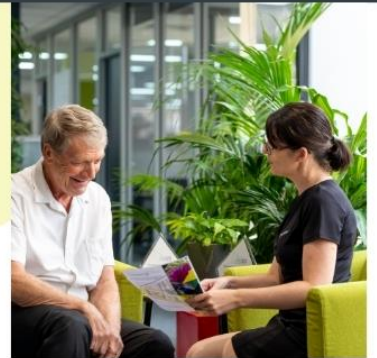
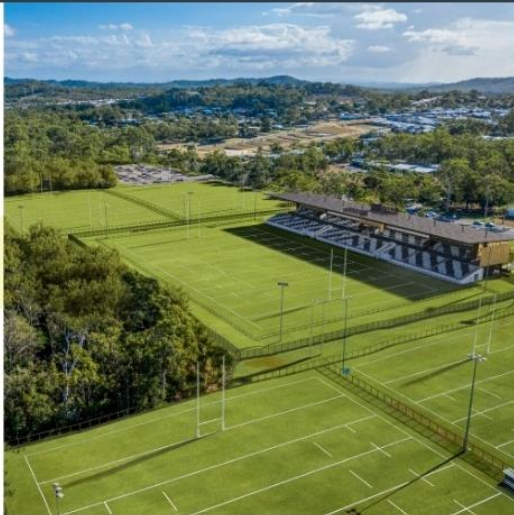




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**North MacLean Lot 7 & 8 Industrial Subdivision
Conceptual Stormwater Management Plan**

Client:
Project Number:
Document Number:

Roubaix Properties Pty Ltd
BE220566
BE220566-RP-CSMP-02

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Recipients are responsible for eliminating all superseded documents in their possession.

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Executive Summary

Roubaix Properties Pty Ltd has engaged Burchills Engineering Solutions to prepare a Conceptual Stormwater Management Plan (CSMP) for the proposed development located at North MacLean.

This CSMP has been prepared in accordance with The Greater Flagstone Priority Development Area (PDA) and is to accompany the development application for a proposed subdivision. The CSMP has referenced relevant guidelines relating to stormwater management to form the conceptual basis of the stormwater plan. The following conclusions have been made as a result of this study.

Stormwater Quantity

- It is proposed to utilise compliant building-scale detention treatment measures to be delivered at the future MCU stage, where final impervious areas, roof layouts and operational uses are known; An approximate detention volume of 146 m³ per lot will be required.
- Post-development stormwater flows from the subject site will be conveyed via perimeter swales and overland flow paths to the identified lawful point of discharge (LPD) along the northern boundary, where flows enter an existing floodplain system.
- Consistent with the findings of the Hydraulic Impact Assessment (BE220566-RP-HIA-02), this discharge regime does not result in adverse afflux, loss of floodplain function, or worsening of flood behaviour upstream, downstream, or within the adjoining State-controlled road corridor.

Stormwater Quality

- Stormwater quality treatment for the fully developed site is addressed through a consolidated, site-wide treatment strategy, comprising:
 - bio-retention street tree systems located within the internal road reserve, providing treatment of road runoff at the precinct scale; and
 - allowance for compliant building-scale treatment measures to be delivered at the future MCU stage, where final impervious areas, roof layouts and operational uses are known.
- This approach avoids reliance on prescriptive lot-by-lot treatment at the subdivision stage and is consistent with EDQ Guideline 13 and the Information Request dated 19 September 2025.
- For clarity, the subdivision-stage water quality treatment proposed within the road reserve comprises street tree bioretention pods with a total treatment area of approximately 70 m². Any future building-scale treatment on individual lots will be confirmed and delivered at the MCU/Operational Works stage

Erosion and Sediment Control

- An Erosion Hazard Assessment has identified that the site is high-risk with regard to erosion potential.
- Sediment loss estimates have been used to determine that Type 1 sediment controls are required, given a yield of 133.8 m³/year for the disturbed catchment.





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Appendix A – Proposed Plans of Development

Appendix B – Time of Concentration and Rational Method Calculations

Appendix C – XP-SWMM Input Parameters

Appendix D – MUSIC Input Parameters

Appendix E – Burchills Engineering Solutions Conceptual Stormwater Management Drawings – Subject Site

Appendix F – Burchills Engineering Solutions Conceptual Stormwater Management Drawings – Individual Lots

Appendix G – Burchills Engineering Solutions Civil Drawings





1. Introduction

Roubaix Properties Pty Ltd (Roubaix) has commissioned Burchills Engineering Solutions (Burchills) to prepare a Conceptual Stormwater Management Plan (CSMP) as part of a Development Approval (DA) submission for a Reconfiguring a Lot (ROL) only, to facilitate a 17-lot industrial subdivision, to Economic Development Queensland (EDQ). This CSMP is prepared at a conceptual level only and does not approve or rely upon detailed building-specific stormwater infrastructure, which will be addressed at the future Material Change of Use (MCU) and Operational Works stages. The proposed North MacLean Industrial development is located at Lot 7 & 8 on RP137101, encompassing the addresses 4745-4759 and 4761-4773 Mount Lindesay Highway, North MacLean.

1.1 Background

1.1.1 Regulatory Requirements and Technical Guidelines

The strategies proposed in this CSMP have been developed to address requirements from The Greater Flagstone Priority Development Area (PDA), and have also been prepared in accordance with the following guidelines:

- State Planning Policy July 2017 (DSPIP, 2017);
- Queensland Urban Drainage Manual (QUDM) Fourth Edition (IPWEAQ, 2017);
- Australian Rainfall & Runoff: A Guide to Flood Estimation (Ball J, 2019);
- Australian Government – Bureau of Meteorology (Bureau of Meteorology, n.d.);
- MUSIC Modelling Guidelines (Water By Design, 2019);
- WSUD Technical Guidelines for South East Queensland – Version 1 (Healthy Waterways, BCC, MBWCP, 2006);
- Best Practice Erosion and Sediment Control (IECA, 2008); and
- Best Practice Erosion and Sediment Control Appendix B - Draft Document Revision December 2016 (IECA, 2016).

1.2 Purpose

The main objectives of this CSMP are summarised as follows:

- Avoid the creation of nuisance flow or hazard problems;
- Protect the quality of surface and ground waters during construction and operation of new development;
- Maintain the natural hydraulic behaviour of catchments;
- Protect existing natural features and ecological processes;
- Integrate stormwater management infrastructure carefully in the urban and natural landscape; and
- Assess the proposed development design and ensure safety for end users with respect to flooding.

1.3 Scope

To achieve the above mentioned objectives, this CSMP details the following:

- Site description including:
 - Topography;
 - Land Use; and
 - Vegetation.
- Stormwater Quantity:
 - Control measures to ensure no net increase in peak discharge from the subject site (up to the 1% Average Exceedance Probability (AEP)).





- Stormwater Quality:
 - Address requirements of the SPP 2017.

To minimise the impact of the proposed development on the external environment and to avoid significant and / or sustained deterioration in downstream water quality the proponent shall implement this CSMP. This CSMP may be amended as required, in response to a monitoring and maintenance program.





2. Site Detail

2.1 Real Property Description

The site is legally described as Lot 7 & 8 on RP137101. The corresponding street address is 4745-4759 and 4761-4773 Mount Lindesay Highway, North MacLean. The combined site is generally rectangular and occupies an area of approximately 8.20 ha. The location of the subject site is shown on Figure 2.1.



Figure 2.1 Site Locality Plan

2.2 Physical Description

The site is accessed from Mount Lindesay Highway service road, an existing road which fronts the eastern boundary of the subject site.

The subject site is mostly flat, ranging from RL26 mAHD to RL29 mAHD. There is a separate development application on Lots 7 and 8 on RP137101 for bulk earthworks and vegetation clearing. Current features of the site include:

- Lot 7 is covered with trees and vegetation
- Lot 8 is covered with trees and vegetation.

The subject site is located within the Great Flagstone Priority Development Area (PDA).

The site is bounded by the following existing land uses:

- North: Lot 6 on RP137101 Vacant Land;
- East: Mount Lindsay Highway;
- South: Lot 2 on SP267252 Industrial business; and
- West: Lot 9 on RP137101 Industrial supplier/business.





2.3 Downstream Environment

The stormwater runoff is conveyed via overland flow to the northern site boundary, where it sheet flows across the vacant lots to the north eventually discharges into the Logan River.

2.4 Rainfall

The mean annual rainfall for the site has been estimated at 932.8 mm from the data set obtained from the nearest Bureau of Meteorology (BOM) station number 040542 at MacLean Bridge, Queensland.

2.5 Proposed Development

The proposed development is a 17 lot industrial subdivision across the two lots, with an internal road network connected to the surrounding road framework (via the existing/ultimate service road network), with no direct stormwater discharge to Mount Lindesay Highway. The lots range in size from 3019m² to 4535m². Refer to the plan shown in Figure 2.2 below and in Appendix A.

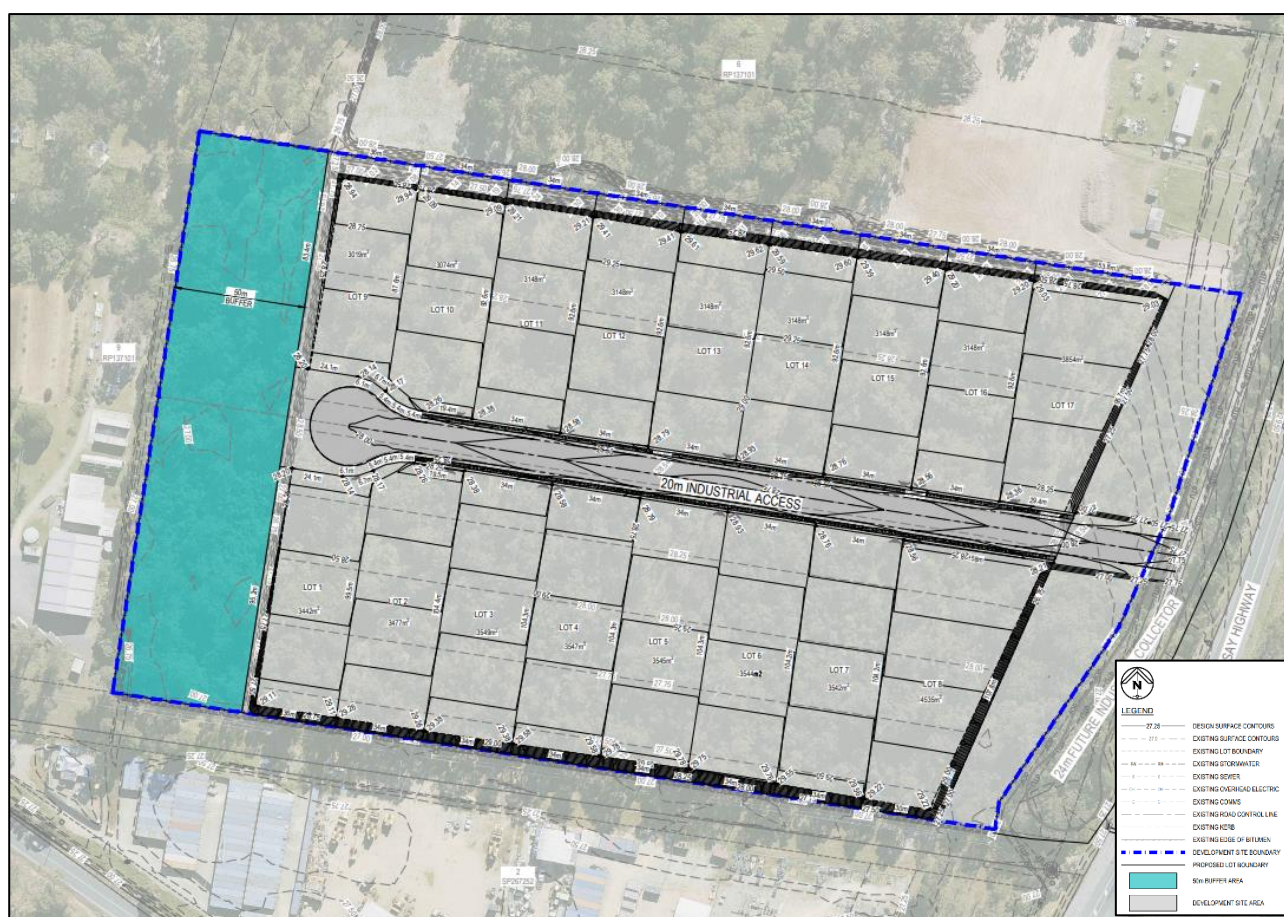


Figure 2.2 Proposed Development





3. Stormwater Quantity Assessment

3.1 Overview

The following section of this report outlines the measures required to meet the above mentioned objective in regard to stormwater quantity. In order to meet these objectives, it is necessary to ensure that post development discharge from the site will not create a worse situation for downstream property owners than that which existed prior to the development (i.e. non-worsening) (IPWEAQ, 2017).

3.2 Assessment of the Master Subject Site

The following section details the stormwater quantity management plan proposed for the master subject site as a whole to ensure non-worsening downstream. Refer to Appendix C for the complete stormwater management plans for the master subject site.

3.2.1 Conveyance of Flows

Important information about the conveyance of flows for the pre-development and post-development scenarios are included in the table below.

Table 3.1 Conveyance of Flows – Subject Site

Subject	Description
Lawful Points of Discharge	One (1) Lawful Point of Discharge (LPD) has been identified in the existing scenario and is defined as the northern lot boundary. For the developed master subject site, the LPD is located along the northern boundary, however only extends the extent of the proposed western buffer. Refer to Figure 3.1 and Figure 3.2 below for more information. No stormwater discharge is proposed directly to Mount Lindesay Highway. All discharges are directed away from the State-controlled road corridor, consistent with QUDM Table 9.4.1 and the findings of BE220566-RP-HIA-02. Capacity of the perimeter swales (including the eastern outlet) for minor and major events, inclusive of contributing external catchments, is demonstrated on the Conceptual Stormwater Management Drawings in Appendix C, and will be confirmed at detailed design during Operational Works to ensure no adverse impact to the State-controlled road corridor.
Pre-Development	In the existing case, runoff from the site is conveyed via overland flow, where it discharges to the north at the LPD. Earthworks have been previously carried out on the subject site (Application No. DEV2025/1587). Refer to Figure 3.1 for more information.
Post-Development	In the developed case runoff is conveyed to the proposed swale's along the north, south and western site boundaries, discharging to the north at the LPD. Refer to Figure 3.2 for more information.



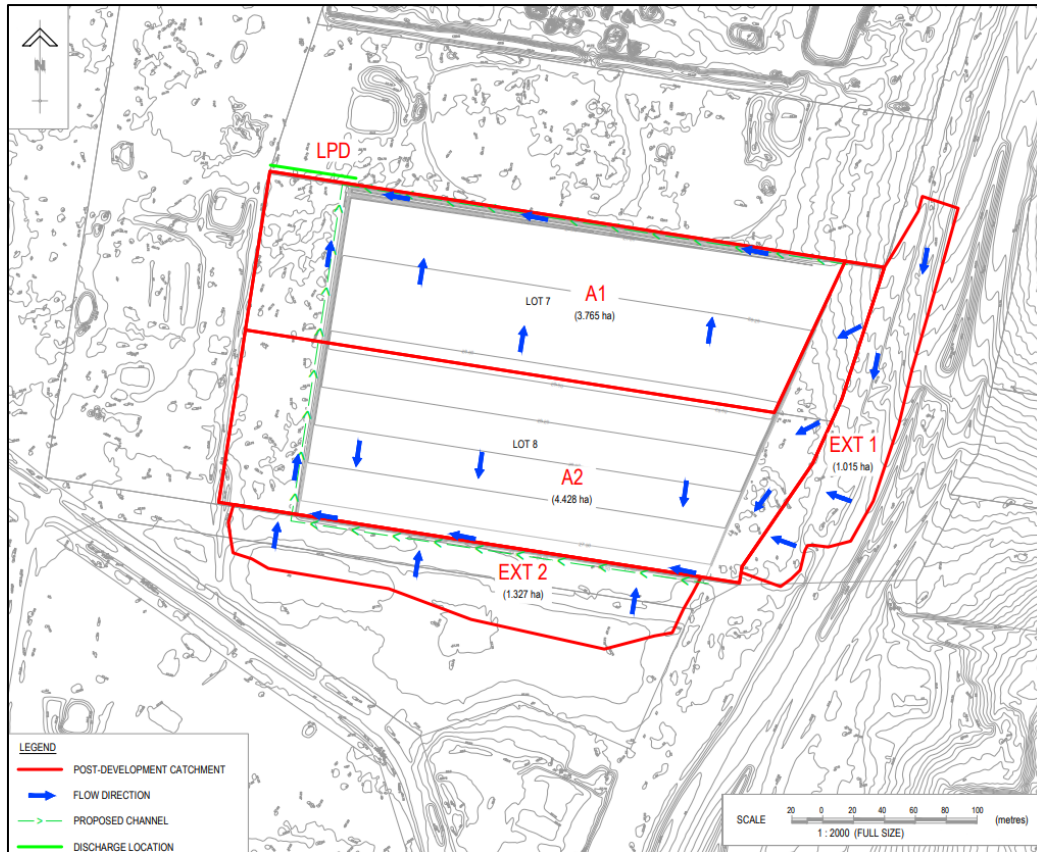


Figure 3.1 Pre-Development Catchments – Subject Site

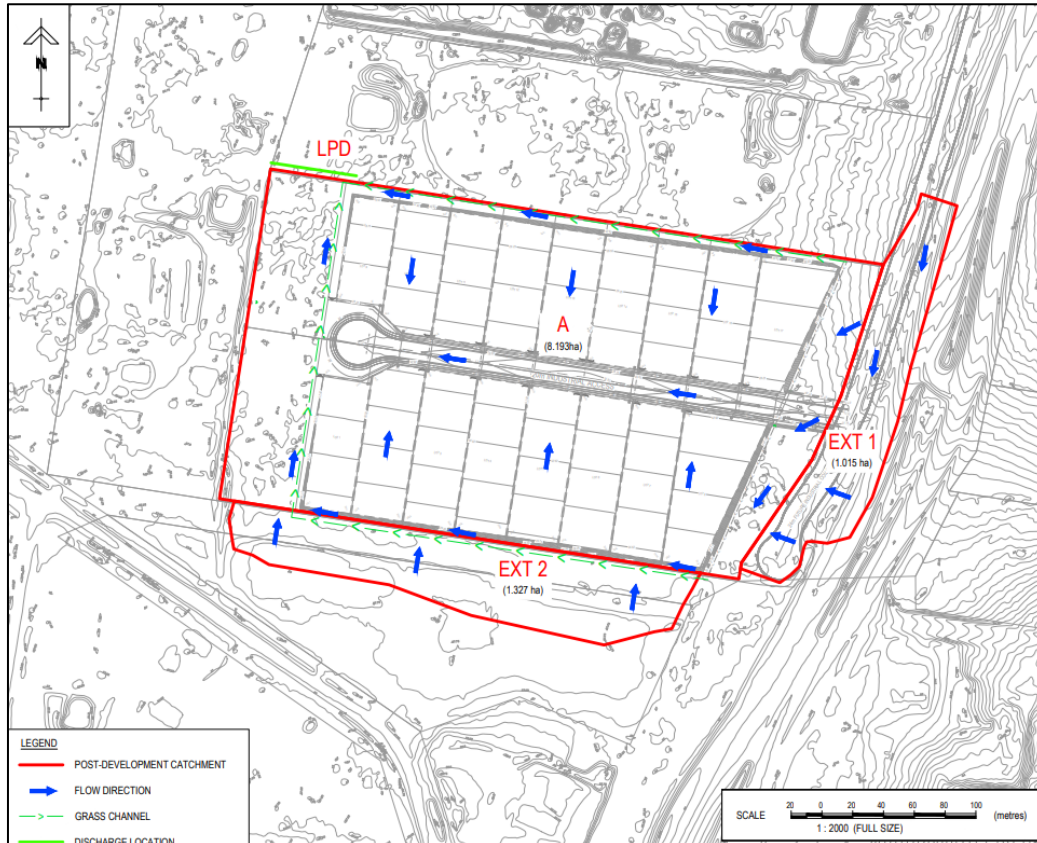


Figure 3.2 Post-Development Catchments – Subject Site





3.2.2 Management of Flows

In the post-developed scenario, the increase in flows from the master subject site is a result of the proposed internal road (with all flows from the proposed industrial lots catered for as per Section 3.3 below). Three swale's, located along the northern, southern and western boundaries of the proposed development pad (refer to Figure 3.2) will convey the flows produced over the site to the LPD.

As outlined in the Burchills Flood Letter dated 28 April, 2024 (BE220566_LTR_Flood_Lot_7-8_RP137101_20250428), the flows will discharge at the LPD before entering a floodplain to the north. Flows are conveyed to the north between Lot 3 and Lot 4 RP137101 before discharging to the channel on the MacLean Estates land (Lot 1 on RP113251). The proposed drainage easement on the western Master Subject Site boundary will help maintain this conveyance to the north.

