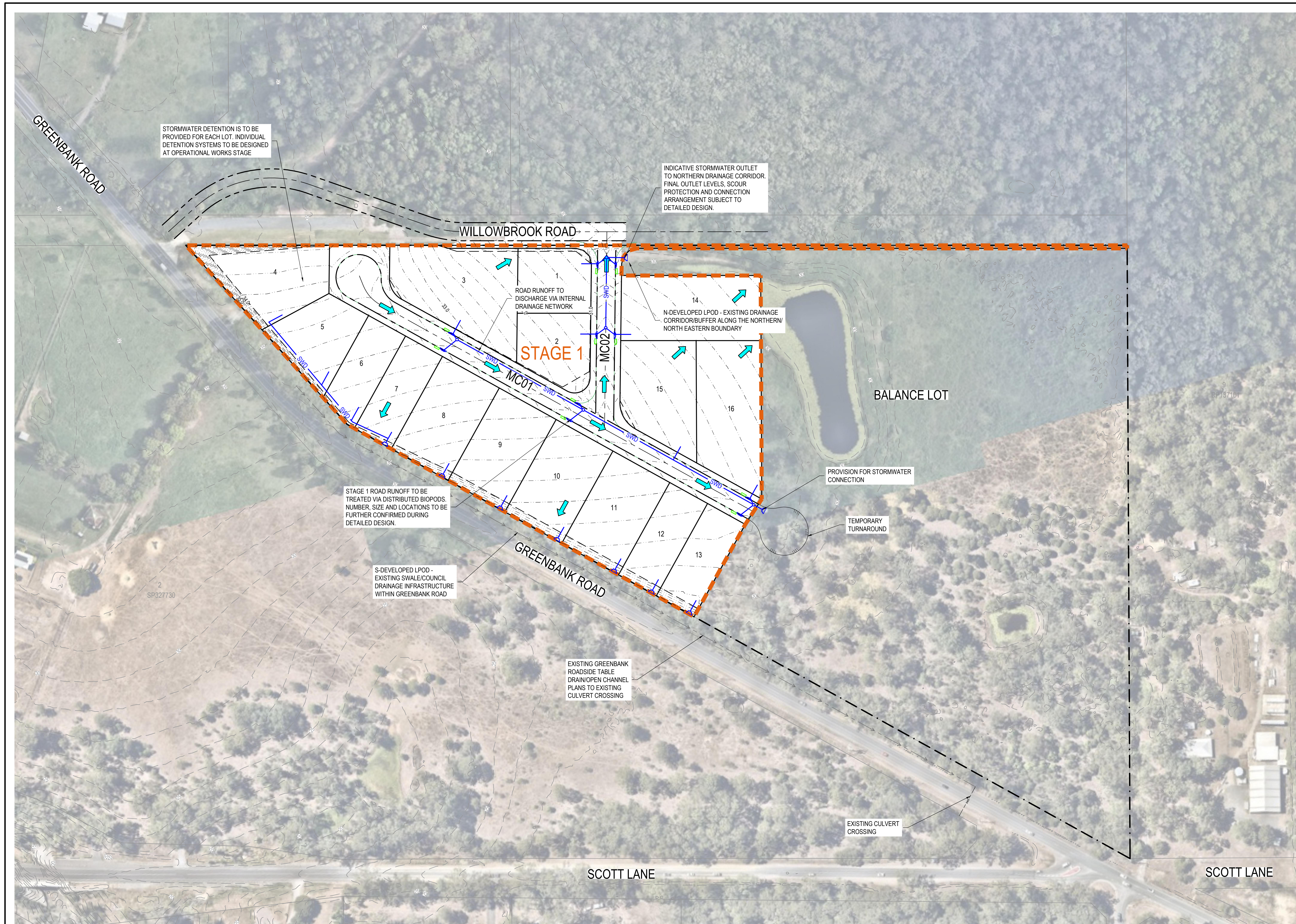
Title

DEVELOPED STORMWATER
CATCHMENT PLAN

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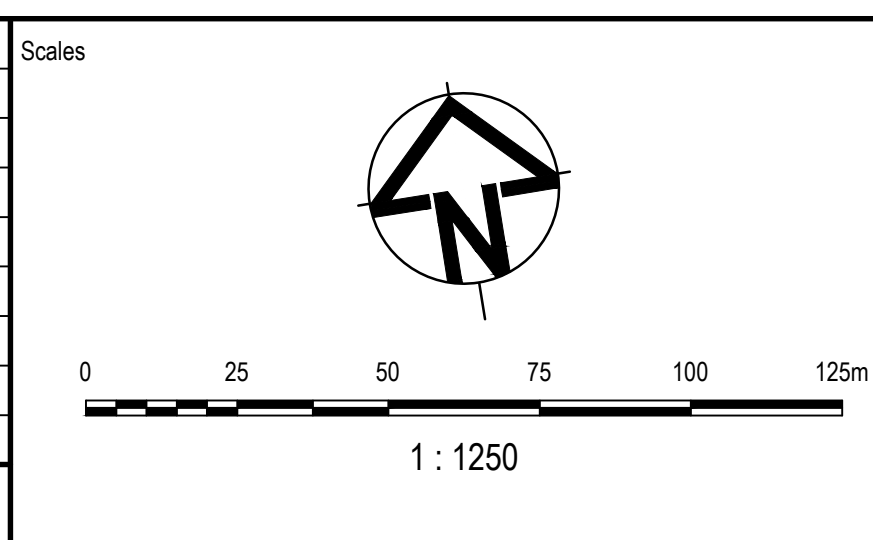
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GBR-AAP-DA-01-DRG-CI-0422	30340582	02



- LEGEND**
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 - 2.0--- EXISTING SURFACE CONTOUR
 - SITE BOUNDARY
 - PROPOSED STAGE BOUNDARY
 - DIRECTION OF OVERLAND FLOW
 - SWD --- PROPOSED STORMWATER RETICULATION AND STRUCTURE
 - PROPOSED STREET TREE BIO-POD
 - NOMINAL KERB LINE
 - swd --- EXISTING STORMWATER DRAINAGE
 - EXISTING SWALE

- NOTES**
1. CONCEPT STORMWATER DRAINAGE LAYOUT SHOWN FOR DEVELOPMENT APPLICATION PURPOSES ONLY. FINAL PIPE SIZING, PIT LOCATIONS AND PROPERTY DRAINAGE AND ON SITE DETENTION SYSTEMS WILL BE CONFIRMED DURING DETAILED DESIGN.
 2. 10 INDICATIVE BIOPODS SHOWN. PROVIDE A MIN COMBINED FILTER AREA OF 95m² TO TREAT RUNOFF FROM THE STAGE ROAD NETWORK. FINAL NUMBER, SIZE CONFIGURATION AND LOCATION SUBJECT TO DETAILED DESIGN.
 3. FUTURE STAGE 2 STORMWATER CONNECTION SHOWN INDICATIVELY ONLY. STAGE 2 RUNOFF HAS NOT BEEN INCLUDED IN THE STAGE 1 STORMWATER MODELLING. FINAL CONNECTION AND NETWORK CAPACITY SUBJECT TO FUTURE DESIGN.