Additionally, the Queensland State Planning Policy (SPP, July 2017) establishes performance-based outcomes for managing stormwater quantity to avoid adverse impacts on the environment and downstream infrastructure. While the SPP does not mandate stormwater detention be provided, it requires development to maintain or improve the natural hydrology of a site and mitigate potential impacts associated with increased runoff.

In particular, the SPP seeks to prevent downstream erosion, flooding, and infrastructure impacts and apply best practice environmental management (BPEM). In this case the site is located adjacent to a 1% AEP flood plain and the runoff from the site would not contribute adverse impact to the existing flood regime.

3.3 Assessment of Individual Typical Proposed Lots

The following section details the stormwater quantity management plan proposed for an individual lot to ensure non-worsening downstream. This proposed plan will be implemented for each of the 17 lots.

Due to the increase in impervious areas within the proposed lot, peak stormwater flow rates will increase. In order to mitigate these flow rates, it is proposed to implement an On Site Detention (OSD) system. OSD systems temporarily store stormwater runoff and release flows at a controlled rate that is no greater than the pre-developed peak rate.

3.3.1 Drainage Catchment Parameters

Drainage catchments have been delineated using site survey, aerial imagery and development plans in the post developed scenario. Pre and post development catchment parameters for the single lot is summarised in Table 3.2. Catchment plans are provided in Appendix F.

Table 3.2 Catchment Parameters – Proposed Individual Lot

Scenario	Catchment ID	Total Area (ha)	Impervious (%)
Pre-Developed	A	0.355	0
Post-Developed	A	0.355	95

3.3.2 Conveyance of Flows

Important information about the conveyance of flows for the pre-development and post-development scenarios are included in Table 3.3 below.





Table 3.3 Conveyance of Flows - Proposed Individual Lot

Subject	Description
Lawful Points of Discharge	One (1) Lawful Point of Discharge (LPD) is proposed for the developed Lot 5 (typical lot) and is defined as the northern site boundary. This is the case for all the lots in the northern portion of the site (Catchment A1 as per Figure 3.2). For the lots in the southern portion of the site (Catchment A2 as per Figure 3.2), the LPD is located along the southern site boundary.
Pre-Development	In the existing case, runoff from the site is conveyed via overland flow, to the respective LPD's. Refer to Figure 3.3 for more information.
Post-Development	In the developed case runoff is conveyed via overland flow to a proposed detention tank adjacent to the LPD where it is released at a controlled rate. Refer to Figure 3.4 for more information.

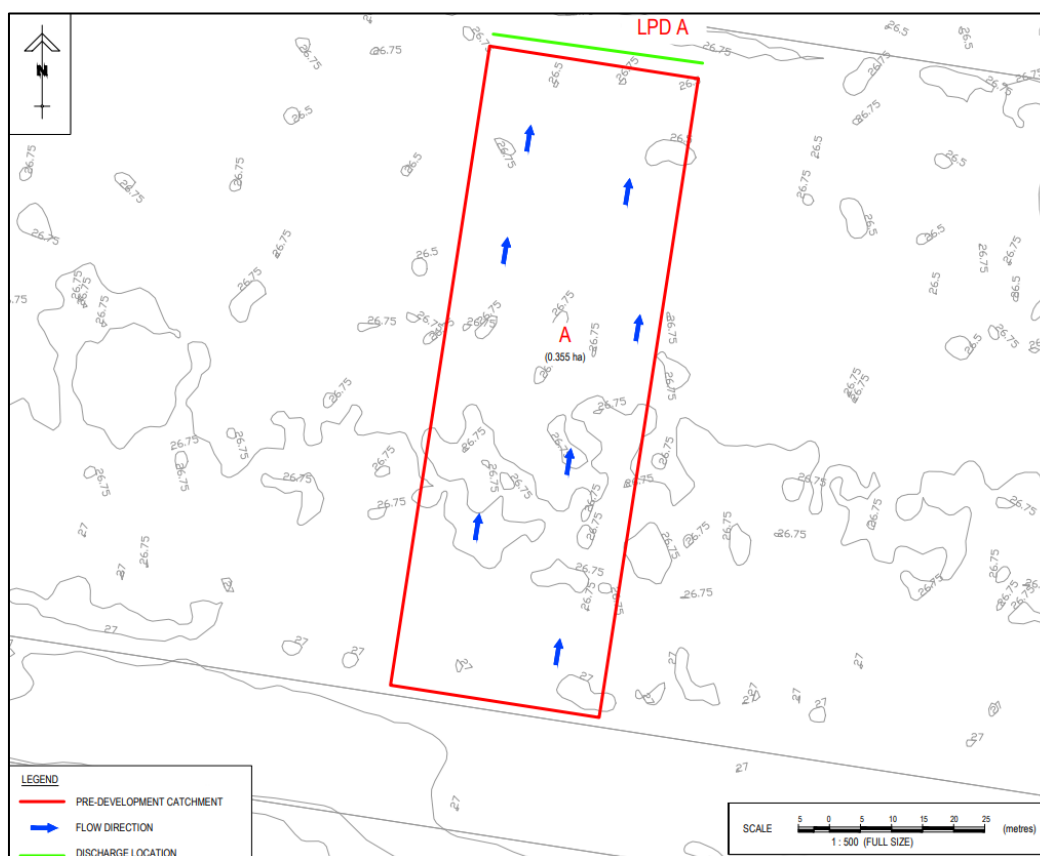


Figure 3.3 Pre-Development Catchments - Proposed Individual Lot



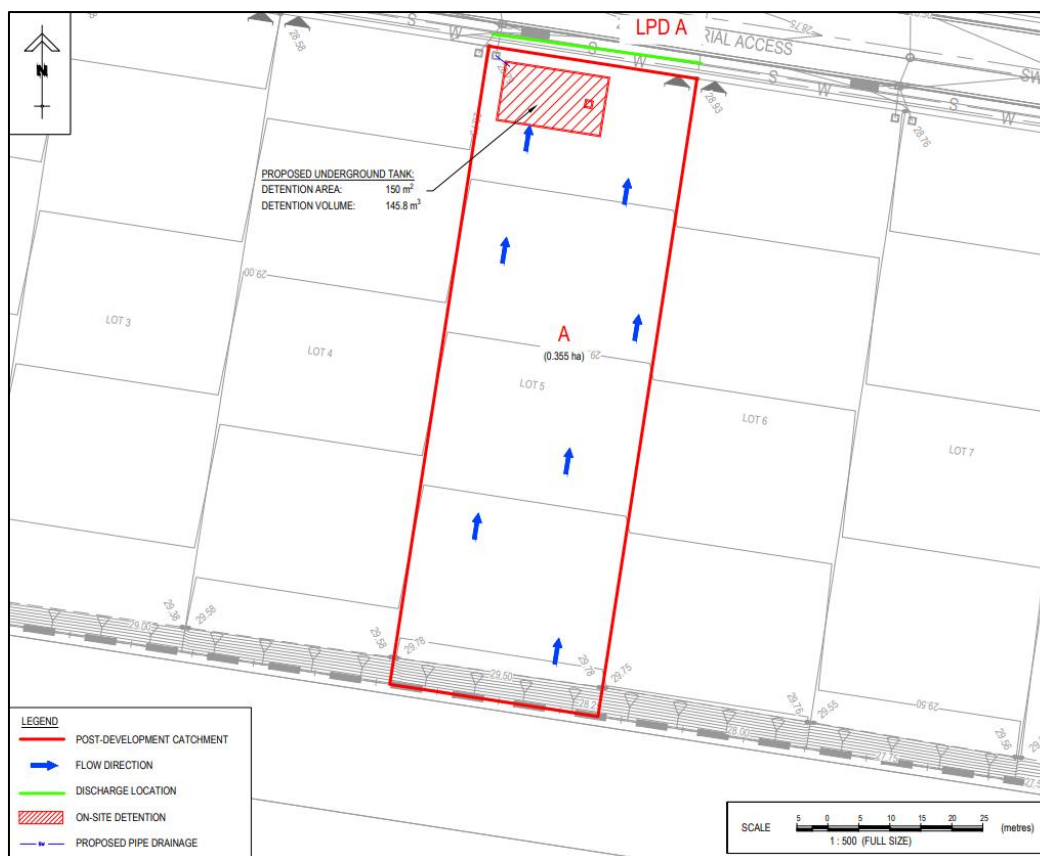


Figure 3.4 Post-Development Catchments - Proposed Individual Lot

3.3.3 XP-SWMM Analysis

XP-SWMM (version 2019) software was utilised to model the performance of the proposed stormwater quantity control measures. This modelling software is a link-node model capable of performing hydrology and hydraulics of stormwater drainage systems simultaneously.

Laurenson's Hydrology has been adopted as the runoff routing method within XP-SWMM. Sub-catchment routing in this method is carried out using the Muskingum procedure, which is a storage routing method based on the storage equation.

Details of the assumptions and input parameters used within the XP-SWMM model inputs are included in Appendix C.

3.3.3.1 Rational Method Comparison

The Rational Method has been used to gain an initial understanding of the relative impact of the proposed development on peak flow rates at the site's LPD. The Rational Method is a basic method for assessing peak flow rates and is considered suitable given the catchment area is less than 500 ha and the time of concentration within the contributing catchments is less than 30 minutes (IPWEAQ, 2017).

It should be noted that although the Rational Method has been used as an initial estimate of site peak flows, it has not been used for the design of any mitigation measures nor has been used for calibration of the runoff XP-SWMM model. A comparison between the peak discharge values obtained using the Rational Method and the XP-SWMM model for the 1% AEP event at the Lawful Point of Discharge is contained in Table 3.4 below.



**Table 3.4 Rational Method vs XP-SWMM Generated Peak Discharges**

Scenario	Catchment ID	Rational (m ³ /s)	XP-SWMM (m ³ /a)	Difference (%)
Pre-Developed	A	0.086	0.098	12
Post-Developed	A	0.256	0.247	-4

The peak discharges generated by XP-SWMM and the Rational Method are similar in comparison and are considered acceptable for this assessment (within 20%).

3.3.4 XP-SWMM Results

3.3.4.1 Development Drainage Infrastructure

To confirm the performance of the proposed OSD system and that peak flow discharging the site has not been worsened, a pre- and post-development model was constructed. These models compare the discharge hydrographs for a range of storm durations at the existing Lawful Points of Discharge. A full range of events have been simulated for critical events.

A summary of the modelling results for different AEP events is contained in Table 3.5. Results of the modelling indicate the proposed system is capable of maintaining the pre-development peak discharges for all storm events up to the 1% AEP event at LPD A.

A plot of the pre-development vs post-development (mitigated) hydrographs at LPD A1 for the 1% AEP event is included as Figure 3.5. The detention sizing was optimised to achieve peak flow requirements.

The critical temporal patterns for the XP-SWMM model are based off the 2019 AR&R Rainfall Data and the max median event of each duration is selected as the critical storm.

Table 3.5 Pre-Development vs Post-Development (Unmitigated) Peak Discharges at LPD A

AEP Event (%)	Pre-Development		Post-Development	
	Critical Duration	Peak Discharge (m ³ /s)	Critical Duration	Peak Discharge (m ³ /s)
1	45min TP3	0.10	15min TP4	0.25
2	45min TP6	0.09	15min TP4	0.22
5	45min TP7	0.07	15min TP10	0.20
10	45min TP7	0.06	15min TP10	0.17
18	1hr TP4	0.04	10min TP3	0.14
39	1hr TP4	0.03	10min TP3	0.11





Table 3.6 Pre-Development vs Post-Development (Mitigated) Peak Discharges at LPD A

AEP Event (%)	Pre-Development		Post-Development			
	Critical Duration	Peak Discharge (m ³ /s)	Pre Critical Duration	Peak Discharge (m ³ /s)	Post Critical Duration	Peak Discharge (m ³ /s)
1	45min TP3	0.10	45min TP3	0.09	15min TP4	0.05
2	45min TP6	0.09	45min TP6	0.08	15min TP4	0.04
5	45min TP7	0.07	45min TP7	0.05	15min TP10	0.04
10	45min TP7	0.06	45min TP7	0.04	15min TP10	0.04
18	1hr TP4	0.04	1hr TP4	0.04	10min TP3	0.03
39	1hr TP4	0.03	1hr TP4	0.03	10min TP3	0.02

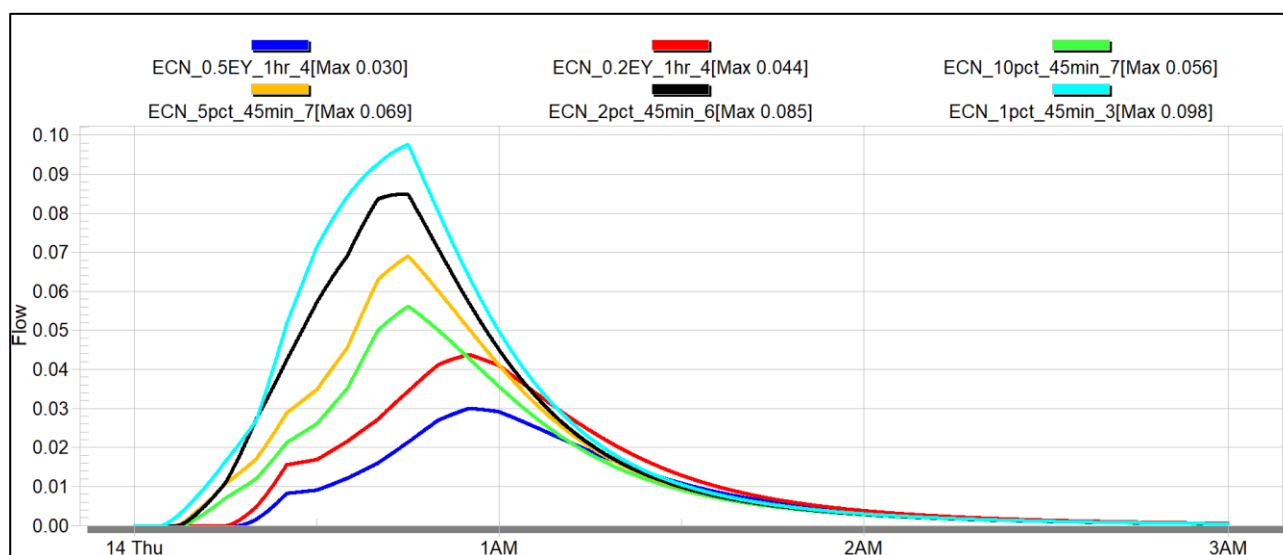


Figure 3.5 Plot of Pre-Development 1% AEP Hydrographs at LPD A



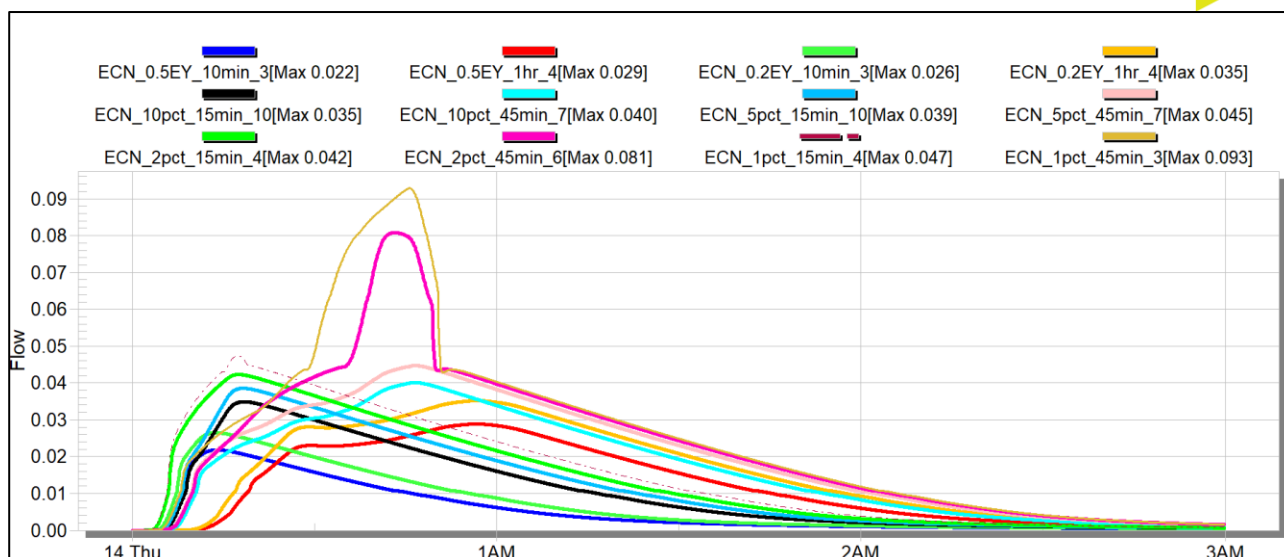


Figure 3.6 Plot of Post-Development Mitigated 1% AEP Hydrographs at LPD A

3.3.5 On Site Detention (OSD) Details

The proposed OSD systems are to be implemented to ensure a non-worsening of peak discharges at LPD A.

Table 3.7 below contains the details of the proposed OSD systems within the subject site.

Table 3.7 OSD Details

Detention ID	Outlet Structures			1% AEP Detention Volume (m ³)
	Orifice 1	Pit	Outlet Pipe	
Detention Tank A	0.1m x 0.15m @ base	0.6m x 0.6m (1.8m weir length) @ 0.9m above base	1 x 300mm dia RCP @ base	145.8

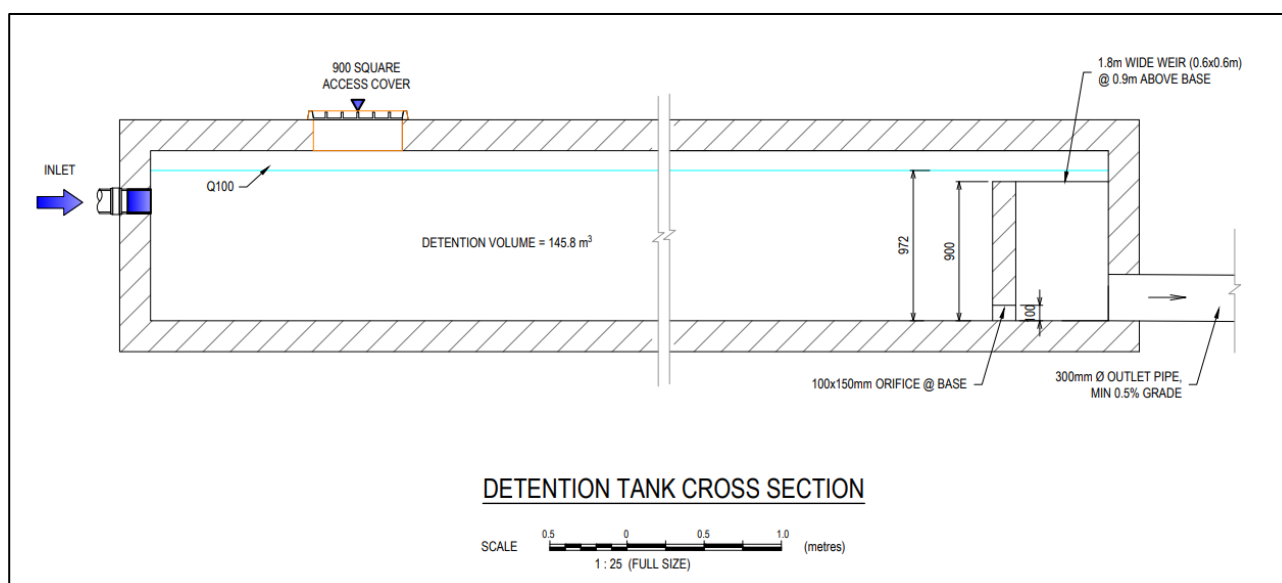


Figure 3.7 Plot of Post-Development Mitigated 1% AEP Hydrographs at LPD A





4. Stormwater Quality Assessment

4.1 Water Quality Objective (WQO)

In accordance with the *State Planning Policy – State Interest Guidance Material: Water Quality*, the total effect of permanent water quality control measures is to achieve reductions in the mean annual load generated by the development site at a minimum of:

- 90% for Gross Pollutants (>5mm);
- 80% for Total Suspended solids (TSS);
- 60% for Total Phosphorus (TP); and
- 45% for Total Nitrogen (TN).

This will ensure the environmental values of the downstream receiving waters are maintained and have been chosen as the WQO for the development.

4.2 Consolidated Stormwater Treatment Framework

This CSMP adopts a consolidated stormwater treatment framework for the fully developed site, consistent with EDQ Guideline 13 and the s.83 Information Request.

Treatment of stormwater runoff generated by the subdivision road network is addressed at the subdivision stage through centrally located bio-retention street tree systems.

Treatment of stormwater runoff generated by future building development is intentionally deferred to the MCU and Operational Works stages, where detailed design can respond to final site coverage, tenancy configuration, and building footprints.

This framework ensures stormwater quality objectives are achieved without imposing premature or speculative lot-level infrastructure requirements at the ROL stage.

4.3 Water Quality Assessment Summary

Consistent with the consolidated framework in Section 4.2, the technical assessment below is presented in two parts: (i) subdivision road reserve treatment (Master Subject Site) and (ii) indicative measures for future development on individual lots. Section 4.4 outlines the water quality plan for the subject site as a whole (Master Subject Site), whilst Section 4.5 provides the water quality plan for the seventeen (17) individual proposed lots (Individual Lot). For the individual lots, two treatment options have been outlined below for the future developments – an ATLAN filter system and a bioretention basin. The remaining area – the internal road, will be treated by street trees as a part of the subject site water quality assessment.

4.4 Subject Site

4.4.1 Treatment Train

To ensure the above WQO's can be met at the subject site's LPD, a treatment train was proposed for the developed site and modelled using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software. The treatment train proposes sixteen street trees along the internal road, with 4.38m² of area per tree, or a total of 70m². The location of the proposed treatment train elements is included in the Burchills Civil Engineering Plans within Appendix E.

Typical sections of a street tree within turf have been included in Figure 4.1 and Figure 4.2. They will be designed in accordance with Brisbane City Council Standard Drawings for 'Stormwater Treatment Asset, Tree Within Turf' during the detailed design phase of the development (BCC, 2023)





For the MUSIC Model, a combined bioretention basin was used to represent the sixteen (16) street trees, or the combined area of 70m². The parameters used are shown in Table 4.1 below.

Table 4.1 Proposed Bio-Retention Street Tree Parameters

Parameter	Street Trees
Extended Detention Depth	0.3m
Filter Media Area	70m ²
Filter Media Depth	0.5m
Overflow Weir Width	7m

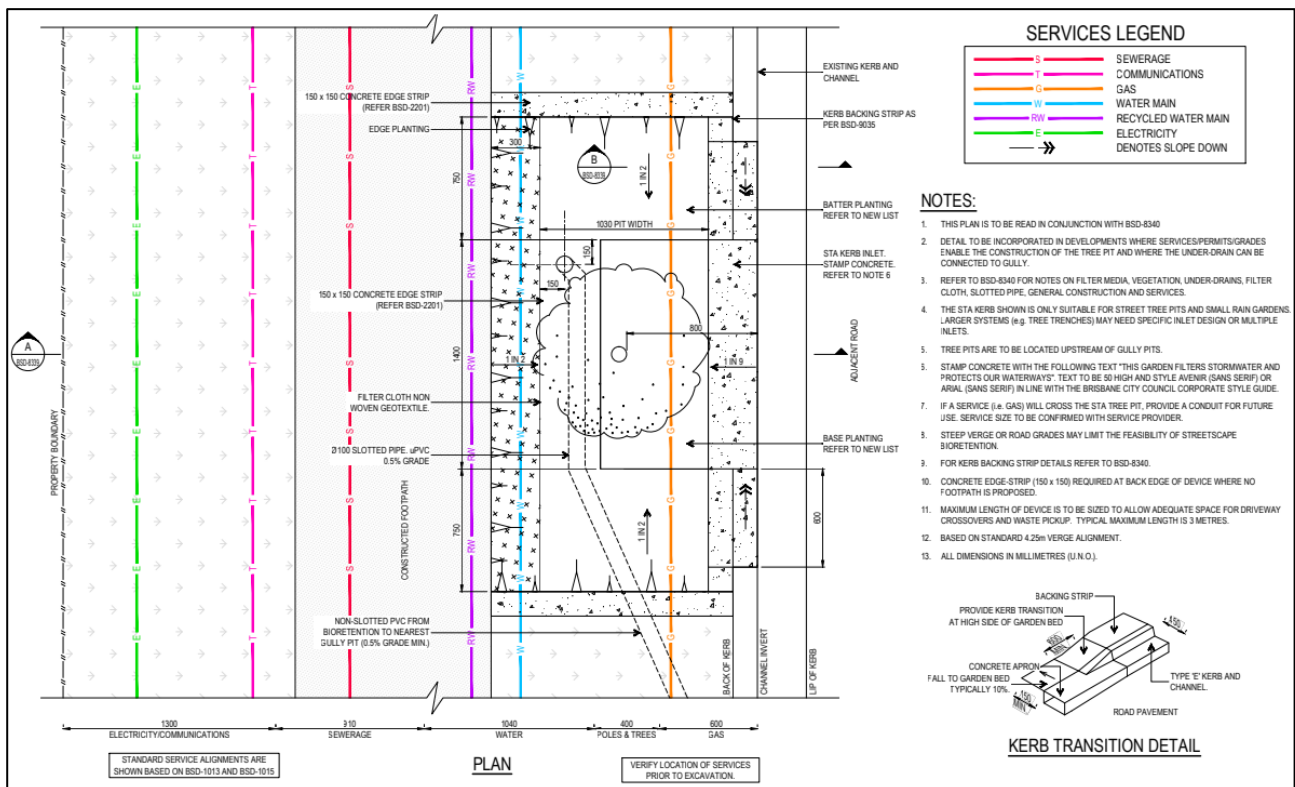


Figure 4.1 Typical Street Tree Within Turf – Plan (BSD-8339)



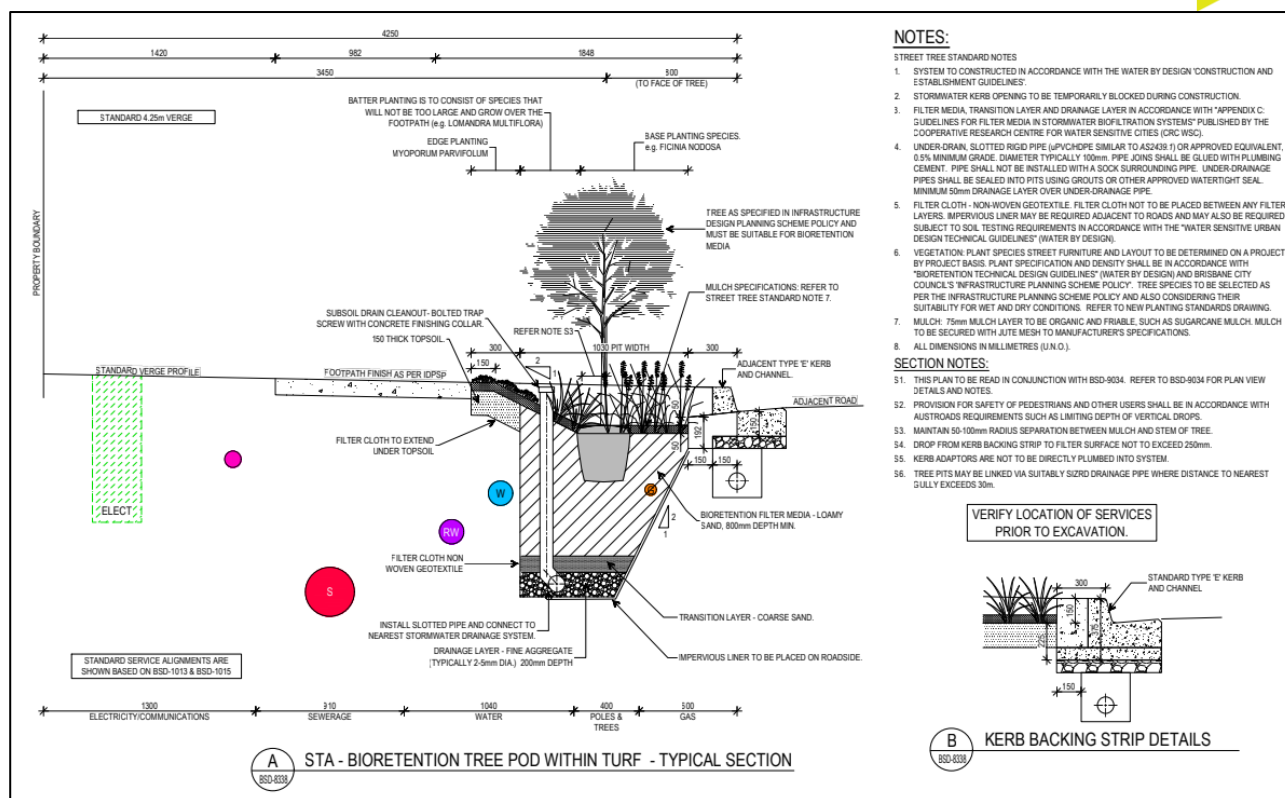


Figure 4.2 Typical Street Tree Within Turf – Section (BSD-8340)

4.4.2 MUSIC Results

Results of the MUSIC modelling for the treatment train effectiveness are summarised in Appendix B. The results indicate the 80%, 60%, 45% and 90% reduction target for TSS, TP, TN and gross pollutants respectively are achieved for the rainfall data set simulated.

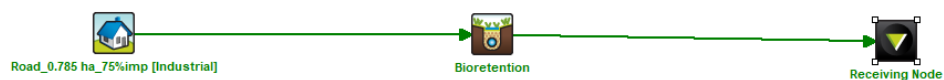
Table 4.2 Treatment Train Effectiveness

Pollutant	Inflows (kg/yr)	Outflows (kg/yr)	Reduction Achieved (%)	Water Quality Objective (%)
TSS	2100	394	81.2	80
TP	3.28	0.783	76.1	60
TN	10.7	5.64	47.4	45
GP	117	0	100	90

NOTE: All simulations have been run with pollutant export estimation set to "stochastic generation".

A screen capture of the MUSIC model and treatment train effectiveness results are presented in Figure 4.3.





Treatment Train Effectiveness - Receiving Node

	Sources	Residual Load	% Reduction
Flow (ML/yr)	4.63	4.49	3.1
Total Suspended Solids (kg/yr)	2100	394	81.2
Total Phosphorus (kg/yr)	3.28	0.783	76.1
Total Nitrogen (kg/yr)	10.7	5.64	47.4
Gross Pollutants (kg/yr)	117	0	100

Print icons: [Printer icon] [PDF icon]

Figure 4.3 Treatment Train Layout & MUSIC Results





4.5 Proposed Individual Lots

4.5.1 Treatment Train

To ensure the above WQO's can be met at the site's LPD, a treatment train was proposed for the developed site and modelled using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software.

For the individual lots, the stormwater quality measures described below are conceptual and indicative only, included to demonstrate that compliant solutions are achievable at the future development (MCU/Operational Works) stage when final site coverage, tenancy layout and impervious areas are known. These measures are not relied upon as lot-by-lot subdivision infrastructure, noting the subdivision-stage water quality strategy for the road reserve is addressed separately within this CSMP.

4.5.2 ATLAN Filter System

The conceptual parameters of the proposed ATLAN Filter are presented below, and further detail of the input parameters used within MUSIC are included in Appendix B. The location of the proposed treatment train elements is included in the Civil Plans within Appendix E. The recommended filter configuration is as follows:

- Four (4) x Tall ATLAN Filter Cartridges;
- One (1) x ATLAN Stormsacks.

A typical section of an ATLAN Filter has been included in Figure 4.4. The stormwater treatment system has been designed and will be installed by ATLAN.

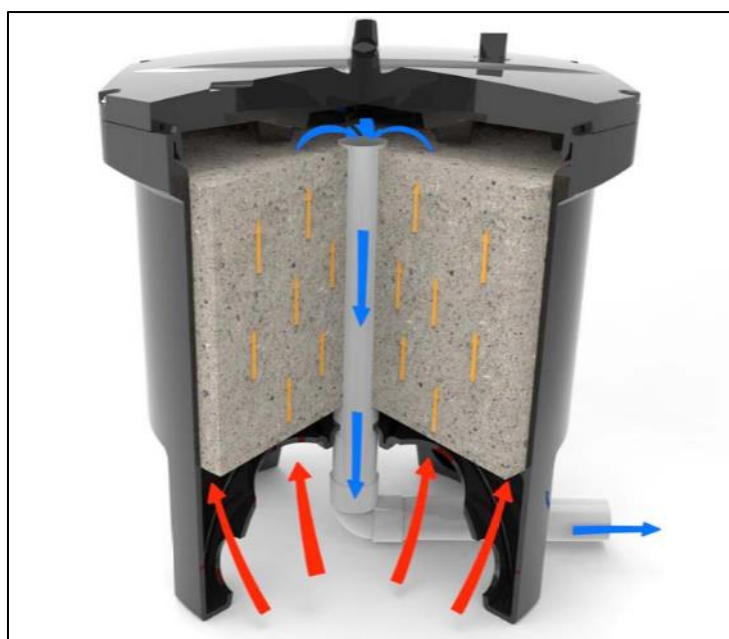


Figure 4.4 Typical ATLAN (ATLAN, 2024)

4.5.3 MUSIC Results

Results of the MUSIC modelling for the treatment train effectiveness are summarised in Appendix B. The results indicate the 80%, 60%, 45% and 90% reduction target for TSS, TP, TN and gross pollutants respectively are achieved for the rainfall data set simulated.





Table 4.3 Treatment Train Effectiveness

Pollutant	Inflows (kg/yr)	Outflows (kg/yr)	Reduction Achieved (%)	Water Quality Objective (%)
TSS	277	51.6	81.3	80
TP	0.698	0.203	70.9	60
TN	5.52	2.64	52.2	45
GP	57.6	0	100	90

NOTE: All simulations have been run with pollutant export estimation set to “stochastic generation”.

A screen capture of the MUSIC model and treatment train effectiveness results are presented in Figure 4.5.

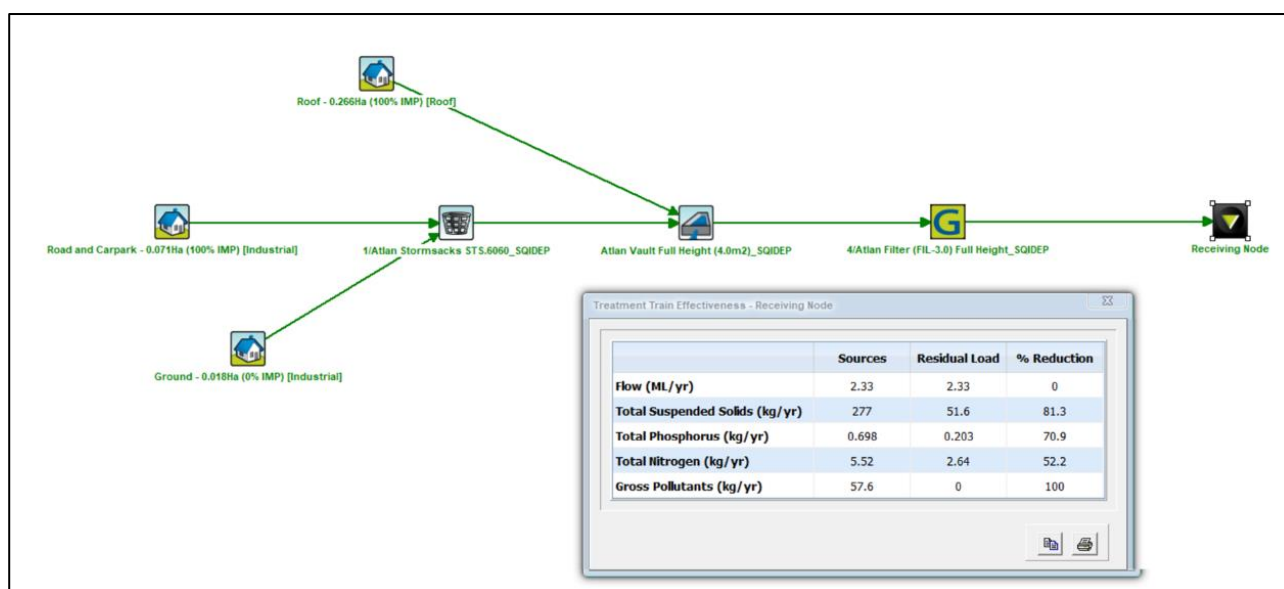


Figure 4.5 Treatment Train Layout & MUSIC Results

4.5.4 Bioretention Basin

The typical details for the proposed bioretention basin (per individual lot) are shown below in Table 4.4.

Table 4.4 Proposed Bio-retention Basin Parameters

Parameter	Modelled Value
Filter Media Area	40m ²
Surface Area	40m ²
Extended Detention Depth	0.30 m
Filter Media Depth	0.50 m
Transition Layer	0.10 m
Drainage Layer	0.2-0.4 m





A typical section of a bioretention basin has been included in the figures below.

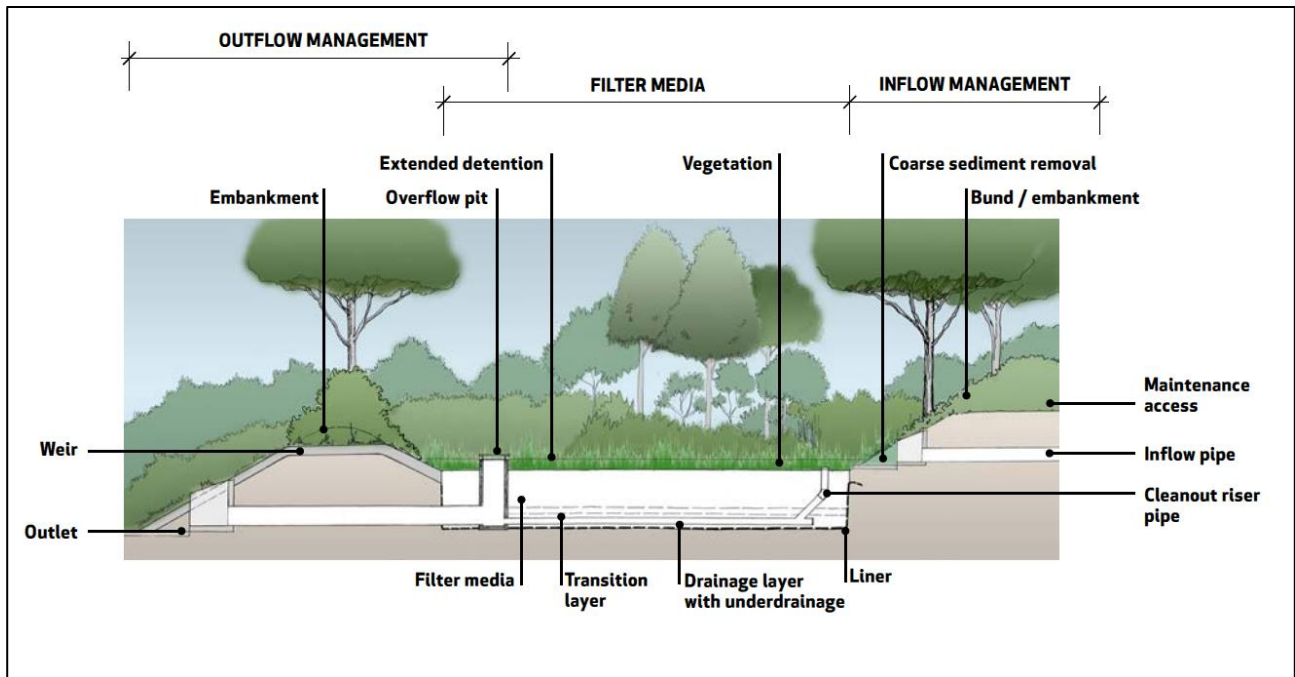


Figure 4.6 Typical Bioretention Basin (Water By Design, 2014)

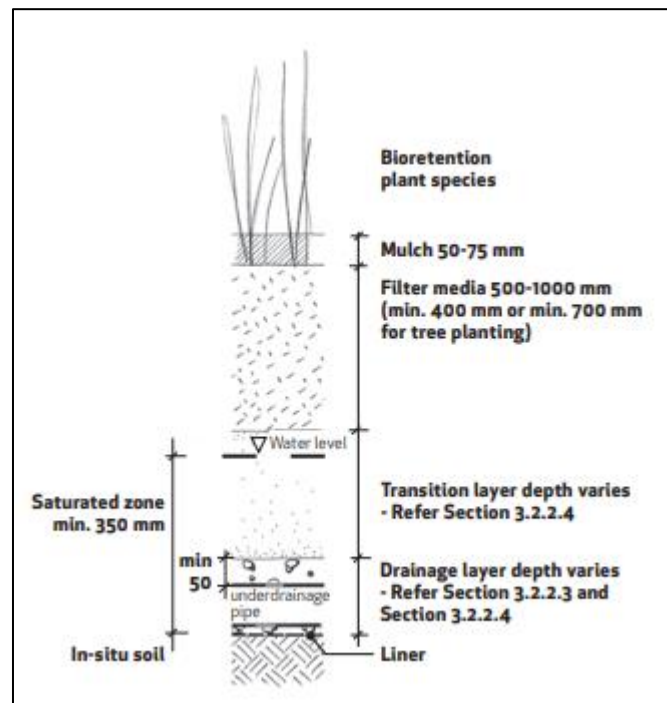


Figure 4.7 Typical Drainage Profile (Water By Design, 2014)

4.5.5 MUSIC Results

Results of the MUSIC modelling for the treatment train effectiveness are summarised in Appendix B. The results indicate the 80%, 60%, 45% and 90% reduction target for TSS, TP, TN and gross pollutants respectively are achieved for the rainfall data set simulated.