02	ISSUE FOR APPROVAL	JV	LW	DC	13.08.26
01	DRAFT ISSUE	JV	LW	DC	11.08.26
Issue	Description	DR	CH	VE	Date



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Verified	M. ELNAHAS		

Project 824-908 GREENBANK ROAD
NORTH MACLEAN
STAGE 1
DEVELOPMENT APPLICATION

Title

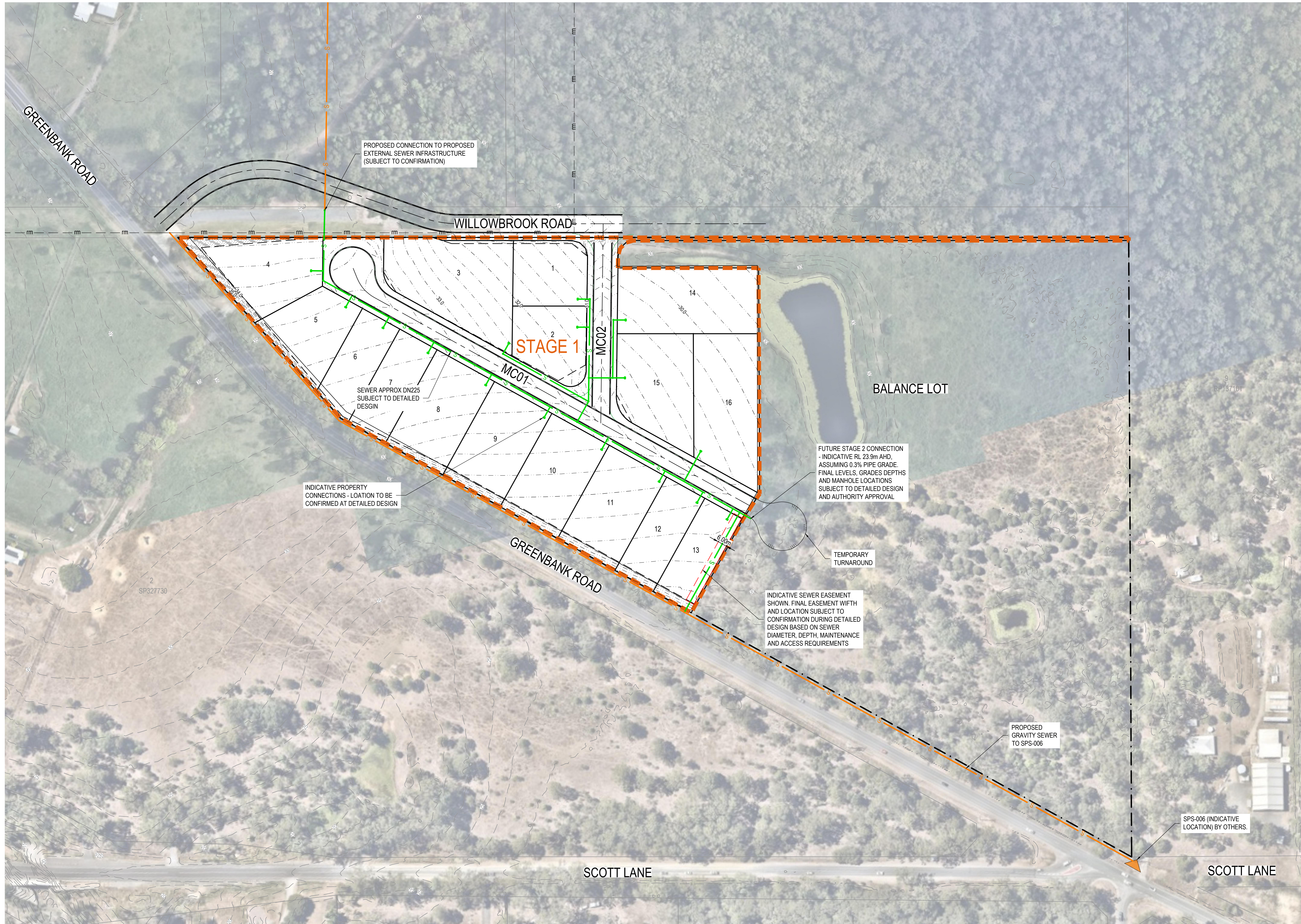
**STORMWATER QUALITY
MANAGEMENT PLAN**

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Issue	02

Drawing No. GBR-AAP-DA-01-DRG-CI-0423



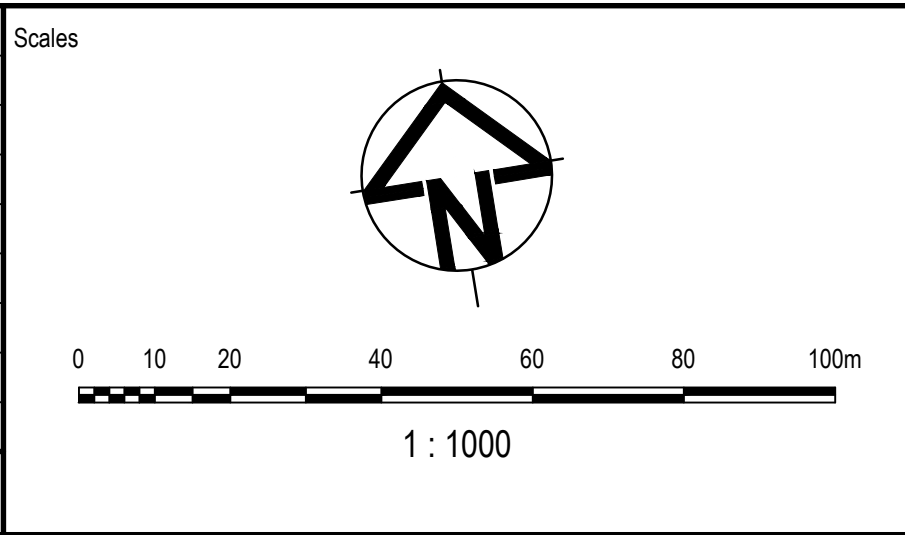
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- 2.0--- DESIGN SURFACE CONTOUR
- 2.0--- EXISTING SURFACE CONTOUR
- SITE BOUNDARY
- PROPOSED EASEMENT
- PROPOSED STAGE BOUNDARY
- NOMINAL KERB LINE
- PROPOSED GRAVITY SEWER RETICULATION
- LOT SEWER CONNECTION
- PROPOSED GRAVITY SEWER (BY OTHERS)
- EXISTING RISING MAIN
- PROPOSED PUMP STATION (BY OTHERS)

NOTES

SEWER ALIGNMENT, LEVELS, GRADES AND CONNECTION ARRANGMENT ARE CONCEPTUAL AND SUBJECT TO CONFIRMATION THROUGH DETAILED DESIGN AND AUTHORITY APPROVAL.

02	ISSUE FOR APPROVAL	JV	LW	DC	13.08.26
01	DRAFT ISSUE	JV	LW	DC	11.08.26
Issue	Description	DR	CH	VE	Date



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Verified	M. ELNAHAS			

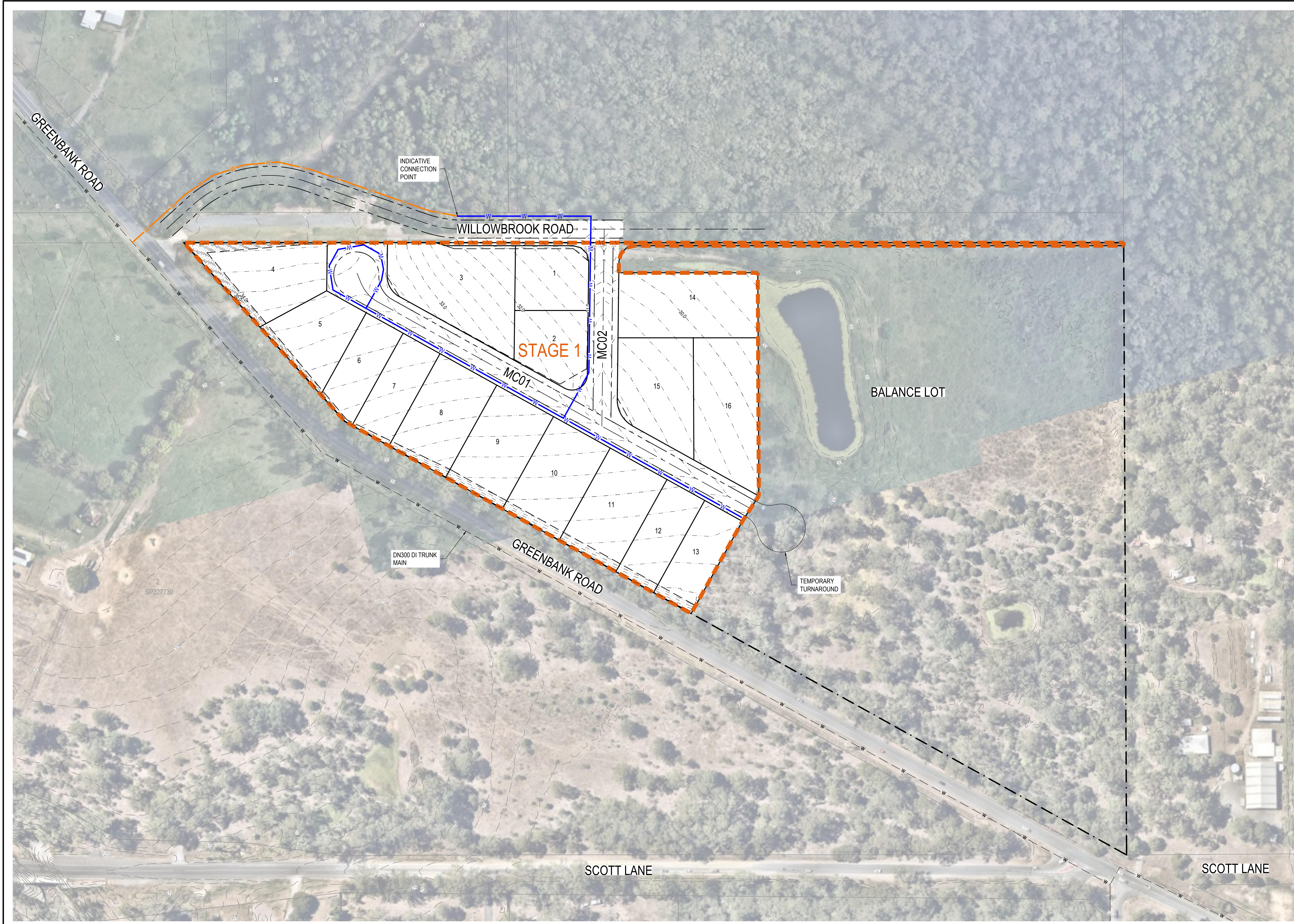
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Title	SEWER RETICULATION LAYOUT PLAN

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Project Number	30340582
Issue	02