Table 4.5 Treatment Train Effectiveness

Pollutant	Inflows (kg/yr)	Outflows (kg/yr)	Reduction Achieved (%)	Water Quality Objective (%)
TSS	278	48.9	82.4	80
TP	0.691	0.191	72.4	60
TN	5.47	2.63	51.9	45
GP	57.6	0	100	90

NOTE: All simulations have been run with pollutant export estimation set to “stochastic generation”.

A screen capture of the MUSIC model and treatment train effectiveness results are presented in Figure 4.5.

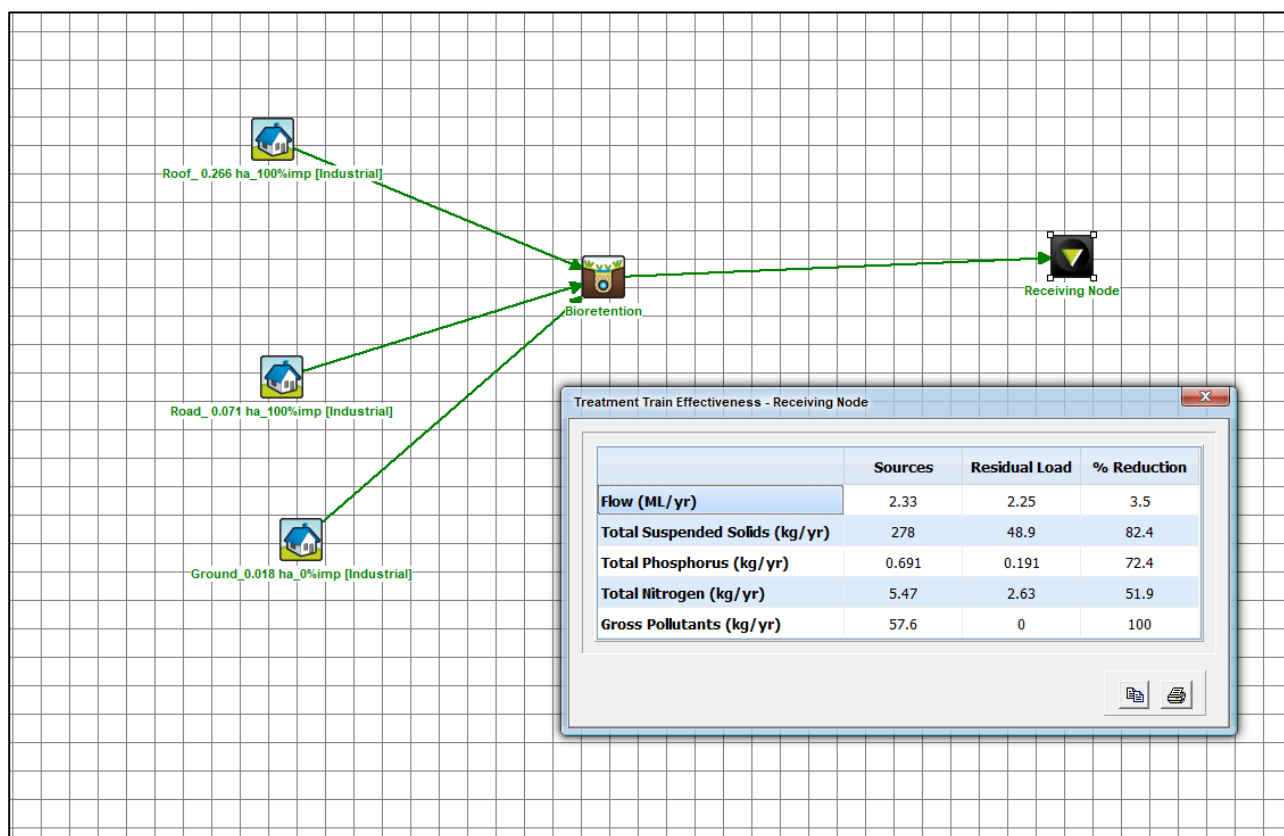


Figure 4.8 Treatment Train Layout & MUSIC Results





5. Erosion and Sediment Control

5.1 Best Management Practices

Stormwater runoff quality during the construction phase of this development shall be managed in accordance with Best Practice Erosion and Sediment Control (IECA, 2008), which is the current recognised construction industry best management practice (BMP) for erosion and sediment control.

Erosion and Sediment Control (ESC) plans are required to be implemented during the construction phase to minimise environmental harm to on-site stormwater treatment devices and downstream receiving waters.

It is important to note that the measures identified below are a generic approach to construction phase stormwater quality management. Erosion and sediment control is highly dependent on local site conditions and staging of the proposed earth disturbing activities. Therefore, further details of the erosion and sediment control systems and procedures will be provided for each development stage when more information is available regarding in-situ soils and development staging.

5.2 Erosion Hazard Assessment

As part of the IECA guidelines, an erosion hazard assessment is to be completed to identify low-risk and high-risk short-term land disturbances within a given region (IECA, 2008). This Erosion Hazard Assessment estimates a TASK number which triggers if a site should be treated as high or low risk in regard to erosion control measures. A trigger value for high-risk site of 200 will be adopted for future stage as recommended by IECA. High risk sites trigger further need for assessment.

Table 5.1 Erosion Hazard Assessment

Catchment ID	Area (m ²)	Duration of Disturbance (months)	Slope Factor	K Factor	TASK Number
Post A	81930	6	0.21	0.040	4129.3

From Table 5.1 the results show that the Post A Catchment requires high-risk ESC treatment. Given the development proposal is at a conceptual phase, further details of the erosion and sediment control systems and procedures will be provided at the detailed design stage.

5.3 Erosion Control Standard

The best practice erosion control measures for high-risk development as detailed in Best Practice Erosion and Sediment Control (IECA, 2008) include the following:

- All reasonable and practical steps to be taken to apply best practice erosion control measures to completed earthworks, or otherwise stabilise such works, prior to anticipated rainfall - including existing unstable, undisturbed, soil surfaces under the management or control of the building/construction works;
- Land clearing limited to maximum 4 weeks work;
- Disturbed soil surfaces stabilised with minimum 75% cover within 10 days of completion of works within any area of a work site;
- Staged construction and stabilisation of earth batters; and
- Soil stockpiles and unfinished earthworks are suitably stabilised (covered) if disturbance is expected to be suspended for a period exceeding 10 days.





5.4 Sediment Loss Estimate

The potential volume of sediment loss from the subject site has been estimated using the Revised Universal Soil Loss Equation (RUSLE).

RUSLE calculates annual soil loss rates based on:

$$A = R \cdot K \cdot LS \cdot C \cdot P$$

Where:

A = annual soil loss due to erosion (t/ha/yr)

R = rainfall erosivity factor

K = soil erodibility factor

LS = topographic factor derived from slope length and slope gradient

C = cover and management factor

P = erosion control practice factor

Table 5.2 Potential Sediment Loss (RUSLE)

Catch. ID	Area (ha)	Slope Length (m)	Slope Grade (%)	Intensity ⁶ I ₂ (mm/hr)	R	K	LS	C	P	A (t/ha/yr)	Yield (m ³ /yr)
A	8.193	80	1.00	9.84	2149	0.04	0.19	1	1.3	21.2	133.8

*Note soil testing will need to be carried out to confirm soil type

Table 5.3 Sediment Control Standard (default) based on soil loss rate (IECA, 2008)

Area limit (m ²) ^[1]	Soil loss rate limit (t/ha/yr) ^[2]			Soil loss rate limit (t/ha/month) ^[3]		
	Type 1	Type 2	Type 3	Type 1	Type 2	Type 3
250	N/A	N/A	[4]	N/A	N/A	[4]
1000	N/A	N/A	All cases	N/A	N/A	All cases
2500	N/A	> 75	75	N/A	> 6.25	6.25
>2500	> 150	150	75	> 12.5	12.5	6.25

5.5 Sediment Pond Requirement

Sediment ponds are generally required during construction where:

- The disturbed area is greater than 10,000m² and the expected sediment loss is greater than 75 t/ha/yr;
- The disturbed soils are dispersive; and/or
- Where there is a need to control runoff suspended solids/turbidity.

As presented in Table 5.2, it is expected that the potential annual soil loss will not exceed 75 t/ha/yr for any of the catchments, and therefore a sediment pond is not required during construction.





5.6 Sediment Control Standard

Table B1 of the guidelines (IECA, 2018) provides a method for determining the sediment control standard for construction activities based on the estimated soil loss rate. Based on the size of the development, it is likely that Type 1 sediment controls are required for this site. A list of Type 1 and supplementary sediment control techniques is provided in Table 5.4 below based on Table 4.5.3 and Table 4.5.4 of the guidelines (IECA, 2008). These control techniques provide a guide that is recommended to be used to minimise the downstream effect of sediments.

Table 5.4 Sediment Control Techniques

Techniques	Type 1	Supplementary
Sheet flow treatment	➤ Buffer Zone capable of infiltrating 100% of stormwater runoff or process water ➤ Infiltration basin or sand filter bed capable of infiltrating 100% of flow	➤ Grass Filter Strips ➤ Fibre Rolls ➤ Stiff Grass Barrier
Concentrated flow treatment	➤ Sedimentation Basin (sized in accordance with design standard)	➤ Straw Bale Barrier ➤ Kerb Inlet Sediment Traps (on-grade and sag inlet traps, including Gully Bags) ➤ Check Dam Sediment Traps
De-watering sediment control	➤ Type F/D Sediment Basin ➤ Stilling Pond	➤ Grass Filter Bed
Instream sediment control	➤ Pump sediment-laden water to an off-stream Type F or Type D Sediment Basin or high filtration system	➤ Straw Bale Barrier (short-term device only)
Other		➤ Construction exits (Rock Pads, Wash Bays)





6. Conclusion

This Conceptual Stormwater Management Plan (CSMP) has been prepared for Roubaix Properties Pty Ltd in support of a Development Application for Reconfiguring a Lot (ROL) over Lots 7 and 8 on RP137101 at 4745–4759 and 4761–4773 Mount Lindesay Highway, North Maclean. This CSMP has referenced relevant guidelines relating to stormwater management to form the conceptual basis of the stormwater plan.

It is proposed to utilise compliant building-scale detention treatment measures to be delivered at the future MCU stage, where final impervious areas, roof layouts and operational uses are known; An approximate detention volume of 146 m³ per individual lot will be required.

The stormwater runoff from the subject site is conveyed to the LPD via overland flow and proposed swales, where it will discharge to an existing floodplain downstream.

To meet the State Planning Policy – State Interest Guidance Material: Water Quality objectives for the proposed internal road, the design includes several street tree bio-retention pods providing a total treatment area of 70 m². Water quality objectives will be achieved for individual lots by the future land owner with each lot to include an ATLAN filtration system—consisting of one (1) ATLAN Stormsack and four (4) ATLAN Filters—or a bioretention basin with 40 m² of filter media.

An Erosion Hazard Assessment has identified that the site is high-risk with regard to erosion potential. Sediment loss estimates have been used to determine that Type 1 sediment controls are required, given a yield of 133.8 m³/year for the disturbed internal catchment. More detailed ESC controls and measures are to be designed and prepared in the detailed design phase of the project.

Please note that in relation to the individual lots, the current application is for a Reconfiguration of a Lot (ROL) only. As such, any future development on these lots would be subject to a Material Change of Use (MCU) application. This process ensures that appropriate development controls can be assessed and conditioned at the time of use, allowing EDQ to manage compliance with planning and infrastructure requirements prior to any development occurring.





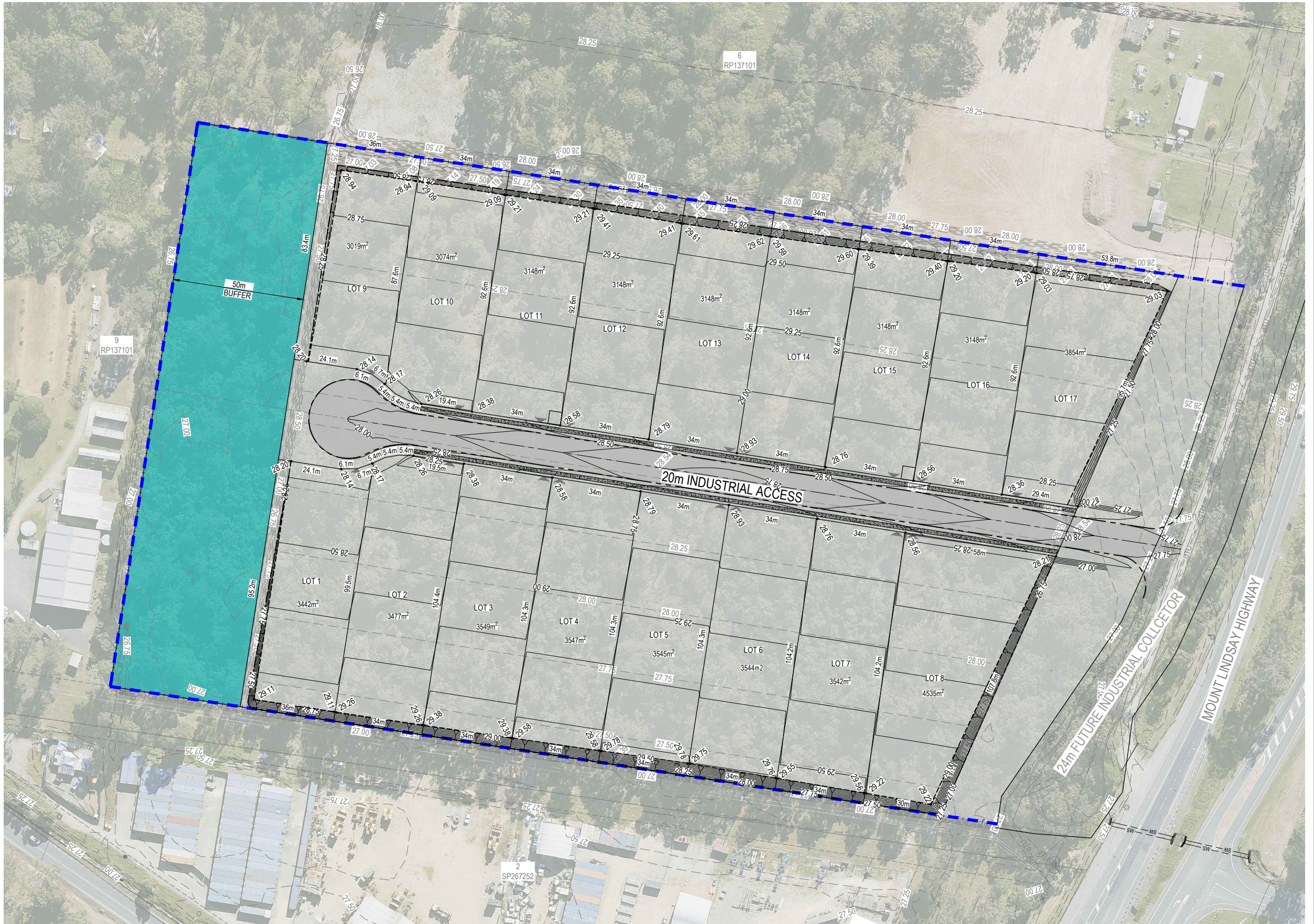
Appendix A – Proposed Plans of Development





LEGEND

- 27.25 — DESIGN SURFACE CONTOURS
- - - 27.0 - - - EXISTING SURFACE CONTOURS
- - - - - EXISTING LOT BOUNDARY
— SW — SW — EXISTING STORMWATER
— S — S — EXISTING SEWER
— OH — OH — EXISTING OVERHEAD ELECTRIC
— C — C — EXISTING COMMS
- - - - - EXISTING ROAD CONTROL LINE
- - - - - EXISTING KERB
- - - - - EXISTING EDGE OF BITUMEN
- - - - - EXISTING LOT BOUNDARY
- - - - - PROPOSED LOT BOUNDARY
50m BUFFER AREA
DEVELOPMENT SITE AREA



WARNING: UNDERGROUND SERVICES:
UNDERGROUND SERVICES EXIST IN THIS VICINITY. THE CONTRACTOR IS TO CONTACT THE RELEVANT AUTHORITIES TO CONFIRM EXACT LOCATION OF SERVICES ON SITE PRIOR TO ANY EXCAVATION OR CONSTRUCTION COMMENCING.

OVERALL LAYOUT PLAN

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NOTE This is an uncontrolled document issued for information purposes only, unless the checked sections are signed or completed. Figured dimensions take precedence over scale. Do not scale reduced size drawings. Verify dimensions prior to commencing any on-site or off-site works or fabrication.		
C	AMENDED KERB RETURN	21-10-25
B	CHANGE TO LAYOUT	24-06-25
A	ISSUE FOR APPROVAL	24-02-25
VER.	DESCRIPTION	DATE

BURCHILLS
ENGINEERING SOLUTIONS

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CLIENT :
**ROUBAIX PROPERTIES
PTY LTD**

DRAWING TITLE :
OVERALL LAYOUT PLAN

PROJECT :
DEVELOPMENT APPROVAL

4733-4743 MT LINDSAY HWY

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

SCALE AT FULL SIZE (A1):
10 0 5 10 15 20 25 30 35m
1:750 (FULL SIZE)

DEVEL. APPLIC. No. :		DATE : 21-10-25
PROJECT LEADER : JACK SHAO	DESIGNER : CARL KRUGER	
DRAFTSPERSON : CARL KRUGER	CHECKED : JACK SHAO	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365		
PROJECT No. : BE220566-DA	DRAWING No. : C1101	VERSION: C



Appendix B – Time of Concentration and Rational Method Calculations

Rational Method Calculations conducted for the individual lots are shown below.

Pre-Development Hydrology

The natural hydrology of the site has been assessed in accordance with QUDM (IPWEAQ, 2017) Section 4.1. The time of concentration for all catchments has been determined using Friend's Equation as per QUDM Section 4.6.6, combined with a channel time flow calculation.

$$\text{Friend's Equation } t_c = (107nL^{0.333})/S^{0.2}$$

The table below presents a summary of the catchment parameters used within Friend's Equation and the calculated time of concentration for the pre-development scenario.

Time of Concentration for Pre-Development Scenario

Catchment ID	Pre A
Overland Flow	
Estimated Length of Sheet (m)	105
Hortons Roughness Value	0.06
Slope (%)	1
tc (mins)	30.24
TOTAL tc (mins)	30

Post-Development Hydrology – Unmitigated

The table below presents a summary of the catchment parameters used for the calculated time of concentration for the post-development scenario. The time of concentration for the external catchment is presented in the table above.

Time of Concentration for Post-Development Scenario

Catchment ID	Post A
Standard Inlet Time	5
Pipe Flow Time	
Length of Pipe Flow (m)	105
Velocity (m/s)	1
tc (mins)	1.75
TOTAL tc (mins)	7





Design storm event flows across the site were derived using the Rational Method as per the above-mentioned manuals. This involved:

- Determination of a C10 value (derived in accordance with QUDM Table 4.05.3(b) and Council guidelines). A value of 0.7 was applied to the pre-development catchment and 0.83 was applied to the post-development catchment;
- Adoption of design rainfall using BoM IFD data; and
- Calculation of design flows through the site for Q100, Q50, Q20, Q10, Q5, Q2, Q1 and Q3_{month}, where Q3_{month} is deemed to be 50% of Q1.

Summaries of the hydrologic calculations are contained in the two tables below for pre and post-development (un-mitigated) scenarios respectively.

Pre-Development Hydrology

Catch.	Area (ha)	tc (min)	I ₁₀₀ (mm/hr)	C	Q ₁₀₀ (m ³ /s)	I ₅₀ (mm/hr)	C	Q ₅₀ (m ³ /s)	I ₂₀ (mm/hr)	C	Q ₂₀ (m ³ /s)	I ₁₀ (mm/hr)	C	Q ₁₀ (m ³ /s)	I ₅ (mm/hr)	C	Q ₅ (m ³ /s)	I ₂ (mm/hr)	C	Q ₂ (m ³ /s)	I ₁ (mm/hr)	C	Q ₁ (m ³ /s)	Q _{3month} (m ³ /s)
Pre A	0.355	30	137.0	0.64	0.086	123.0	0.61	0.074	105.0	0.56	0.058	91.0	0.53	0.048	78.1	0.50	0.039	61.2	0.45	0.027	48.3	0.42	0.020	0.010

Un-Mitigated Post-Development Hydrology

Catch.	Area (ha)	tc (min)	I ₁₀₀ (mm/hr)	C	Q ₁₀₀ (m ³ /s)	I ₅₀ (mm/hr)	C	Q ₅₀ (m ³ /s)	I ₂₀ (mm/hr)	C	Q ₂₀ (m ³ /s)	I ₁₀ (mm/hr)	C	Q ₁₀ (m ³ /s)	I ₅ (mm/hr)	C	Q ₅ (m ³ /s)	I ₂ (mm/hr)	C	Q ₂ (m ³ /s)	I ₁ (mm/hr)	C	Q ₁ (m ³ /s)	Q _{3month} (m ³ /s)
Post A	0.355	7	260.0	1.00	0.256	234.0	1.00	0.231	200.0	0.9240	0.182	173.0	0.88	0.150	149.0	0.84	0.123	117.0	0.75	0.086	92.5	0.70	0.064	0.032





Appendix C – XP-SWMM Input Parameters

XP-SWMM was utilised for the detention tank sizing for the individual lots. This is detailed below.

Laurenson Routing Parameters

In this study, the “Laurenson” routing method was applied to XP-SWMM for hydrograph generation. To enable this method to be used, each catchment must be split into pervious (undeveloped) and impervious (developed) portions. Adopted parameters for the Laurenson routing method included:

The fraction impervious has been determined by analysis of aerial photographs and the proposed development layout.

- Manning Roughness coefficient (n):
 - Pervious portion: 0.035; and
 - Impervious portion: 0.015.

Initial Loss (IL) and Continuing Losses (CL) have been applied to the hydrologic model. Details of IL and CL parameters applied in the XP-SWMM model are presented in the table below.

Adopted Initial & Continuing Losses

Impervious Area		Pervious Area	
IL (mm)	CL (mm/hr)	IL (mm)	CL (mm/hr)
0	0	10	2

Analysis of the catchment has been undertaken to determine the average slope, with the results of this being applied to the model.

Pre-Development Catchment Parameters

Catchment	Impervious Area			Pervious Area		
	Area (ha)	Fraction Impervious (%)	Slope (%)	Area (ha)	Fraction Impervious (%)	Slope (%)
Pre A	0	100	1	0.332	0	1

Post-Development Catchment Parameters (Unmitigated)

Catchment	Impervious Area			Pervious Area		
	Area (ha)	Fraction Impervious (%)	Slope (%)	Area (ha)	Fraction Impervious (%)	Slope (%)
Post A	0.337	100	1	0.018	0	1





Appendix D – MUSIC Input Parameters

MUSIC Modelling was conducted for the internal road and the individual lots separately. This is shown in the two sections below.

MUSIC – Internal Road

Rainfall and Evapotranspiration

MUSIC modelling was based on 6-minute interval data obtained from the Bureau of Meteorology (BOM) for rainfall station 040659 Greenbank, QLD, as summarised in the table below.

Meteorological and Rainfall Runoff Data Reporting Table

Input	Data Used in Modelling
Rainfall station	040659
Time step	6 minute
Modelling period	1/01/1980 to 31/12/1989 (10 years)
Mean annual rainfall (mm)	759
Rainfall runoff parameters	Industrial
Pollutant export parameters	Industrial

Catchment Parameters

Based on the proposed land uses within the development, the site has been modelled as urban land use as detailed in the table below. The site has been divided into roof, ground and road source nodes as per the architectural drawings included in Appendix A.

Land Use Parameters

Catchment ID	Land Use	Total Impervious (%)
Road	Industrial	75

The MUSIC catchment plan with full breakdown of road, ground and road areas is presented in Appendix E. The pollutant loads and runoff parameters for each source node have been based on the data from the Water by Design MUSIC Modelling Guidelines (2010), as summarised in the tables below/

Rainfall Runoff Parameters

Parameter	All Nodes
Landuse	Industrial
Rainfall threshold (mm)	1
Soil storage capacity (mm)	18
Initial storage (% capacity)	10
Field capacity (mm)	80





Parameter	All Nodes
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

Pollutant Load Parameters

Urban Residential	Total Suspended Solids (log mg/L)		Total Phosphorous (log mg/L)		Total Nitrogen (log mg/L)	
	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
Storm Flow Concentration	1.30 ⁽¹⁾	0.44	-0.89 ⁽¹⁾	0.36	0.25	0.32
Base Flow Concentration	0 ⁽¹⁾	0 ⁽¹⁾	0 ⁽¹⁾	0 ⁽¹⁾	0 ⁽¹⁾	0 ⁽¹⁾

NOTE: (1) values applied to 'Roof' areas

The bioretention parameters used to represent the street trees are shown below.

Bioretention Basin Parameters (Street Trees)

Parameter	Value
Low Flow By-pass (m³/s)	0
High Flow By-pass (m³/s)	100
Extended Detention Depth (m)	0.3
Surface Area (m²)	70
Filter Area (m²)	70
Unlined Filter Media Perimeter (m)	0.01
Saturated Hydraulic Conductivity (mm/hr)	200
Filter Depth (m)	0.5
TN Content of Filter Media (mg/kg)	30
Exfiltration Rate (mm/hr)	0
Base Lined (Y/N)	Y
Vegetated with Effective Nutrient Removal Plans (Y/N)	Y
Overflow Weir Width (m)	7
Underdrain Present (Y/N)	Y
Submerged Zone With Carbon Present (Y/N)	N





MUSIC – Individual Lots

Rainfall and Evapotranspiration

MUSIC modelling was based on 6-minute interval data obtained from the Bureau of Meteorology (BOM) for rainfall station 040756 Greenbank, QLD, as summarised in the table below.

Meteorological and Rainfall Runoff Data Reporting Table

Input	Data Used in Modelling
Rainfall station	040659
Time step	6 minute
Modelling period	1/01/1980 to 31/12/1989 (10 years)
Mean annual rainfall (mm)	759
Rainfall runoff parameters	Industrial
Pollutant export parameters	Industrial

Catchment Parameters

Based on the proposed land uses within the development, the site has been modelled as urban land use as detailed in the table below. The site has been divided into roof, ground and road source nodes as per the architectural drawings included in Appendix A.

Land Use Parameters

Catchment ID	Land Use	Total Impervious (%)
Roof	Urban	100
Ground	Urban	0
Road	Urban	100

The MUSIC catchment plan with full breakdown of roof, ground and road areas is presented in Appendix F. The pollutant loads and runoff parameters for each source node have been based on the data from the Water by Design MUSIC Modelling Guidelines (2010), as summarised in the tables below

Rainfall Runoff Parameters

Parameter	All Nodes
Landuse	Industrial
Rainfall threshold (mm)	1
Soil storage capacity (mm)	18
Initial storage (% capacity)	10
Field capacity (mm)	80
Infiltration capacity coefficient a	243





Parameter	All Nodes
Infiltration capacity coefficient b	0.6
Initial depth (mm)	50
Daily recharge rate (%)	0
Daily baseflow rate (%)	31
Daily seepage rate (%)	0

Pollutant Load Parameters

Urban Residential	Total Suspended Solids (log mg/L)		Total Phosphorous (log mg/L)		Total Nitrogen (log mg/L)	
	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
Storm Flow Concentration	1.30 ⁽¹⁾	0.38	-0.89 ⁽¹⁾	0.34	0.37	0.34
	2.43 ⁽²⁾		-0.30 ⁽²⁾			
	2.16 ⁽³⁾		-0.39 ⁽³⁾			
Base Flow Concentration	0 ⁽¹⁾	0 ⁽¹⁾	0 ⁽¹⁾	0 ⁽¹⁾	0 ⁽¹⁾	0 ⁽¹⁾
	0.78 ^(2,3)	0.39 ^(2,3)	-0.60 ^(2,3)	0.50 ^(2,3)	0.32 ^(2,3)	0.30 ^(2,3)

NOTE: (1) values applied to 'Roof' areas

(2) Values applied to 'Carpark' areas

(3) Values applied to 'Ground' areas

The bioretention basin parameters used for the individual lots bio basins in shown below.

Bioretention Basin Parameters (Lot Basins)

Parameter	Value
Low Flow By-pass (m ³ /s)	0
High Flow By-pass (m ³ /s)	100
Extended Detention Depth (m)	0.3
Surface Area (m ²)	40
Filter Area (m ²)	40
Unlined Filter Media Perimeter (m)	0.01
Saturated Hydraulic Conductivity (mm/hr)	200
Filter Depth (m)	0.5
TN Content of Filter Media (mg/kg)	30
Exfiltration Rate (mm/hr)	0
Base Lined (Y/N)	Y
Vegetated with Effective Nutrient Removal Plans (Y/N)	Y





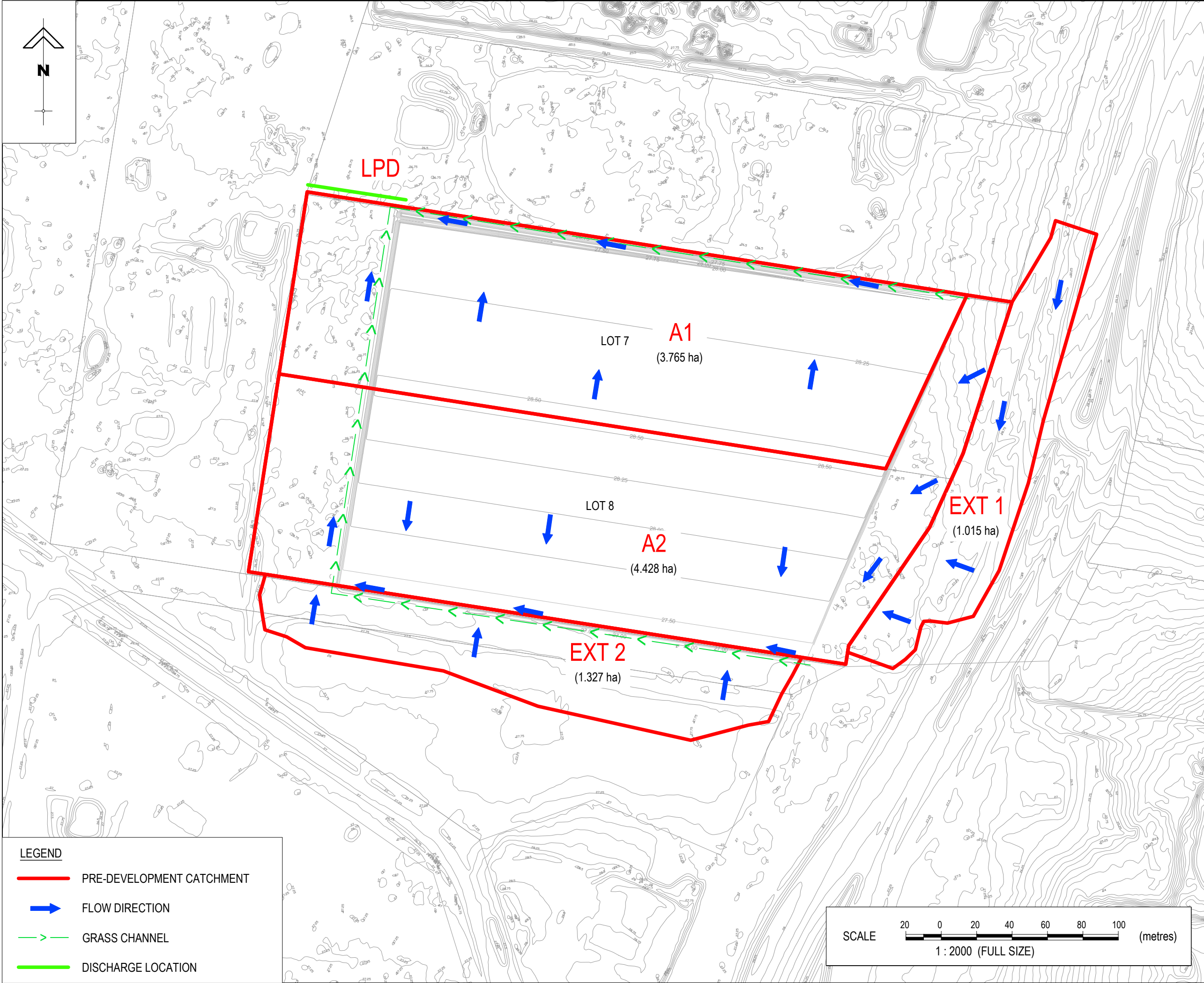
Parameter	Value
Overflow Weir Width (m)	4
Underdrain Present (Y/N)	Y
Submerged Zone With Carbon Present (Y/N)	N





Appendix E – Burchills Engineering Solutions Conceptual Stormwater Management Drawings – Subject Site





PROPOSED
INDUSTRIAL
DEVELOPMENT

4733-4743 MOUNT
LINDESAY HIGHWAY

FOR

ROUBAIX PROPERTIES

ORIGINAL SCALE BEFORE REDUCTION
A3 0 10 20 30 40mm.

A	ORIGINAL ISSUE		25.07.25
VER.	DESCRIPTION	APPR.	DATE

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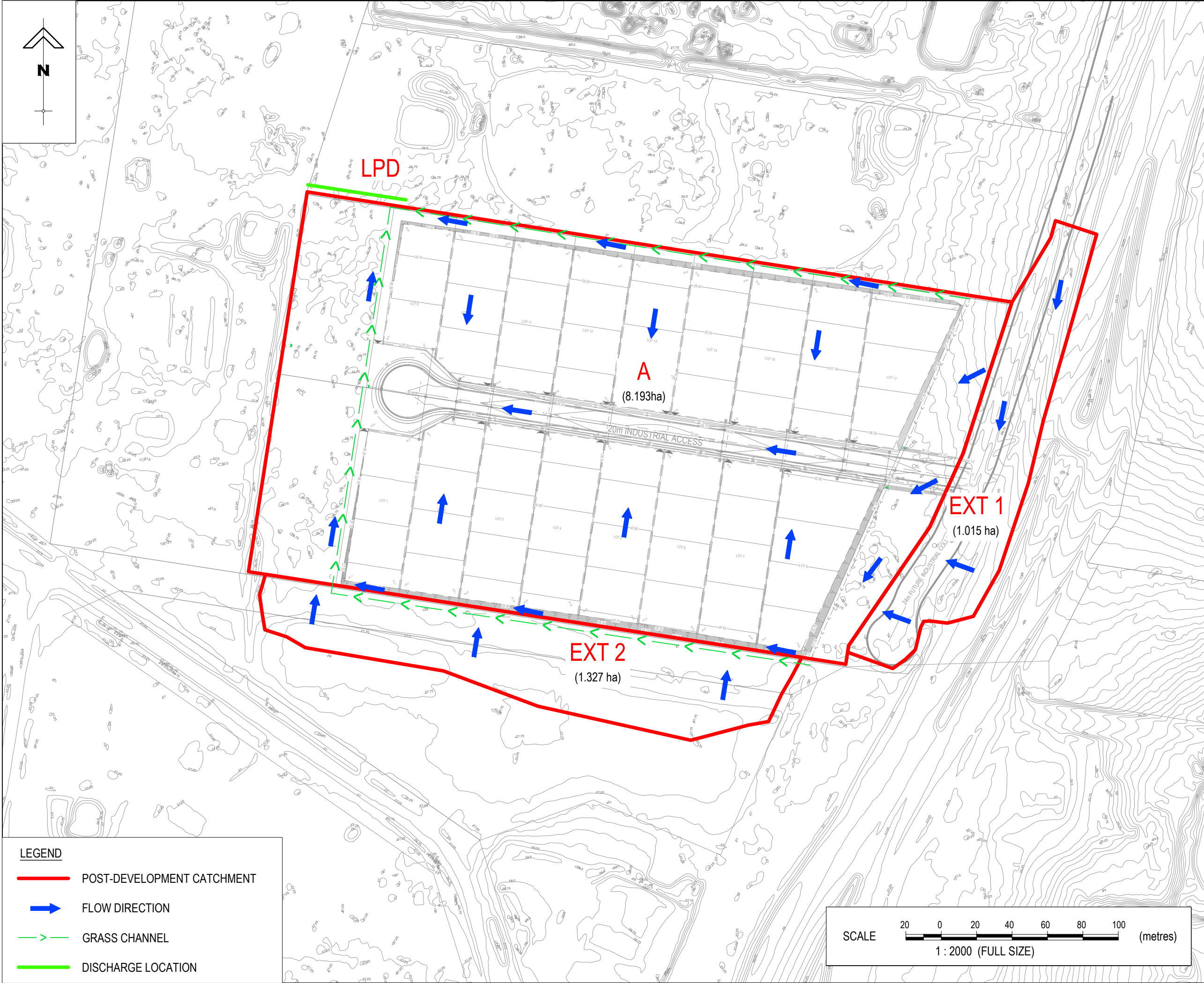
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FAX: +61 7 5509 6411
EMAIL: ADMIN@BURCHILLS.COM.AU
COOTE BURCHILLS ENGINEERING PTY LTD
ABN 76 166 942 365

DRAWING TITLE :

PRE -DEVELOPMENT
CATCHMENT PLAN

DEV. APPLIC. No. :		DATE : 25.07.25
PROJECT LEADER :		
SIGNER :		
DRAFTSPERSON : LINH DAO		
CHECKED :		
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365		
RPEQ No. :		
SCALE : AS SHOWN	DATUM :	FULL SIZE : A3
PROJECT No. : E220566	DRAWING No. : N200	VERSION : A



LEGEND

- POST-DEVELOPMENT CATCHMENT
- FLOW DIRECTION
- GRASS CHANNEL
- DISCHARGE LOCATION

PROPOSED INDUSTRIAL DEVELOPMENT

4733-4743 MOUNT LINDESAY HIGHWAY

FOR ROUBAIX PROPERTIES

ORIGINAL SCALE BEFORE REDUCTION

A3 0 10 20 30 40mm.

A	ORIGINAL ISSUE		25.07.25
VER.	DESCRIPTION	APPR.	DATE

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ABN 76 166 942 365

DRAWING TITLE :

POST - DEVELOPMENT CATCHMENT PLAN

DEVL. APPLIC. No. :	DATE : 25.07.25
PROJECT LEADER :	
DESIGNER :	
DRAFTSPERSON : LINH DAO	
CHECKED :	
APPROVED FOR AND ON BEHALF OF Burchills Engineering Solutions	ABN 76 166 942 365
RPEQ No. :	
SCALE : AS SHOWN	DATUM : FULL SIZE : A3
PROJECT No. : BE220566	DRAWING No. : N201
	VERSION : A



PROPOSED
INDUSTRIAL
DEVELOPMENT

4733-4743 MOUNT
LINDESAY HIGHWAY

FOR

ROUBAIX PROPERTIES

ORIGINAL SCALE BEFORE REDUCTION

A3

0 10 20 30 40mm.