Drawing No: GBR-AAP-DA-01-DRG-CI-0521



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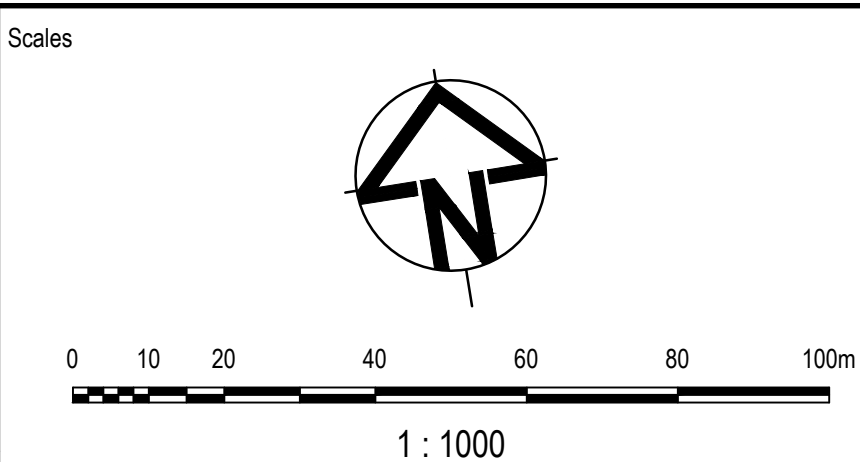
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- 2.0--- EXISTING SURFACE CONTOUR
- - - - SITE BOUNDARY
- PROPOSED STAGE BOUNDARY
- - - - NOMINAL KERB LINE
- W--- PROPOSED WATER
- W--- PROPOSED WATER (BY OTHERS)
- w --- EXISTING POTABLE WATER

NOTES

INDICATIVE PROPERTY WATER SERVICE CONNECTIONS TO BE PROVIDED DURING DETAILED DESIGN.

POTABLE WATER NETWORK SHOWN CONCEPTUALLY FOR DEVELOPMENT APPLICATION PURPOSES ONLY. FINAL PIPE SIZING, VALVE LOCATIONS, HYDRANTS AND SERVICE CONNECTIONS WILL BE CONFIRMED DURING DETAILED DESIGN.

02	ISSUE FOR APPROVAL	JV	LW	DC	13.08.26
01	DRAFT ISSUE	JV	LW	DC	11.08.26
Issue	Description	DR	CH	VE	Date



Surveyor

Planner

SaundersHavill®

Client

ORCHARD
PROPERTY GROUP

Vibrant communities \ Created for you

Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION			
© Copyright reserved				
Original Issue Signatures				
Drawn	J. VARGAS	Original Size	A1	
Designed	L. WILLEMSSEN	Height Datum	AHD	
Project Manager	L. WILLEMSSEN	Grid	MGA/20-56	
Verified	M. ELNAHAS			

Project 824-908 GREENBANK ROAD
NORTH MACLEAN
STAGE 1
DEVELOPMENT APPLICATION

Title
**WATER RETICULATION
LAYOUT PLAN**

ARCADIS

Arcadis Australia Pacific Pty Limited
Level 7, Seabank Building, 12-14 Marine Parade
SOUTHPORT QLD 4215
ABN 76 104 485 289
Tel No: +61 7 5503 4800
www.arcadis.com/au

Drawing No.	Project Number	Issue
GBR-AAP-DA-01-DRG-CI-0621	30340582	02



APPENDIX B

Biopod Typical Details

1. FOR BIORETENTION SYSTEM NOTES, REFER TO BSD-8331.
2. SELECTION OF APPROPRIATE PLAN LAYOUT IS BASED ON SITE SPECIFIC DETAILS INCLUDING SPACE, SERVICES, DRAINAGE, TOPOGRAPHY, TRAFFIC CONDITIONS ETC.
3. FLOWS MUST BE DEMONSTRATED TO BYPASS THE KERB BUILDOUT AND NOT POOL ON THE UPSTREAM SIDE ONCE BIORETENTION HAS REACHED CAPACITY. (i.e. BUILDOUT WIDTH x ROAD CROSSFALL < TRANSITION LENGTH x ROAD LONGITUDINAL GRADE.)
4. KERB BUILDOUT TO COMPLY WITH GENERAL DESIGN CRITERIA AS PER BSD-3201 AND LINEMARKING AND SIGNAGE REQUIREMENTS FOR INTEGRATED KERB BUILDOUTS AS PER BSD-5257.
5. CONSIDER PLACEMENT OF KERB BUILDOUT AT DIVIDING BOUNDARY TO PREVENT IMPINGING ON AVAILABLE PROPERTY ACCESS.
6. USE OF KERB BUILD-OUT WILL REQUIRE CONSULTATION WITH ROADS/TRAFFIC ENGINEER.
7. APPROVAL FOR VARIATIONS TO EXISTING ROADS/VERGES SHALL BE OBTAINED FROM COUNCIL.

230 X 280mm CONCRETE EDGE STRIP (REFER BSD-2001)

UNDER-DRAIN CONNECTED TO GULLY PIT.

GULLY PIT CONNECTED TO STORMWATER.

BYPASS FLOW

BYPASS FLOW

FLOW

KERB SUPPORT AND SIDE DRAIN DETAILED BY ENGINEER IN CONJUNCTION WITH BSD-2002 & BSD-2041.

UNDER-DRAIN CLEANOUT POINT.

DELINATOR SIGN.

KERB INLET

COARSE SEDIMENT FOREBAY. LOCATE INLET AS CLOSE AS POSSIBLE TO START OF BUILDOUT

TRANSITION TO BE GRADED TO PREVENT TRAPPED SAG POINTS - REFER NOTE 3.

KERB SIDE DRAIN TO FOLLOW KERB BUILDOUT ALIGNMENT (REFER BSD-8334).

DENSE PLANTING AT KERB INLET

TRANSITION LENGTH - REFER NOTE 3

RP ALIGNMENT

ALTERNATIVE ALIGNMENT - REFER BSD-8334

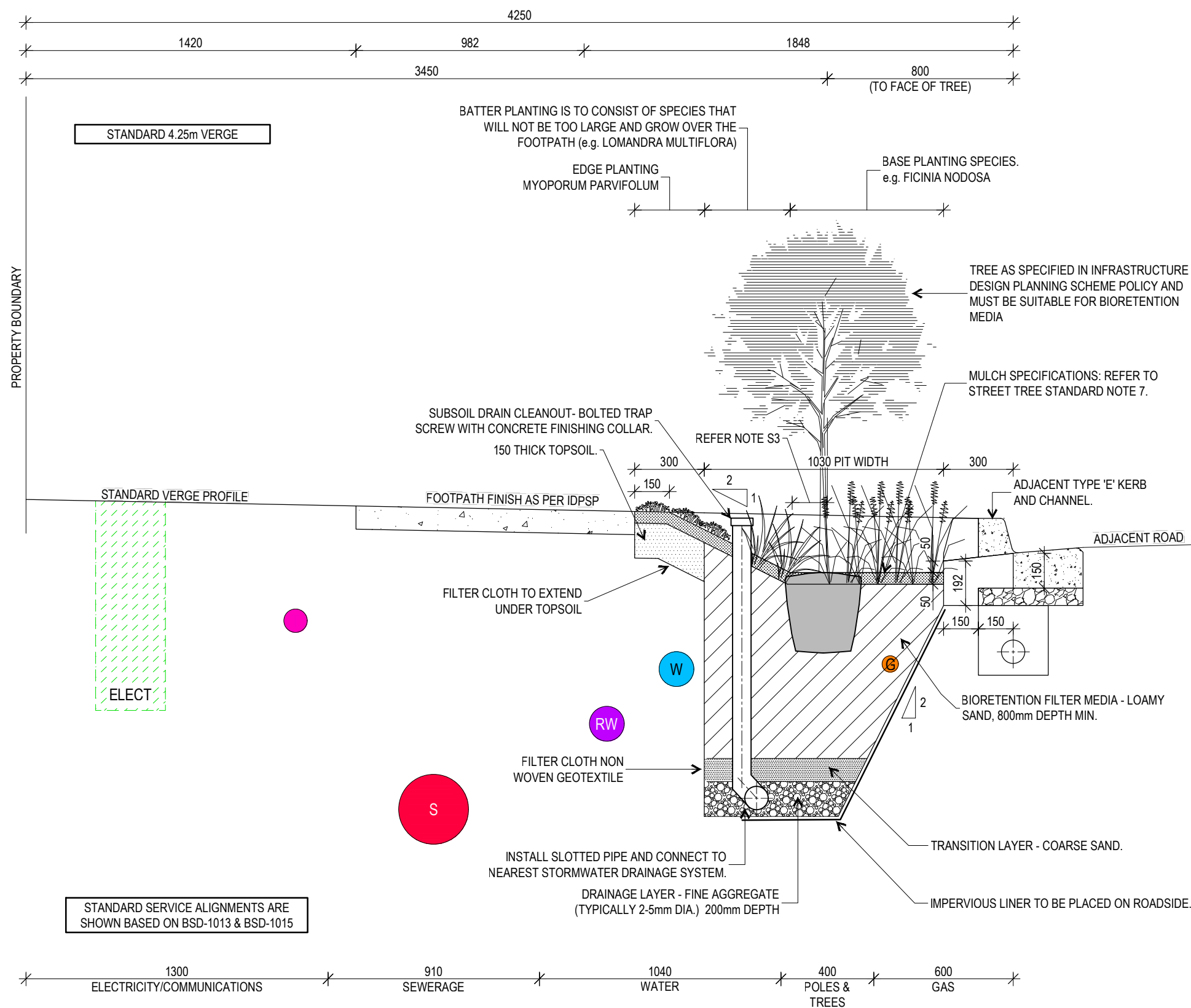
TURF TO EDGE OF CONCRETE EDGE STRIP

REFER NOTE 5.