A	ORIGINAL ISSUE		25.07.25
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DRAWING TITLE :

MUSIC CATCHMENT PLAN

DEVEL. APPLIC. No. : DATE : 25.07.25

PROJECT LEADER :

DESIGNER :

DRAFTSPERSON : LINH DAO

CHECKED :

APPROVED FOR AND ON BEHALF OF
BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365

RPEQ No. :

SCALE : AS SHOWN DATUM : FULL SIZE : A3

PROJECT No. : BE220566 DRAWING No. : N202 VERSION : A

CATCHMENT A

ROAD AND CARPARK: 0.785 ha

TOTAL AREA: 0.785 ha

LEGEND

— MUSIC CATCHMENT

▤ ROAD AND CARPARK

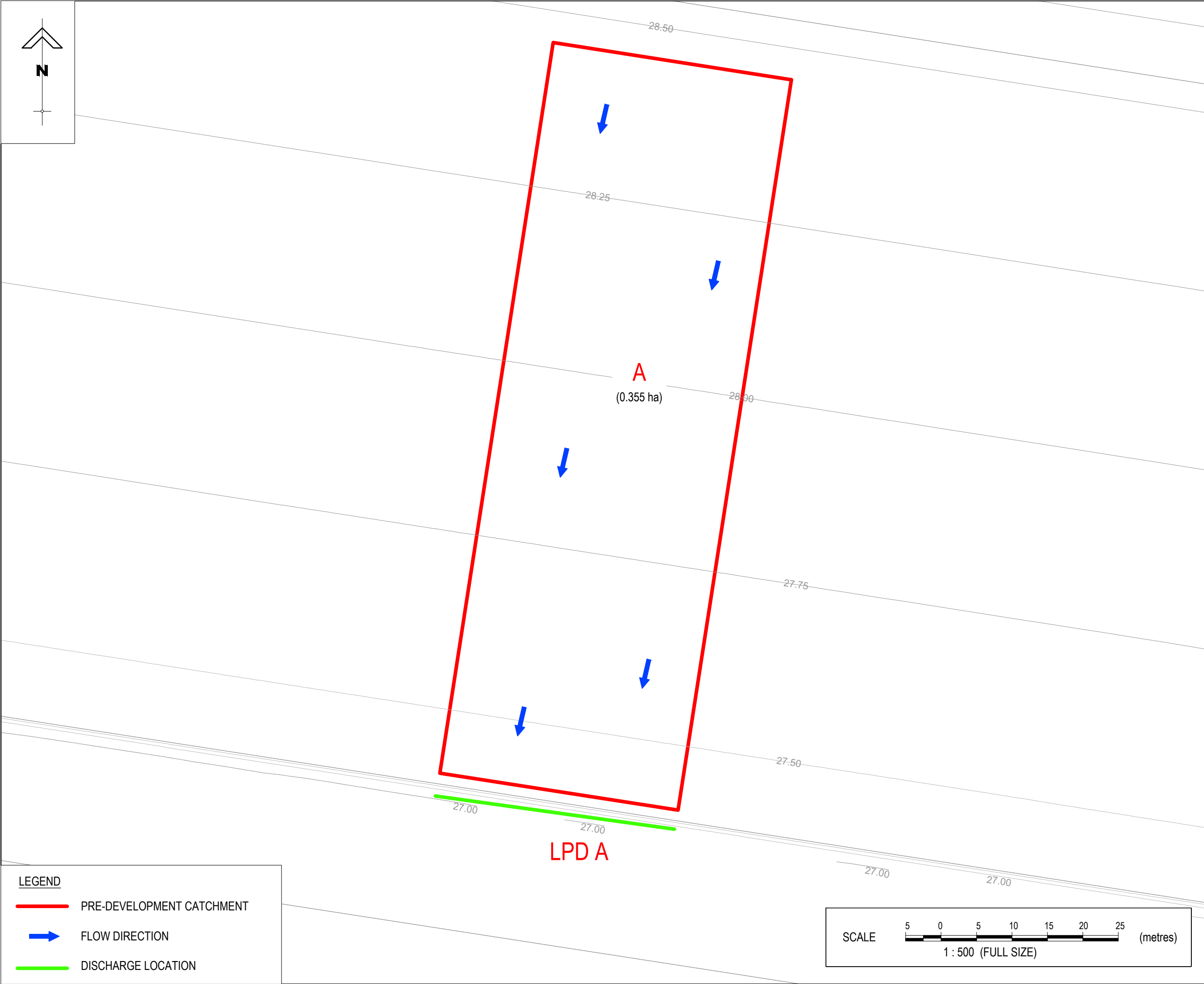
SCALE 20 0 20 40 60 80 100 (metres)

1 : 2000 (FULL SIZE)



Appendix F – Burchills Engineering Solutions Conceptual Stormwater Management Drawings – Individual Lots





LEGEND

PRE-DEVELOPMENT CATCHMENT

FLOW DIRECTION

DISCHARGE LOCATION

PROPOSED
INDUSTRIAL
DEVELOPMENT

4733-4743 MOUNT
LINDESAY HIGHWAY

FOR

ROUBAIX PROPERTIES

ORIGINAL SCALE BEFORE REDUCTION

A3

0

10

20

30

40mm.

A	ORIGINAL ISSUE		25.07.25
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ABN 76 166 942 365

DRAWING TITLE :

PRE-DEVELOPMENT
CATCHMENT PLAN

DEVEL. APPLIC. No. :

DATE : 25.07.25

PROJECT LEADER :

DESIGNER :

DRAFTSPERSON : LINH DAO

CHECKED :

APPROVED FOR AND ON BEHALF OF
BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365

RPEQ No. :

SCALE : AS SHOWN

DATUM :

FULL SIZE : A3

PROJECT No. :
BE220566DRAWING No. :
N200VERSION:
A

SCALE

5

0

5

10

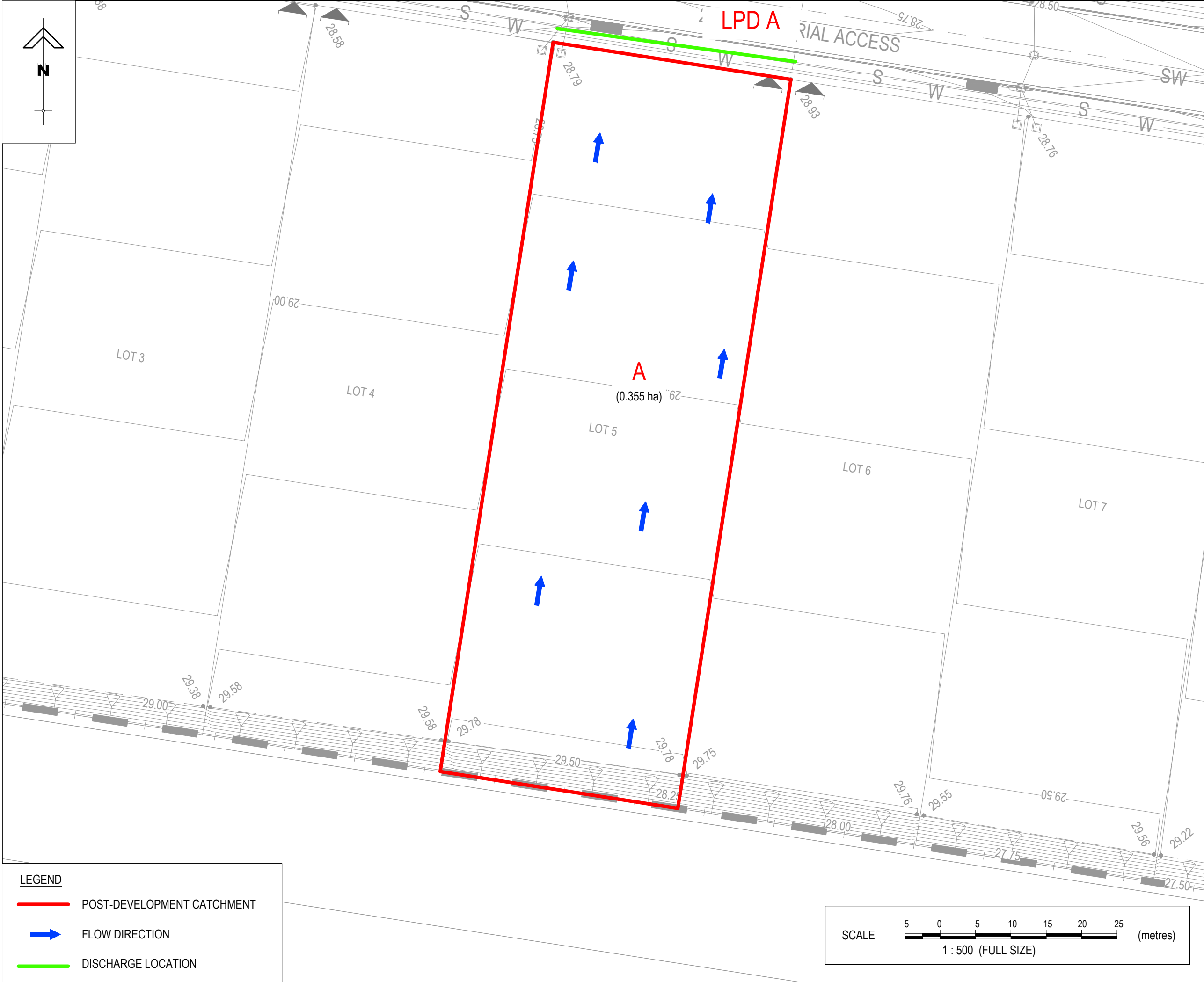
15

20

25

(metres)

1 : 500 (FULL SIZE)



LEGEND

- POST-DEVELOPMENT CATCHMENT
- FLOW DIRECTION
- DISCHARGE LOCATION

SCALE 1 : 500 (FULL SIZE)

PROPOSED INDUSTRIAL DEVELOPMENT
4733-4743 MOUNT LINDESAY HIGHWAY
FOR ROUBAIX PROPERTIES

ORIGINAL SCALE BEFORE REDUCTION
A3

A	ORIGINAL ISSUE		25.07.25
VER.	DESCRIPTION	APPR.	DATE

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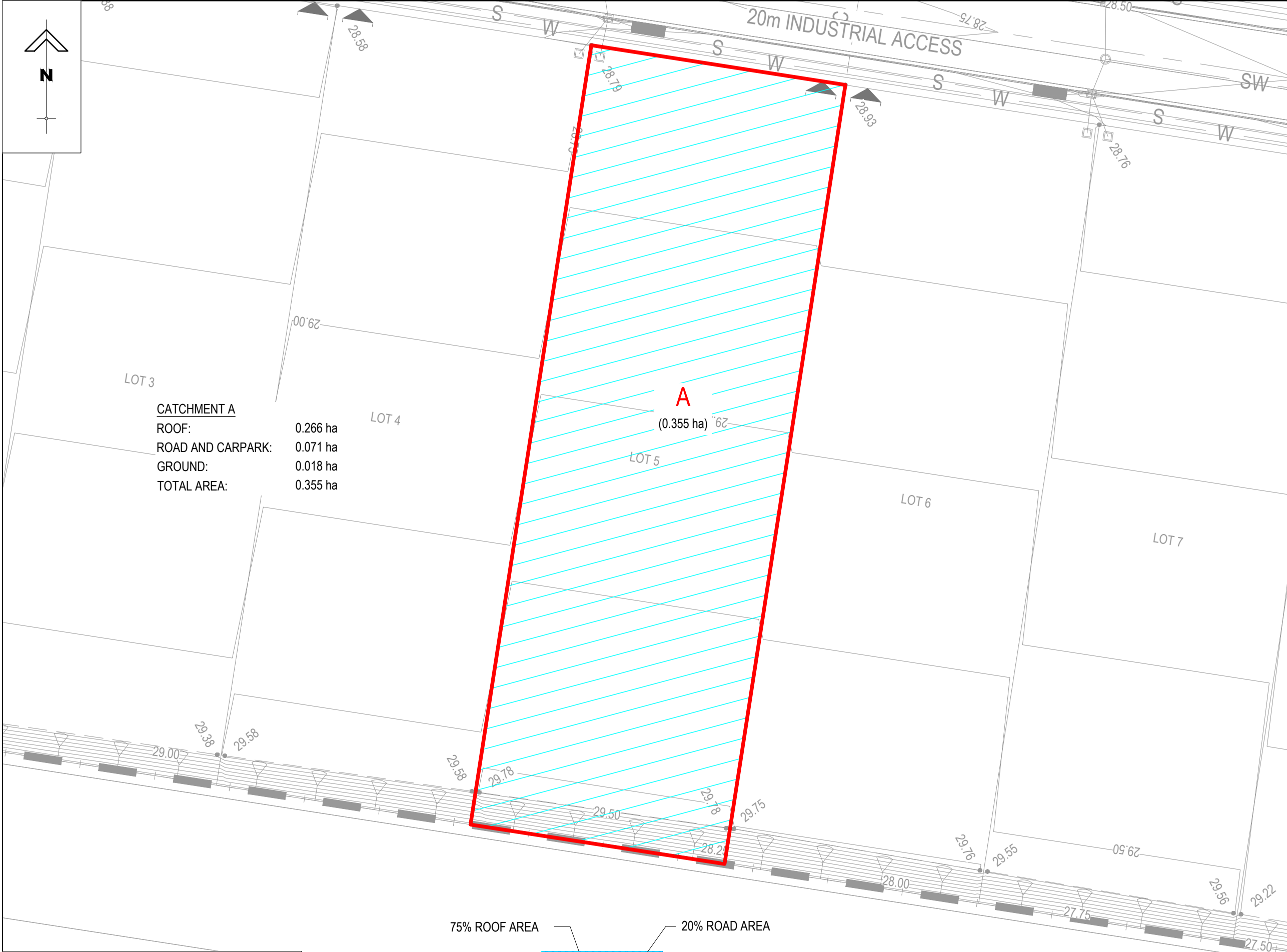
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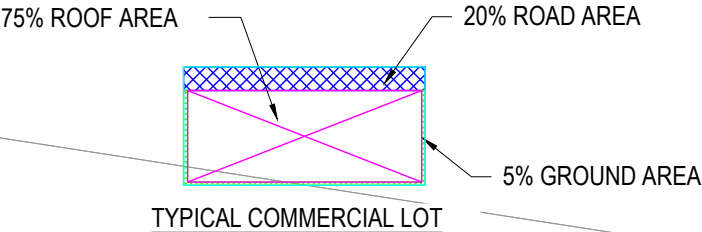
DRAWING TITLE :

POST-DEVELOPMENT CATCHMENT PLAN

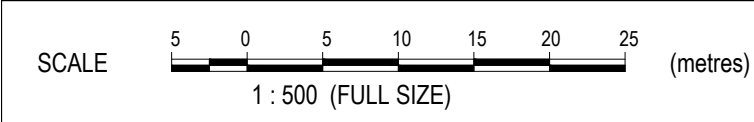
DEVEL. APPLIC. No. :		DATE : 25.07.25
PROJECT LEADER :		
DESIGNER :		
DRAFTSPERSON : LINH DAO		
CHECKED :		
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365		
RPEQ No. :		
SCALE : AS SHOWN	DATUM :	FULL SIZE : A3
PROJECT No. : BE220566	DRAWING No. : N201	VERSION : A



CATCHMENT A	
ROOF:	0.266 ha
ROAD AND CARPARK:	0.071 ha
GROUND:	0.018 ha
TOTAL AREA:	0.355 ha



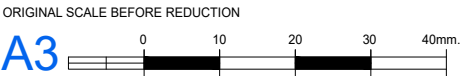
LEGEND	
	MUSIC CATCHMENT
	LOT



PROPOSED INDUSTRIAL DEVELOPMENT

4733-4743 MOUNT LINDESAY HIGHWAY

FOR ROUBAIX PROPERTIES



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VER.	DESCRIPTION	APPR.	DATE

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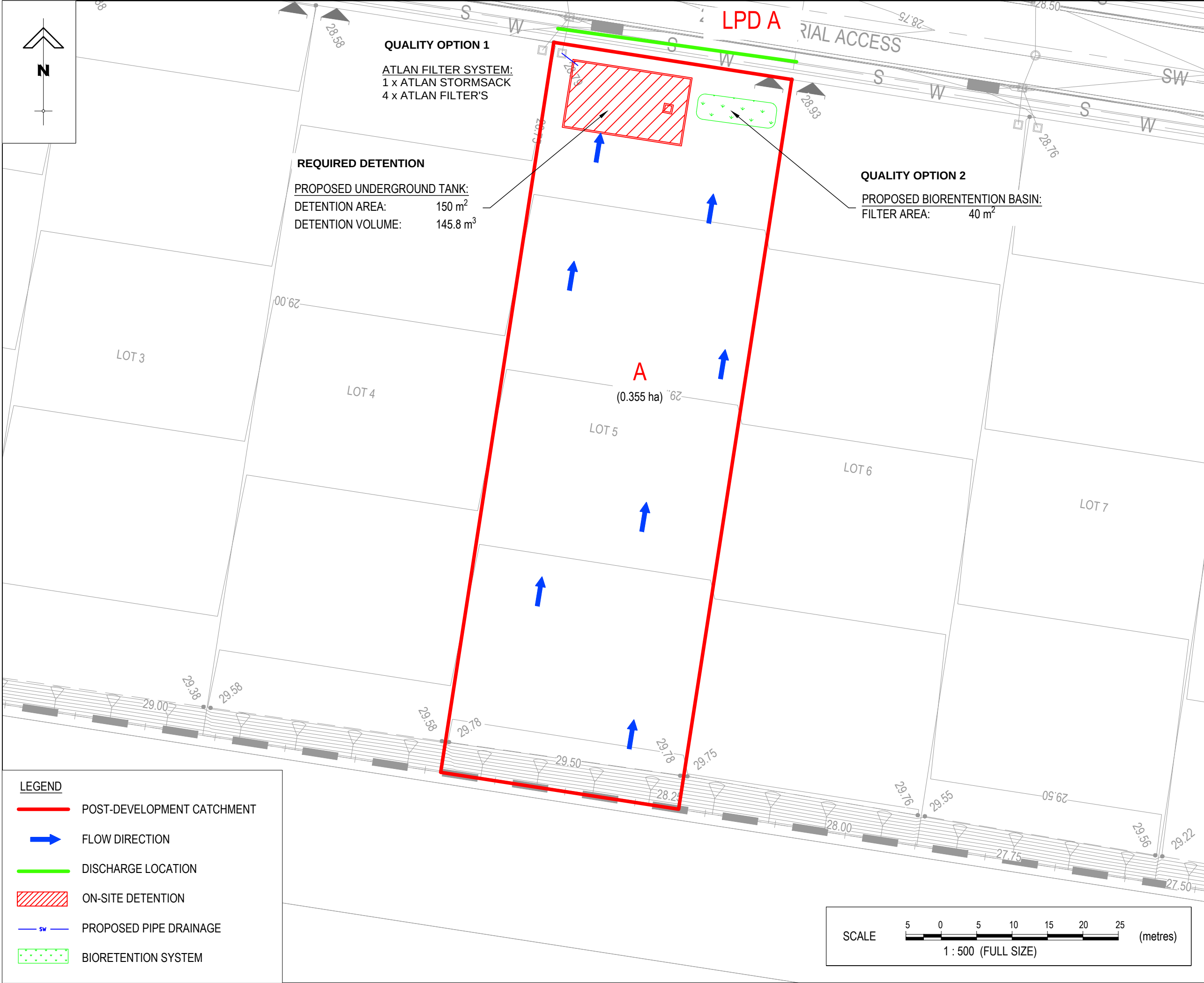
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ABN 76 166 942 365

DRAWING TITLE :	
MUSIC CATCHMENT PLAN	
DEVEL. APPLIC. No. :	DATE : 25.07.25
PROJECT LEADER :	
DESIGNER :	
DRAFTSPERSON : LINH DAO	
CHECKED :	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365	
RPEQ No. :	
SCALE : AS SHOWN	DATUM : FULL SIZE : A3
PROJECT No. : BE220566	DRAWING No. : N202
	VERSION: A



PROPOSED INDUSTRIAL DEVELOPMENT

4733-4743 MOUNT LINDESAY HIGHWAY

FOR ROUBAIX PROPERTIES

ORIGINAL SCALE BEFORE REDUCTION

A3

0

10

20

30

40mm.

A	ORIGINAL ISSUE		25.07.25
VER.	DESCRIPTION	APPR.	DATE

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DRAWING TITLE :

OPERATION CONTROL PLAN

DEVEL. APPLIC. No. :	DATE : 25.07.25
PROJECT LEADER :	
DESIGNER :	
DRAFTSPERSON : LINH DAO	
CHECKED :	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365	
RPEQ No. :	
SCALE : AS SHOWN	DATUM : FULL SIZE : A3
PROJECT No.: BE220566	DRAWING No. : N400
	VERSION: A



Appendix G – Burchills Engineering Solutions Civil Drawings



Doc Title: Conceptual Stormwater Management Plan
Client: Roubaix Properties Pty Ltd
Doc No.: BE220566-RP-CSMP-02

burchills.com.au

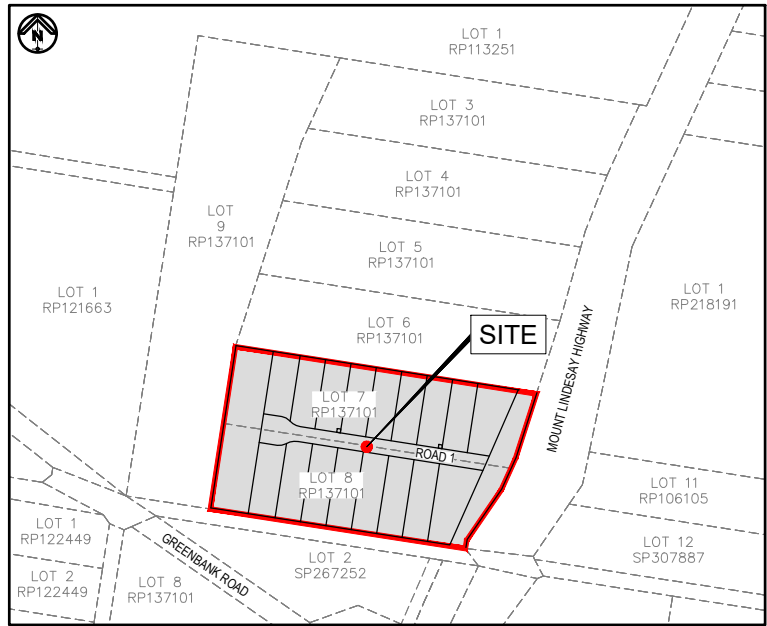
PROPOSED DEVELOPMENT AT
4733-4743 MOUNT LINDESAY HIGHWAY
NORTH MACLEAN, QUEENSLAND
PROJECT No. BE220566-DA
DA APPLICATION



LOCALITY PLAN
N.T.S.

DRAWING INDEX		
DRG. No.	DRAWING TITLE	REVISION
C1000	COVER SHEET, LOCALITY PLAN & DRAWING INDEX	C
C1101	OVERALL LAYOUT PLAN	C
C2000	GENERAL NOTES AND TYPICAL DETAILS	C
C2101	EARTHWORKS LAYOUT PLAN	C
C2301	EARTHWORKS SECTIONS	B
C3201	20m INDUSTRIAL ACCESS ROAD - LONGITUDINAL SECTION	B
C5101	COMBINED SERVICES LAYOUT PLAN	C
C9000	HAZARD RISK REGISTER - DESIGN RISKS	B

SURVEY
PROVIDED BY: SUNRISE SURVEY
REPORT No: 22095 4001 001-A
DATE: 11-10-2024
SYSTEM: MGA2020 ZONE 56



NEIGHBOURHOOD PLAN
N.T.S.

PREPARED FOR



ROUBAIX PROPERTIES PTY LTD

PREPARED BY



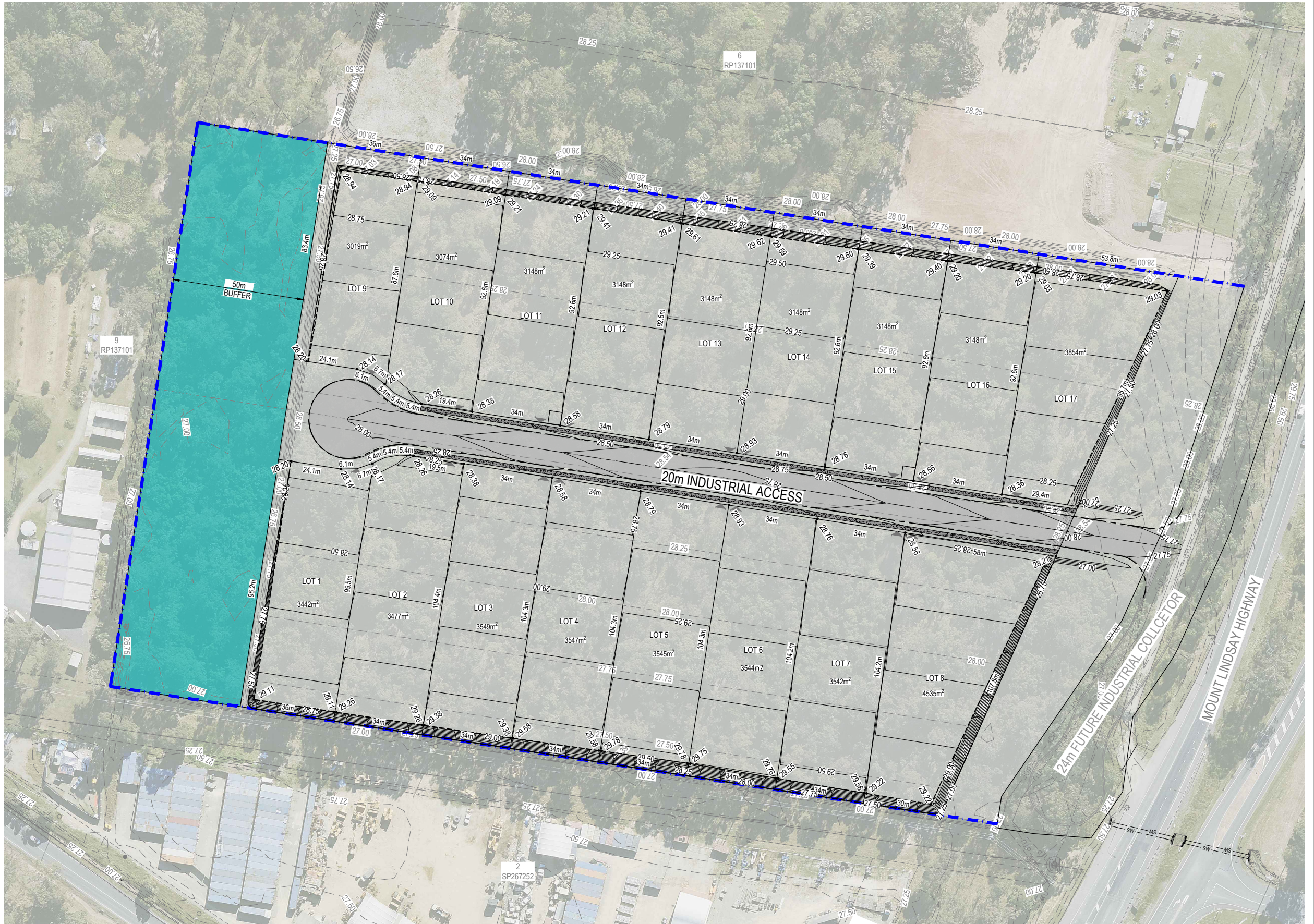
GOLD COAST | BRISBANE | TOOWOOMBA
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COOTE BURCHILLS ENGINEERING PTY LTD
ABN 76 166 942 365

PROJECT No.:	DRAWING No.:	VERSION:	DATE:
BE220566-DA	C1000	C	21-10-25



LEGEND

- 27.25 — DESIGN SURFACE CONTOURS
- - - 27.0 - - - EXISTING SURFACE CONTOURS
- - - - - EXISTING LOT BOUNDARY
- SW - - - SW - - - EXISTING STORMWATER
- S - - - S - - - EXISTING SEWER
- OH - - - OH - - - EXISTING OVERHEAD ELECTRIC
- C - - - C - - - EXISTING COMMS
- - - - - EXISTING ROAD CONTROL LINE
- - - - - EXISTING KERB
- - - - - EXISTING EDGE OF BITUMEN
- ■ ■ ■ ■ DEVELOPMENT SITE BOUNDARY
- — — — — PROPOSED LOT BOUNDARY
- 50m BUFFER AREA
- DEVELOPMENT SITE AREA



WARNING: UNDERGROUND SERVICES:
UNDERGROUND SERVICES EXIST IN THIS VICINITY. THE CONTRACTOR IS TO CONTACT THE RELEVANT AUTHORITIES TO CONFIRM EXACT LOCATION OF SERVICES ON SITE PRIOR TO ANY EXCAVATION OR CONSTRUCTION COMMENCING.

OVERALL LAYOUT PLAN

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C	AMENDED KERB RETURN	21-10-25
B	CHANGE TO LAYOUT	24-06-25
A	ISSUE FOR APPROVAL	24-02-25
VER.	DESCRIPTION	DATE

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ABN 76 166 942 365

CLIENT :
**ROUBAIX PROPERTIES
PTY LTD**

DRAWING TITLE :
OVERALL LAYOUT PLAN

PROJECT :
DEVELOPMENT APPROVAL

4733-4743 MT LINDSAY HWY

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

SCALE AT FULL SIZE (A1):
10 0 5 10 15 20 25 30 35m
1:750 (FULL SIZE)

DEVEL. APPLIC. No. :		DATE : 21-10-25
PROJECT LEADER : JACK SHAO	DESIGNER : CARL KRUGER	
DRAFTSPERSON : CARL KRUGER	CHECKED : JACK SHAO	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365		
PROJECT No. : BE220566-DA	DRAWING No. : C1101	VERSION: C

GENERAL NOTES:

CONTRACT DOCUMENTATION

ALL DRAWINGS UNDER THIS CONTRACT ARE TO BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATION.

SURVEY INFORMATION

CONTROL SURVEY INFORMATION WILL BE ESTABLISHED ON SITE BY THE PRINCIPAL'S SURVEYOR. SETOUT OF THE WORKS IS TO BE CARRIED OUT BY THE CONTRACTOR FROM THE CONTROL SURVEY PROVIDED.
SETOUT INFORMATION SHALL NOT BE OBTAINED BY SCALING FROM THESE DRAWINGS.

DATUM

ALL LEVELS SHOWN ON DRAWINGS ARE A.H.D. (DERIVED).

EXISTING SURVEY CONTROL STATIONS

THE CONTRACTOR IS TO ENSURE THAT SURVEY CONTROL STATIONS ARE NOT DAMAGED OR DISTURBED IN ANY WAY BY CONSTRUCTION ACTIVITIES.

EXISTING SERVICES

EXISTING SERVICES LOCATIONS WHERE SHOWN ON THE DRAWINGS ARE INDICATIVE ONLY. THE CONTRACTOR SHALL CONTACT THE RELEVANT AUTHORITIES IN ORDER TO VERIFY THE EXACT LOCATION OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORK ON SITE AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO EXISTING SERVICES.

SITE ACCESS

THE CONTRACTOR SHALL GAIN ACCESS TO THE SITE AT LOCATIONS APPROVED BY THE SUPERINTENDENT AND IS TO ALLOW FREEDOM OF ACCESS TO OTHER WORK AREAS ON THE SITE AT ALL TIMES.

PROVISION FOR TRAFFIC

PROVISION FOR TRAFFIC ON LOCAL ROADS IS TO BE IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AND LOCAL AUTHORITY REQUIREMENTS.

WORK BOUNDARIES

THE CONTRACTOR IS TO RESTRICT ACTIVITIES TO THOSE AREAS DESIGNATED AS CONTRACT WORK AREAS. AT NO TIME SHALL THE CONTRACTOR ENTER OR CROSS ADJOINING AREAS WITHOUT WRITTEN AUTHORISATION FROM THE SUPERINTENDENT. SITE OFFICE FACILITIES MAY ONLY BE LOCATED WHERE AUTHORISED.

MAINTENANCE OF SITE CONDITION

AREAS BEYOND THE IMMEDIATE WORKS ARE TO BE PROTECTED AND NOT DAMAGED OR DISTURBED IN ANY WAY. EXISTING TREES ARE NOT TO BE REMOVED WITHOUT THE APPROVAL OF THE SUPERINTENDENT. AT COMPLETION OF WORKS THE SITE IS TO BE LEFT IN A CLEAN AND TIDY CONDITION TO THE SATISFACTION OF THE SUPERINTENDENT AND LOGAN CITY COUNCIL.

SITE CLEARING

CLEARING AND GRUBBING SHALL BE CARRIED OUT TO ALL WORK AREAS AS SPECIFIED AND SHALL INCLUDE THE REMOVAL OF ALL EXISTING TREES (UNLESS NOMINATED TO BE PRESERVED), EXISTING VEGETATION, TIMBER, FENCES AND ANY OTHER DEBRIS.

TOPSOIL STRIPPING

ALL TOPSOIL STRIPPED FROM WORK AREAS SHALL BE STOCKPILED FOR LATER RE-SPREADING TO ALL FOOTPATHS, BATTERS AND FILL AREAS.

EARTHWORKS (GENERAL)

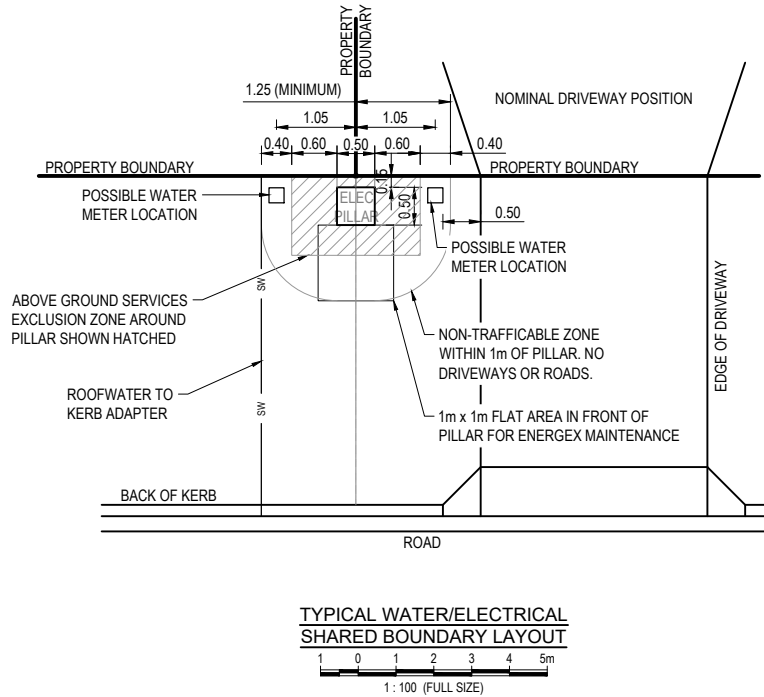
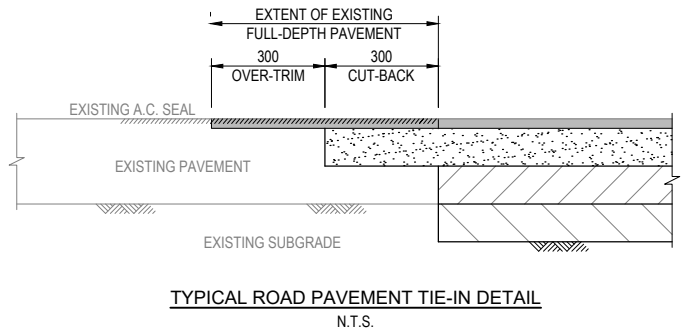
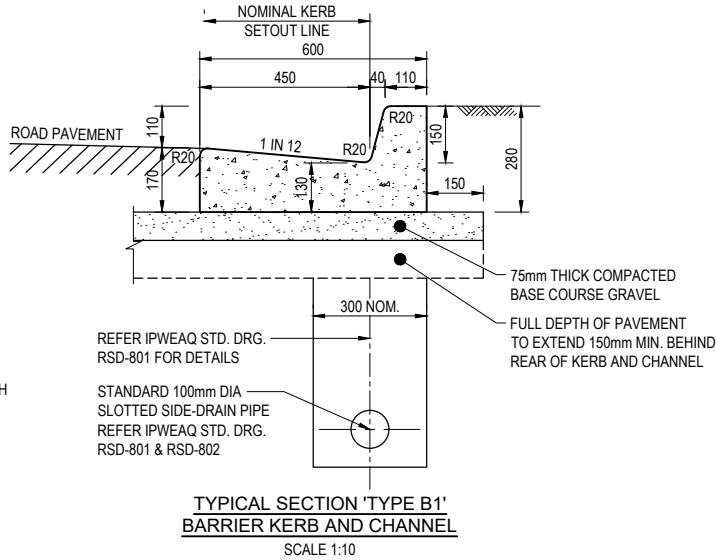
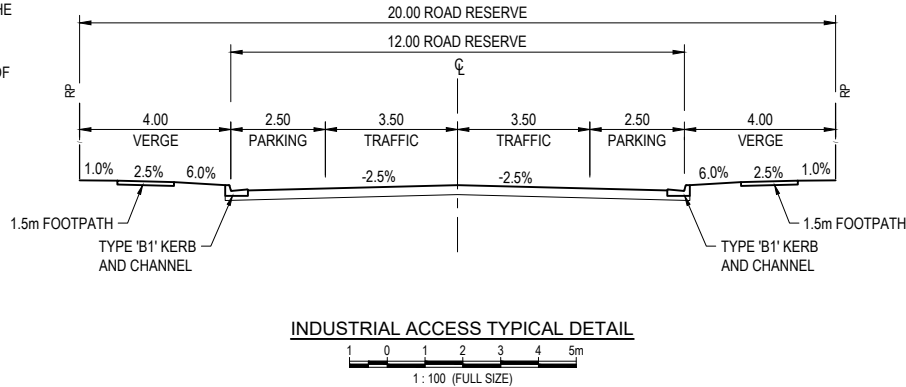
ALL FILL MATERIAL PLACED SHALL BE COMPACTED AND TRIMMED TO FINAL EARTHWORKS LEVELS AND PROFILES SHOWN ON THE CONTRACT DRAWINGS AND TESTED IN ACCORDANCE WITH THE PROJECT SPECIFICATION. ALL COMPACTION TESTING UNDER THIS CONTRACT IS TO BE CARRIED OUT TO AS3798 LEVEL 1 STANDARD BY A NATA-ACCREDITED TESTING AUTHORITY. CERTIFICATION FOR ALL EARTHWORKS CONSTRUCTION AND TESTING IS TO BE PROVIDED BY A REGISTERED PROFESSIONAL ENGINEER QUEENSLAND (RPEQ) ENGAGED BY THE CONTRACTOR.

EARTHWORKS MATERIALS

ANY EXCAVATED SILTS OR UNCOMPACTED FILLS ARE TO BE INCORPORATED IN STRUCTURAL FILLING BY SELECTIVELY MIXING WITH OTHER MATERIALS TO CONTROL THE MOISTURE CONTENT AND TO ACHIEVE THE REQUIRED COMPACTION STANDARDS.

"AS CONSTRUCTED" SURVEY

"AS CONSTRUCTED" SURVEY SHALL BE CARRIED OUT BY THE PRINCIPAL'S SURVEYOR AS WORK PROCEEDS.



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C	DETAIL ADDED	21-10-25
B	CHANGE TO LAYOUT	24-06-25
A	ISSUE FOR APPROVAL	24-02-25
VER.	DESCRIPTION	DATE



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EMAIL: ADMIN@BURCHILLS.COM.AU
COOTE BURCHILLS ENGINEERING PTY LTD
ABN 76 166 942 365

CLIENT :

ROUBAIX PROPERTIES
PTY LTD

DRAWING TITLE :

GENERAL NOTES AND TYPICAL DETAILS

PROJECT :

DEVELOPMENT APPROVAL

4733-4743 MT LINDESA HWY

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

SCALE AT FULL SIZE (A1) :

DEVEL. APPLIC. No. :

DATE : 21-10-25

PROJECT LEADER : JACK SHAO

DESIGNER : CARL KRUGER

DRAFTSPERSON : CARL KRUGER

CHECKED : JACK SHAO

APPROVED FOR AND ON BEHALF OF
BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365

PROJECT No.:

BE220566-DA

DRAWING No. :

C2000

VERSION:

C



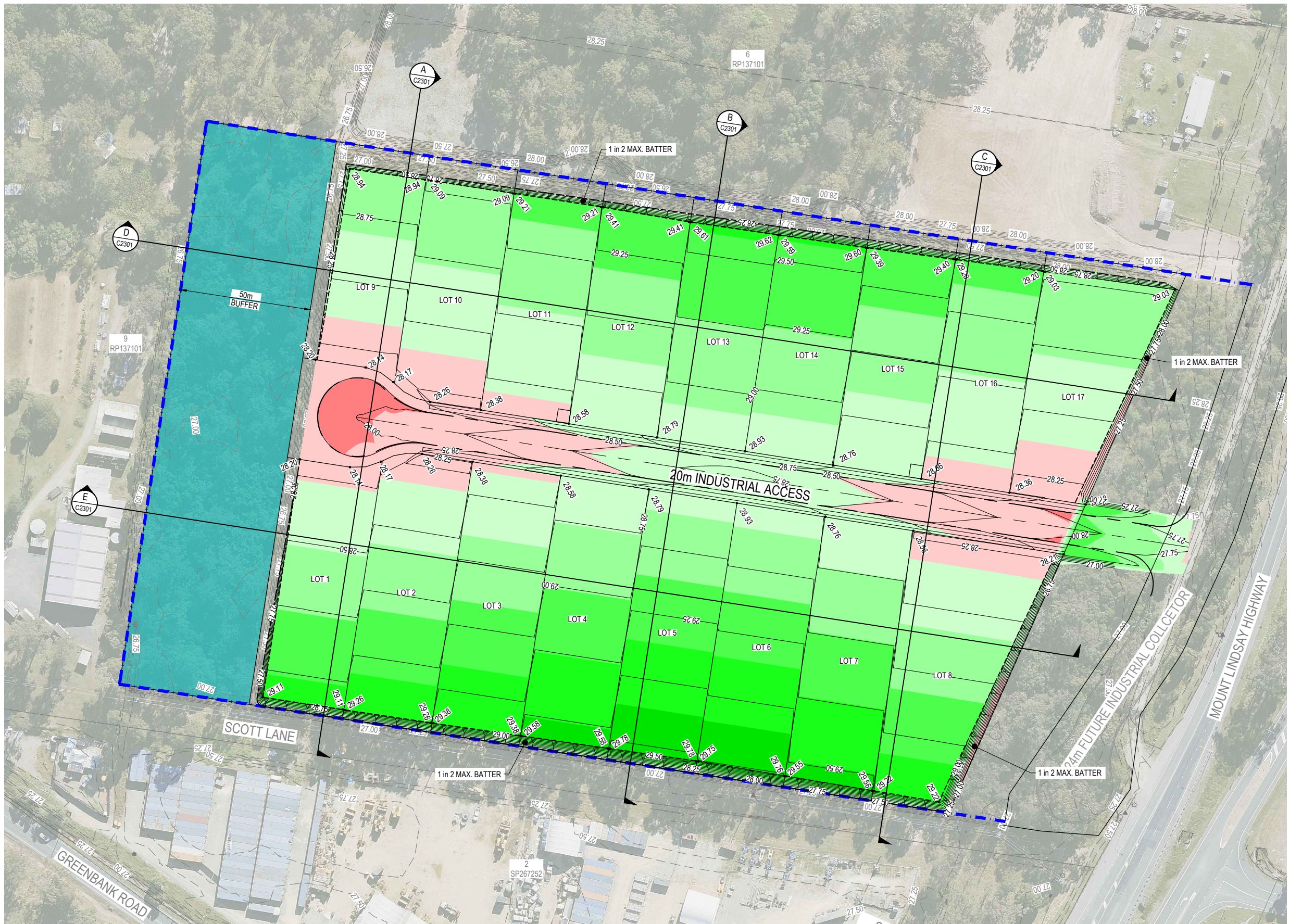
LEGEND

- 27.25 — DESIGN SURFACE CONTOURS
- - - 27.0 - - - EXISTING SURFACE CONTOURS
- - - - - EXISTING LOT BOUNDARY
— SW — SW — EXISTING STORMWATER
— — — EXISTING EDGE OF BITUMEN
[Blue dashed line] DEVELOPMENT SITE BOUNDARY
[Red dashed line] PROPOSED LOT BOUNDARY
[Light blue shaded area] 50m BUFFER AREA