REFER NOTE 5.



PUBLISH DATE	
JUN 2023	
SCALE	
NOT TO SCALE	
DRAWING NUMBER	
BSD-8333	
ORIGINAL SIZE	REVISION
A3	D



NOTES:

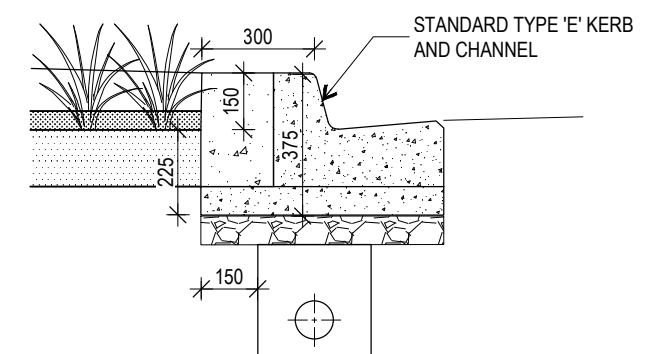
STREET TREE STANDARD NOTES

1. SYSTEM TO CONSTRUCTED IN ACCORDANCE WITH THE WATER BY DESIGN 'CONSTRUCTION AND ESTABLISHMENT GUIDELINES'.
2. STORMWATER KERB OPENING TO BE TEMPORARILY BLOCKED DURING CONSTRUCTION.
3. FILTER MEDIA, TRANSITION LAYER AND DRAINAGE LAYER IN ACCORDANCE WITH "APPENDIX C: GUIDELINES FOR FILTER MEDIA IN STORMWATER BIOFILTRATION SYSTEMS" PUBLISHED BY THE COOPERATIVE RESEARCH CENTRE FOR WATER SENSITIVE CITIES (CRC WSC).
4. UNDER-DRAIN, SLOTTED RIGID PIPE (uPVC/HDPE SIMILAR TO AS2439.1) OR APPROVED EQUIVALENT, 0.5% MINIMUM GRADE. DIAMETER TYPICALLY 100mm. PIPE JOINS SHALL BE GLUED WITH PLUMBING CEMENT. PIPE SHALL NOT BE INSTALLED WITH A SOCK SURROUNDING PIPE. UNDER-DRAINAGE PIPES SHALL BE SEALED INTO PITS USING GROUTS OR OTHER APPROVED WATERTIGHT SEAL. MINIMUM 50mm DRAINAGE LAYER OVER UNDER-DRAINAGE PIPE.
5. FILTER CLOTH - NON-WOVEN GEOTEXTILE. FILTER CLOTH NOT TO BE PLACED BETWEEN ANY FILTER LAYERS. IMPERVIOUS LINER MAY BE REQUIRED ADJACENT TO ROADS AND MAY ALSO BE REQUIRED SUBJECT TO SOIL TESTING REQUIREMENTS IN ACCORDANCE WITH THE "WATER SENSITIVE URBAN DESIGN TECHNICAL GUIDELINES" (WATER BY DESIGN).
6. VEGETATION: PLANT SPECIES STREET FURNITURE AND LAYOUT TO BE DETERMINED ON A PROJECT BY PROJECT BASIS. PLANT SPECIFICATION AND DENSITY SHALL BE IN ACCORDANCE WITH "BIORETENTION TECHNICAL DESIGN GUIDELINES" (WATER BY DESIGN) AND BRISBANE CITY COUNCIL'S 'INFRASTRUCTURE PLANNING SCHEME POLICY'. TREE SPECIES TO BE SELECTED AS PER THE INFRASTRUCTURE PLANNING SCHEME POLICY AND ALSO CONSIDERING THEIR SUITABILITY FOR WET AND DRY CONDITIONS. REFER TO NEW PLANTING STANDARDS DRAWING.
7. MULCH: 75mm MULCH LAYER TO BE ORGANIC AND FRIABLE, SUCH AS SUGARCANE MULCH. MULCH TO BE SECURED WITH JUTE MESH TO MANUFACTURER'S SPECIFICATIONS.
8. ALL DIMENSIONS IN MILLIMETRES (U.N.O.).

SECTION NOTES:

- S1. THIS PLAN TO BE READ IN CONJUNCTION WITH BSD-9034. REFER TO BSD-9034 FOR PLAN VIEW DETAILS AND NOTES.
- S2. PROVISION FOR SAFETY OF PEDESTRIANS AND OTHER USERS SHALL BE IN ACCORDANCE WITH AUSTRROADS REQUIREMENTS SUCH AS LIMITING DEPTH OF VERTICAL DROPS.
- S3. MAINTAIN 50-100mm RADIUS SEPARATION BETWEEN MULCH AND STEM OF TREE.
- S4. DROP FROM KERB BACKING STRIP TO FILTER SURFACE NOT TO EXCEED 250mm.
- S5. KERB ADAPTORS ARE NOT TO BE DIRECTLY PLUMBED INTO SYSTEM.
- S6. TREE PITS MAY BE LINKED VIA SUITABLY SIZED DRAINAGE PIPE WHERE DISTANCE TO NEAREST GULLY EXCEEDS 30m.

VERIFY LOCATION OF SERVICES
PRIOR TO EXCAVATION.



B KERB BACKING STRIP DETAILS
BSD-8338

A STA - BIORETENTION TREE POD WITHIN TURF - TYPICAL SECTION
BSD-8338

THE PURPOSE OF THIS STANDARD DRAWING IS TO PROVIDE TYPICAL DETAILS THAT SUPPORT THE DESIRED OUTCOMES OF THE BRISBANE CITY PLAN 2014 AND ASSOCIATED PLANNING SCHEME POLICIES. THE FITNESS FOR PURPOSE OF THIS STANDARD DRAWING FOR A SPECIFIC PROJECT SHOULD BE ASSESSED AND ACCEPTED BY AN APPROPRIATELY QUALIFIED DESIGNER AND/OR REGISTERED PROFESSIONAL ENGINEER OF QUEENSLAND (RPEQ).



BRISBANE CITY COUNCIL STANDARD DRAWING

STORMWATER TREATMENT ASSET (STA)
TREE WITHIN TURF
SECTION

PUBLISH DATE	JUN 2023
SCALE	NOT TO SCALE
DRAWING NUMBER	BSD-8340
ORIGINAL SIZE	A3
REVISION	A

APPENDIX C
TLPI FLOOD OVERLAY

8.2.5 Flood hazard overlay code

8.2.5.1 Application

1. This code applies to all development for which the Flood hazard overlay code is identified as an assessment benchmark in Part 5 - Tables of assessment.
2. When using this code, reference should be made to section 5.3.2 - Determining the category of development and category of assessment and, where applicable, section 5.3.3 - Determining the requirements for accepted development and assessment benchmarks and other matters for assessable development, in Part 5 - Tables of assessment.

Note - The following purpose, overall outcomes, performance outcomes and acceptable outcomes comprise the assessment benchmarks of this code.

Note - Pursuant to section 32(a) of the *Building Act 1975* and part 3, section 8(1)(a) of the *Building Regulation 2021*, land identified in a High flood risk area, Moderate flood risk area, Low flood risk area or Flood investigation area on Flood hazard overlay map OM-05.04 is the 'designated flood hazard area' for the National Construction Code and Queensland Development Code.

Note - For the purposes of section 32(a) of *Building Act 1975* and part 3, section 8(1)(b) of the *Building Regulation 2021*, where in the designated flood hazard area:

- a. the defined flood level is the level of the defined flood event, unless otherwise specified in Table 8.2.5.3.3 of 8.2.5 Flood hazard overlay code or Table 9.3.2.3.3 of 9.3.2 Dual occupancy and Dwelling house code;
- b. a freeboard greater than 300mm as identified in Table 8.2.5.3.3 of 8.2.5 Flood hazard overlay code or Table 9.3.2.3.3 of 9.3.2 Dual occupancy and Dwelling house code;
- c. the finished floor level for class 1 buildings as identified in Table 8.2.5.3.3 of 8.2.5 Flood hazard overlay code or Table 9.3.2.3.3 of 9.3.2 Dual occupancy and Dwelling house code.