CONCEPT BULK EARTHWORKS SUMMARY	
STRUCTURAL FILLING	
AREA	NETT SOLID FILL
OVERALL FILLING	45,871 cu.m.
EXCAVATION	
AREA	NETT CUT
OVERALL EXCAVATION	1,673 cu.m.
SUMMARY: 45,871 cu.m. - 1,673 cu.m. = 44,198 cu.m IMPORTED MATERIAL NO ALLOWANCE FOR BOXING HAS BEEN CONSIDERED NO ALLOWANCE HAS BEEN MADE FOR TOPSOIL STRIP / REPLACEMENT. NO ALLOWANCE FOR COMPACTION HAS BEEN CONSIDERED	

EARTHWORKS DEPTH ANALYSIS LEGEND			
LOWER		UPPER	COLOUR
-4.0m	TO	-3.5m	[Dark red]
-3.5m	TO	-3.0m	
-3.0m	TO	-2.5m	
-2.5m	TO	-2.0m	
-2.0m	TO	-1.5m	
-1.5m	TO	-1.0m	[Red]
-1.0m	TO	-0.5m	
-0.5m	TO	0.0m	[Light red]
0.0m	TO	0.5m	
0.5m	TO	1.0m	[Light green]
1.0m	TO	1.5m	
1.5m	TO	2.0m	[Green]
2.0m	TO	2.5m	
2.5m	TO	3.0m	[Dark green]
3.0m	TO	3.5m	
3.5m	TO	4.0m	[Very dark green]
	TO		

WARNING: UNDERGROUND SERVICES:
UNDERGROUND SERVICES EXIST IN THIS VICINITY. THE CONTRACTOR IS TO CONTACT THE RELEVANT AUTHORITIES TO CONFIRM EXACT LOCATION OF SERVICES ON SITE PRIOR TO ANY EXCAVATION OR CONSTRUCTION COMMENCING.



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VER.	DESCRIPTION	DATE
C	AMENDED KERB RETURN	21-10-25
B	CHANGE TO LAYOUT	24-08-25
A	ISSUE FOR APPROVAL	24-02-25

BURCHILLS ENGINEERING SOLUTIONS

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ABN 76 166 942 365

CLIENT :

ROUBAIX PROPERTIES PTY LTD

DRAWING TITLE :

EARTHWORKS LAYOUT PLAN

PROJECT :

DEVELOPMENT APPROVAL

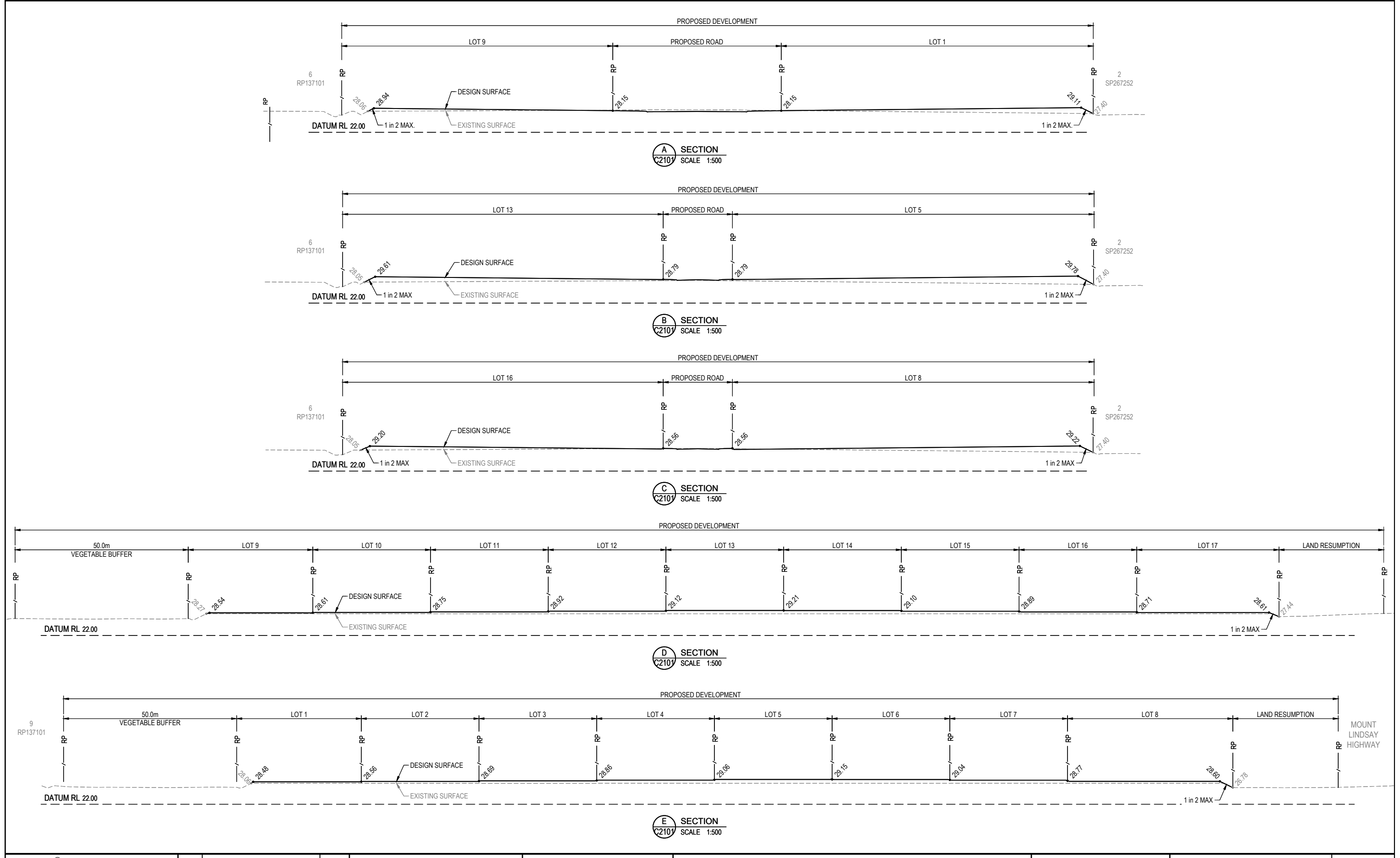
4733-4743 MT LINDESAY HWY

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

SCALE AT FULL SIZE (A1) :

10 0 5 10 15 20 25 30 35m
1 : 750 (FULL SIZE)

DEVEL. APPLIC. No. :		DATE : 21-10-25	
PROJECT LEADER : JACK SHAO		DESIGNER : CARL KRUGER	
DRAFTSPERSON : CARL KRUGER		CHECKED : JACK SHAO	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365			
PROJECT No. : BE220566-DA		DRAWING No. : C2101	
		VERSION : C	



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B	CHANGE TO LAYOUT	24-06-25
A	ISSUE FOR APPROVAL	24-02-25
VER.	DESCRIPTION	DATE



BURCHILLS
ENGINEERING SOLUTIONS

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COOTE BURCHILLS ENGINEERING PTY LTD
ABN 76 166 942 365

CLIENT :

**ROUBAIX PROPERTIES
PTY LTD**

DRAWING TITLE :

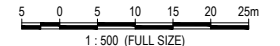
EARTHWORKS SECTIONS

PROJECT :

DEVELOPMENT APPROVAL

4733-4743 MT LINDSAY HWY

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

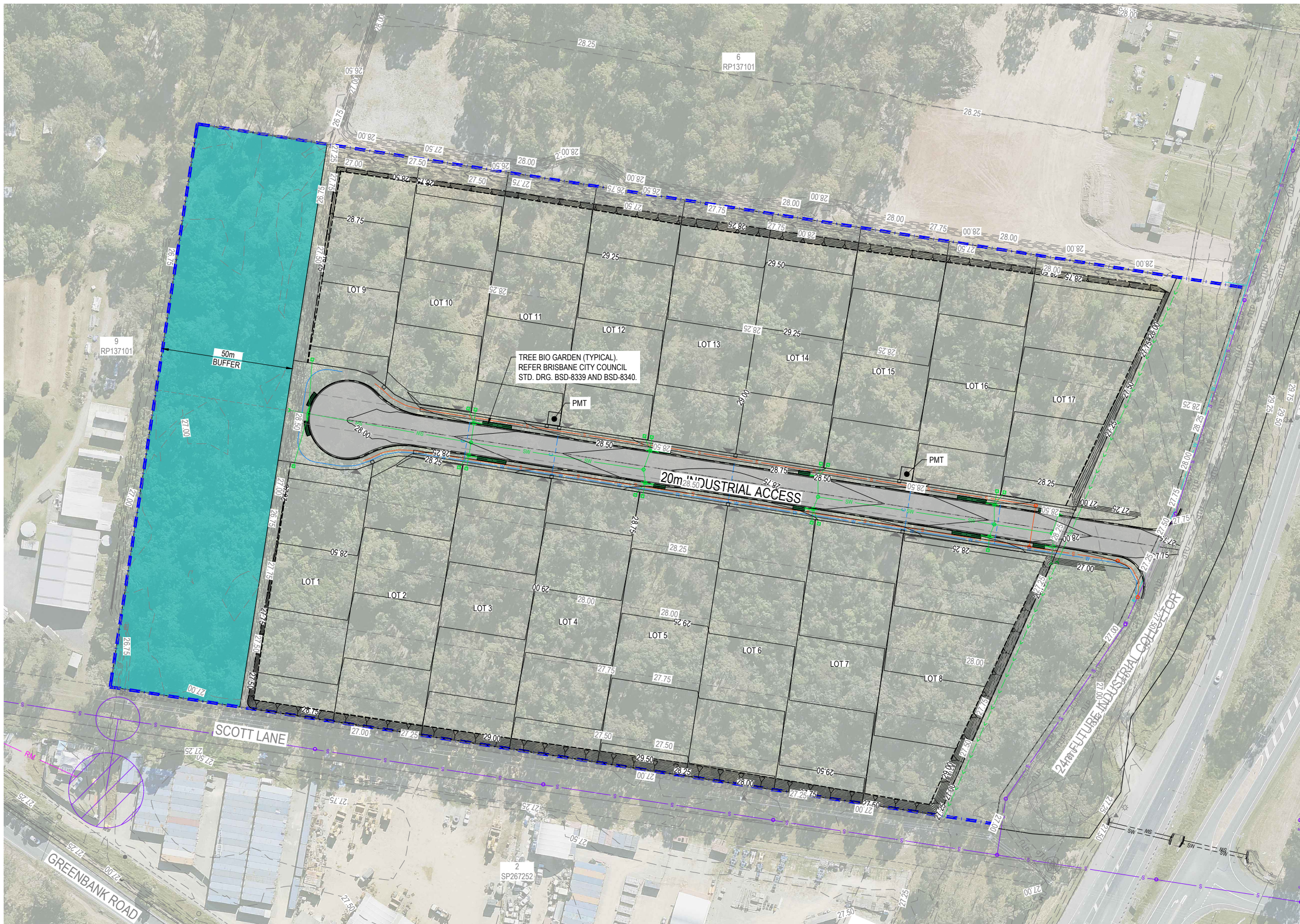
SCALE AT FULL SIZE (A1) :

1 : 500 (FULL SIZE)

DEVELOP. APPLIC. No. :		DATE : 24-06-25
PROJECT LEADER : JACK SHAO	DESIGNER : CARL KRUGER	
DRAFTSPERSON : CARL KRUGER	CHECKED : JACK SHAO	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365		
PROJECT No. : BE220566-DA	DRAWING No. : C2301	VERSION: B



LEGEND

- 28.00 --- EXISTING SURFACE CONTOURS
- 29.50 --- DESIGN SURFACE CONTOURS
- EXISTING LOT BOUNDARY
- SW --- SW --- EXISTING STORMWATER
- EXISTING KERB
- EXISTING EDGE OF BITUMEN
- PROPOSED LOT BOUNDARY
- INDICATIVE FUTURE DRIVEWAY LOCATION
- SW --- PROPOSED STORMWATER
- W --- PROPOSED WATER
- C --- PROPOSED CONDUIT
- S --- PROPOSED SEWER
- RM --- EXTERNAL SEWER RISING MAIN (BY OTHERS)
- S --- EXTERNAL SEWER (BY OTHERS)
- W --- EXTERNAL WATER (BY OTHERS)
- PROPOSED ROAD CONTROL LINE
- PROPOSED MOUNTABLE
- PROPOSED KERB (TYPE B1)
- DEVELOPMENT SITE BOUNDARY
- 50m BUFFER AREA



WARNING: UNDERGROUND SERVICES:
UNDERGROUND SERVICES EXIST IN THIS VICINITY. THE CONTRACTOR IS TO CONTACT THE RELEVANT AUTHORITIES TO CONFIRM EXACT LOCATION OF SERVICES ON SITE PRIOR TO ANY EXCAVATION OR CONSTRUCTION COMMENCING.

COMBINED SERVICES LAYOUT PLAN

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VER.	DESCRIPTION	DATE
C	AMENDED KERB RETURN & SERVICES	21-10-25
B	CHANGE TO LAYOUT	24-06-25
A	ISSUE FOR APPROVAL	24-02-25

BURCHILLS
ENGINEERING SOLUTIONS

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COOTE BURCHILLS ENGINEERING PTY LTD
ABN 76 166 942 365

CLIENT :
**ROUBAIX PROPERTIES
PTY LTD**

DRAWING TITLE :
COMBINED SERVICES LAYOUT PLAN

PROJECT :
DEVELOPMENT APPROVAL
4733-4743 MT LINDSAY HWY

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

SCALE AT FULL SIZE (A1) :
10 0 5 10 15 20 25 30 35m
1:750 (FULL SIZE)

DEVEL. APPLIC. No. :	DATE : 21-10-25
PROJECT LEADER : JACK SHAO	DESIGNER : CARL KRUGER
DRAFTSPERSON : CARL KRUGER	CHECKED : JACK SHAO
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365	
PROJECT No. : BE220566-DA	DRAWING No. : C5101
VERSION: C	

QMS RISK & OPPORTUNITIES REGISTER							
SAFETY IN DESIGN – NORMAL DESIGN RISKS - CIVIL							
Design Element	Associated risks & opportunities	Raw risk assessment		Raw risk rating	Treatment Measures to avoid, minimize or treat the risk.	Responsibility	Residual risk rating
		Likelihood	Consequence				
CONSTRUCTION PHASE							
SITE ACCESS	Unsafe site access and egress point, restricted access, flooding, unauthorised access from persons or animals	L	M	L-M	Prepare site specific Construction Traffic Management Plan and Workplace Health and Safety Management Plan	Principal Contractor	L
CLEARING & DEMOLITION	Removal of existing structures, decommission of services, vegetation clearing and fauna management	M	H	M-H	Contractor to obtain Demolition Permit, arrange all service disconnections with asset ownerand carry out vegetation works in accordance with Vegetation and Fauna Management Plan	Principal Contractor	L
EXISTING SERVICES	Disturb or damage existing services and infrastructure, overhead powerlines, work adjacent to existing services, existing service relocations	M	H	M-H	Client to commission detailed site survey and service potholing at critical locations. Contractor to undertake Dial Before You Dig and service verification with service authority providers and undertake additional potholing prior to construction	Client and Principal Contractor	L-M
EXCAVATION & TRENCHING	Unstable existing slopes and landslip, steep cut profiles, deep trench excavations, working at heights, intercept water table, dispersive soils, acid sulphate soils	M	H	M-H	Client to commission a geotechnical investigation and contractors to undertake own investigations. Temporary and final earthworks profiles confirmed by client's geotechnical consultant. Temporary earthworks profile to be confirmed by Contractor's geotechnical consultant. Contractor to provide temporary benching, fencing, stabilisation and shoring.	Client and Principal Contractor	L
MATERIALS HANDLING	Manual handling, handling and disposal of sharps, repetitive work processes, hazardous substances	H	M	M-H	Contractor or provide a site specific Workplace Health and Safety Management Plan including Material Safety Data Sheets	Principal Contractor	L
PLANT & EQUIPMENT	Operation of plant and machinery, site access by visitors, material deliveries and waste removal	M	H	M-H	Contractor or provide a site specific Workplace Health and Safety Management Plan including register of operator machinery tickets. Contractor to maintain a site visitor register and provide site specific induction to all visitors	Principal Contractor	L
OPERATIONAL PHASE							
ROADS & PATHWAYS	General road safety, flood free access, pedestrian and cyclist injuries, inadequate signage	L	H	M	Design, approvals and construction undertaken in accordance with Australian, State Government and Local Authority standards, codes, guidelines and best practice	Asset Owner	L
STORWATER / FLOODING	Hazard from storm and flood water depths and velocities, ponding and access to inlets, outlets and basins	M	H	M-H	Design, approvals and construction undertaken in accordance with Australian, State Government and Local Authority standards, codes, guidelines and best practice	Asset Owner	L
WATER & SEWER	Blockages, contamination, interruption to service, access to fittings, confined space access	L	M	L-M	Design, approvals and construction undertaken in accordance with Australian, State Government and Local Authority standards, codes, guidelines and best practice	Asset Owner	L
WALLS & FENCING	Risk of falls, unauthorised access from persons and animals, structural failure	M	M	M	Design, approvals and construction undertaken in accordance with Australian, State Government and Local Authority standards, codes, guidelines and best practice	Asset Owner	L
MAINTENANCE PHASE							
ROADS & PATHWAYS	All as for construction and operation phases					Asset Owner	
STORWATER / FLOODING	All as for construction and operation phases					Asset Owner	
WATER & SEWER	All as for construction and operation phases					Asset Owner	
WALLS & FENCING	All as for construction and operation phases					Asset Owner	
REFURBISHMENT PHASE							
ROADS & PATHWAYS	All as for construction and operation phases					Asset Owner	
STORWATER / FLOODING	All as for construction and operation phases					Asset Owner	
WATER & SEWER	All as for construction and operation phases					Asset Owner	
WALLS & FENCING	All as for construction and operation phases					Asset Owner	
DEMOLITION PHASE							
ROADS & PATHWAYS	All as for construction and operation phases					Asset Owner	
STORWATER / FLOODING	All as for construction and operation phases					Asset Owner	
WATER & SEWER	All as for construction and operation phases					Asset Owner	
WALLS & FENCING	All as for construction and operation phases					Asset Owner	

 GOLD COAST BRISBANE TOOWOOMBA IPSWICH MORETON BAY PHONE: +61 7 5509 6400 FAX: +61 7 5509 6411 EMAIL: ADMIN@BURCHILLS.COM.AU COOTE BURCHILLS ENGINEERING PTY LTD ABN 76 166 942 365	CLIENT : ROUBAIX PROPERTIES PTY LTD	DRAWING TITLE :	HAZARD RISK REGISTER - DESIGN RISKS		PRELIMINARY NOT FOR CONSTRUCTION OR TENDER		DEVEL. APPLIC. No. : PROJECT LEADER : JACK SHAO		DATE : 24-06-25 DESIGNER : CARL KRUGER	
		PROJECT :	DEVELOPMENT APPROVAL		SCALE AT FULL SIZE (A1) :		DRAFTSPERSON : CARL KRUGER		CHECKED : JACK SHAO	
		4733-4743 MT LINDESAY HWY		APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365		PROJECT No. : BE220566-DA		DRAWING No. : C9000		VERSION: B