8.2.5.2 Purpose

1. The purpose of the Flood hazard overlay code is to ensure development:
 - a. avoids flood risk or where not possible to avoid, mitigates the exposure of people, property, infrastructure and the environment to a tolerable level of flood risk;
 - b. maintains the accessibility and functionality of Essential community infrastructure activities and Vulnerable use activities during and after all flood events;
 - c. improves the resilience of buildings to flood risk, while maintaining built form and amenity expectations;
 - d. supports safe, self-evacuation and does not increase the emergency management response or recovery burden;
 - e. increases the community's resilience to flood risk and minimises flood recovery time;
 - f. does not result in unacceptable flood risk to people, property, infrastructure and the environment;

- g. minimises the exposure of people to isolation during flood events;
 - h. maintains the natural functions of the floodplain for the storage and conveyance of floodwaters and avoids adverse impacts on overland flow paths.
2. The purpose of the Flood hazard overlay code will be achieved through the following overall outcomes:
- a. Development in a High flood risk area identified on Flood hazard overlay map OM-05.04 does not expose people, property, infrastructure and the environment to intolerable flood risk by:
 - i. limiting development to the following compatible land uses where consistent with the intent of the underlying zone:
 - A. Rural activities other than Rural industry, Intensive animal industry or Intensive horticulture; or
 - B. Nature-based tourism and where involving accommodation, development is located outside of areas impacted by flash flooding and there are no habitable buildings permanently attached to the land; or
 - C. where in the Environmental management and conservation zone or Recreation and open space zone, a use other than an accommodation land use and, if involving Nature-based tourism, meets overall outcome 2(a)(i)(B); or
 - D. a use other than an accommodation land use or Vulnerable use activities, and there is no increase to the existing lawful building footprint; or
 - E. where associated with an existing lawful accommodation land use, there is no increase to the number of persons on the premises and there is no increase to the existing lawful building footprint;
 - ii. limiting reconfiguring a lot to:
 - A. realignment of boundaries where not materially increasing the exposure of new lots to a High flood risk area, unless for the purpose of a drainage or environmental reserve; or
 - B. creating an additional lot where the development envelope area is located outside of a High flood risk area, or the additional lot is only for the purpose of a drainage or environmental reserve;
 - iii. increasing the resilience of development to flood risk through building location, design and operations;
 - iv. maintains the existing conveyance function of the High flood risk area.
 - b. Development in a Moderate flood risk area identified on Flood hazard overlay map OM-05.04 incorporates building location, design and operations that mitigate flood risk to people, property, infrastructure and the environment to a tolerable or acceptable level.
 - c. Development involving an accommodation land use located in a Low flood island identified on Flood hazard overlay map OM-05.01 does not expose people to an unacceptable level of risk.
 - d. Other than for a Hospital located in the Meadowbrook flood assessment area identified on Flood hazard overlay map OM-05.03, Vulnerable use activities:
 - i. are located outside of a Moderate flood risk area, High flood risk area or a High flood island identified on Flood hazard overlay map OM-05.04 and OM-05.01;
 - ii. are located in a Low flood risk area identified on Flood hazard overlay map OM-05.04 only where:
 - A. if people reside on the premises, buildings have a flood planning level above the probable maximum flood to protect vulnerable members of the community;

- B. buildings are designed to be resilient to all flood events and reduce flood recovery time;
- C. there is a low flood hazard vehicle evacuation route that leads outside the floodplain to a suitable area that supports the needs of evacuees;
- iii. maintain functionality and accessibility during and after all flood events;
- iv. do not increase the exposure of people to isolation during all flood events up to and including the probable maximum flood.
- e. A Hospital in the Meadowbrook flood assessment area identified on Flood hazard overlay map OM-05.03 advances the intended health centre services while mitigating flood risk to people, property, infrastructure and the environment through:
 - i. incorporating a building location, design and operations that are resilient to flood events;
 - ii. maintaining functionality during and after all flood events, including the probable maximum flood;
 - iii. not exposing people or property to unacceptable risk during a defined flood event.
- f. Essential community infrastructure activities are not located in the floodplain, unless:
 - i. there is an overriding planning need for the use that cannot be met in a location outside of the floodplain;
 - ii. development incorporates building location, design and operations that reduce the potential impacts of flooding;
 - iii. development maintains functionality during and after all flood events, including the probable maximum flood;
 - iv. where for Emergency services, development is accessible during and after all flood events up to and including the probable maximum flood.
- g. Development in a Flood investigation area identified on Flood hazard overlay map OM-05.04:
 - i. does not increase exposure of people, property and infrastructure to flood risk; or
 - ii. demonstrates the development is compatible with the level of flood risk, including achieving the outcomes as relevant for a:
 - A. High flood risk area;
 - B. Moderate flood risk area;
 - C. Low flood risk area and High flood island where involving Essential community infrastructure activities or Vulnerable use activities.

Note - Planning scheme policy 10 - Flood provides guidelines on how to prepare a detailed localised flood risk assessment to assist with achieving Overall Outcome g(ii).

- h. Development does not locate buildings or structures in a High flow area.
- i. Development is able to function safely during flood events up to and including the defined flood event.
- j. Development minimises flood recovery time, rebuilding costs and disruption to residents, businesses and the community.
- k. Development does not compromise amenity, environmental, parks and open space outcomes in delivering flood risk mitigation strategies.
- l. Development protects personal health, safety and the environment from the release of hazardous materials during a flood event.
- m. Development does not add to emergency management or the evacuation burden during or after a flood event.
- n. Development:

- i. involving an accommodation land use or new lots intended for a future dual occupancy (auxiliary unit), dwelling house or accommodation land use, has safe vehicle access to a low flood hazard road and road network that supports safe and efficient access to a suitable flood-free area that contains essential goods;
- ii. not involving an accommodation land use (or new lots intended for a future accommodation land use) or Vulnerable use activities, has safe vehicle access to a low flood hazard road that supports safe and efficient self-evacuation, or is only isolated for a short duration from creek or overland flow flooding and has safe refuge available during flood events;
- iii. plans for the orderly and safe evacuation of people, including being supported by a flood emergency management plan in particular circumstances;
- iv. does not rely upon flood emergency management plans to alter land use tolerability to flood risk.

Editor’s note - Flood emergency management plans should be utilised to assist in managing residual risk of development and should be implemented as a tool to plan for safe evacuation where an active management entity exists for the development.

- o. Development does not directly, indirectly or cumulatively adversely impact the function of the floodplain and overland flow paths on the premises and off-site, including adjoining premises, infrastructure and the environment.
- p. Development does not change the flood storage capacity or alter flood characteristics outside of a premises in a way that would result in:
 - i. loss of flood storage;
 - ii. loss or change to flow paths;
 - iii. alteration in the speed of water flows;
 - iv. reduction in flood warning times elsewhere in the floodplain.

8.2.5.3 **Assessment benchmarks for assessment development and requirements for accepted development**

Part A - Requirements for accepted development (subject to requirements) and assessment benchmarks for assessable development

Table 8.2.5.3.1 - Flood hazard overlay code: accepted development (subject to requirements) and assessable development

Performance outcomes	Acceptable outcomes	Comments
For accepted development (subject to requirements) and assessable development		
Part A - Risk compatibility (other than a Home-based business)		
Material change of use		

PO1 A development envelope area is located outside of a High flood risk area identified on Flood hazard overlay map OM-05.04 unless complying with the requirements identified in Table 8.2.5.3.2 - Land use compatibility in a high flood risk area. Note - Planning scheme policy 10 - Flood includes guidance on demonstrating the qualifying criteria in Table 8.2.5.3.2 - Land use compatibility in a high flood risk area.	AO1 Development is contained in a development envelope area located outside of a High flood risk area identified on Flood hazard overlay map OM-05.04.	The proposed industrial development is not located within a High Flood Risk Area. Development envelopes are proposed above the adopted flood planning levels. Refer to the Engineering Services Report and flood assessment information. Approximate Stage 1 Earthworks extent is shown below in orange. 
PO2 Vulnerable use activities: a. are not located in a High flood island identified on Flood hazard overlay map OM-05.01; b. are located outside of the floodplain unless located in: i. a Low flood risk area identified on Flood hazard overlay map OM-05.04; or ii. the Meadowbrook flood assessment area identified on Flood hazard overlay map OM-05.03 and involving a Hospital.	AO2 No acceptable outcome provided.	Proposed land uses are industrial and not classified as vulnerable uses as defined by Logan City Council Planning Scheme 2015 Administrative Definitions.

PO3 Essential community infrastructure activities are not located in the floodplain unless: a. there is an overriding planning need for the use; b. there is no alternative site located outside of the floodplain that would address the identified need; c. development maintains functionality during and after all flood events, including the probable maximum flood; d. where for Emergency services, the development remains accessible during and after all flood events, including the probable maximum flood. Note - Planning scheme policy 10 - Flood provides guidance on how to demonstrate compliance with this performance outcome.	AO3 No acceptable outcome provided.	Proposed land uses are industrial and not classified as essential community infrastructure activities as defined by Logan City Council Planning Scheme 2015 Administrative Definitions.
PO4 Development is located outside of a Flood investigation area identified on Flood hazard overlay map OM-05.04, unless it: is demonstrated to be compatible with the level of flood risk; delivers the relevant outcomes for the flood risk area, including a: High flood risk area; Moderate flood risk area; Low flood risk area and High flood island where involving Essential community infrastructure activities or Vulnerable use activities. Note - Planning scheme policy 10 - Flood provides guidelines on how to prepare a detailed localised	AO4 No acceptable outcome provided.	

flood risk assessment to assist with achieving this performance outcome. It also includes guidance on how to demonstrate compliance with this performance outcome.	The site is not located within a Flood Investigation Area. The development has been designed having regard to the identified flood risks applicable to the site.	
Reconfiguring a lot		
PO5 Development provides a development envelope area that is: a. above the flood level during the defined flood event; b. of an area and dimensions to accommodate the activities associated with the intended use.	AO5 Development provides a development envelope area above the flood level during the defined flood event with a minimum size and dimension specified in Table 8.2.5.3.4 - Development envelope area.	Development envelopes are proposed above the adopted flood planning level and are of sufficient size to accommodate the intended industrial land use.
PO6 Each lot has a development envelope area located outside a High flood risk area identified on Flood hazard overlay map OM-05.04, except where limited to: a. the rearrangement of boundaries and flood risk is not materially increased on new lots; or b. creating an additional lot for the purpose of a drainage or environmental reserve.	AO6 No acceptable outcome provided.	Each proposed lot contains a development envelope located outside identified High Flood Risk Areas
PO7 Reconfiguring a lot involving a development envelope area located in a Flood investigation	AO7 Each lot has a development envelope area located outside of a Flood investigation area	The site is not located within a Flood Investigation Area in accordance with the Logan Flood Portal Property Flood Report. Development envelopes

area identified on Flood hazard overlay map OM-05.04 is limited to: a. the realignment of boundaries where the development envelope area is located outside a High flow area identified on Flood hazard overlay map OM-05.02; or b. the development is demonstrated to be compatible with the level of flood risk, including delivering the relevant outcomes for a: i. High flood risk area; ii. Moderate flood risk area; iii. Low flood risk area and High flood island where involving Essential community infrastructure activities or Vulnerable use activities. Note - Planning scheme policy 10 - Flood provides guidelines on how to prepare a detailed localised flood risk assessment to assist with achieving Performance Outcome 7(b).	identified on Flood hazard overlay map OM-05.04.	have been planned having regard to the applicable flood risks identified for the site. 
Part B - Resilient building location, design and operations (other than a Home-based business)		
PO8 Buildings and structures are located outside of a High flow area. Note - Planning scheme policy 10 - Flood provides guidance on how to demonstrate compliance with this performance outcome where located in a Flood investigation area and it is proposed to undertake a detailed localised flood risk assessment.	AO8.1 New buildings and structures, other than fences, are located outside of a High flow area identified on Flood hazard overlay map OM-05.02. AO8.2 Enclosure of existing structures or areas underneath an existing building, such as an undercroft, does not occur in a High flow area	No buildings are proposed as part of the current application. Future building development will be required to demonstrate compliance with flood planning requirements and any applicable High Flow Area constraints.

	identified on Flood hazard overlay map OM-05.02.	
PO9 A Hospital in the Meadowbrook flood assessment area identified on Flood hazard overlay map OM-05.03 ensures that the location, design and operation of development: a. mitigates the risk of flooding to buildings and structures; b. minimises risk of injury to life and damage to property and infrastructure; c. maintains functionality during and after all flood events, including the probable maximum flood. Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	AO9 No acceptable outcome provided.	Proposed land uses do not include a hospital and is not located in the Meadowbrook flood assessment area.
PO10 Buildings are designed to account for the potential risk of inundation during flood events by complying with the Minimum flood planning levels identified in Table 8.2.5.3.3 - Minimum flood planning levels. Editor's note - Planning scheme policy 10 - Flood provides guidance on obtaining available flood level information for a property from Council, and resilient design.	AO10 No acceptable outcome prescribed.	The Logan Flood Portal Property Flood Report identifies a 1% AEP flood level of RL 27.7 m AHD, a 0.5% AEP flood level of RL 28.2 m AHD and a 0.2% AEP flood level of RL 28.9 m AHD. Development envelopes and proposed pad levels are located above the applicable flood planning levels and are capable of accommodating future industrial development in accordance with the minimum flood planning level requirements of Table 8.2.5.3.3 of the Flood Hazard Overlay Code.
PO11 Vehicle manoeuvring areas and car parking (other than a Parking station) are only located below the defined flood event where there is no increase in risk to: a. pedestrian and vehicular safety; b. a building or other structure.	AO11 Vehicle manoeuvring areas and car parking (other than a Parking station) are located above the defined flood event.	Vehicle access and manoeuvring areas are proposed to be provided above the applicable flood planning levels identified for the site. Detailed design will confirm final flood immunity requirements.

Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.		
PO12 Basement access and openings are designed and located to: a. ensure safety during a flood event; b. improve resilience to flood events; c. reduce recovery time after flooding; d. minimise economic loss to individual and public assets stored in the basement. Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	AO12 All entry points and openings to a basement are located at or above the Minimum flood planning levels identified in Table 8.2.5.3.3 - Minimum flood planning levels.	No basement structures are proposed as part of this application
PO13 Essential building services and infrastructure is located or designed to ensure their continued function during and immediately after flood events that are up to and including the: a. defined flood event for uses other than Essential community infrastructure activities or Vulnerable use activities; or b. probable maximum flood for Essential community infrastructure activities or Vulnerable use activities. Note - Essential building services and infrastructure may include air conditioning ducts, communication equipment, charging units, pumps, motors, sensitive electrical equipment such as transformers, low voltage switch gear, high voltage switch gear, battery charges, and communal assets and materials (such as waste bins or chemicals). Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	AO13 The function of essential building services and infrastructure is maintained during a flood event by: a. locating the services and infrastructure outside of a High flood risk area identified on Flood hazard overlay map OM-05.04; b. locating the services and infrastructure above the flood planning level in accordance with Table 8.2.5.3.3 - Minimum flood planning levels; or c. designing and constructing essential services and infrastructure to exclude water infiltration for flood events up to and including: i. the defined flood event where not involving Essential community infrastructure activities or Vulnerable use activities;	The Logan Flood Portal Property Flood Report identifies a 1% AEP flood level of RL 27.7 m AHD, a 0.5% AEP flood level of RL 28.2 m AHD and a 0.2% AEP flood level of RL 28.9 m AHD. Development envelopes and proposed pad levels are located above the applicable flood planning levels identified in Table 8.2.5.3.3 of the Flood Hazard Overlay Code. Future essential building services and infrastructure will be located above the relevant flood planning levels to maintain functionality during and immediately following flood events.

	ii. the probable maximum flood where for Essential community infrastructure activities or Vulnerable use activities.	
PO14 Screening the understorey of a building: a. does not impede the passage of floodwater or overland flow in a High flood risk area identified on Flood hazard overlay map OM-05.04; b. maintains an attractive streetscape interaction and interface as intended by the zone, precinct or local plan. Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	AO14 No acceptable outcome provided.	No proposed building understorey for development areas/lots.
Storage, manufacturing or handling of hazardous materials		
PO15 Development protects public safety and the environment from release of hazardous materials into floodwaters by: a. locating hazardous materials and chemicals outside of a High flood risk area or High flow area identified on Flood hazard overlay map OM-05.04 and OM-05.02; b. ensuring hazardous materials are stored to prevent the release or hazardous reaction of hazardous materials during flood events, including events rarer than the defined flood event.	AO15.1 Development involving the manufacturing or storage of hazardous materials, or involving hazardous chemicals at a hazardous chemical facility is located outside of a: a. High flood risk area identified on Flood hazard overlay map OM-05.04; b. High flow area identified on Flood hazard overlay map OM-05.02. AO15.2 Development in a Moderate flood risk area identified on Flood hazard overlay map OM-05.04: a. does not involve the manufacturing or storage of hazard materials or	Should hazardous materials be proposed in future, storage will be located above the applicable flood planning level, including the 0.2% AEP flood level where required by Table 8.2.5.3.3. The Property Flood Report identifies the 0.2% AEP flood level as RL 28.9 m AHD.

	hazardous chemicals at a hazardous chemical facility; or b. ensures the storage of hazardous materials is located above the 0.2% AEP at 2100 flood event.	
Part C - Access and evacuation (other than a Home-based business)		
PO16 Development involving Vulnerable use activities, other than a Hospital in the Meadowbrook flood assessment area identified on Flood hazard overlay map OM-05.03, has a low flood hazard vehicle evacuation route that leads outside the floodplain to a suitable area that supports the needs of evacuees. Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	AO16 No acceptable outcome provided.	Proposed land uses are industrial and are not classified as Vulnerable Use Activities under the Logan Planning Scheme
PO17 Development involving an accommodation land use has a low flood hazard vehicle route to a suitable flood-free area that contains essential goods to serve the needs of people. Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	AO17 During the defined flood event, development for an accommodation land use has a: a. flood-free vehicle access to a road above the flood level; b. flood-free vehicle route that leads to a suitable flood-free area that contains essential goods.	Not applicable. The proposed development comprises industrial land uses only and does not include accommodation land uses. Notwithstanding this, a Flood Emergency Management Plan (FEMP) will be prepared prior to occupation to address the potential isolation of the site resulting from flooding of Greenbank Road, including procedures for early site closure and departure before the access route becomes unsafe.
PO18 Development has a low flood hazard vehicle route from dwellings to a flood-free or low flood hazard road.	AO18 During the defined flood event, development involving a new dwelling or an increase in bedrooms, has a flood-free vehicle route from dwellings to the flood-free road. Editor's note - Figure 8.2.5.3.1 - Compliant dwelling with flood-free vehicle route illustrates an example of a	Not applicable. The proposed development comprises industrial land uses only and does not include accommodation land uses. Notwithstanding this, a Flood Emergency Management Plan (FEMP) will be prepared prior to occupation to address the potential isolation of the site resulting from flooding of Greenbank Road, including procedures for early

	development complying with this acceptable outcome. Figure 8.2.5.3.2 - Non-compliant dwelling with no flood-free vehicle route illustrates an example of a development that does not comply with this acceptable outcome.	site closure and departure before the access route becomes unsafe.
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Figure 8.2.5.3.1 - Compliant dwelling with flood-free vehicle route

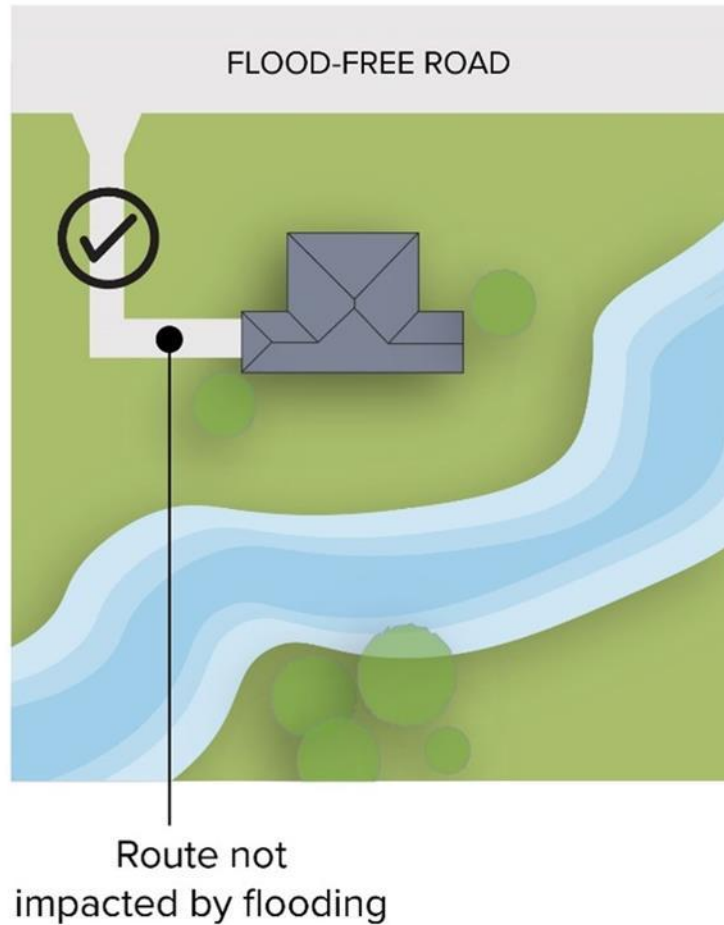
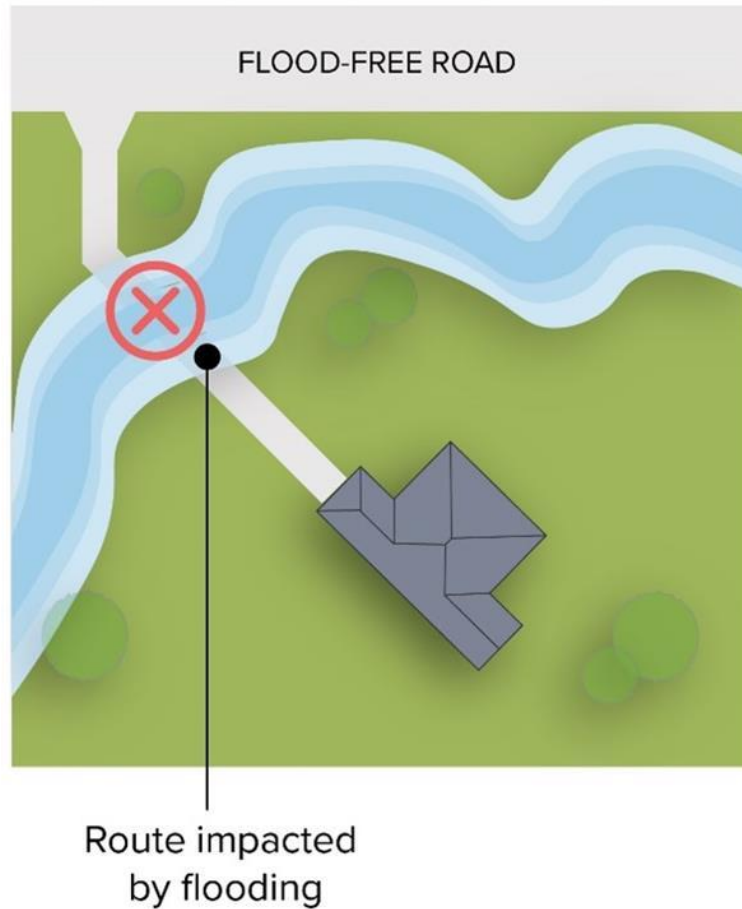


Figure 8.2.5.3.2 - Non-compliant dwelling with no flood-free vehicle route



PO19 Reconfiguring of a lot intended for a future dual occupancy (auxiliary unit), dwelling house or accommodation land use ensures each lot has internal low flood hazard vehicle access to a road and a low flood hazard vehicle route to a suitable flood-free area that contains essential goods to serve the needs of people. Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	AO19 Reconfiguring of a lot in a residential zone category or Emerging community zone, or intended for a future dual occupancy (auxiliary unit), dwelling house or accommodation land use, ensures each lot during the defined flood event has a: a. flood-free vehicle access to a road above the flood level; b. flood-free vehicle route that leads to a suitable flood-free area that contains essential goods.	The proposed reconfiguration of lot is for industrial development and does not create lots intended for future residential or accommodation land uses.
PO20 Development, other than where PO16-PO19 is applicable: a. ensures safe self-evacuation by having, for a period of at least 10 hours, low flood hazard vehicle access to a low flood hazard road; or b. is only isolated for a period of less than 4 hours from a low flood hazard road and there is a suitable area on site that is: i. above the defined flood event; ii. not a Low flood island identified on Flood hazard overlay map OM-05.01 or an area impacted by flash flooding during the defined flood event. Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	AO20 Where AO16-AO19 is not applicable, development has flood-free vehicle access to a road that is above the flood level during the defined flood event.	The proposed development will provide vehicle access to the existing road network. Detailed design will confirm compliance with applicable flood access requirements.
PO21	AO21 No acceptable outcome provided.	

Development identified in Table 8.2.5.3.5 - Development requiring a flood emergency management plan appropriately plans for its safe operation and evacuation during a flood event to ensure there is no burden on emergency services, including during a probable maximum flood where involving Vulnerable use activities. Note - Planning scheme policy 10 - Flood provides guidance preparing a flood emergency management plan to achieve this performance outcome. Note - Flood emergency management plans do not alter the land use tolerability to a flood risk area, nor act as an alternative to achieving other specified mitigation measures required to ensure risk is mitigated to a tolerable or acceptable level. Flood emergency management plans should be utilised to assist in managing residual risk of development and should be implemented as a tool to plan for safe evacuation where an active management entity exists for the development.		Complies. A site-specific Flood Emergency Management Plan (FEMP) will be prepared prior to occupation to manage residual flood risk associated with potential site isolation resulting from flooding of Greenbank Road. The FEMP will include procedures for monitoring flood conditions, early site closure and the safe evacuation of occupants prior to floodwaters affecting the access route, thereby avoiding reliance on emergency services.
Part D - Preservation of floodplain function and overland flow paths (other than a Home-based business)		
PO22 Filling and excavation ensures the conveyance function of a High flood risk area and Flood investigation area identified on Flood hazard overlay map OM-05.04 is maintained. Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	AO22 Where located in a High flood risk area or Flood investigation area identified on Flood hazard overlay map OM-05.04, filling and excavation, other than for stormwater quantity and quality infrastructure, does not exceed: a. a total volume of 20m³; b. a total area of 2,000m².	The detailed earthworks design will demonstrate that floodplain function is maintained and that compensatory flood storage is provided where required.
PO23 Development does not involve earthworks that would either directly, indirectly or cumulatively	AO23 The total volume of fill is equal to or less than the total volume of cut where earthworks are	Concept earthworks have been developed having regard to flood constraints affecting the site. Detailed design will confirm compliance with floodplain storage requirements.

cause a loss of floodplain storage below the defined flood event. Note - Planning scheme policy 10 - Flood provides guidance on achieving this performance outcome.	below the level of the defined flood event in a Moderate flood risk area identified on Flood hazard overlay map OM-05.04.	
PO24 Development does not involve works that would either directly, indirectly or cumulatively: a. concentrate, intensify or divert floodwater or overland flow paths onto upstream, downstream or adjacent properties; b. result in an increase in flood levels or flood hazard on upstream, downstream or adjacent properties; c. result in a loss of floodplain storage up to and including the defined flood event; d. adversely impact the role and function of waterways and areas of ecological significance; e. adversely affect adjoining premises, infrastructure and the environment. Note - Planning scheme policy 10 - Flood provides guidance on how to demonstrate compliance with this performance outcome.	AO24 No acceptable outcome provided.	Development has been planned having regard to the flood constraints affecting the site. Detailed design and supporting assessments, where required, will confirm compliance with the flood behaviour outcomes of the Flood Hazard Overlay Code.
PO25 Development does not adversely change the following flood characteristics for all flood events up to and including the defined flood event: a. peak flow; b. flow of any part of the flood before the peak; c. flood flow velocity;	AO25 No acceptable outcome provided.	The proposed development is located outside the regional 1% AEP flood extent. Detailed design and any supporting flood assessment will confirm that the proposed development does not adversely affect flood behaviour, including flood levels, velocities, conveyance and flood storage, up to and including the defined flood event.

d. level of flooding; e. flood time to peak. Note - Planning scheme policy 10 - Flood provides guidance on how to demonstrate compliance with this performance outcome.		
PO26 Development does not cause a rapid or unexpected increase in safety risks or flood damage during a flood event larger than the defined flood event, including flood events up to and including the probable maximum flood. Note - Planning scheme policy 10 - Flood provides guidance on how to demonstrate compliance with this performance outcome.	AO26 No acceptable outcome provided.	The proposed development has been planned having regard to the identified flood risks affecting the site. Detailed design and supporting flood assessment, where required, will confirm that the development does not result in an increase in flood risk or flood damage. Refer to Arcadis Prepared SBSMP 30340582-GA0002-02 - SBSMP
PO27 A stormwater quality improvement device is located to retain existing floodplain storage capacity and ensure functionality of the stormwater quality improvement device. Note - Planning scheme policy 10 - Flood provides guidance on how to demonstrate compliance with this performance outcome.	AO27 A stormwater quality improvement high flow outlet device is located: a. above the 5% AEP flood event caused by local flooding; b. above the 5% AEP flood event caused by regional flooding.	Refer to Arcadis Prepared SBSMP 30340582-GA0002-02 - SBSMP
PO28 A stormwater quantity management device is located to retain existing floodplain storage capacity and ensure functionality of the stormwater quantity management device. Note - Planning scheme policy 10 - Flood provides guidance on how to demonstrate compliance with this performance outcome.	AO28 A stormwater quantity management outlet device is located above the 2% AEP flood event.	Refer to Arcadis Prepared SBSMP 30340582-GA0002-02 - SBSMP
PO29	AO29 Filling and excavation associated with stormwater quantity and quality infrastructure	Stormwater infrastructure requirements will be addressed during detailed design. Any stormwater infrastructure will be designed to maintain floodplain storage capacity and floodplain function.

Stormwater infrastructure does not result in a loss of floodplain storage below the defined flood event.	has a total volume of fill equal to or less than the total volume of cut where below the defined flood event. Note - Planning scheme policy 10 - Flood provides guidance on stormwater management detention basins.	
Part E - A Home-based business		
PO30 A Home-based business does not put additional people at risk of flooding during the defined flood event. Note - Where detailed flood information does not exist to determine the defined flood event, a Registered Professional Engineer of Queensland with expertise in flood studies may be required to determine the relevant defined flood event and demonstrate compliance with this outcome. Planning scheme policy 10 - Flood provides guidance on how to demonstrate compliance with this performance outcome.	AO30.1 In a High flood risk area or Flood investigation area identified on Flood hazard overlay map OM-05.04, a Home-based business does not involve: a. non-resident staff or visitors to the premises; b. new buildings or structures associated with the home-based business. AO30.2 Buildings, structures and storage of items associated with a Home-based business are located outside of a High flow area identified on Flood hazard overlay map OM-05.02.	Proposed land uses are industrial and are not classified as Home-based Business activities.
PO31 A Home-based business being a bed and breakfast or farm stay has: a. low flood hazard vehicle manoeuvring areas; b. low flood hazard vehicle access to a low flood hazard road.	AO31 A Home-based business being Short-term accommodation where a bed and breakfast or farm stay has: a. flood-free vehicle manoeuvring areas during a defined flood event; b. flood-free vehicle access to a road above the flood level during a defined flood event.	Proposed land uses are industrial and do not include bed and breakfast, farm stay or other Home-based Business accommodation activities.

Table 8.2.5.3.2 - Land use compatibility in a high flood risk area

Zone	Land use (where consistent with the intent of the underlying zone)	Qualifying criteria
Environmental management and conservation zone or Recreation and open space zone	A use other than an accommodation land use	N/A
	Nature-based tourism other than involving accommodation	N/A
	Nature-based tourism involving accommodation	If - a. located outside an area of flash flooding; b. there are no permanent habitable buildings or structures attached to the land in a High flood risk area
Any zone other than Environmental management and conservation zone or Recreation and open space zone	Rural activities other than Rural industry, Intensive animal industry or Intensive horticulture	N/A
	Nature-based tourism other than involving accommodation	N/A
	Nature-based tourism involving accommodation	If - a. located outside an area of flash flooding; b. there are no permanent habitable buildings or structures attached to the land in a High flood risk area
	A use other than: a. accommodation land use; or b. Vulnerable use activities	If there is no increase to the existing building footprint
	An existing lawful accommodation land use	If - a. there is no increase to the existing building footprint; b. there is no increase in the number of persons on the premises in a High flood risk area

Table 8.2.5.3.3 - Minimum flood planning levels

Column 1 Use	Column 2 Minimum flood planning level
Uses other than Essential community infrastructure activities and Vulnerable use activities (building floor level and essential building services)	
Where in a High flood risk area, Moderate flood risk area or Flood investigation area on Flood hazard overlay map OM-05.04 Note - Where located in a Flood investigation area, a Registered Professional Engineer of Queensland with expertise in flood studies is to determine the level of the flood event identified in Column 2 corresponding to the applicable use identified in Column 1.	
Accommodation land use	Habitable rooms and essential building services - defined flood event + 500mm freeboard Non-habitable rooms - above the defined flood event Basement Entry/Exit - defined flood event + 300mm freeboard
An industry activity involving the manufacture or storage of noxious or hazardous materials (e.g. a regional fuel storage facility)	0.2% AEP flood level at 2100
Educational establishment where for vocational trade training only	Building floor level - defined flood event + 500mm freeboard Essential building services - defined flood event + 500mm freeboard
Transport infrastructure as defined by the Regulation	No specific recommended level but development proponents should ensure that the infrastructure is optimally located and designed to achieve suitable levels of service, having regard to the processes and policies of the administering government agency
Warehouse, being a food storage warehouse	0.5% AEP flood level at 2100
Where involving the storage of valuable records or items of historic or cultural significance (e.g. galleries and libraries)	0.5% AEP flood level at 2100
Development involving the use of a Class 5, 6 & 9b building other than specified above	Defined flood event + 500mm freeboard
Development involving the use of Class 7(b) or 8 building other than specified above	Building floor level - defined flood event Essential building services - defined flood event + 500mm freeboard

Any other use other than listed above	Defined flood event + 500mm freeboard
Essential community infrastructure activities (building floor level and essential building services)	
Emergency services	0.2% AEP flood level at 2100 + 500mm freeboard
Major electricity infrastructure	0.2% AEP flood level at 2100 + 500mm freeboard
Renewable energy facility	0.2% AEP flood level at 2100 + 500mm freeboard
Substation	0.5% AEP flood level at 2100 + 500mm freeboard
Telecommunications facility Utility installation where not otherwise listed in this table	No specific recommended level but development proponents should ensure that the infrastructure is optimally located and designed to achieve suitable levels of service, having regard to the processes and policies of the administering government agency
Utility installation being power station	0.2% AEP flood level at 2100 + 500mm freeboard
Utility installation, being a sewage treatment plant or water treatment plant	0.2% AEP flood level at 2100 + 500mm freeboard
Vulnerable uses activities (building floor level and essential building services)	
Where located in Meadowbrook flood assessment area on Flood hazard overlay map OM-05.03	
Vulnerable use activities, being a Hospital	0.2% AEP flood level at 2100 + 500mm freeboard
Where located in the Low flood risk area on Flood hazard overlay map OM-05.04	
Vulnerable use activities	Above the flood level of the probable maximum flood

Table 8.2.5.3.4 - Development envelope area

Zone or precinct	Development envelope area specification	
	Minimum area	Minimum dimension (length and width)
Rural zone	2,000m ²	30m
Rural residential zone		
Environmental management and conservation zone - Environmental management precinct		
Environmental management and conservation zone - Rural environmental management precinct		
All other zones	The entire lot	-

Table 8.2.5.3.5 - Development requiring a flood emergency management plan

Use	Qualifier
Vulnerable use activities	Where involving an active management entity and in a Low flood risk area identified on OM-05.04
Nature-based tourism	Where involving accommodation and an active management entity
Resort complex	Where involving an active management entity
Tourist park	Where involving an active management entity
Multiple dwelling	Where involving an active management entity and in a: a. Moderate flood risk area identified on OM-05.04 and the premises or vehicle route during evacuation is inundated during the defined flood event; or b. Flood investigation area identified on OM-05.04
Rooming accommodation	
Rural workers' accommodation	
Short-term accommodation	
Any development	Where involving an active management entity and development involves an access easement to provide flood-free or low flood hazard vehicle access to a flood-free or low flood hazard road

Note - There may be other circumstances in which development will require a flood emergency management plan to manage the residual flood risk to the development.

Note - Flood emergency management plans do not alter the land use tolerability to a flood risk area, nor act as an alternative to achieving other specified mitigation measures required to ensure risk is mitigated to a tolerable or acceptable level. Flood emergency management plans should be utilised to assist in managing residual risk of development and should be implemented as a tool to plan for safe evacuation where an active management entity exists for the development.